KIRAN INSTITUTE OF CAREER EXCELLENCE PVT. LTD. (KICX), DELHI PRESENTS

Kiran's

One Liner Approach

General Knowledge

A Dictionary of Facts

BASED ON NCERT LATEST SYLLABUS

History : (India & World), Post Independence India, Art & Culture, Geography, States of India, Constitution & Polity, Economy, General Science, Human Body and Health, Environment, Agriculture and Animal Husbandry, Computer Knowledge, Updated Traditional General Knowledge etc.

List of Governors & Chief Ministers Since Independence



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of other study materials, we have strategically planned this book, so that it played a role of Guide for all those who are appearing in the various competitive examinations.

❑ **How will it Cater to the needs of the competitive examination's aspirants ?**

This book is meticulously designed to cater the needs of aspirants as :

(i) The book is compiled after a deep analysis of the various examinations's qestions.

(ii) Materials for various sections is based on the type of questions generally asked.

(iii) Important datas and useful informations are tabulated for qick revision.

(iv) The book covers almost all the topics generally asked in different competitive examinations.

❑ **Will this is only helpful for competitive students ?**

John Milton once said "A good book is the life blood of a master spirit, embalmed and treasured up on purpose for life beyond life".

General Knowledge is not only a part of examination's syllabus but it is useful in our daily life also.

This book is a treasure house of knowledge, wisdom and information for all those who seek to whet their appetities. This book has in it the maximum possible coverage of general knowledge which is also useful in our daily life. For example, It's General Science section deals with the balanced diet, vitamins, various diseases, Immunisation Schedule, Electricity, Functioning of Camera, etc. and Indian Polity & Constitution section describe our duties, rights, etc. which are of common use. All the sections have more or less informations of general interests and uses.

Hence this book is like a bouquet of flowers which can be used to enhance the beauty of knowledge.

At Last we believe that the book in the Present form is almost a complete dictionary of General Knowledge from A to Z and has everything which a student desires to get success in the upcoming examinations.

We have done our job with great care and attention, however, omissions are human weakness. There may be some printing mistakes, some doubts about text and explanations which might have been escaped from ourselves. We shall be grateful to all readers who will be kind enough to point out the errors. Yours comments, corrections, suggestions and criticisms are eagerly solicited.

Wishing you Good Luck for Coming Examinations !

GANPAT PRASAD SAH
Founder & Chairman
Kiran Prakashan Pvt. Ltd.

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HISTORY OF INDIA

➢ Past should be made to function as a means of understanding the Present and Planning for the future".

➢ The above mentioned statement aptly highlights the importance of HISTORY in our lives. It is through the study of History that we can understand our contemporary achievements and failure. The study of 'History of India' would provide an overview of the rich cultural heritage of our glorious country. The Empires of Ancient India, the growth of composite Indo-Muslim culture, the advent of Britishers and the freedom struggle, all played important roles in the evolution of India as a Nation, based on the underlying idea of Unity in Diversity. Thus study of our past is indispensable for developing a rational outlook and inquisitive approach.

INDIAN HISTORY AT A GLANCE

(B.C.)		
6000	:	Earliest evidence of agriculture and animal domestication in India from Mehargarh and Burzahom.
5000-4000	:	Earliest evidence of sheep-goat domestication at Bagor and Adamgarh.
4000-3000	:	Spread of Civilizations based on agriculture and animal domestication.
2500-1750	:	Time period of Harappan Civilization on the basis of Radio Carbon dating.
1500	:	Rigvedic Period, Coming of Aryans.
1000	:	Later Vedic Period, Spread of Aryans in the Gangetic plain.
600-550	:	Emergence of Sixteen Mahajanapadas, composition of the Upanishadas.
540	:	Birth of Mahavir-Founder of Jainism
563	:	Birth of Gautam Buddha-Founder of Buddhism
483	:	Buddha attained Nirvana.
468	:	Mahavira attained Nirvana
362	:	Nanda Dynasty came to power in Magadha
327-325	:	Alexander's invasion of India.
321	:	Chandragupta Maurya's accession to the throne of Magadha.
305	:	Defeat of Seleucus at the hands of Chandragupta Maurya.
273-232	:	Ashoka's reign.
261	:	Conquest of Kalinga
230	:	Establishment of Satvahanas.
185	:	Establishment of Sunga dynasty.

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58	:	Beginning of Vikram era
22	:	Trade relations of Cholas and Pandayas with the Romans.
(A.D.)		
14-15	:	St. Thomas came to India.
40 AD	:	Sakas in power in Indus Valley and Western India
50 AD	:	The Kushans and Kanishkas
78 AD	:	Saka Era begins
320 AD	:	Chandragupta I establishes the Gupta dynasty
360 AD	:	Samudragupta conquers the North and most of the Deccan
380 AD	:	Chandragupta II comes to power; Golden Age of Gupta Literary Renaissance
405 AD	:	Fa-hein begins his travels through the Gupta Empire
415 AD	:	Accession of Kumara Gupta I
467 AD	:	Skanda Gupta assumes power
476 AD	:	Birth of astronomer Aryabhatta
606 AD	:	Accession of Harshavardhan
622 AD	:	Era of the Hejira begins
711 AD	:	Invasion of Sind by Muhammad Bin Qasim
892 AD	:	Rise of the Eastern Chalukyas
985 AD	:	The Chola Dynasty : Accession of Rajaraja, the Great
1001 AD	:	Defeat of Jaipal by Sultan Mahmud
1026	:	Mahmud Ghazni sacks Somnath Temple
1191	:	Prithviraj Chauhan routs Muhammad Ghori : the first battle of Tarain
1192	:	Ghori defeats Prithviraj Chauhan : the second battle of Tarain
1206-1210	:	Qutubuddin Aibak establish Slave dynasty.
1210-1211	:	Aram Shah came to the throne.
1211-1236	:	Iltutmish
1236-1240	:	Raziya Sultan
1240-1242	:	Bahram Shah
1242-1246	:	Masud Shah
1246-1266	:	Nasiruddin
1266-1287	:	Ghiyasuddin Balban
1287-1290	:	Kaikubad
1290-1296	:	Jalaluddin Khalji establishes Khalji dynasty.
1296-1316	:	Alauddin Khalji
1316-1320	:	Qutubuddin Mubarak Khalji
1320-1325	:	Ghiyasuddin Tughluq founded Tughlaq dynasty
1325-1351	:	Muhammad bin Tughlaq

1336	:	Foundation of Vijaynagar Empire
1351-1388	:	Feroz Tughlaq
1390-1394	:	Nasiruddin Muhammad Shah
1394-1412	:	Mahmud Shah Tughlaq
1398	:	Taimur invades India
1414-1421	:	Khizr Khan, power in the hands of Sayyids
1421-1434	:	Mubarak Shah
1434-1443	:	Muhammad Shah
1443-1451	:	Alauddin Alam Shah
1451-1489	:	Bahlol Lodhi, establishment of Lodi dynasty
1489-1517	:	Sikandar Lodhi
1490	:	Nizam Shahi dynasty at Ahmednagar
1498	:	First voyage of Vasco da Gama
1510	:	Portuguese capture Goa
1518	:	Kutub Shahi dynasty at Golkunda
1526	:	Establishment of the Mughal Dynasty; First Battle of Panipat : Babur defeats Lodis
1526-1530	:	Reign of Babur
1530	:	Humayun succeeds Babur
1538	:	Death of Guru Nanak
1539	:	Sher Shah Suri defeats Humayun and becomes Emperor of Delhi
1555	:	Humayun recovers the throne of Delhi
1556	:	Death of Humayun; Accession of Akbar;
1564	:	Akbar abolsihes poll tax on Hindus
1565	:	Battle of Talikota : Muslim rulers in Deccan defeats and destroys Vijaynagar Empire
1568	:	Fall of Chittor
1571	:	Foundation of Fatehpur Sikri by Akbar
1572	:	Akbar annexes Gujarat
1573	:	Surat surrenders to Akbar
1575	:	Battle of Tukaroi
1576	:	Battle of Haldighati : Akbar defeats Rana Pratap; Subjugation of Bengal
1577	:	Akbar troops invade Khandesh
1580	:	Accession of Ibrahim Adil Shah II in Bengal; Rebellion in Bihar and Bengal
1581	:	Akabr's march against Muhammad Hakim and reconciliation with him
1582	:	Divine Faith promulagated
1586	:	Annexation of Kashmir
1591	:	Mughal conquest of Sind
1592	:	Annexation of Orissa
1595	:	Siege of Ahmednagar; Annexation of Baluchistan
1597	:	Akbar completes his conquests

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1600 : Charter to the English East India Company
1602 : Formation of the United East India Company of Netherlands
1605 : Death of Akbar and Accession of Jahangir
1606 : Rebellion of Khusrav; Execution of the Fifth Sikh Guru, Arjun
1607 : Sher Afghan first, husband of Nur Jahan, killed
1608 : Malik Ambar takes Ahmednagar
1609 : The Dutch open a factory at Pulicat
1611 : The English establish a factory at Masulipatnam
1612 : The Mughal Governor of Bengal defeats the rebellious Afghans; Mughals annex Kuch Hajo
1615 : Submission of Mewar to the Mughals; Arrival of Sir Thomas Roe in India
1616 : The Dutch establish a factory at Surat
1620 : Capture of Kangra Fort; Malik Ambar revolts in the Deccan
1622 : Shah Abbas of persia beseiges and takes Qandahar
1623 : Shah Jahan revolts agaisnt Jahangir
1624 : Suppression of Shah Jahan's Jahangir
1626 : Rebellion of Mahabat Khan
1627 : Death of Jahangir; Accession of Shah Jahan
1628 : Shah Jahan proclaimed Emperor
1631 : Death of Shah Jahan's wife Mumtaz Mahal; The construction of Taj Mahal
1632 : Mughal invasion of Bijapur; Grant of the "Golden Firman" the English Company by the Sultan of Golkunda
1633 : End of Ahmednagar Dynasty
1636 : Aurangzeb appointed Viceroy of Deccan
1639 : Foundation of Fort St. George at Madras by the English
1646 : Shivaji captures Torna
1656 : The Mughals attack Hyderabad and Golkunda; Annexation of Javli by Shivaji
1657 : Invasion of Bijapur by Aurangzeb; Aurangzeb captures Bidar and Kalyani
1658 : Coronation of Aurangzeb
1659 : Battles of Khajwah and Deorai
1661 : Cession of Bombay to the English; Mughal capture of Cooch Bihar
1664 : Shivaji sacks Surat and assumes royal title
1666 : Death of Shah Jahan; Shivaji's visit to Agra and escape
1674 : Shivaji assumed the title of Chhatrapati

1678 : Marwar occupied by the Mughals
1680 : Death of Shivaji; Rebellion of Prince Akbar
1686 : English war with the Mughals; Fall of Bijapur
1689 : Execution of Sambhaji
1690 : Peace between the Mughals and the English
1691 : Aurangzeb at the zenith of his power
1698 : The new English company trading to the East Indies
1699 : First Maratha raid on Malwa
1700 : Death of Rajaram and regency of his widow Tara Bai
1702 : Amalgamation of English and the London East India Companies
1707 : Death of Aurangzeb; Battle of Jajau
1714 : Husain Ali appointed Viceroy of the Deccan; The treaty of the Marathas with Husain Ali
1720 : Accession of Baji Rao Peshwa at Poona
1739 : Nadir Shah conquers Delhi; The Marathas capture Salsette and Bassein
1740 : Accession of Balaji Rao Peshwa; The Marathas invade Arcot
1742 : Marathas invade Bengal
1748 : First Anglo-French war
1750 : War of the Deccan and Carnatic Succession; Death of Nasir Jung
1751 : Treaty of Alivardi with the Marathas
1756 : Siraj-ud-daulah captures of Calcutta
1757 ; Battle of Plassey : The British defeat Siraj-ud-daulah
1760 ; Battle of Wandiwash : The British defeat the French
1761 : Third battle of Panipat : Ahmed Shah Abdali defeats the Marathas; Accession of Madhava Rao Peshwa; Rise of Hyder Ali
1762 : Madhava Rao takes power in his own hands. Raghunath Rao approaches Nizam for help.
1763 : Expulsion of Mir Qasim. Re-instatement of Mir Jafar. Raghunath Rao recaptures power and keeps Madhava Rao in confinement.
1764 : Battle of Buxar. The English defeat Shah Alam, Shuja-ud-daula and Mir Qasim.
1765 : Grant of the 'Diwani' of Bengal, Bihar, and Orissa to the East India Company by Shah Alam II under Treaty of Allahabad. Clive, Company's Governor in Bengal. Death of Mir Jafar.

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1765-1767	:	Clive's second Governorship.
1766	:	Nizam cedes Northern Sarkars to the English.
1767	:	Departure of Clive. Verelst, Company's Govenor in Bengal.
1767-1769	:	The First Mysore War. Hyder Ali advances on Madras and forces the English to enter into a defensive alliance.
1770	:	The Great Bengal Famine
1771	:	Marathas attack Hyder Ali. Marathas occupy Delhi and restore Shah Alam who was till then under English protection at Allahabad.
1772-1785	:	Warren Hastings, Governor of Fort William.
1772	:	Marathas invade Rohilkhand.
1772-1833	:	Raja Rammohan Roy.
1773	:	The Regulating Act passed, bringing the Comapny partially under Parliament's control and the Presidencies under Calcutta's control.
1774	:	The Marathas again invade Rohilkhand. Nawab of Awadh assists Rohillas. Marathas withdraw but Rohillas refuse to pay Rs. 40 lakhs to Awadh as agreed upon. Establishment of Supreme Court, Calcutta. Rohilla War between Rohillas and Nawab of Awadh assisted by the English. Rohilla Chief Hafiz Rahmat Khan killed. Rohilkhand annexed by Awadh.
1775	:	Trial and execution of Nanda Kuamr who alleged that Warren Hastings had taken bribe from the Begums of Awadh.
1775-1782	:	The First Anglo-Maratha War.
1776	:	The Treaty of Purandhar between the English and Poona's Ministers, who were opposed to Raghunath Rao.
1779	:	Convention of Wadgaon stipulating that all acquisitions of Maratha territory, made since 1773 by the Company, be restored and the advance of English force from Bengal be stopped.
1780	:	Capt. Popham's capture of Gwalior.
1780-1784	:	Second Mysore War, Both parties agree to give up their conquests under the Treaty of Mangalore.
1781	:	Deposition of Chait Singh of Banaras. Calcutta Madras founded by Warren Hastings to conciliate the Mohammedans of Calcutta.
1782	:	Asaf-ud-daula exports money from the Begums of Awadh with the English help. The Treaty of Salbai between the English, the Marathas and Hyder Ali Death of Hyder Ali.

1782-1798	:	Tipu Sultan, ruler of Mysore.
1783	:	Fox's India Bills give more powers to Parliament and to the Governor-General.
1784	:	Treaty of Mangalore between Tipu and the English who promise not to assist enemies of Tipu, in return for Tipu giving up English territory. Pitt's Act passed, setting up Board of Control for East India Company. Asiatic Society of Bengal founded.
1786-1793	:	Lord Cornwallis, Govenror-General.
1786	:	Marathas and Nizam raid Mysore.
1787	:	Treaty between Tipu, Marathas and Nizam, Marathas the gainers.
1788	:	Ghulam Kadir Rohilla seizes Delhi and blinds Shah Alam II. Bedar Bakht put on Delhi's throne.
1788-1795	:	Impeachment of Warren Hastings.
1789-1803	:	Marathas control Delhi.
1789	:	Tipu attacks Travancore.
1790-1792	:	Third Mysore War following 'Triple Alliance' between English, Marathas and Nizam against Tipu.
1792	:	Tipu surrenders half his kingdom. Ranjit Singh succeeds his father as leader of a Sikh Misl. Sanskrit College founded at Varanasi by English resident, Jonathan Duncan "for endearing our Government to the native Hindus".
1793-1798	:	Sir John Shore, Governor-General.
1793	:	The Permanent Settlement of Bengal.
1794	:	Death of Mahadavji Sindhia at Poona.
1795	:	Battle of Kharda between the Nizam and the Marathas.
1796	:	Baji Rao II Peshwa.
1797	:	Zaman Shah, grandson of Ahmad Shah Abdali, takes Lahore. Death of Asaf-ud-daula of Awadh and succession of Wazir Ali.
1798	:	Wazir Ali deposed and succeeded by Sa'dat Ali at Awadh.
1798-1805	:	Wellesley, Governor-General.
1799	:	English attack Tipu without provocation. Fourth Mysore War. Fall of Seringapatam. Death of Tipu. English restore previous Hindu dynasty in Mysore. Partition of Mysore. Shah Zaman appoints Ranjit Singh as the Governor of Lahore. William Carey opens Baptist Mission at Serampore.

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1800	:	Death of Nana Phadnavis. Establishment of the College of Fort William.
1801	:	Annexation of the Carnatic and part of Awadh by the English.
1802	:	Holkar defeats combined forces of Sindhia and the Peshwa at Poona, Peshwa Baji Rao flees to Bassein and signs the Treaty of Bassein with the English.
1803	:	Occupation of Delhi by Lord Lake, War with Sindhia.
1803-1805	:	Second Anglo-Maratha War.
1804	:	Emperor Shah Alam places himself under British protection. Lake's war with Holkar.
1805	:	Siege of Bharatpur fails and Lake makes peace with the Raja.
1805-1807	:	George Barlow, Governor-General.
1806	:	Mohd. Akbar II succeeds his father Shah Alam II.
1807-1813	:	Lord Minto I, Governor-General,
1809	:	Treaty of Amritsar-Ranjit Singh and British sign treaty of perpetual amity.
1809-1811	:	Ranjit Singh takes Kangra from the Gurkh
1813-1823	:	Lord Hastings, Governor-General.
1814-1816	:	Anglo-Gurkha War resulting in the cession of Garhwal and Kumaon by the Gurkhas to the English.
1817-1818	:	Pindari War-Peshwar defeat at Kirkee.
1817-1905	:	Debendranath Tagore who reorganised the Brahmo Samaj.
1817-1898	:	Sir Syed Ahmad Khan, founder of Aligarh Muslim University.
1817-1819	:	Last Anglo-Maratha War. Hostile princes like Sindhia and Holkar become allies of the English.
1818	:	First Bengali newspaper, the weekly Samachar Darpan published by the Baptist Mission, Serampore.
1819-1827	:	Elphinstone, Governor of Bombay.
1820	:	Munro, Governor of Madras.
1821	:	Sanskrit college founded at Poona.
1823-1828	:	Lord Amherst, Governor-General.
1823	;	Raja Rammohan Roy's memorial to Government protesting against the Press Ordinance of 1823.
1824	:	Mutiny at Barrackpore. Large numebr of Indian soldiers killed on parade for demanding more pay for fighting in Burma.

1824-1826	:	First Burmese War. Arakan and Tenasserim annexed.
1824-1883	:	Swami Dayanand Saraswati, founder of Arya Samaj.
1826	:	English caputre Bharatpur. Conquest of Assam by East India Company.
1828-1835	:	Lord William Bentinck, Govenror-General.
1829	:	Brahmo Samaj founded by Raja Rammohan Roy. Prohibition of Sati.
1829-1837	:	Suppression of Thuggee.
1830-1833	:	Raja Rammohan Roy visits England.
1831	:	Raja of Mysore deposed and its administration taken over by the Company. Meeting of Ranjit Singh and William Bentinck at Rupar.
1832	:	Annexation of Jaintia.
1833	:	Abolition of the Company's trading rights. Legislative power centralised. Indian Law Commission appointed.
1834	:	Annexation of Coorg. Maculay, Law member. Government establishes tea garden. Formation of Agra Province.
1835-1836	:	Sir Charles Metcalf, Governor-General.
1835	:	Macaulay's Education Resolution. English made official language instead of Persian. Abolition of Press restrictions and inland transit duties.Company strikes its own coins omitting Mughal emperor's name.
1836-1842	:	Lord Auckland, Governor-General.
1837	:	Bahadur Shah II succeeded by Akbar II.
1838	:	Tripartite Treaty among Shah Shuja, Ranjit Singh and the English.
1838-1884	:	Kesab Chandra Sen, another pillar of Brahmo Samaj.
1839	:	Death of Ranjit Singh.New treaty forced on the Amirs of Sind. Work begun on G.T. Road, between Calcutta and Delhi. English declare Shah Shuja, Amir of Kabul.
1839-1842	:	The First Anglo-Afghan War.
1840	:	Amir Dost Mohammad surrenders.
1842	:	Simla Proclamation of Ellenborough. Govenror-General agrees to recognise the Amir of Afghans' choice.
1842-1844	:	Lord Ellenborough, Governor-General.
1843	:	Return of Dost Muhammad to Afghanistan as its Amir. Conquest of Sind by the British. Slavery prohibited in British India.

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1844-1848	:	Lord Hardinge, Governor-General.
1844	:	Lord Hardinge decides to employ, in Government service, Indians educated in English schools.
1845	:	First Anglo-Sikh War.
1846	:	Defeat of the Sikh Army, Treaty of Lahore.
1847	:	Engineering College founded in Roorkee.
1848-1856	:	Lord Dalhousie, Governor-General.
1848	:	Annexation of Satara. Rising at Multan.
1848-1849	:	Second Anglo-Sikh War.
1849	:	Defeat of Sikhs and annexation of the Punjab. Opening of a Hindu Girls' Schools in Calcutta by Drinkwater Bethune. Dalhousie's proposal to end Mughal dynasty in Delhi.
1852	:	Second Anglo-Burmese War. Annexation of Rangoon and Pegu.
1853	:	Railway opened from Bombay to Thane. Telegraph line from Calcutta to Agra. Annexation of Nagpur and Jhansi. Cession of Berar by Nizam. Competitive examiantion for Civil Service.
1855	:	Santhal insurrection in Bihar. Beginning of the jute industry in India.
1856	:	Annexation of Awadh. University Act. Hindu Widow's Remarriage Act.
1856-1862	:	Lord Canning, Governor-General and viceroy.
1857	:	Universities set up at Bombay, Calcutta, and Madras.
1857-1858	:	Revolt of 1857. Revolt at Meerut begins on May 10, 1857.
1858	:	British India placed under the direct Government of the Crown. Queen Victoria's Proclamation.
1859-1861	:	Indigo Riots in Bengal.
1861	:	Indian Councils Act. Indian High Courts Act. Archaeological Survey of India set up.
1862	:	Penal Code introduced. Amalgamation of the Supreme and Sadar courts into High Courts.
1862-1863	:	Lord Elgin, Viceroy.
1863	:	Death of Amir Dost Muhammad. Afghan War of Succession. Sher Ali, Amir of Afghanistan receives an annual grant of six lakh of rupees.
1863-1902	:	Swami Vivekananda.
1864-1869	:	Sir John Lawrence, Viceroy.
1865	:	Telegraphic communication with Europe opened.

1869	:	Ambala Conference with Amir Sher Ali. Amir Yakub's rebellion in Afghanistan. Opening of Suez Canal. Birth of M.K. Gandhi (2 October).
1869-1872	:	Lord Mayo, Viceroy.
1870	:	Mayo's Provincial Settlement. Erection of Red Sea telegraph.
1872	:	Kuka Revolt.
1872-1876	:	Lord Northbrook, Viceroy.
1874	:	Bihar Famine.
1875	:	M.A.O. College, Aligarh founded by Syed Ahmad Khan. Mayo College, Ajmer, opened. Visit of the Prince of Wales. Arya Samaj founded by Swami Dayananda.
1876	:	Occupation of Quetta. Indian Association of Calcutta. The Queen of England proclaimed Empress of India.
1876-1880	:	Lord Lytton, Viceroy.
1877	:	Lytton's Delhi Durbar.
1878	:	Vernacular Press Act.
1878-1880	:	Second Afghan War. Flight of Sher Ali.
1879	:	Madam Blavatsky (Russian) and Col. Olcott (American) come to India from USA and set up Theosophical Society at Adyar, Madras.
1880	:	Abdur Rahman recognised as Amir of Afghanistan. Famine Commission.
1880-1884	:	Lord Ripon, Viceroy.
1881	:	Factory Act. Rendition of Mysore.
1882	:	Hunter Commission. Indian Education Commission. University of Punjab set up.
1883	:	Indian National Conference held in Calcutta.
1883-1884	:	Illbert Bill controversy.
1884-1888	:	Lord Dufferin, Viceroy.
1885	:	First Meeting of the Indian National Congress. Bengal Tenancy Act. Bengal Local Self-Government Act. Third Anglo-Burmese War.
1886	:	Annexation of Upper Burma. Ramakrishna Mission founded. Delimitation of Afghan northern boundary.
1888	:	University set up at Allahabad.
1888-1894	:	Lord Landsdowne, Viceroy.
1891	:	Factory Act, Age of Consent Act. Manipur Rebellion.
1892	:	Indian Councils Act introduces the principle of election.
1893	:	Durand's mission to Kabul. Mrs. Besant arrives in India.

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1894-1899	:	Lord Elgin II, Viceroy.
1897	:	Frontier Risings. Plague at Bombay. Indian Education Service set up.
1898	:	Ramakrishna Math and Mission founded at Belur by Swami Vivekananda.
1899-1905	:	Lord Curzon, Viceroy.
1900	:	Famine Commission, Land Alienation Act, North-West Frontier Province created.
1902	:	Gurukul Kangri started at Hardwar.
1904	:	Act passed empowering the Universities to appoint professors and lecturers. Cooperative Societies Act. Archaeological Department established by Curzon. The Youghsband Expedition to Tibet.
1905	:	First Partition of Bengal. Morley, Secretary of State for India.
1905-1910	:	Lord Minto II, Viceroy.
1906	:	Muslim League formed at Dacca. Congress declaration regarding 'Swaraj'.
1907	:	Surat Congress, Moderate-extremist clash. The Anglo-Russian Convention. Mrs. Annie Besant succeeds Col. Olcott as President of Theosophical Society.
1908	:	Newspapers Act. Tilak convicted of sedition (July 22).
1909	:	Morley-Minto Reforms. Appointment of S.P. Sinha to the Governor-General's Council. Indian Councils Act passed (May 21). Madan Lal Dhingra shoots dead Curzon Whyllie in London (July 1).
1010-1916	:	Lord Hardinge II, Viceroy.
1910	:	Death of Edward III and accession of George V.
1911	:	Delhi Durbar. Partition of Begal modified. Census of India. Transfer of Capital of Delhi announced.
1912	:	Removal of the Imperial Capital of Delhi. Province of Delhi created by a proclamation Attempt of Lord Hardinge's life.
1913	:	Education Resolution of the Government of India. Nobel Prize for Rabindranath Tagore.
1914-1918	:	First World War.
1915	:	Gandhi arrives in India (January). Defence of India Act. Death of Gokhale (February 19). Mrs. Besant announces the formation of the Home Rule League (September 25).
1916	:	Sadler Commission. Lucknow Pact of Indian National Congress and All-India Muslim League.

		Foundation of Women's University at Poona. Banaras Hindu University established at Varanasi.
1916-1921	:	Lord Chelmsford, Viceroy.
1917	:	British declaration on Indian self-government. Montague becomes Secretary of State. visits India. Announcement of granting of responsible government. Gandhi tried for Champaran Satyagraha (April 18). Mrs. Besant interned by Madras Government (June 15).
1918	:	Indians made eligible for King's Commission. Rowlatt (Sedition) Committee submits its report.
1919	:	Montague-Chelmsford Reforms. Rowlatt Act passed. Massacre at Jallianwala Bagh, Amritsar (April 13). Third Afghan War. Royal Proclamation. Government of India Act, 1919 passed.
1920	:	Khilafat Movement and Non Cooperation Movement. Lord Sinha, Governor of Bihar and Orissa. Mahatma Gandhi leads the Congress. All India Trade Union Congress founded. Aligarh Muslim University established.
1921	:	Chamber of Princes inaugurated. Moplah Rebellion. Prince of Wales visits India. Census of India.
1921-1926	:	Lord Reading, Viceroy.
1921	:	Harappa excavations begin.
1922	:	Resignation of Montague. Mohenjodaro excavations begin. Chauri Chaura incident. Visvabharati University started by Rabindranath Tagore.
1923	:	Swarajists in India Councils. Certification of Salt Tax. Tariff Board set up. Question of Indianising the command of certain regiments.
1924	:	Kanpur Conspiracy Case.
1925	:	All-India Depressed Class Association. Cotton excise abolished. Reforms. Enquiry Report. Death of C.R. Sikh Gurdwaras Act passed to enable Sikhs to take over control of Gurdwaras from Mahants. Vithalbhai J. Patel elected at the first Indian President of the Legislative Assembly.
1926	:	Trade Union Act passed. Swami Shraddhanand Assassinated (December 23).
1926-1931	:	Lord Irwin, Viceroy.
1927	:	Indian Navy Act. Appointment of Simon Commission.

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1928	:	Simon Commission comes to India. All Parties' Conference set up. Nehru Report. Royal Commission on Agriculture appointed.
1929	:	Bhagat Singh and Batukeswar Dutt drop bombs in the Legislative Assembly (April 8). Establishment of the Imperial Council of Agricultural Research. Meerut Conspiracy case trial begins.
1930-1932	:	Boycott of the Simon Commission. Civil Disobedience Movement.
1930	:	Gandhijis Dandi March, Rebellion in Burma. Round Table Conference (First Session). January 26, Independence Pledge.
1931	:	Gandhi-Irwin Pact signed. Census of India. Round Table Conference (Second Session). Publication of the Royal Labour Commission's Report.
1931-1936	:	Lord Willingdon, Viceroy.
1932	:	Second Civil Disobedience Movement. Round Table Conference (Third Session). Communal Award announced. Poona Pact signed. Indian Military Academy, Dehra Dun set up.
1934	:	Civil Disobedience Movement called off. Bihar Earthquake (January 16).
1935	:	Indo-British Agreement signed. Government of India Act, 1935 passed by British Parliament (August 2).
1936	:	Death of King George V (January 21). Accession and abdication of Edward VIII. Accession of George VI.
1936-1944	:	Lord Linlithgow, Viceroy.
1937	:	Inauguration of Provincial Autonomy (April 1). Congress Ministries formed in seven out of eleven Provinces. In NWFP the pro-Congress Red Shirt Party of Khan Abdul Ghaffar Khan wins majority.
1938	:	V.D. Savarkar elected President of the Hindu Mahasabha. Death of Sarat Chandra Chatterjee (born 1876) and of Sir Muhammad Iqbal (born 1877). Subhash Chandra Bose elected President of the Indian National Congress.
1944-1947	:	Lord Wavell, Viceroy.
1944	:	Gandhi-Jinnah talks opened in Bombay on Rajagopalachari's proposals for solution of constitution deadlock (September 9). Talks break down on Pakistan issue (September 27). INA reaches Indian soil.

1945	:	Labour Government in Britain. Lord Wavell's broadcast announcing British Government's determination to go ahead with the task of fitting India for self-government (September 19). End of Second World War. Germany surrenders (May). Japan surrenders (June) INA Surrenders to the British (May), Congress leaders released (June). First trial of INA men (November 5).
1945	:	Elections to the Central Legislative Assembly held (December).
1946	:	Mutiny of the Indian Naval ratings in Bombay (February 18). Violence in Bengal. Announcement of special Mission of Cabinet Ministers of India (February 19). Cabinet Mission's plans announced (June 16). Muslim League decides to participate in Interim Government. Congress announces acceptance of the longterm part of May 16 plan, but refuses invitation to participate in Interim Government (June 25). Jawaharlal Nehru takes over Presidentship of the Congress (July 6). Muslim League withdraws its acceptance and decides on a policy of direct action (July 29). This leads to outbreak of mob violence in Calcutta (August 16). Interim Government formed (September 2). Muslim League members sworn in (October 26). Constituent Assembly's first meeting (December 9).
1947-1948	:	Lord Mountbatten, Viceroy.
1947	:	British Government's historic announcement of transfer of power to "responsible hands", not later than 1948 (February 20). Announcement of Lord Mountbatten's plan for Partition of India (June 3). Indian Independence Act passed (July). Creation of free India and Pakistan (August 14-15, 1947).

IMPORTANT DYNASTIES, FOUNDER AND CAPITAL

Dynasty	Founder	Capital
Haryank Dynasty	Bimbisara	Rajgriha
Shishunaga Dynasty	Shisunaga	Vaishali
Nanda Dynasty	Mahapadmananda	Pataliputra
Maurya Dynasty	Chandragupta Maurya	Patliputra
Shunga Dynasty	Pushyamitra Sunga	Patliputra
Kanva Dynasty	Vasudeva	Pataliputra
Satvahanas	Simuka	Paithan
Kushanas	Kujula Kadphises	Purushpura

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Dynasty	Founder	Capital
Guptas	Sri Gupta	Patliputra
Hunas	Toraman	Sialkot
Vardhans	Pushyabhuti	Thaneswar/Kannauj
Sena Dynasty	Samanta Sena	Lakhnauti
Parmaras	Upendra	Dhara
Chandellas	Nannuk	Khajuraho/Mahoba
Gahadvalas	Chandradeva	Kanauj
Gurjar Pratiharas	Nagabhatta-I	Kanauj
Pallava Dynasty	Simbhavishnu	Kanchipuram
Chalukyas of Badami	Pulakesin-I	Badami
Chalukyas of Vengi	Vishnuvardhana	Vengi
Chalukyas of Kalyani	Vijayaditya	Manyakhet
Rashtrakutas	Dantidurg	Manyakhet
Slave Dynasty	Qutubuddin Aibak	Delhi
Khalji Dynasty	Jalalludin Khalji	Delhi
Tughlaq Dynasty	Ghiyasuddin Tughlaq	Delhi
Saiyyads	Khizr Khan	Delhi
Lodi Dynasty	Bahlol Lodi	Delhi
Pandayas	Nediyan	Madurai
Cholas	Vijaylaya	Tanjaur
Yadavas	Bhillan	Devagiri
Hoysalas	Vishnuvardhan	Dwarasamudra
Sangam Dynasty	Harihar and Bukka	Vijaynagar
Saluvas	Narsingha	Vijaynagar
Tuluvas	Vir Narsingha	Vijaynagar
Aravidu Dynasty	Tirumala	Penukonda
Bahmani Dynasty	Hasan Gangu	Gulbarga
Qutubshahi Dynasty	Quli Qutubshah	Golkunda
Adilshai Dynasty	Adilshah	Bijapur
Nizamshahi Dynasty	Malik Ahmad	Ahmednagar
Imadshahi Dynasty	Amir ul Barid	Bidar
Solanki Dynasty	Mulraj	Anhilwara
Kalchuris	Kokkal	Tripuri
Sharqui Dynasty	Malik Sarvar	Jaunpur
Mughal Dynasty	Babur	Delhi/Agra
Bhonsle Dynasty	Shivaji	Raigarh
Pala Dynasty	Gopala	Munger
Hyderabad State	Nizam-ul-Mulk	Hyderabad
Karkota Dynasty	Durlabhvardhan	Kashmir
Utpal Dynasty	Avantivarman	Kashmir
Lohar Dynasty	Sangramraj	Kashmir
Vakatakas	Vindhyashakti	Nandivardhan
Faruqi Dynasty	Malik Raza	Burhanpur

IMPORTANT BATTLES OF INDIAN HISTORY

327-326 B.C.	:	Alexander invades India. Defeats Porus in the Battle of Hydaspes (Jhelum) 326 B.C.
305 B.C.	:	Chandragupta Maurya defeats the Greek king Seleucus.
216 B.C.	:	The Kalinga War. Conquest of Kalinga by Ashoka.
c.155 B.C.	:	Menander's invasion of India.
c.90 B.C.	:	The Sakas invade India.
A.D. 454	:	The first Huna invasion.
A.D. 495	:	The second Huna invasion.
A.D. 711-712	:	The Arab invasion of Sind under Mohammed-bin-Qasim.
1000-1027	:	Mahmud Ghazni invades India 17 times.
1175-1206	:	Invasions of Muhammad Ghori. First Battle of Tarain, 1191, Prithvi Raj Chauhan defeats Muhammad Ghori; Second Battle of Tarain, 1192, Muhammad Ghori defeats Prithviraj Chauhan; Battle of Chandawar, 1194, Muhammad Ghori defeats Jayachandra Gahadvala of Kannauj.
1294	:	Alauddin Khalji invades the Yadava kingdom of Devagiri. The first Turkish invasion of the Deccan.
1398	:	Taimur invades India. Defeats the Tughlaq Sultan Mahmud Shah; the Sack of Delhi.
1526	:	Babur invades India and defeats the last Lodi Sultan Ibrahim Lodi in the First Battle of Panipat.
1539-1540	:	Battle of Chausa or Ghaghra (1539) and Kanauj or Ganges (1540) in which Sher Shah defeats Humayun.
1545	:	Battle (siege) of Kalinjar and death of Sher Shah Suri.
1556	:	Second Battle of Panipat. Akbar defeats Hemu.
1565	:	Battle of Raktakshasi-Tangadi (Talikota) in which the forces of the empire of Vijayanagar under King Sadasiva Raya and his regent Rama Raya routed by the confederate forces of the Deccani states of Bijapur, Golcunda Ahmadnagar, and Bidar.
1576	:	Battle of Haldighati. Akbar defeats Rana Pratap of Mewar.
1632-1633	:	Conquest of Ahmadnagar by Shah Jahan.
1658	:	Battles of Dharmat (April-May 1658) and Samugarh (June 8, 1658). Dara Shikoh, eldest son of Shah Jahan, defeated by Aurangzeb.

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1665	:	Shivaji defeated by Raja Jai Singh and Treaty of Purandhar.
1739	:	Invasion of India by Nadir Shah.
1746	:	First Carnatic War.
1748-1754	:	Second Carnatic War.
1756-1763	:	Third Carnatic War.
1757	:	Battle of Plassey. Siraj-ud-daulah, the Nawab of Bengal, defeated by Clive.
1760	:	Battle of Wandiwash, in which the English under Sir Eyre Coote defeat the French under Lally.
1762	:	Third Battle of Panipat. Marathas defeated by Ahmad Shah Abdali.
1764	:	Battle of Buxar. The English (under Munro) defeat Mir Kasim, the Nawab of Bengal and Nawab Shuja-ud-daulah of Awadh.
1767-1769	:	First Mysore War.
1780-1782	:	Maratha War.
1774	:	The Rohilla War between the Rohillas and the Nawab of Awadh supported by the East India Company.
1775-1782	:	First Maratha War.
1780-1784	:	Second Mysore War.
1792	:	Third Mysore War.
1799	:	Fourth Mysore War. Defeat and death of Tipu Sultan.
1802-1804	:	Second Maratha War.
1817-1818	:	Third Maratha War.
1845-1846	:	First Sikh War.
1846	:	Battle of Aliwal between the English and the Sikhs. The Sikhs defeated.
1848-1849	:	Second Sikh War and annexation of the Punjab to British India.
1857	:	The Revolt of 1857 (The First War of Indian Independence).

IMPORTANT INDIAN RULER, DYNASTY AND TITLES

Rulers	Dynasty	Titles
Ajatshatru	Haryank	Kunika
Bimbisara	Haryank	Shrenika
Mahapadmananda	Nanda	Agrasen
Dhanananda	Nanda	Agramese
Chandragupta Maurya	Maurya	Sandrocottus, Androcottus
Bindusara	Maurya	Amitraghat

Rulers	Dynasty	Titles
Ashoka	Maurya	Devanampiya Piyadassi
Chandragupta II	Gupta	Vikramaditya
Harshvardhana	Pushyabhuti	Siladitya
Narsimhavarman I	Pallava	Vatapikonda
Amoghvarsha	Rashtrakuta	Vir Narayan
Pulakesin II	Chalukyas (Vatapi)	Parmeshvar
Mahendravarman I	Pallava	Vichitrachita
Govinda III	Rashtrakuta	Jagtung
Vikramaditya IV	Chalukyas (Kalyani)	Tribhuvan, Malla
Vikramaditya II	Chalukyas (Vengi)	Sikandar
Ibrahim Qutubshah	Qutubshahi	Malik Brahim
Qutubuddin Aibek	Slave dynasty	Lakh Baksh, Malik
Jauna Khan	Tughlaq	Muhammad bin Tughlaq, Ulug Khan
Hala	Satvahana	Kavivatsal
Gautami Putra Satkarni	Satvahana	Kshatriya Darp Mardan
Kanishka	Kushana	Devaputra
RajRaj	Chola	Mummadi Chola, Arumoli, Raj Kesari
Rajendra I	Chola	Gangaikonda Chola
Mahmud Ghazni	Ghazni	Yamin-ud-Daula
Krishnadevaraya	Tuluva	Andhra Bhoj, Yavanraj
Ibrahim Lodi	Lodi	Sthapanacharya
Babar	Mughal	Ibrahim Shah
Sher Shah	Sur	Ghazi
Bairam Khan	Mughal	Hazrat-i-Ala
Akbar	Mughal	Khan Baba
Jahangir	Mughal	Islam-i-Adil
Mehrunissa	Mughal	Shekh Salim
Dara Shikoh	Mughal	Nurjahan
Aurangzeb	Mughal	Shah-Iqbal
Shivaji	Marathas	Alamgir, Ghazi
Balaji Bajirao	Marathas	Chhatrapati Nana Saheb

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ANCIENT INDIA

PRE-HISTORIC PERIOD

- The Pre-historic phase can be roughly divided into 3 parts i.e. paleolithic, Mesolithic and Neolithic.

PALEOLITHIC AGE (250,000-10,000 B.C.)

- Paleolithic Culture developed in the Pleistocene period.
- Pleistocene was the period when ice covered the earth's surface.
- The main tools used during this period are handaxes, cleavers, Choppers, flakes, burins, scrapers.
- Their tools were made up of hard rock called 'quartzite'.
- The paleolithic sites are spread in practically all parts of India except the alluvial plains of the Indus and Ganga.
- The people of this age lived on hunting and gathering wild fruits and vegetables.
- Man during this period used tools of unpolished, undressed rough stones and lived in cave rock shelters.
- They had no knowledge of agriculture, fire, or pottery of any metal.
- In the later Paleolithic phase domestication of animals was practiced.
- Homo sapiens first appeared in the last of this phase.
- It has been pointed out that Paleolithic men belonged to the Negrito race.
- The paleolithic Age in India has been divided into three phases according to the nature of stone tools - Early or lower Paleolithic, middle paleolithic and upper Paleolithic.

MESOLITHIC AGE (10,000-6,000 B.C.)

- The Mesolithic Age began around 8000 B.C.
- It was the transitional phase between the Paleolithic Age and the Neolithic Age
- The Mesolithic tools are microliths.
- Blade, Mesolithic tools are microliths.
- Blade, Core, Point, Triangle, Lunate and Trapeze are the main types of Mesolithic tools.
- Important sites of Mesolithic Age are Bagor, Langhraj, Sarai Nahar Rai, and Birbhanpur
- Sites like Bhimbetka, Adamgarh and Mirzapur are rich in Mesolithic Art.

NEOLITHIC AGE (6000-2500 B.C.)

- The term 'Neolithic' was coined by Sir John Lubbock in his book 'Pre Histroic Times'.
- Neolithic men cultivated land and grew fruits and corn like ragi and horse gram. They domesticated cattle, sheep and goat.

- Important sites are Gufkaral, Burzahom, Chirand, Mehargarh, Piklihal.
- Chopani Mando provides the earliest evidence of the use of pottery in the World.

STONE - COPPER PHASE

- This phase is also called as chalcolithic phase.
- It is charaterised by the use of stone and copper.
- Chalcolithic people were not acquainted with burnt brick.
- People used different types of Pottery of which Black and Red ware was most popular.
- They worshipped Mother Goddess and Bull.
- They generally lived in thatched houses.

CHALCOLITHIC CULTURE

Name of the Culture	Period
Kayatha	2000-1800 B.C.
Ahar or Banas	2000-1400 B.C.
Savalda	2000-1800 B.C.
Malwa	1700-1200 B.C.
Prabhas	1800-1500 B.C.
Rangpur	1400-700 B.C.
Chirand	1500-750 B.C.

HARAPPAN CIVILIZATION

- It belongs to the Bronze Age.
- It extended from Manda (Jammu) in North to Daimabad in South.
- Major Settlements are in the Ghaggar-Hakra belt.
- More than 1000 sites have been excavated.
- Copper, bronze, silver, gold were known but not iron.
- Seals were made up of steatite
- Camel bones have been discovered at Kalibangan.
- They worshipped, Proto-Shiva, Mother-Goddess, Bull, and Pipal tree.
- Important sites are Harappa, Mohenjodero, Lothal, Kalibangan, Banwali, Dholavira.
- At Kalibangan and Lothal fire altars have been discovered.
- Furrowed field has been discovered at Kalibangan.
- Harappan civilization was the first urban civilization.
- Great Bath is at Mohenjodaro
- Their Pottery was red or black Pottery
- The script was pictographic
- The writing was Boustrophedon.
- Bead making factory existed in Chanhudaro and Lothal
- Dholavira is the latest site discovered in India.

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- Ink-pot has been discovered at Chanhudaro
- Cemetry H and R-37 have been discovered at Harappa.
- Teracotta Plough has been discovered at Banawali

IMPORTANT HARAPPAN SITES

Site	Excavator	Present Position
Harappa	Dayaram Shahani (1921)	Montogomery (Punjab) Pakistan
Mohenjodaro	Rakhal Das Banerjee (1922)	Sindh (Pakistan)
Kalibanga	Amlananda Ghosh, B. B. Lal	Hanumangarh (Rajasthan)
Lothal	S. R. Rao (1957)	Ahmedabad (Gujarat)
Banwali	R. S. Bist (1973)	Hissar (Haryana)
Rangpur	M. S. Vatsa (1931)	Gujarat (near Madar river)
Ropar	Y. D. Sharma (1955-56)	Punjab (Sutlej Bank)
Alamgirpur	Y. D. Sharma	Meerut (Hindon river)
Sutkagendor	A. Stein, George Dales	Baluchistan (Dashak river)
Surkotada	J. P. Joshi (1964)	Gujarat (Kuchchh Plain)
Dabarkot	Macay (1935)	Baluchistan
Chanhudaro	N. G. Majumdar (1931)	Sindh (Pakistan)
Ali Murad	K. M. Kazzak	Sindh (Pakistan)
Mitathal	Punjab University	Bhiwani
Rakhi Garhi	Suraj Bhan	Jind (Haryana)
Sutkakoh	Dales (1962)	8 km from Perin
Manda	Jagpati Joshi	Akhnur

TOWNS NEAR RIVER BANKS

Towns	Rivers	Towns	Rivers
Mohenjodaro	Indus	Harappa	Ravi
Banwali	Ghagghar	Kalibanga	Ghagghar
Lothal	Bhogava	Rojdi	Bhadar
Malavan	Tapti	Sutkakoh	Shadi Kaur
Sutkagendor	Dashak	Chanhudaro	Indus
Bhagtrav	Kissagar confluence	Alamgirpur	Hindon
Rangpur	Bhadar	Kot Diji	Indus

THEORIES OF DECLINE OF HARAPPAN CIVILIZATIONS

Cause	Historian
Aryan invasion	Wheeler, Gordon, Childe
Ecological disturbance	Fairservice
Change in river course	Dales, M.S. Vatsa
Low rainfall	Stein
Flood	Macay, S. R. Rao
Drying of Ghaghar	D. P. Agrawal and Sood
Earthquake	Raikes and Dales

THE VEDIC AGE (1500-600 B.C.)

THE EARLY VEDIC PERIOD (1500-1000 B.C.)

- It is also known as Rig Vedic Age.
- The earliest Aryans lived in the land of 'Sapta Sindhava' i.e., land of Seven rivers.
- The early vedic society was Pastoral.
- Cattle was the chief measure of wealth and wealthy man was called 'Gomat'.
- The Raja or chief is called 'Gopati'.
- In the Rigveda Godhuli is used as a term for a measure of time.
- Apart from Yava or Barley, no other grain is mentioned
- Indra was the greatest God of Aryans Agni occupied the second position.
- Varuna occupied the third position and he personfied water.
- The Battle of Ten Kings ended with the victory of the Bharatas led by Sudas.
- Gayatri Mantra is attributed to Savitri. Aditi was goddess of eternity.
- Important functionaries were Purohita, Senani, and gramini
- Important tribal Assemblies were Sabha, Samiti, Vidath and Gana.
- Sabha performed judicial and administrative functions.
- King attended Sabha but was not elected by it.
- Samiti is mentioned nine–times in Rigveda.
- Samiti was presided over by king.
- King was elected in Samiti.
- 'Gana' is mentioned for 46 places in Rigveda.
- Leader of Gana was called as 'Ganapati'.
- Dasyus were the most bitter enemies of the Rigvedic people.
- Rigvedic people were not aware of Iron.
- Indra was the most important God.
- Indra was known as Purandar, Vritrahan and Marutavant.
- Varuna Uphold the natural order and moral order (Rita).
- Varuna was punisher of sin.
- Agni was called as Bhuvan-chakshu.

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- IXth book is devoted to Soma.
- Gayatri Mantra is addressed to Savitri.
- Gayatri Mantra is mentioned in IIIrd Mandal of Rigveda.
- Asvins and Nasatyas were divine physicians.
- Yama was the Lord of the dead.
- Aditi is the mother of Surya.
- Varuna bears the title 'Asura'.

THE LATER VEDIC PERIOD (1000-600 B.C.)

- The period assigned to later Vedic phase is 1000 B.C. to 600 B.C.
- These communities used a particular kind of pottery called the Painted Grey Ware (PGW).
- More then 700 PGW sites have been found in the upper Ganga basin. Some important PGW sites are Atranji Khera, Ahichhatra, Noh, Hastinapur, Kurukshetra, Bhagwanpura and Jakhera.
- Iron objects are common to most PGW sites. This metal was introduced around 1000-800 B.C. It is mentioned as Ayas.
- Society was clearly divided into four Varnas namely–Brahmin, Kashatriya, Vaishya and Sudras.
- The upper three classes were known as Dvij (twice born).
- Education begin with investiture ceremony (upanayana)
- Sometimes girls were also initiated. Woman lost Importance.
- Gotra first appeared in Atharvaveda with the meaning of clan.
- There was practice of class exogamy.
- There was reference to sati but not in common fashion.
- There were instances of child marriage.
- Indra and Agni lost their importance. Prajapati (the creator) became supreme.
- Vishnu came to be conceived as the preserver and protector of the people.
- Pushan became God of Shudras.
- Sacrifices became more important and elaborate.
- There were 33 deities during later Vedic period.
- The king's influence was strengthened by rituals.
- Rajasuya conferred supreme power on king.
- Vajapeya was a drink of strength. It had a chariot race.
- Aswamedha was the horse sacrifice.
- Kings were known with different names in different region.
- Eastern Kings were called Samrat.
- Western Kings were called Svarat.
- Northern Kings were called Virat.
- Southern Kings were called Bhoja.
- Kings of the middle country were called Raja.
- Earliest evidence of medicine comes from Atharvaveda.
- Parikshit has been called as the king of 'Mrituloka in Atharvaveda'.
- King used to visit the house of each ratnin in Ratnavimshi' ceremony.

- Atharvaveda mentions Sabha and Samiti as daughters of Prajapati.
- According to Kathak Samhita 24 oxen were employed for agriculture.
- During later vedic period Prajapati came to occupy the Supreme position.
- Pushan was the God of Shudras.
- Rudra was the God of animals.
- Institution of Gotra appeared during later vedic period.
- Duties of four varnas are given in Aatreya Brahamana.
- Three roomed mud house has been discovered at Bhagwanpura.
- Largest deposit of Iron weapon have been found at Atranjikhera.
- Two furnaces for iron smelting have been found at Suneri village in Jhunjhunu district.
- Legend of 'Videha Madhav' is mentioned in Satapatha Brahamana.
- Eight forms of marriages are given in Ashvalahayan Grihyasutra.
- Satapatha Brahamana says that 'wife is half her husband'.
- Earliest clear reference to the four ashrams is given is Jabala Uanishad.

THE VEDIC LITERATURE

- The word Veda is derived from the Sanskrit word Vid meaning, to know or knowledge par excellence.
- Vedic texts are divided between Sruti (based on hearing), which is distinct from Smriti (based on memory).
- Four Vedas and their Samhitas, the Brahmanas, the Aranyakas and the Upanishads form a class of literature known as Sruti.

RIG VEDA

- It is divided into 10 Books or Mandalas. Books II to VII are considered the oldest. Book I, VIII and X seem to be later additions.
- A collection of 1028 hymns of a number of priestly families.
- Written between 1700-1500 B.C. when Aryans were still in Punjab.
- Books II to VII are earliest and are also called as family books. They are attributed to Gritsamada, Visvamitra, Vasudeva, Atri, Bhardwaj, Vashishtha, Kanva and Angiras.
- The IX mandala is dedicated exclusively to Soma.
- The X Mandala contains the famous Purushsukta hymn that explains the origin of four Varnas.
- Gayatri Mantra is the most sacred hymn of Rig Veda.

YAJUR VEDA

- A ritualistic Veda.
- It is divided into Shukla Yajurveda and Krishna Yajurveda.
- Atharvaveda mentions beliefs and practices of non-Aryans.
- In Atharvaveda, Sabha and Samiti are described as uterine sisters - the two daughters of Prajapati.

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- Written in prose, it deals with procedure for performance of sacrifices and contains rituals as well as hymns.

SAMA VEDA

- Sam Veda derives its roots Saman, which means a melody.
- A collection of melodies.
- A collection of 1603 hymns. Except 99, all other were derived from Rig Veda.

ATHARVA VEDA

- A collection of 711 hymns, it is divided into 20 khandas:
- It is the latest Veda.
- Atharva Veda is a book of magical formula
- It contains charms and spell to ward off evil and disease.
- Its content throws light on the practices of non-Aryans.

RELIGIOUS MOVEMENTS

BUDDHISM

- Buddhism was founded by Gautam Buddha.
- Buddha was born on the Vaisakh Purnima day in 563 B.C.
- He belonged to the Sakya clan of Kashtriyas.
- His father was Suddhodana, the ruler of Kapilvastu.
- He was born in Lumbini in kapilvastu.
- His mother was mahamaya of the Kosala dynasty.
- Buddha got Nirvana at the age of 35 years.
- Buddha got Nirvana at Uruvela on the bank of river Niranjana.
- Buddha gave his first Sermon at Sarnath.
- Buddha's first sermon is called as "Dharma Chakraparivartana"
- Buddha died in 483 B.C. at Kushinagar.
- Kushinagar has been identified with village Kasia in Deoria district of U.P.
- Buddha's last words were "All composite things, strive diligently".
- Buddha was brought up by his stepmother Gautami.
- After seeing an old man, a sick man, a corpse and an ascetic, Buddha decided to become a wanderer.
- Asvajit, Upali, Mogallana, Sariputra and Ananda were five disciples of Buddha

Five Great Events of Buddha's Life and their symbols

- **Birth :** Lotus and Bull
- **Great Renunciation :** Horse
- **Nirvana :** Bodhi tree
- **First Sermon :** Dharmachakra or wheel
- **Parinirvana or Death :** Stupa.

Four Noble Truths

- The world is full of sorrows.
- Desire is root cause of sorrow.

IMPORTANT FACTS RELATED WITH BUDDHA

Tathagata, Sakyamuni	Titles of Buddha
Sakya	Clan to which Buddha belong
Gautama	Gotra of Buddha
Suddhodana	Buddha's Father
Mahamaya	Buddha's Mother
Prajapati Gautami	Foster Mother
Yasodhara	Buddha's Wife
Rahul	Buddha's Son
Kanthaka	Buddha's Horse
Channa	Buddha's Charioteer
Alara Kalam	Buddha's Teacher
Sujata	Girl who offered rice and milk
Niranjana	River on the bank of which Buddha attained Nirvana
Mara	King of spirit who troubled Buddha during meditation
Chunda	The person who offered pork to Buddha
Sravasti	Buddha preached most of his sermons here

- If desire is conquered, all sorrows can be removed.
- Desire can be removed by following the eight-fold path.

Eight Fold Path

(1) Right understanding
(2) Right speech
(3) Right livelihood
(4) Right mindfulness
(5) Right thought
(6) Right action
(7) Right effort and
(8) Right concentration

Three Ratnas

- Buddha
- Dhamma
- Sangha

BUDDHIST COUNCILS

- **The First Council** was held in 483 BC at Saptaparni cave near Rajagriha to compile the Dhamma Pitaka and Vinaya Pitaka.
  Chairman : Mahakassapa, Patron : Ajatsatru
- **The Second Council** was held at Vaisali in 383 BC. The monks of Vaisali wanted some change in the rites. Schism into Sthaviravadins and Mahasanghikas.
  Chairman : Sabakami, Patron : Kalasoka
- **The Third Council** was held at Pataliputra during the reign of Ashoka 236 years after the death of Buddha. It was held under the Presidentship of Moggliputta Tissa to revise the scriptures.

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➤ **The Fourth Council** was held during the reign of Kanishka in Kashmir under the Presidentship of Vasumitra, who was helped by Aswvaghosha and resulted in the division of Buddhists into Mahayanists and Hinayanists.

SECTS OF BUDDHISM

➤ **Hinayana : (a)** Its followers believed in the original teachings of Buddha **(b)** They sought individual salvation through self-discipline and meditation **(c)** They did not believe in idol-worship **(d)** Hinayana, like Jainism, is a religion without God, Karma taking the place of God **(e)** Nirvana is regarded as the extinction of all **(f)** the oldest school of Hinayana Buddhism is the Sthaviravada (Thervada in Pali) or the 'Doctrine of the Elders' **(g)** Its Sanskrit counterpart, which is more philosophical is known as Sarvastivada or the doctrine which maintains the existence of all things, physical as well as mental and **(h)** Gradually, from Sarvastivada or Vaibhasika branched off another school called Sautantrika, which was more critical in outlook.

➤ **Mahayana : (a)** Its followers believed in the heavenliness of Budha and sought the salvation of all through the grace and help of Buddha and Bodhisatvas. **(b)** Believes in idolworship. **(c)** Believes that Nirvana is not a negative cessation of misery but a positive state of bliss. **(d)** Mahayana had two chief philosophical schools : the Madhyamika and the Yogachara. **(e)** The former took a line midway between the uncompromising realism of Hinayanism and the idealism of Hinayanism and the idealism of Yogachara. **(f)** The Yogachara school founded by Maitreyanatha completely rejected the realism of Hinayana and maintained absolute idealism.

➤ **Vajrayana (a)** Its followers believed that salvation could be best attained by acquiring the magical power, which they called Vajra. **(b)** The chief divinities of this new sect were the Taras. **(c)** It became popular in Eastern India, particularly Bengal and Bihar.

BUDDHIST LITERATURE

➤ The Buddhist scriptures in Pali are commonly referred to as Tripitaka i.e. Three fold Basket.

➤ Tripitaka includes Vinaya Pitaka, Sutta Pitaka, and Abhidhamma Pitaka.

➤ The Vinayapitaka comprires of suttavibhanga, Khandakas and Parivarpatha.

➤ The Vinay Pitaka : (a) Mainly deals with rules and regulations, which the Buddha promulgated. (b) It describes in detail the gradual development of the Sangha. (c) An account of the life and teaching of the Buddha is also given.

➤ The Sutta Pitaka is divided into five Nikayas.

➤ The five Nikayas are DighNikaya, Majjhima Nikaya, Samyutta Nikaya, Anguttara Nikaya and Khuddaka Nikaya.

➤ The Khuddaka Nikaya consists of large number of miscellanceous works.

➤ The Jatakas are a part of Khuddaka Nikaya of Sutta Pitaka.

➤ The Sutta Pitaka Consists chiefly of : (a) discourses delivered by Buddha himself on different occasions. (b) Few discourses delivered by Sariputta. Ananda, Moggalana and other are also included in it. (c) It lays down the principles of Buddhism.

➤ The Abhidhamma Pitaka is written in the form of questions and Answers.

➤ It consists of seven books of which Kathavattu is most important.

➤ Kathavattu is attributed to Tissa Moggaliputta

➤ The Abhidhamma Pitaka : (a) Contains the profound philosophy of the Buddha's tecahings. (b) It investigates mind and matter, to help the understanding of things as they truly are.

BUDDHIST ARCHITECTURE

➤ Buddhist architecture developed essentially in three forms, viz. (a) Stupa (relics of the Buddha or some prominent Buddhist monks are preserved) (b) Chaitya (prayer hall) (c) Vihara (residence)

EIGHT HOLY PLACE (ASHTAMAHASTHANAS)

(1) Lumbini, (2) Bodh Gaya, (3) Kusinagar, (4) Sravasti, (5) Sankasya, (6) Rajgriha, (7) Vaishali, (8) Sarnath.

SECTS OF BUDDHISM : AREA

Hinayana	:	India, Sri Lanka, Burma, Bangladesh, Malaysia, Nepal, Singapore
Mahayana	:	India, China, Nepal, Singapore, Japan, Korea, Taiwan, Vietnam
Vajrayana	:	India, Nepal, Tibet, Mongolia, Bhutan.

JAINISM

➤ Jainism was founded by Vardhamana Mahavira.

➤ Mahavira was born in 540 B.C.

➤ Mahavira's Birth place was Kundagram in Vaishali

➤ He belonged to the Jantriak Kshatriya clan.

➤ His father's name was Siddhartha and mother's name was Trishala, who was a sister of the Lichchavi prince Chetak of Vaishali.

➤ Mahavira was married to Yashoda.

➤ Hie left home at the age of 30 and wandered for 12 years.

➤ Mahavira is regarded as the 24th Tirthankara.

➤ Rishabha was the Ist Tirthankara.

➤ Parsavanath was the 23rd Tirthankara.

➤ Mahavira's first disciple was Jamali.

➤ Mahavira attained Kaivalya on the bank of river Rijupalika near Jrimbhikgrama.

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Important Facts about Jainism	
Mahavira, Arhat	Titles of Vardhamana,
Vardhamana	Original name of Mahavira
Kundagram	Mahavira's birth place
Trisala	Mahavira's Mother
Yashoda	Mahavira's Wife
Jamali	Mahavira's Son in Law.
Jnatrika	Clan to which Mahavira belonged.
Rijupalika	River on the bank of which Mahavira got Kaivalya. 10th baisakh
Sal tree	The tree under which Mahavira got Kaivalya.
Pava	Place where Mahavira died.

- The names of two jaina Tirthankaras, Rishabha and Aristanemi, are found in the Rigveda.
- The Vishnu Purana and the Bhagvata Purana describe Rishabha as an incarnation of Narayana.
- In the course of wandering Mahavira met Mokhliputta (the founder of Ajivika sect).
- Ashoka's grandson Samparati accept Jainism.
- In First century A.D. Mathura became the Centre of Jaina art and culture.
- The spread of Jainism in Karnataka is attributed to Chandragupta Maurya.
- Many Jaina followers went to south under the leadership of Bhadrabahu.
- These southern followers later formed the Digambra sect.
- Those who remained at Magadha, under the leadership of Sthalabahu, formed Shvetambar sect.

FIVE MAIN TEACHINGS

- Non-injury (ahimsa)
- Non-lying
- Non-Stealing (asateya)
- Non-Possession (aparigraha)
- Observe continence (Brahamcharya). It was added by Mahavira.

JAINA LITERATURE

- Most of the literature is written in Prakrit.
- The jaina Literature includes,

(1) The 12 Angas
(2) The 12 Upangas
(3) The 10 Prakirna
(4) The 6 Chhedsutras
(5) The 4 Mulasutras

JAINA COUNCILS

- **First Council** was held at Pataliputra by Sthulabahu in the beginning of the third century BC and resulted in the compilation of 12 Angas to replace the lost 14 Purvas.
- **Second Council** was held at Valabhi in the 6th (513 AD) century AD under the leadership of Devaradhi Kshamasramana and resulted in final compilation of 12 Angas and 12 Upangas.

24 TIRTHANKARAS AND THEIR SYMBOL		
	Name	**Symbol**
1.	Rishabha	Bull
2.	Ajitnath	Elephant
3.	Sambharnath	Horse
4.	Abhiaandam Swamy	Monkey
5.	Sumathinath	Curlew
6.	Padamprabhu	Red Lotus
7.	Suparaswanath	Swastik
8.	Chandraji Prabhu	Moon
9.	Suvidhinath	Crocodile
10.	Shitalnath	Srivatsa
11.	Shregansnath	Rhinoceros
12.	Vasupujya	Buffalo
13.	Vimalnath	Boar
14.	Ananthanth	Falcon
15.	Dharamnath	Vajra
16.	Shantinath	Deer
17.	Kuntunath	He-Goat
18.	Arnath	Fish
19.	Mallinath	Water Pot
20.	Muniswasth	Tortoise
21.	Naminath	Blue Lotus
22.	Neminath	Conch Shell
23.	Parswanath	Serpent
24.	Mahavir	Lion

RISE OF MAHAJANAPADAS

- The Buddhist text Anguttara Nikaya gives the list of sixteen Mahajanapadas at the time of Buddha.
- These Mahajanapadas extended from the North western Pakistan to east Bihar and from Himalayas to the river Godavari.

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Mahajanapada	Capital	Area
Anga	Champa	Bhagalpur, Munger (Bihar)
Magadha	Rajgriha	Patna, Gaya (Bihar)
Kasi	Varanasi	Near Varanasi
Kosal	Saketa, Sravasti	Eastern Uttar Pradesh
Vajji (Ganasangha)	Vaishali	Muzaffarpur (Bihar)
Malla	Kusinara/Pava	Gorakhpur (U.P.)
Chedi	Suktimati	Bundelkhand (U.P.)
Vatsa	Kaushambi	Allahabad (U.P.)
Kuru	Indraprastha	Meerut Delhi region
Panchal	Ahicchatra, Kampilya	Western U.P.
Sursena	Mathura	Mathura (U.P.)
Gandhar	Taxila	Peshawar (Pakistan)
Kamboja	Rajpura	Near Gandhar
Asmak	Paithan	Godhavari area
Avanti	Ujjain, Mahishmati	Malwa region
Matsya	Viratnagar	Near Jaipur

- Kashi was famous for its cotton textiles and market for horses.
- Champa was noted for its trade and Commerce.
- Vajji represented a confederacy of eight clans.
- The Buddha died in the vicinity of Kusinara.
- The Northern Panchalas had their capital at Ahicchatra
- The Southern Panchalas had their Capital at Kampilya
- Viratnagar was used as the hiding place by Pandavas.
- Mathura was located at the junction of two famous trade routes i.e. Uttrapatha and Dakshinapatha.
- The Kambojas were regarded as uncultured by the Brahamancial texts.
- The Buddha calls himself Kosalan in the Majjhima Nikaya
- Kashi had emerged as a cloth manufaturing centre by the time of Buddha.

RISE OF MAGADHA

HARYANK DYNASTY

- The epic Mahabharata has provided information about the early period of Magadha.
- Jarasandh and Brihdrath were the rulers during the period of Mahabharata.
- Girivraja was the magadhan capital during the early period.

BIMBISARA (544-492 B.C.)

- Bimbisara established Haryank dynasty
- Bimbisara ascended the throne in 544 B.C.

- In Jain literature he has been called as 'Shraunik'.
- Bimbisara had three wives, mahakosala, Chellana and Khema.
- Mahakosala was the sister of Kosal ruler Prasenjit and Chellana was Lichchhavi Princess.
- Bimbisara defeated Anga and annexed it.
- Bimbisara send his physician Jivak to treat Chand Pradyot of Avanti
- Bimbisara was prisoned by his son Ajatshatru and died in 493 B.C.

AJATSHATRU (492-460 B.C.)

- Ajatshatru sat on Magadh throne in 492 B.C.
- Ajatshatru followed an expansionist policy.
- After a long struggle he defeated Kasi and Vajji confederacy.
- Ajatshatru took the services of his minister Vassakar to divide the Vajji confederacy.
- Ajatshatru got a large stupa constructed in Rajgriha.
- Ajatshatru constructed a fort around Rajgriha to protect it from Lichcchavi attack.
- Ajatshatru was killed by his son Udayin in 461 B.C.
- Udayin transferred the Capital to Patliputra.
- Udayin was a follower of Jainism.
- The last Haryank ruler was Nagdasak.

SHISUNAGA DYNASTY (412-344 B.C.)

- Nagdasak was killed by his amatya Shisunaga.
- Shisunaga established Shisunaga dynasty in 412 B.C.
- Shisunaga annexed Avanti to Magadha.
- Shisunaga established his capital at Vaishali.
- Kalashoka came to the throne in 344 B.C.
- Kalashoka again transferred the capital to Pataliputra.
- During the reign of Kalashoka second Buddhist council was organized at Vaishali.
- Nandivardhan was the last Shisunaga ruler.

NANDA DYNASTY

- Nanda Dynasty was established by Mahapadmananda.
- According to Puranas he was not a Kshatriya.
- Mahapadmananda was known as Ekarat and Sarvakshatrantaka.
- Mahapadmananda conquered Kalinga.
- Last Nanda ruler was Dhanananda.
- Dhanananda was the contemporary of Alexander.
- Nanda Dynasty was destroyed by Chandragupta Maurya and Chanakya.
- Nandas have been termed as first empire builders of India.

FACTORS FOR THE RISE OF MAGADHA

- Magadha enjoyed an advantageous geographical position

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- Iron deposits were situated close to Rajgir, the earliest capital of Magadha.
- Rajgir and Pataliputra were situated at very strategic points.
- Pataliputra was surrounded by rivers from all sides it was called as jaladurga (water-fort).
- Magadha lay at the centre of the middle Gangetic plain.
- Magadha for the first time used elephants on a large scale in wars.
- Greek sources have mentioned that the Nandas maintained 6000 elephants.
- Magadha society was unorthodox and was recently Aryanized.
- Ambitious rulers like Bimbisara, Ajatshatru and Mahapadma nanda established Magadha as a powerful kingdom.

FOREIGN INVASION

- North-West India was ruled by smaller principalities like Kambojas, Gandharas and Madras.
- The Period of 6th B.C. marked by political instability in North-West India.
- In 516 B.C. the Iranian ruler Darius penetrated into North-West India.
- Darius annexed Punjab, west of Indus and Sindh.
- This area constituted the 20th kshatrapy (province) of Iran.
- The Indian kshatraphy included Sindh, the North-West frontier and part of Punjab.
- The Indian Kshatrapy paid a tribute of 360 talents of Gold.
- Xerxes, the successor of Darius, employed Indians in the long war against the Greeks.
- The Iranian Scribes brought into India Kharoshti script.
- Under the leadership of Alexander of Macedonia, the Greeks destroyed the Iranian Empire.
- Alexander marched to India through the Khyber Pass in 326 B.C.
- Ambhi was the king of Taxila.
- Porus ruled between Jhelum and Ravi.
- Porus provided a strong resistance to Alexander.
- Alexander remained in India for 19 months (326-325 B.C.)
- Alexander's campaign opened up four distinct routes by land and sea.
- Alexandria and Boukephala were Greek settlements which were established in the North West.
- Alexander's historian Nearchus has left valuable geographical accounts.
- Battle of Hydaspes was fought between Porus and Alexander.
- Alexander sent 20,000 oxen to Macedonia for use in Greece.
- The Sati system and slave trade was prevalent in the society.
- Alexander's invasion paved the way for the expansion of Mauryan Empire in North West India.
- Alexander's campaign opened up four distinct routes by land and sea.

THE MAURYAN EMPIRE (321 BC - 289 BC)

CHANDRAGUPTA MAURYA (322-295 B.C)

- The Mauryan dynasty was founded by Chandragupta Maurya with the help of Chanakya or Kautilya.
- Brahamanical texts say he was born of Mura, a sudra women in the court of the Nandas.
- An earlier buddhist tradition says he belonged to the Moriya Kshatriya clan.
- In some texts he is referred to as Vrishala and Kulahina.
- He fought Seleucus in 305 B.C.
- Seleucus surrendered a large territory including Paropanisadai (Kabul), Aria (Herat), Arachosia (Gandhara) and Gedrosia (Baluchistan), in return for 500 elephants.
- According to Jaina tradition Chandragupta was converted to Jainism.
- Chandragupta Maurya passed his last days at Sravanbelagola near Mysore
- Seleucus sent an ambassador Megasthenes to the Mauryan court.
- Megasthenes wrote the text 'Indica'

BINDUSARA (298-272 B.C.)

- Bindusara succeeded Chandragupta Maurya.
- In Jain literature he has been called as 'Simhasen'.
- Antiochus sent Daimiachus as an ambassador to Bindusara's court..
- Ptolemy Philedelphus of Egypt sent Dionysius as ambassador.
- He was known as Amitraghata. He was also known as Amitrochates.
- He wrote to Antiochus I of Syria and asked for some sweet, wine, dry figs and a sophist.
- He sent his son Ashoka to quell a rebellion in Taxila.
- He was a followers of Ajivika sect
- The Syrian ambassador Demiachus was sent to his court.

ASHOKA (273-232 B.C.)

- Ashoka (273-232 B.C.) succeeded Bindusara.
- He was holding viceroyalty of taxila and Ujjain during his fathers lifetime.
- After his fathers death he ascended the throne but formal consecration was delayed for 4 years.
- A Buddhist text says he usurped the throne after killing his 99 brothers.
- He fought Kalinga war in 260 B.C. in the 9th year of his reign.
- In course of his second Dharmayatra tour (in 21st year of his reign), he visited Lumbini.
- In the 14th year of his reign he started the institution of Dharma Mahamatras

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- The reverberation of the war drum (Bheri Ghosha) was to become the reverberation of the law (Dhamma Ghosha).
- His Hellenistic contemporaries were Antiochus II of Syria, Ptolemy II of Egypt, Antigonas of Macedonia, Magas of Cyrene and Alexander of Epirus.
- He organised the third Buddhist council in the 18th year of his reign at Patliputra.
- Ashoka banned animal sacrifice, regulated the slaughter of animal for food.
- According to his Maski and Gurjara inscriptions he was known as Devanam Priya Priyadarshi.
- He was converted to Buddhism by Nigrodh.

NAMES & TITLES OF ASHOKA	
Ashoka	Personal name
Piyadassi	Official name
Ashoka	Maski edict & Gurjara edict
King of Magadha	Bhabru edict
Ashok Vardhan	Puranas.
Ashoka Maurya	Junagarh inscription
Piyadassi	Dipavamsa, Kandhar inscription
Piyadassi Raja	Barabar hill cave inscription

EDICTS OF ASHOKA RELATED PLACES

Location of Major Rock Edicts

(1) Kalshi (Dehradun) (2) Manshera (Hazara dist. Pakistan) (3) Shahbazgarhi (Peshawar) (4) Girnar (Gujarat) (5) Sopara (Near Mumbai) (6) Dhauli (Orissa) (7) Jaugada (Orissa) (8) Maski (Andhra Pradesh) (9) Yerragudi (Andhra Pradesh)

Location of Minor Rock Edicts

(1) Bairat (2) Rupnath (3) Sahsaram (4) Rupnath (5) Brahmagiri (6) Gavimath (7) Jatinga Rameshwar (8) Maski (9) Palkigundu (10) Rajula-Mandagiri (11) Suvarnagiri (12) Yerragudi (13) Gurjara (14) Ahraura

Location of Pillar Edicts

(1) Allahabad (2) Delhi-Topra (3) Delhi-Meerut (4) Nigalisagar (5) Lauriya-Araraj (6) Lauriya-Nandangarh (7) Rampurva

INFORMATION ABOUT ASHOKAN INSCRIPTIONS

- 1st major rock edict declares prohibition of animal sacrifice.
- 2nd major rock edict mentions medical treatment of human and animals.
- 3rd major rock edict mentions Pradeshikas, Rajukas and Yukta.
- 4th major rock edict mentions Bheri Ghosha is replaced by Dhamma Ghosha.

- 5th major rock edict mentions the appointment of Dhamma Mahamattas.
- 6th major rock edict mentions Mantri Parishad and officers like pulisani and Prativedikar.
- 7th major rock edict mentions religious toleration amongst all sects.
- 8th major rock edict mentions that he went to Sambodhi in Bodh Gaya.
- 9th major rock edict mentions the uselessness of various ceremonies.
- 10th major rock edict mentions that the king desires no more fame
- 11th major rock edict explains the policy of Dhamma.
- 12th major rock edict appeals for toleration amongs sects.
- 13th rock edict mentions Kalinga war.
- 14th major rock edict mentions the purpose of the rock edicts.
- There are 7 pillar edicts.
- In the 1st pillar edict, social code has been mentioned.
- In the 2nd pillar edict eye donation has been mentioned.
- In the 3rd pillar edict soul and sin has been mentioned.
- In the 4th pillar edict Rajukas have been mentioned.
- In the 5th pillar edict animal killing is mentioned.
- The 6th pillar edict mentions the welfare of people.
- The 7th pillar edict mentions the Dhamma Mahamattas.

FACTS ABOUT ASHOKAN INSCRIPTIONS

- Maski edict discovered in 1915 is the only edict which mentions the name Ashoka.
- The Topra & Meerut pillars were brought to Delhi by Feroz Shah Tughlaq.
- Ashokan edicts were deciphered by James Princep in 1837.
- The Kausambi pillar was brought to Calcutta by Jahangir.
- The Bairat inscription was brought to Allahabad by Cannigham.
- Two major rock edicts as Mansehra and Sahbazgarhi are in Kharoshti script.
- The Kandhar inscription is bilingual-Greek and Armaic.
- Most of the Ashokan edicts are Written in Brahmi script.
- The language used in Ashokan edicts except Kandhar is Prakrit.
- The inscription in fragmentary condition found at Lampak/ Lamghan is in Aramaic
- In all the edicts except the Maski edict Ashoka refers to himself by his title Devanampiya Piyadassi.
- The Allahabad pillars (brought from Kausambi) contains the inscription of Samudra Gupta and Jehangir also.
- Major rock edicts are fourteen in number.
- Total number of pillar edicts is thirteen, they are inscribed in ten pillars. Out of thirteen seven are major pillar edicts, four are minor pillar edicts and two are commemorative pillar edicts.

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- Of the four minor pillars edicts one is known as Queen's edict and it is on Allahabad pillar.
- Schism edicts (one each) are found in Allahabad, Sanchi and Sarnath Pillars.
- The commemorative pillar edicts are Rumeindei and Nigalisagar (both in Nepal).
- The longest among the major rock edict is 13th rock edict (in Orissa).
- 7th pillar edict is longest among all the edicts.
- The Allahabad pillar contains first six pillar edicts, Queen's edict, Kosam Schism edicts, Prasasti of Samudragupta written by Harisena and some decrees of Jehangir.
- Kharosthi script was derived from Persian Aramaic.

18 TIRTHAS MENTIONED IN ARTHASHASTRA

1.	Mantrin	: Chief Minister
2.	Purohita	: Chief Priest
3.	Senapati	: Commander in Chief
4.	Yuvaraja	: Crown prince (These four were the highest functionaries among the tirthas).
5.	Dauvarika	: Chamberlain
6.	Antarvesika	: Chief of the harem.
7.	Prasastri	: Inspector general of prisons
8.	Samaharta	: Collector general
9.	Sanidhata	: Treasury Chief
10.	Pradeshtri	: Divisional Commissioner
11.	Nayaka	: City Constable
12.	Paura	: Governor of the City.
13.	Vyavaharika	: Chief Judge
14.	Karmantika	: Chief of the Mines
15.	Mantri	: President of the Council. Parishadhyaksha
16.	Dandapal	: Police Chief
17.	Dvarapala	: Chief of the Home Defence.
18.	Antapal	: Chief of the Frontier Defence.

IMPORTANT ADHYAKSHAS AND THEIR DUTIES

1.	Panyadhyaksha	: Commerce
2.	Samsthadhyaksha	: Markets, checking wrong practices
3.	Pautavadhyaksha	: Weights and measure
4.	Navadhyaksha	: State Boats
5.	Sulkadhyaksha	: Tolls/Customs
6.	Akaradhyaksha	: Mines
7.	Lohadhyaksha	: Iron
8.	Savvarnika	: Gold
9.	Sitadhyaksha	: Crown lands.
10.	Aksha pataladhyaksha	: Accounts

11.	Rathadhyaksha	: Chariot
12.	Hastyadhyaksha	: Elephant force
13.	Ayudhagaradhyaksha	: Production and maintenance of armaments
14.	Kosadhyaksha	: Treasury
15.	Kosthagaradhyaksha	: Store house
16.	Kupyadhyaksha	: Forest produce
17.	Manadhyaksha	: Measurement
18.	Mudradhyaksha	: Passports
19.	Pattanadhyaksha	: Ports
20.	Ganikadhyaksha	: Courtesan
21.	Devatadhyaksha	: Religious institutions
22.	Lakshanadhyaksha	: Mint

THE SANGAM AGE

- The word Sangam is associated with the assembly of Tamil Scholars and Poets flourished under the royal Patrongage of the Pandyan Kings at Madurai.
- The first Sangam was held at Madurai but its work has not survived. Its Chairman was Agasya.
- The second Sangam was held in Kapatpuram. Its Chairman was Tolkapiyar.
- The third Sangam was held in Madurai. Its chairman was Nakkirar.
- Tolkapiyam belongs to second Sangam.
- Tokapiyam is a work on grammar.
- The Sangam literature was compiled in circa A.D. 300-600.
- Thirukural of Kural by Tiruvalluvar is sometimes called the 'fifth Veda' or 'Bible of the Tamil land'.
- Silpaddikaram literally 'The jeweled Anklet' by Ilango Adigal is an epic, deals with the love stories of Kovalan and Madhavi.
- Manimekhalai is written by Sattalai Sattanar, considered the 'Odyssus of Tamil poetry'.
- Jivaga Chintamani, a third epic by the Jaina Tiruttakadevar.
- Roman king built a temple of Augustus at Muziris.
- Murugan was the God par excellence of the Tamils, also known as Subramaniyam.
- Yavan Priya is a Sanskrit terms for pepper.
- Muslin, gems, pearls and spices were the important export items to Rome.
- The Sangam Age was marked by three political powers.
- These were Pandyas, Cholas and Cheras.
- The Chola dominion was known as Tondaimandlam.
- Karikala was the greatest Chola king.
- He constructed 160 km of embankment along the Cauvery river.
- Uraiyur was the Chola capital.

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- Nedunjeral Adan is the first known Chera king.
- He earned the title of Udiyanjeral.
- Senguttuvan was the greatest Chera king.
- He established the Pattini cult.
- The capital of Cheras was Vanji.
- Nedunjhelian was the most important Pandya king.
- He ordered the execution of Kovalan the husband of Kannagi.
- The capital of Pandyas was Madurai.
- Megasthenes has pointed out that Pandyas were rules by a woman.
- Korkai and Saliyur were important sea ports of Pandyas.
- Earliest known Pandya king is Palyagasalai Mudukudumi.
- Chola king Elara conquered Sri Lanka and ruled over it for 50 years.
- Karikala defeated the joint forces of Cheras and Pandyas.
- Captains of army were invested with the title Enadi.
- The ruling class in Sangam Age was called Arasar.
- The lowest class in society was of Kadaisiyar.
- Purananuru contain the poems of Kapilar, Avvai and Kovur-kilar.
- In Silppadikaram there is a reference to Ceylonese king Gajabahu.
- Bow was the royal emblem of Cheras.
- Tiger was the royal emblem of Cholas.
- Carp/Fish was the royal emblem of Pandyas.
- In the battle of Talaiyalanganam Nedunjelian defeated Chera and Chola kings.
- Muziris was a great centre of cotton trade.
- Uraiyur was famous for pearls and muslims.
- Yavana ships used to arrive at Kaveripattinam.
- Kadamai and Kavalmaram are tutelary tree.
- 'Yal' was a stringed instrument like lute.
- Puliyars were the craftsmen.
- Tamil work Jivak Chintamani highlights the importance of Jaina philosophy.
- Jivak Chintamani was written by Tiruttakkadevar.

FIVE TINAIS

Area	Occupation	God
Forest land (Mullai)	Iended cattle, sheep	Mayon
Hill area (Kurinji)	Hunting	Seyon (Murugan)
Cultivable land (Marudam)	Cultivators	Vendan (Indra)
Coastal regions (Neidal)	Fishing	Varunan
Sandy region (Palai)	Robbery	Korravai.

POST-MAURYAN DYNASTIES

SUNGAS AND KANVAS

- Pushyamitra laid the foundation of Sunga dynasty.
- Pushyamitra killed the last Mauryan ruler Brihdrath in 185 B.C.
- Patanjali was a contemporary of Pushyamitra Sunga.
- Pushyamitra performed two Aswamedha sacrifices.
- It was corroborated by Patanjali and Malvikagnimitra.
- He was succeeded by Agnimitra.
- Heliodorus came during the reign of Bhagbhadra
- He was the ambassador of Greek king Antialkidas of Taxila.
- The last Sunga king was Devabhuti.

THE SATVAHANA DYNASTY

- The Puranas speak only of Andhra rule and not of Satvahana rule.
- Simuka was the first Satvahana king.
- They issued mostly coins of lead.
- Gautamiputra Satkarni (106-130 A.D.) called himself the only Brahamana.
- His achievements are recorded in Nasik Inscription.
- Nasik Inscription belongs to his mother Gautami Balasri.
- Vashisthaputra Pulumayi (130-158 A.D.) set up his capital at Paithan.
- He enlarged Amravati Stupa and decorated it with marble.
- He has been praised in Nanaghat Inscription.
- Yajnasri Satkarni (165-194 A.D.) recovered Malwa from the Shaka rulers.
- Ship is depicted on his coins.
- Satvahanas were the first rulers to make land grants to Brahamanas.
- Prakrit text Gathasaptashati is attributed to Satvahana king Hala.
- They had brisk trade with Romans.
- Nasik and Nanaghat are important inscription of the Satvahana period.

THE INDO-GREEKS

- A series of invasions from central Asia began around 200 B.C.
- The first to cross the Hindukush were the Indo–Greeks.
- Demetrius, the king of Bactria invaded India about 190 B.C.
- The most famous Indo-Greek ruler was Menander (165-145 B.C.). His capital was Sakala or Sialkot.
- Menander was converted to Buddhism by Nagasena or Nagarjuna.
- The conversation between the two is recorded in a book named 'Milindapanho', or question of Milinda.
- Indo–Greeks were the first to issue gold coins in India.
- They were the first rulers in India to issue coins definitely attributed to the kings.

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- They also introduced practice of military governorship. The governors were called 'Strategos'.
- The Greek ambassador Heliodorus set up a pillar in honour of Vishnu at Vidisha.
- The term Horashastra used for astrology in Sanskrit is derived from the Greek term Horoscope.

THE SAKAS

- The Greeks were followed by the Sakas.
- They are referred to as scythians.
- The Saka poured into India through the Bolan Pass.
- The earliest Indian textual reference to the Sakas are found in the Mahabhasya.
- The first Saka king in India was Maues or Moga who established Saka power in Gandhara.
- Maues was succeeded by Azes who successfully attacked the last of the Greek kings in Northern India, Hippostratos.
- The most famous of the Saka rulers was Rudradaman (130-150 A.D.)
- His achievements are highlighted in his Junagarh Inscription.
- It is the first major inscription to be written in Sanskrit.
- It records the repair of Sudarshan lake undertook by his officers.

THE KUSHAN DYNASTY

- They are referred to as Yuch-Chis or Tocharians.
- They belonged to one of the five clans of the Yuch-Chis tribe.
- Kujula Kadphises initiated copper in imitation of Roman coins.
- Wima Kadphises issued a large number of gold coins.
- Kanishka (78-144 A.D.) started the Shaka era (78 A.D.)
- His two capitals were Purushpura (Peshawar) and Mathura.
- He erected a monastery stupa at Peshawar.
- He was a great patron of art and literature.
- At Toprak-Kala a huge Kushan palace has been unearthed.
- Charak was the court physician of Kanishka.
- He was a great patron of Buddhism.
- Fourth Buddhist Council was held under his patronage at Kundalvan.
- Kanishka controlled the famous Silk route in central Asia.
- The Gandhara School of art recieved royal patronage of the Kushans.
- The Kanishka group of rulers used the title 'Shanaushahi'.
- The Kushanas started erecting mortuary temples called Devakulas.
- Kushanas divided their empire into strapis.
- Kanishka provided patronage to Ashvaghosha and Nagarjuna.

THE GUPTAS (320-550 A.D.)

- Sri Gupta was the founder of Gupta rule.
- He was succeeded by Ghatotkacha.
- The real founder of the Gupta power was Chandragupta I (319-355 A.D.)
- He was the first independent king with the title of Maharajadhiraja.
- He started the Gupta era in 319-320 A.D.
- He married a Lichchavi Princess.
- His empire included Bihar, Uttar Pradesh and Bengal.
- Samudragupta (355-380 A.D.) enlarged enormously the Gupta kingdom.
- His achievements are mentioned in the Prayag-Prasasti composed by Harisena.
- He captured and annexed the Aryavrata rulers.
- He defeated 12 rulers of Dakshinapatha.
- These rulers were first captured and then released by Samudragupta.
- Harisena and Vasubandhu adorned his court.
- He was a great patron of art and adopted the title of Kaviraja.
- On some coins he is shown playing the Veena.
- V.A. Smith calls Samudragupta the 'Napoleon of India'.
- Samudragupta had a disputed accession to the throne.
- Virasena was the commander of Samdragupta during his southern campaign.
- Samudragupta performed the Aswamedha Yajna and struck gold coins of Yupa type.
- He granted permission to the Buddhist king of Ceylon Meghavarman to build a Monastry at Bodh Gaya.
- Samudragupta was succeeded by Ramgupta but Chandragupta II killed him and married his queen Dhruvadevi.
- He entered into matrimonial alliance with the Nagas by marrying princess Kubernaga
- He defeated the Saka king Rudrasimha III and annexed his kingdom.
- He adopted the title of Vikramaditya. Mehrauli iron pillar inscription mentions his authority over North western India and a portion of Bengal.
- Virasena's Udaigiri cave inscription refers to his conquest of the whole world.
- He made Ujjain his second capital.
- His court contained 9 gems including Kalidasa, Amarsimha, Fa-heien, Acharya Dignaga etc.
- Veerasena Saba was the court poet and minister of Chandragupta II. Amarkhaddava was his army general.
- Fa-hein, the Chinese traveller came during the time of Chandragupta II.
- He issued silver and copper coins.

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- His predecessors had issued only gold coins.
- The gold coins were called 'Dinara'.
- Chandragupta II was succeeded by Kumargupta I.
- His inscriptions are the Bilsad inscription, the Karandanda inscription, the Mandsor inscription, the Damodarpur copper plate inscription.
- He founded the Nalanda University.
- Towards the last year of his reign, the Gupta empire faced foreign invasions.
- Skandagupta had to fight the Pushyamitras and the Hunas.
- He was successful in throwing the Hunas back.
- The Junagarh inscription of his reign tells that his governor Parnadatta got the Sudarshan lake repaired.
- He adopted the title of Vikramaditya.
- Some of the successors of Skandagupta were Buddhagupta, Vainyagupta Bhanugupta Narsimhagupta Baladitya, Kumargupta II and Vishmigupta.

Gupta Temples	
Vishnu temple	: Tigawa (Jabalpur)
Shiva temple	: Bhumara (Nagaud)
Parvati temple	: Nachna Kuthara
Dasavtar temple	: Deogarh (Jhansi)
Shiva temple	: Koh (Nagaud)
Bhitargaon temple	: Bhitargaon
Lakshman temple (birck made)	: Kanpur
Laxman temple	: Sirpur (Raipur)
Mukund Darra temple	: Kota
Dhammekh stupa	: Sarnath
Jarasandh's sitting	: Rajgrih (Bihar)

HARSHVARDHAN (606-647 A.D.)

- Harshavardhan ascended the Pushyabhuti throne in 606 A.D.
- Harshavardhan was also known as Siladitya.
- Banabhatta and Hiuen Tsang have provided important information about Harsha's reign.
- Poet Banabhatta wrote 'Harshacharita'.
- Harsha was not successful in his first expedition against Gauda.
- In his second expedition Harsha conquered Magadha and Sasanka's empire.
- Gauda was divided between Harsha and Bhaskarvarman.
- The Aihole inscription mentions that Harsha met defeat at the hands of Pulakesin II.
- Harsha's empire extended from the Punjab to northern Orissa and from Himalayas to the banks of Narmada.
- Harsha wrote three Sanskrit plays-Nagananda, Ratnavali and Priyadarshika.

- Banabhatta wrote Harshacharita and Kadambri.
- Harsha showed equal respect to all religious sects.
- Harsha built rest houses, hospitals, and endowed numerous Brahamanical, Buddhist and Jaina establishments.
- The Kannauj assembly was held in the honour of Hiuen-Tsang.
- Harsha used to celebrate religious festivals at the end of every five years at Prayag.
- Harsha sent an embassy in 641 A.D. to the Chinese emperor.
- Harsha also received a Chinese embassy in return.
- Harsha died in 647 A.D.

SOUTH INDIAN DYNASTIES

THE CHALUKYAS OF BADAMI (543-757 A.D.)

- The Vakatakas in the deccan were followed by the Chalukyas of Badami.
- The Chalukyas established their base at Badami (Vatapi) in Bijapur district of Karnataka.
- The Chalukyas claimed their descent either from Manu or Moon.
- Pulakesin-I (543-66) : founder of the Chalukya dynasty, established a small kingdom with Badami/Vatapi in Bijapur District as its capital.
- Kirtivarman-I-expanded the kingdom by wars against the Kadambas of Banavasi and the Nalas of Bastar.
- Pulakesin II was able to check Harsha's design to conquer Deccan.
- Aihole inscription is a eulogy written by his court poet Ravikirti.
- He sent an ambassador to Persian king Khusrau II in 625 A.D. and also received one from him.
- The Chinese pilgrim Hiuen Tsang Visited his kingdom.
- Pallava ruler Narsimhavarman I invaded the Chalukya kingdom, killed Pulakesin II and captured Badami.
- Vishnuvardhan, son of Pulakesin II, founded the eastern branch of the Chalukyas with its capital at Vengi.

THE PALLAVAS (560-803)

- The Pallavas played an important role after the fall of Satvahanas in 3rd century until the rise of the Cholas.
- The origin of Pallavas is a debatable issue.
- Pallava dynasty was founded by Simhavisnu in 560 A.D.
- Mahendravarman-I was defeated by Pulakesin-II.
- Narasimhavarman was the greatest king. He defeated Pulakesin II and captured Badami/Vatapi. So took the title of Vatapikonda.
- Narsimhavarman also defeated Cholas, Cheras and Pandyas, thus became supreme in South India.
- Narsimhavarman was a great builder, having constructed Mamallapuram and the various buildings here. During his reign Hieun Tsang visited Kanchi.

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- Narsimhavarman II constructed the shore temple of Mamallapuram and the Kailasnath temple of Kanchi. He sent embassies to China to encourage maritime trade.
- The Chalukya Vikramadita-II attacked the Pallava capital during the reign of Paramesvar Varman.
- Nandivarman-II was a worshipper of Vishnu. He built Vaikuntaperumal temple at Kanchi.
- The last Pallava ruler, Aparajita Pallava was defeated by Aditya Chola.
- Kanchi, Pallavas capital was a great centre of Sanskrit learning.
- Both Bharavi and Dandin, the authors of 'Kirtarjuniyam' and 'Dashkumarcharitam.' Respectively lived in the Pallava court.
- The scientific works of Varahamihira and the poetry of Kalidasa were well known in the Pallava country.
- Most of the kings were accomplished scholars and Mahendravarman-I himself wrote the famous burlesque. 'Mattavilasa Prahasana.'

THE GANGAS

- The Gangas were the contemporaries of the Chalukyas and the Pallavas.
- They ruled over a large part of modern Mysore.
- The region was called after them as Gangavadi.
- The founder of the Ganga dynasty was Konkanivarman Dharmamahadhiraja.
- The Gangas had matrimonial alliances with the Pallavas, Chalukyas and Rashtrakutas.

THE KADAMBAS

- The Kadamba dynasty was founded by Mayur Sarman.
- The Kadambas ruled from Banvasi from 345 A.D. to 365 A.D.
- Kakusthavarman (435-455 A.D.) was the most powerful ruler of the dynasty.
- Kakusthavarman established matrimonial relations with the Gangas and the Guptas.

THE CHOLAS

- The Cholas were the feudatories of the Pallavas
- The founder of Chola dynasty was Vijayalaya, who was at first a feudatory of the Pallavas. He captured Tanjore in 850 A.D.
- The greatest Chola rulers were Rajaraja (985-1014 A.D.) and his son Rajendra I (1014-1044 A.D.)
- Raja built a Saiva, a temple of Rajarajeshwara at Tanjore.
- Rajendra I assumed the title of Gangaikondachola and built a city called Gangaikondacholapuram.
- The Chola empire was divided into Mandalams or provinces and these in turn were divided into Valanadu and Nadu.
- Chola rulers marked their victories by erecting a number of Shiva and Vishnu temples.
- During the reign of Rajendra I a naval expedition was sent against the Sri Vijaya empire.

- The Bay of Bengal was converted into a 'Chola lake'.
- The Chola rulers fought constantly with the Chalukyas of Kalyani.
- Rajaraja I granted a village for the maintenance of Buddhist vihara at Nagapattam.
- The king was the most important person in the Chola administration.
- The Cholas maintained a large army consisting of elephants, cavalry and infantry.
- Rajaraja gave his daughter Kundavai to Vimaladitya (Eastern Chalukya of Vengi) and restored Vengi to him.
- Rajaraja-I sent his son Rajendra-I to capture Banarasi and sack Manyakhet of Western Chalukyas.
- During the reign of Rajaraja Maldives was captured.
- Rajaraja conferred the title of 'Mahadandanayaka' upon Rajendra-I for his victory over Pandyas & Keralas.
- Rajaraja-I started the system of land survey called 'kadamb'.
- Adhirajendra was killed in a public revolt.
- Kulotunga-I of Vengi united the kingdom of Eastern Chalukyas of Vengi and Chola kingdom. His other name was Rajendra-II. He was given the title of Sangam Tavirtta (he who abolished tolls).
- Rajendra II was crowned in the battle field of Koppam. He was given the title of Prakesari.
- Vira Rajendra Rajakesari defeated Western Chalukyas king Someswara-I Ahvamalla in the battle of Kudal Sangman (Kurnool district). He foiled all efforts of Vijayabahu of Sri Lanka to extend his authority and drive away the Cholas from Sri Lanka.
- After the decline of Cholas, their place was taken by the Hoysalas of Dwarsamudra and Pandyas of Madurai.
- The gopuram style was developed under the Cholas.
- The system of canals in south is a contribution of the Cholas.
- Rajendra-I built Shiva temple at Gangaikondacholapuram.
- The Cholas were famous for the bronze statue of Nataraja.
- Kamban wrote Ramayana. Sivagasindamani was also produced.
- Temple architecture in south attained its climax under the Cholas.
- The style of architecture which came into vogue during this period is called Dravida.
- 'Mandap' was the pillared hall.
- 'Garbhgriha' was the room of the chief-deity.
- Ceremonial dances were performed by Devadasis.

CHOLA KINGS

1. Vijayalaya	:	846-887	A.D.
2. Aditya	:	871-907	A.D.
3. Parantaka-I	:	907-955	A.D.
4. Ganaraditya	:	955-956	A.D.
5. Arinjaya	:	956-957	A.D.

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6. Parantaka-II	:	957-973	A.D.
7. Uttamachola	:	973-985	A.D.
8. Rajaraja-I	:	985-1014	A.D.
9. Rajendra-I	:	1014-1044	A.D.
10. Rajadhiraja	:	1044-1054	A.D.
11. Rajendra II	:	1054-1064	A.D.
12. Virarajendra	:	1064-1069	A.D.
13. Kulottunga-I	:	1070-1118	A.D.
14. Vikramachola	:	1118-1135	A.D.
15. Kulottunga-II	:	1135-1150	A.D.
16. Rajaraja-II	:	1150-1173	A.D.

TRIPARTITE STRUGGLE (PALAS, PRATIHARAS AND RASTRAKUTAS)

- A number of powerful empires arose in Northern India and the Deccan between 750 A.D.-1000 A.D.
- The Gurjara Pratiharas, the Palas and the Rastrakutas emerged almost at the same time.
- These three powers fought for the supremecy over Kannauj.

THE PRATIHARAS

- The Pratiharas emerged from Gurjaratra or South West Rajasthan.
- They resisted Araburincrusions from Sindh into Rajasthan.
- Pratihara dynasty was founded by Nagabhatta-I.
- Pratihara power revived under Nagabhatta-II. He defeated Dharmapala near Monghyr (Mudgir).
- Pratiharas traced their descent from Lakshamana (the solar race).
- Their capital was at Mahodaya (Kannauj).
- The real founder and the greatest king was Bhoja (836–885 A.D.).
- Bhoja is also called Mihir Bhoja. He defeated Devapala and got Kannauj back.
- Bhoja was a devotee of Vishnu and adopted the title of Adivaraha.

IMPORTANT PRATIHARA RULERS

Vatsaraja	773-793	Nagabhata I	793-833
Bhoja	836-885	Mahipala	908-942

THE PALAS

- The pala empire was founded by Gopala in 750 A.D.
- Gopala was elected as the king by the notable men of the area.
- Gopala was succeeded by his son Dharmapala in 770 A.D.
- Palas established their rule in Bengal and Bihar.
- Dharmapala (770-810) was defeated by Dhruva (Rashtrakuta) and Nagabhatt II (Pratihara).
- During Dharmapala, two brothers Indra & Chakra clashed for Kannauj.
- Dharmapala revived Nalanda University, which had been famous all over the eastern world.
- He also founded the Vikramshila University.

IMPORTANT PALA RULERS

Gopala	:	750-770 A.D.
Dharmapala	:	770-810 A.D.
Devapala	:	810-850 A.D.
Vigrhapala	:	850-854 A.D.

THE RASHTRAKUTAS

- Founded by Dantidurga in deccan.
- Their capital was at Manyakhet or Malkhed near modern Sholapur (earlier at Ellora).
- Amoghvarsha rulled for 68 years.
- Amoghvarsha wrote 'Kavirajamarga', a book on Poetics Kannada.
- Amoghavarsha first transferred capital from Ellora to Manyakhet or Malkhed.
- Indira III (915-927) defeated Mahipala (Pratihara) and sacked Kannauj in 915, Indra was the most powerful ruler of his time.
- Rashtrakutas imported horses from Arabia, West-Asia and central Asia.
- In the Rashtrakuta kingdom, the directly administered areas, were divided into Rashtras (provinces), Visaya and Bhukti.
- The last ruler Karka was overthrown by Tailap, the founder of Chalukyas of Kalyani.
- Dantidurga built the Dasavatara temple at Ellora.
- Krishna-I built the Kailasa or Shiva temple at Ellora in the 9th century.
- The great Apabhramsha poet Svayambhu and his son lived at the Rashtrakuta court.

IMPORTANT RASHTRAKUTA RULERS

1. Dantidurga	:	753-756
2. Krishna-I	:	756-773
3. Govinda-II	:	773-780
4. Dhruva	:	780-792
5. Govinda-II	:	792-814
6. Amoghavarsha	:	814-880
7. Krishna-II	:	880-915
8. Indra-III	:	915-927
9. Amoghavarsha	:	927-930
10. Govinda-IV	:	930-935
11. Amoghavarsha-II	:	935-940
12. Krishna-III	:	940-967
13. Khottiga	:	967-972
14. Karka	:	972-973

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REGIONAL DYNASTIES

THE PARMARAS

- The Parmaras ruled in the Malwa region.
- The Parmaras initially had their capital at Ujjain.
- The Parmaras later transferred their capital to Dhara.
- Vakpati Munj was the founder of the Parmara dynasty.
- Vakpati was a great patron of art and literature.
- Padmagupta, Dhananjya, graced the court of Vakpati.
- The greatest ruler of dynasty was Bhoja.
- Bhoja built the city of Bhojapur.
- Bhoja founded a college, Bhojshala near Dhara.

THE GAHADAVALS

- The Gahadaval dynasty was founded by Chandradeva.
- The capital of Gahadaval was Kannauj.
- Govindchandra conquered east Malwa.
- Govind Chandra's minister for peace and war, Lakshmidhara wrote Krityakalpataru.
- Jaychandra was defeated by Lakshman Sena of Bengal.
- In the Battle of Chandawar (1194 A.D.) Muhammad Ghori defeated Jaichandra.
- Harischandra was the last ruler of Gahadaval dynasty.

THE CHAUHANS

- The Chahamana (Chauhan) dynasty emerged near Sakambhari (Ajmer).
- The Chauhans were the feudatories of Pratihara.
- Simharaja declared independence in the middle of 10th century.
- Ajayraja founded the city of Ajaymeru (Ajmer).
- Prithviraja Chauhan ascended to the throne in 1177 A.D.
- Prithviraja Chauhan defeated Muhammad Ghori in the first battle of Tarain (1191 A.D.).
- In the second battle of Tarain (1192 A.D.) Muhammad Ghori defeated Prithviraja Chauhan.

KASHMIR

- Three dynasties Karkota, Utpala and Lohar ruled Kashmir during 800 A.D. to 1200 A.D.
- Karkota dynasty was founded by Durlabh Vardhana.
- Lalitaditya Muktapida defeated Yasovarman of Kannauj.
- Lalitaditya built the famous Sun temple at Martand.
- Utpala dynasty was founded by Avantivarman.
- Queen Didda ruled from 980 A.D. to 1003 A.D.
- Sangramraja founded the Lohara dynasty.
- King Harsha belonged to Lohara dynasty.
- Kalhana wrote 'Rajatarangini' in 12th century.

THE CHANDELLAS

- The Chandelas ruled in Bundelkhand.

- The dynasty was founded by Nanuka in the early years of 9th century and his capital was Khajuraho.
- Dhanga was the first independent king of the Chandella dynasty and assumed the title Maharajadhiraja.
- He was succeeded by Ganda who in turn was succeeded by Vidyadhara.
- During Vidyadhara's reign Mahmud of Ghazni invaded Kalinjar in 1019 and again in 1022.
- In 1165 Parmardideva was defeated by Prithviraja Chauhan.
- Qutub-ud-din Aibak defeated Parmadideva and occupied greater part of Bundelkhand.
- Alauddin Khalji captured the whole of the kingdom.
- Temples of Khajuraho were built by Chandellas.
- The most prmoinent among the Khajuraho temples are the Kandariya Mahadeva, Devi Jagadamba. Parsvanatha, Lakshamana and the Viswanatha temples.

THE SENAS

- The Senas supplanted the Palas in Bengal.
- The Senas called themselves 'Brahma Kshatriya'.
- Vijaysena ascended the throne in 1095 A.D. and enlarged the frontiers off senas.
- Vijayapuri and Vikrampuri were two capitals of Senas.
- Vijayasena was succeed by his son Ballalsena.
- Ballalsena established the tradition of 'Kulinism'.
- Ballalsena wrote 'Adbhutsagar' and 'Dansagar'.
- Ballalsena was succeeded by Lakshmansena.
- Bakhtiyar Khalji invaded Bengal during the reign of Lakshmansena.
- Jayadeva, Dhoyi, Halayudha adorned Lakshmansena's court.

IMPORTANT LITERARY WORKS OF ANCIENT INDIA

Literary Work		Author
Ashthadhyayi	:	Panini
Mahabhashya	:	Patanjali
Manu Smriti	:	Manu
Arthshastra	:	Kautilya
Chhanda-Sutra	:	Pingala
Buddhacharita	:	Ashvaghosha
Sariputra Prakarna	:	Ashvaghosha
Saundaranand	:	Ashvaghosha
Kumarsambhavam	:	Kalidasa
Raghuvansa	:	Kalidasa
Malvikagnimitram	:	Kalidasa
Sisupalvadha	:	Magha
Natyashastram	:	Bharata Muni
Ratnavali	:	Harshavardhana
Nagananda	:	Harshavardhana
Maltimadhav	:	Bhavabhuti
Uttararamcharita	:	Bhavabhuti

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Meghaduta	:	Kalidas
Gita Govinda	:	Jayadeva
Harshacharita	:	Banabhatta
Ramcharita	:	Sandhyakar Nandi
Gaudvaho	:	Vakpati Raj
Daskumarcharita	:	Dandin
Vashvadatta	:	Subandhu
Kathasaritsagar	:	Somdeva
Panchatantra	:	Vishnu Sharma
Hitopdesha	:	Narayan Pandit
Kamasutra	:	Vatsayan
Mattavilasa Prahasana	:	Mahendravarman I
Nitisara	:	Kamandaka
Charak Samhita	:	Charak
Dayabhaga	:	Jimutavahana
Nighantu	:	Yaska
Mitakshara	:	Vijneshvra
Brihat Kathamanjari	:	Kshemendra
Mahaviracharita	:	Bhavabhuti

FAMOUS SCHOLARS AND THEIR PATRONS

Scholar		Patron
Udayraja	:	Mahmud Begrha (Gujarat)
Hemchandra	:	Kumarpala (Chalukyas of Anhilwara)
Nagarjuna	:	Kanishka
Amar Singh	:	Chandragupta Vikramaditya
Ravikirti	:	Pulkesin-II
Vakpatiraj	:	Yashovarman of Kannauj
Bhav Bhuti	:	Yashovarman of Kannauj
Harishena	:	Samudragupta
Rajshekhar	:	Mahendrapala and Mahipala
Somadeva	:	Prithviraja III
Chandarbardai	:	Prithviraja III
Banabhatta	:	Harshavardhana
Dandin	:	Narsinghavarman (Pallava)
Bharvi	:	Simhavishnu (Pallava)
Gunadhya	:	Hala (Satvahana)
Mahaviracharya	:	Amoghvarsha (Rashtrakuta)
Jinasen	:	Amoghvarsha (Rashtrakuta)
Sakatyayan	:	Amoghvarsha (Rashtrakuta)
Jayadeva	:	Lakshman Sena (Bengal)
Bilhan	:	Vikramaditya VI (Chalukya of Kalyani)
Vijnaneshwar	:	Vikramaditya VI
Lakshmidhar	:	Govind Chandra
Shri Harsha	:	Jaychand
Firdausi	:	Mahmud Ghazni
Amir Khusro	:	Balban to Alauddin Khalji

MEDIEVAL INDIA

MUSLIM INVASION

THE GHAZNAVIDS

- Alpatgin established an independent kingdom with its capital at Ghazni.
- Mahmud ascended the throne (998-1030) at Ghazni.
- Firdausi was the poet laureate at the court of Mahmud.
- Firdausi wrote 'Shah Namah'.
- Mahmud claimed descent from Iranian legendary king Afrasiyab.
- Mahmud is said to have made 17 raids into India.
- The initial raids were directed agaisnt the Hindustani rulers.
- In 1001 Jayapala, the Hindushahi, ruler was defeated.
- Jaypala's son Anandpal succeeded him to the throne.
- The Battle of Waihind(1008-1009) was fought between Mahmud and Ananda.
- After the battle, Punjab passed into the hands of Ghaznavis.
- The subsequent raids of Mahmud into India were aimed at plundering the rich temples and cities.
- Mahmud invaded Kannauj in 1018 and Somnath in 1025 A.D.
- Mahmud died at Ghazni in 1030 A.D.

MAHMUD GHAZNI'S 17 ATTACKS

1.	1000-1001	(against Jaipal of Peshawar) Sindh.
2.	1001	(against Anandpal of Peshawar) Sindh
3.	1002-1004	Multan
4.	1005-1006	Multan
5.	1007-1008	Nawasa Shah of Multan
6.	1008-1009	Anandpal of hindushahi of Sind
7.	1009-1010	Narayanpur (Rajasthan)
8.	1010-1011	Daud of Multan
9.	1012-1013	Thaneswar (The Mecca of Hindus)
10.	1013-1014	Nandana (against Anandpal)
11.	10-15-1016	Kashmir valley (unsuccessful)
12.	1016-1018	Kannauj, Mathura
13.	1020-1021	Kalinjar
14.	1021-1022	Lahore
15.	1025-1026	Somnath
16.	1026-1027	Jats of Sind
17.	1027	Khokars of Punjab

THE TURKISH CONQUEST

- The Ghurid empire rose into prominece in North-West Afghanistan.
- The Ghurids had started as vassals of Ghazni, but had soon thrown off its yoke.

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- The power of the Ghurids increased under Sultan Alauddin who earned the title of 'jahan-soz'.
- In 1173, Shahabuddin Muhammad (Muhammad Ghori) ascended the throne at Ghazni.
- By 1190, Muhammad Ghori had conquered Peshawar, Lahore and Sialkot.
- In India Chauhans had captured Delhi from the Tomars.
- Conflict between Muhammad Ghori and Prithviraj Chauhan started with rival claims for Tabarhinda (Bhatinda)
- The First Battle of Tarain was fought in 1191 A.D.
- In this battle the Ghuri forces were completely routed. Muhammad Ghori's life was saved by a young Khalji horseman.
- The Second battle of Tarain was fought in 1192 A.D.
- This battle is regarded as one of the turning points in Indian History.
- Prithviraj Chauhan escaped but was captured near Saraswati.
- After Tarain Muhammad Ghori returned to Ghazni.
- He left the affairs in India in the hands of his trusted slave Qutubuddin Aibak.
- In 1194 A.D. Muhammad Ghori returned to India.
- The battle of Chandawar (1194 A.D.) was fought between Muhammad Ghori and Jaichandra.
- Jaichandra was defeated in the battle of Chandawar.
- The battles of Tarain and Chandawar laid the foundations of Turkish rule in India.

DELHI SULTANATE (1206-1526 A.D.)

THE SLAVE DYNASTY (1206-1290 A.D.)

- After the death of Muhammad Ghori, his slave, Qutubuddin Aibak laid the foundation of Slave dynasty in 1206 A.D.
- Qutubuddin Aibak ruled from Lahore.
- Qutubuddin Aibak was known as Lakh Baksh for his magnanimity.
- He built *Quwwattul Islam* mosque in Delhi and *Adhai Din Ka Jhopada* in Ajmer.
- He laid the foundation of *Qutub Minar*, in memory of famous sufi saint Khwaja Qutbuddin Bakhtiyar Kaki in 1199 A.D.
- Aibak was a Turk of 'Aibak tribe' which means in Turkish language. 'Lord of the Moon.'
- He began his reign with the modest title *malik* and *siphasalar* which had been conferred upon him by Muhammad Ghori.
- Under Ghori, he was 'amir-i-akhur', the master of stables.
- He made Indraprastha near Delhi, his military headquarters.
- After Qutubuddin, Aram Shah ascended the throne.
- Aram Shah was deposed by Iltutmish.

- Iltutmish ruled from 1211-1236 A.D.
- Iltutmish was the real founder of the Sultanate.
- First appointed by Aibak as amir-i-shikar.
- He was governor of the iqtas of Gwalior and Baran (Bulandshahar) in succession.
- At the time of Aibak's death he was governor of Badaun.
- He was son-in-law of Aibak.
- He made Delhi capital of his empire.
- He was manumitted by Aibak in 1206 at the instance of Muhammad Ghori.
- Defeated Aram Shah and took the throne in 1211.
- Iltutmish defeated Tajuddin Yaldoz, the sultan of Ghazni in 1216 at Tarain (third battle of Tarain)
- In 1217 he defeated Nasiruddin Qabacha, the governor of Lahore at Mansura.
- Introduced the silver tanka and the copper jital two basic coins of the Sultanate period.
- He reconquered Multan and Bengal in 1227-1228. reasserted his authority in Bengal and Bihar in 1229.
- In 1229 he received a deed of investiture from the Abassid Caliph of Baghdad.
- In 1226, Iltutmish wrested Ranthambhor and Mandor. In 1233, he attacked Malwa and captured Bhilsa. He also conquered Gwalior and Jalore.
- He issued a purely arabic coinage of silver and was the first to do so.
- He organised the *turkan-i-chahalgani*.
- Minhas-us-siraj, his contemporary historian has praised him.
- Iltutmish declared Razia to be his successor.
- The amirs put Ruknuddin Firoz Shah on the throne.
- He was executed and Razia became the sultan.
- She was the first and the last muslim woman ruler of Delhi Sultanate.
- Iltutmish's Wazir Nizamul Mulk Junayadi rebelled and was defeated.
- Muhazabuddin (a Tajik) was made deputy wazir.
- Yakut (Ethiopian/Abyssinian) was made Amir-i-Akhur.
- Raziya's reign marked the beginning of a struggle for power between the monarchy and the Turkish nobles called '*forty*' or the '*chahalgani*'.
- She discarded the female apparel and started holding court with her face unveiled.
- The Turkish nobles accused her of violating feminine modesty and of being too friendly to Yakut Khan.
- Raziya and Altunia were killed at Kaithal in 1240.

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- The contemporary historian Minhaj described her as a great sovereign endowed with all the admirable attributes and qualifications necessary of kings.
- Khutba was read and coins struck in Raziya's name as Sultan Raziat al-Dunia wa'l Din bint al-sultan.
- The successor of Razia (1236-1240 were Muizuddin Bahram shah (1240-1242) and Alauddin Masud Shah (1242-1246).
- In 1246 Nasiruddin Mahmud (1246-1265) ascended the throne but the real power was in the hands of Balban.
- Balban or Ulugh Khan (1246-1286) was a member of the chahalgani founded by Iltutmish. In 1250 the Balban married his daughter to the Sultan.
- Balban became Naib-i-Mamlakat and got the title of Ulugh Khan (Great Khan) by Sultan.
- In 1253 Imamuddin Raihana was made Wazir and Balban was dismissed and sent to Nagaur.
- Turks resentment led to Raihana's transfer to Badaun and Balban was restored.
- In 1260 Halaku's (Mongol-il-Khan) emissary was received in Delhi.
- Balban ascended the throne in 1266 A.D.
- To control the on–slaught of the Mongols he founded the Diwan-i-Arz.

WORKS AND FACTS ABOUT BALBAN

- Started Iranian practice of Sijda (bowing before Sultan) and paibos (kissing of monarch's feat) a unislamic trace.
- Abolished Chalisa or Chehalgani.
- Held darbar (court) on Iranian model.
- Sought to increase the prestige and power of the monarchy by curbing nobles.
- No jokes and laughter in courts.
- Stopped drinking wine and made nobles to do so.
- Called himself the *Nasir amir-ul momin* or caliph's right hand man.
- Claimed descent from *Afrasiyab* (the legend of Iranian hero)
- Real organiser or consolidator of Delhi Sultanate.
- First Sultan to propound the *theory of kingship*. According to it king is shadow of God. (Zil-i-Ilahi)
- He separated finance department from military department.
- He reorganised the Diwan-i-Arz (military department).
- Built strong forts at Kampil, Patiali, and Bhojpur to suppress Hindu rebels.
- Bhatinda, Sunam and Samana forts strengthened as frontier outposts.
- Kept friendly relations with Halaku and received his envoys.
- In 1279 Chaghatay Mongols defeated by Prince Mahmud, Bughra Khana and Malik Bektars.

- In 1285 Mongols under Taimur invaded India and killed Prince Mahmud (Khan Sahid).
- After Balban's death in 1286, Kaiqubad (1287-1290) and Kaimurs became Sultans for a brief period.
- After 3 months Kaimurs the last ilbari was killed and Jalaluddin ascended the throne.

THE KHALJI DYNASTY (1290-1320 A.D.)

- The Khalji Dynasty was founded by Jalaluddin Khalji.
- Jalaluddin began to rule from Kilkhori.
- Malik Chhajju (Balban's nephew and governor of Kara) rebelled but was pardoned and Kara was given to Ali Gurshap (Alauddin Khalji)
- A gang of thugs were banished to Bengal showing leniency.
- In 1291–1292 Mongols under Abdulla were defeated at Dipalpur.
- Ulghus (descendent of Changez) embraced Islam and these new mussalmans settled near Delhi.
- In 1292 Ranthambhor was beseized but later abandoned.
- Sidi Maoula, a darvesh of Delhi was accused of conspiracy by Maydari Qalandars was trampled by an elephant ordered by prince Arkali Khan.
- Jalaluddin was assassinated in 1296 at Kara by Alauddin Khalji.
- Alauddin Khalji's original name was Ali Gurshap.
- Alauddin Khalji was the Governor of Kara.
- Mongols under Kadar were repulsed by Zafar Khan (Rustam-i-Hind).
- In 1299 Mongol leader Qutugh Khawaja was repulsed by Alauddin Khalji and Jafar Khan, the latter was killed at Kili near Delhi.
- In 1303 Mongols under Targhil were defeated near Siri, (near Delhi)
- 1304-1305 Alibeg and Khwaja Tash and Tartag were defeated.
- During Jalaluddin's reign Alauddin had captured Bhilsa, Devgiri (Ramchandra) and Chanderi.
- The Mongol incursions were repulsed by Zafar Khan during the reign of Alauddin Khalji. The new mussalmans were slaughtered.
- Alauddin captured Gujarat in 1297 A.D., which was ruled by Rai Karan. He sacked Anhilwara and Somnath and married Kamla Devi, the queen of Rai Karan. He also captured Malik Kafur and took him to the royal court.
- In 1300, he captured Ranthambhor which was under Hamirdeva.
- During Gujarat campaign Malik Kafur (Hazar dinari) was captured from Cambay.
- Alp Khan was made Governor of Gujarat.
- In 1303, Chittor under Ratan Singh was captured.
- Khizr Khan was made the Governor of Chittor.
- Chittor was renamed as Khizarabad.

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- In the Deccan, Malik Kafur attacked Devagiri in 1306-1307.
- Ramchandradeva was given title Rai-i-Rayon.
- Warangal under Pratap Rudra Deva was attacked in 1309 (Kakatiya)
- In 1310 Dwarasamudra under Vir Balala Deva III (Hoysala) was invaded.
- In 1311 Mabar/Madura under Vira Pandya was attacked. But none of southern states were annexed.
- For successful Deccan campaigns, Kafur was awarded title Malik Naib (Regent)
- Malik Kafur was a Eunuch.
- During south campaigns Kafur reached up to Rameshwaram where he built a mosque.

WORKS AND FACTS ABOUT ALAUDDIN KHALJI

- New land settlement was introduced.
- Cultivators were brought under direct control of states and middlemen (*Khut, Chaudhari, Mukadums*) were deprived of powers and privileges.
- Organised standing army, first Sultan to do so. Soldiers were paid in cash.
- Appointed Diwan-i-mustakharaj to collect arrears.
- *Ghari* (house tax) and *Charai* (Irazing tax) levied.
- All Patwari accounts were audited.
- *Kismat-i-Khuti* (headmen's cess) was abolished.
- Market reforms for the maintenance of a large army cheaply.
- Prices of goods were fixed on the principle of Bar Award (Production cost). Wheat 7.5 jitals per maund, barley 4, rice 5.
- Land revenue from Khalisa village was paid in cash.
- Diwan-i-Riyasat, ministry of commerce organised under Malik Yakub.
- Three types of markets (i) Sahna-i-mandi (grain market, (ii) Sarai Adl (cloth and groceries market) (iii) Market for horses, cattle and slaves.
- Malik Qabul looked after grain market.
- Sarai Adl was near Badaun gate under Rais Parwana.
- Nayaks were grain merchants.
- Multanis is traded mainly in cloth.
- Alauddin Khalji paid his soldiers in cash.
- Cavalry was main stay, 234 tankas per year for maintaining one horse (Yak Aspa) and 78 more for two (Do Aspa).
- *Dagh* or branding of horses was introduced. *Chehra* or descriptive role of soldier was also introduced.
- Diwan-i-Ariz as military department. Ariz-i-Mumalik was the commander in chief.
- Khams collected 4/5th.

- Built Alai Minar (incomplete) height twice of Qutub Minar. Alai Darwaza, Siri Fort and the second capital Mahal Hazar Satoon (palace of thousand pillars) and Jamait Khana mosque.
- Alai Darwaza was first sultanate building on scientific method. Arc and dome used. It is now entrance of Qutub Minar complex.
- Alauddin Khalji adopted title Sikandar-i-Saini (the second Alexander) inscribed in his coins.
- After Alauddin's death his on Mubarak Khalji ascended the throne. He declared himself the Khalifa and took the title 'Al wasiq Billah'. He was killed and succeeded by Nasiruddin Khusrau Shah. He was the only Hindu convert to sit in the throne of Delhi.

THE TUGHLAQ DYNASTY (1320-1414 A.D.)

- Ghiyasuddin Tughlaq ascended the throne after murdering Khusrau Shah.
- Ghiyasuddin Tughlaq ruled from 1320-1325.A.D.
- Ghiyasuddin Tughlaq belonged to the Qarauna Tribe.
- He was first Sultan to use term *Ghazi* with his name.
- he banned sell and production of wine.
- He exempted *Khuts, Mukadams* from tax.
- He encouraged cultivation by digging canals, first to do so.
- He laid the foundation of Tughlaqabad Fort.
- His relation with Nizamuddin Auliya soured because he wanted gift and money back given by Khusrau Khan to Auliya.
- Prince Jauna Khan's (title Ulugh Khan) Warangal campaign (1321) against Kakatiya ruler failed with rumours of the sultan's death.
- In 1323 second Warangal campaign of Jauna Khan succeeded and Telengana was annexed.
- In 1324-1325 Ghiyasuddin invaded Bengal and defeated Ghiasuddin Bahadur. On return journey Tirhut under Raja Harpal Deva annexed.
- Died in the collapse of the victory pavilion for the Bengal campaign built by Jauna Khan at Afghanpur near Delhi.
- Ibn Batuta accused Jauna Khan of patricide. Barani says that stage collapsed due to lightening or parade of elephants.
- Muhammad bin Tughlaq is one of the most controversial figures in Sultanate history.
- Muhammad bin Tughlaq's original name was Jauna Khan.
- Muhammad bin Tughlaq ruled from 1325-1351.A.D.
- Other many important works and facts about Muhmmad bin Tughlaq are given below :
- Muhammad bin Tughlaq was a scholar of mathematics, astrology and medical science.
- Muhammad bin Tughlaq has been called king of moneyers, mad king and mixture of opposites.

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WORKS AND FACTS ABOUT MUHAMMAD-BIN-TUGHLAQ

- Had discussion with Jain saint Jinaprabha Suri and enjoyed playing holy.
- Allowed Indians into services, even son of gardeners, cooks, musicians and weavers.
- In 1325 Mongol under Tamrashirin reached Meerut but were repelled.
- Bahauddin Gurshap, Governor of Sagar (M.P.) rebelled and was flayed alive in 1326.
- Believed in 'Divine rights of kings'.
- First sultan to grant loans to farmers (sondhar)
- Increased land tax 1/2 in Doab.
- Neglected religion in matters of politics.
- Created agriculture department *Diwan-i-Amir Kohi.*
- Organised army on decimal model of Mongols.
- Made centrally located Devagiri (Daulatabad) his capital in 1328-1329.
- He introduced Token Currency.
- After repulsing an attack of Mongols he planned to occupy Khurasan and Iraq. He organised a huge army but later disbanded it.
- His Qarachill expedition was launched in the Kumaon hills to counter Chinese incursions. His army suffered heavy setbacks.
- He also organised the Kangra expedition.
- He instituted agricultural reforms. He fixed the land revenue at half the produce and not on the basis of produce.
- When a large part of India was ravaged by famine and plague, he shifted to Swargdwari, 100km east of Delhi.
- Harihara and Bukka founded the Vijaynagar kingdom in 1336.
- Hasan founded the Bahmani kingdom in Deccan in 1347.
- His end came when he was in Thatta to quell one of the many rebellions that took place during his reign.
- Muhammad Bin Tughlaq was succeeded by Firoz Shah Tughlaq.
- Firoz Tughlaq ruled from 1351 A.D. to 1388 A.D.
- Firoz Tughlaq has been described as "not even a mediocre military leader".

WORKS AND FACTS ABOUT FIROZ SHAH TUGHLAQ

- Irrigation extended massively by digging canals and wells.
- Gardens and orchard's planted. Established 1200 gardens around Delhi for grapes.
- As well as 23 taxes were abolished. Only 4 taxes sanctioned by *shariat* were levied.
  - (i) *Kharaj* (1/10th of produce)
  - (ii) *Zakat* (Alms for poor Muslims)

  - (iii) *Jaziya* (poll tax on non-muslims)
  - (iv) *Khams* (1/5th of the spoils of war)
- *Jaziya* was separated from land tax, earlier it was part of land tax.
- Jaziya was also imposed on Brahmins (earlier exempted) only women, children, disabled.
- Sharb (irrigation tax) 1/10th of produce was imposed.
- Free hospitals (Darul Shafa), marriage bureau and employment bureau were set up.
- Officials were paid by *iqta* grants, very few were paid in cash.
- Soldiers and higher officials post became hereditary.
- In 1353 led campaign against Haji Illyas of Bengal but failed in siege of Ikadalamud fort.
- In 1358 second Bengal campaign against Sikandar Shah Ilyas who accepted Firoz's suzerainty.
- Raja Gajpati of Jajnagar (Orissa) was attacked and Jagannath temple of Puri was sacked.
- In 1365 Nagarkot campaign was successful, 1300 Sanskrit manuscripts from Jawalamukhi temple were collected and got trasnalted into Persian as the Dalai-i-Firoz Shahi (by Azizudin Khan).
- He had 180,000 slave set up Diwan-i-Bandagan (for slaves)
- Founded towns of Jaunpur (old name Manaich) named after Jauna Khan, Hisar Firoza, Fatehabad and Firozabad (Firoz Shah Kotla, the 5th city of Delhi).
- Topara and Meerut pillars of Ashoka were brought to Delhi.
- *Diwan-i-Khairat*, the chairty bureau formed.
- Introduced new coins *Adha* (1/2 Jital) and *Bikh* (1/4th Jital). *Shashgani* was 6 jitals and *Hastgani* 8 jitals.
- Firoz Shahi Madrasa was built at Firozabad.
- Banned unislamic practices e.g., prohibiting women to pray at graves of sufi saints.
- He erased palace paintings.
- He repaired the Qutubaminar which had been struck by lightening.
- The chief architect of Firoz was Ghazi Shahna.
- He wrote Fautuhat-i-Firoz Shahi.
- He entertained great regard for the Caliph of Egypt and styled himself as his deputy.
- He revived the jagir system which had been abolished by Alauddin.
- After Firoz Shah Tughlaq, Muhammad Khan, Ghiyasuddin Tughlaq Shah-II, Abu Baqr, Nasiruddin Muhammad, Humayun and finally Nasiruddin Mahmud ascended the throne.
- Taimur invaded Delhi in 1398 A.D.
- Nasiruddin Mahmud fled to Gujarat.
- Nasiruddin Mahmud died in Kaithal.

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THE SAYYIDS AND THE LODHIS

- The Sayyids occupied the throne of Delhi in 1414 A.D.
- Yahya Sirhindi claims that the founder of the Sayyid dynasty was a descendant of the Prophet.
- Khizr Khan, the founder of Sayyid dynasty had collaboration with Taimur.
- As a reward for his service Taimur gave him governorship of Lahore, Multan and Dipalpur.
- After Taimur's departure, he declared himself the Viceroy of Taimur in north-western India.
- Later he invaded Delhi and became its master.
- Khizr Khan did not rule as a sovereign ruler but professed to rule as the deputy of Taimur's son and successor, Shah Rukh.
- Khizr Khan's three successors Mubarakshah (1421-1433), Muhammad Shah (1434-1443) and Alauddin Alam Shah (1443-1451) assumed the royal title of Sultan and ruled as sovereign rulers.
- Bahlol Lodhi, the most prominent noble of the state, got the control of Delhi.
- Bahlol Lodhi deposed Shah Alam (or Alam Shah) the last Sayyid sultan, and laid the foundation of the Lodhi dynasty.
- All Sayyid rulers had to face stiff resistance from the Khokhars led by Jasrath.
- The Sayyid dynasty had the shortest lifespan of all Sultanate ruling houses, excluding that of Khaljis.
- The Lodhi's were the first 'Afghans to rule Delhi.
- Bahlol Lodhi, the founder of Lodhi dynasty. (1451-1489).
- He annexed the Sharqui kingdom of Jaunpur in 1484.
- His government was like a tribal confederacy of Afghans on high positions.
- He introduced copper Bahloli coins.
- He was succeeded by Sikandar Shah Lodi (Nijam Khan).
- He introduced, *Gazz-i-sikandari*, new yard for land measurement.
- He conquered South Bihar and concluded a treaty of friendship with Alauddin Hussain Shah, ruler of Bengal.
- In 1506 he founded the city of Agra (original name Yoginipur) and made it his capital.
- He wrote verses in Persian (130 verses) under pen name of *Gulrukhi*.
- Prices of commodities were made cheap by him.
- he forbade unisalmic practices because he was a bigoted ruler. Forbade women from visiting graves of saints, prohibition of processions in their memory.
- Jaziya was reimposed by him.

IMPORTANT DEPARTMENTS AND OFFICIALS UNDER DELHI SULTANATE

Officials	Departments
Wakil-i-Dar	: Royal palace
Diwan-i-Istikak	: Head of pension department
Sahna-i-Mandi	: Head of grain market.
Mufti	: Interpreter of shariat.
Diwan-i-Mawalim	: Head of administrative tribunal
Sar-Jandar	: Head of royal bodyguards.
Sar-i-Jamadar	: looked after royal garments
Hajib	: An officer under Barbak
Diwan-I-khas	: Head of royal correspondence department.
Barbek/Amir-i-Hajib	: royal ceremonies.
Amir-i-Koh	: Head of agriculture department
Amir-i-Shikar	: looked after royal hunting.
Barid-i-Mamalik	: Head of intelligence department.
Ariz	: Military needs, recruitment, horses.
Dabiri-Mamalik	: Chief secretary.
Shiqdar	: Head of Shiq.
Qazi ul-Qazat	: Chief justice.
Amir	: Officer of Sipalsalar.
Amirdad/Dadbau	: Head of Diwan-i-majlis in absence of sultan.
Amiran-i-Tuman	: Head of 10,000 soldiers.
Amiran-i-Hazara	: Officer of 1000 soldiers.
Amiran-i-Sada	: Head of 100 soldiers.
Amir-i-Punjah	: Head of 50 soldiers.
Amil	: Land revenue collection in Paragana.
Qazi	: Justice.
Kargun	: Land record keeper.
Kotwal	: Law & order.
Kharitdar	: Dispatcher of orders.
Dabir	: Officer of royal correspondence.
Naib Barbak	: Head of royal court.
Barid	: Spionage, Intelligence.
Malik	: Head of Sipalsalari & Amirs.
Mutsarif	: Head of royal Karkhana.
Mushrif	: Accountant general.
Mustaufi	: Auditor general.
Muhatasib	: Public morals.

SULTANATE RULERS : AT A GLANCE

Slave Dynasty		
Qutb-ud-din Aibak	:	1206-1210 AD
Aram Shah	:	1211 AD
Shamsuddin Iltutmish	:	1211-1236 AD
Ruknuddin Feroz	:	1236 AD
Razia Sultan	:	1236-1240 AD

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Muizuddin Behram	:	1242 AD
Alauddin Masud	:	1246 AD
Naseeruddin Mahmud	:	1246-1266 AD
Ghiyasuddin Balban	:	1266-1286 AD
Muizuddin Kaikubad	:	1290 AD
Kaimur	:	1290 AD
Khalji Dynasty		
Jalaluddin Khalji	:	1290-1296 AD
Alauddin Khalji	:	1296-1316 AD
Shihabuddin Omar	:	1316 AD
Mubarak Khalji	:	1316-1320 AD
Khusro Khan	:	1320 AD
Tughlaq Dynasty		
Ghiyasuddin Tughlaq	:	1320-1324 AD
Muhammad Tughlaq	:	1324-1351 AD
Firoz Shah Tughlaq	:	1351-1388 AD
Mohammad Khan	:	1388 AD
Ghiyasuddin Tughlaq Shah II	:	1388 AD
Abu Baqr	:	1389-1390 AD
Naseeruddin Muhammad	:	1390-1394 AD
Humayun	:	1394-1395 AD
Naseeruddin Mahmud	:	1345-1412 AD
Sayyid Dynasty		
Khizr Khan	:	1414-1420 AD
Mubarak Shah	:	1421-1433 AD
Muhammad Shah	:	1434-1443 AD
Alauddin Alam Shah	:	1443-1451 AD
Lodhi Dynasty		
Bahlol Lodhi	:	1451-1489 AD
Sikander Lodhi	:	1489-1517 AD
Ibrahim Lodhi	:	1517-1526 AD

THE VIJAY NAGAR EMPIRE

- The Vijayanagar Empire was founded by Harihara-I and Bukka-I in 1336 A.D.
- Earlier they had served under the Kakatiya ruler of Warangal, Prataprudra-II.
- The first dynasty was named (Sangama) after founders' father Sangama.
- Capital city Vijayanagar (The city of victory) was named after their Guru Vidyaranya.
- City of Vijayanagar was located on the bank of Tungabhadra river.
- There are four dynasties in the history of the Vijayanagar empire.
- The first was Sangama dynasty founded by Harihara-1 and Bukka in 1336.

- The second was Saluva dynasty founded by Saluva Narasimha in 1485.
- The third was Tuluva dynasty, founded by Vira Narasimha in 1505.
- The fourth was Aravidu dynasty, founded by Tirumala in 1570.
- Raichur Doab was the area of contention between the Vijaynagar and Bahmani rulers.
- Buka-I fought with the Bahmani Sultan Muhammad Shah-I and signed a treaty with him.
- Harihara-II repulsed the attack of Bahmani Sultan Muzahid Shah.
- Devaraya-I had to face invasion by the Bahmani ruler Firoz Shah and he had to surrender the fort of Bankapur.
- In 1410 Devaraya-I constructed a barrage across the Tungabhadra. He also encouraged the construction of a dam of the river Harihara.
- The famous Telugu poet Srinatha, the author of 'Harivilasam', adorned Devaraya-I's court. The "Pearl Hall" of the palace honoured the men of eminence.
- Devaraya-II was called Immadidevaraya and Proudha Devaraya. The inscriptions call him as Gajabetekara (the elephant hunter).
- Devaraya-II was the greatest king of Sangama dynasty.
- In order to strengthen his army, Devaraya-II employed muslims in his army and asked his soldiers and officers to learn the archery from them.
- In 1442 Devaraya-II sent a naval expeditor against Srilanka and defeated them.
- Devaraya-II wrote two sanskrit works–'Mahanataka Sudhanidhi' and a commentary on the Brahma Sutras of Badarayana.
- The history of the Sangama dynasty ended with the murder of Virupaksha by his own son in 1485.
- Krishna devaraya (of Tuluva dynasty) was regarded as the greatest of all the Viajayanagar rulers for his military as well as other achievements.
- In battle of Diwani, Krishna devaraya defeated Bahmani forces and murdered Yusuf Adil Shah of Bijapur.
- Krishna devaraya defeated the rebellious chief of Ummattur, the Gajapati king Prataprudra of Orissa, the Adil Shahi sultan Yusuf Adil Shah and his son Ismail Adil Shah.
- Krishna devaraya restored Bahmani sultan Mahmud on the throne of Bidar.
- His political ideas are contained his Telegu work "Amuktamalayada". He was known as 'Andhra Bhoja' and 'Abhinava Bhoja'.
- Ashta Diggajas (eight eminent luminaries in literature) adorned his court.
- He built the famous temples of Krishnaswami, Hazara Ramaswami and Vitthalaswami at the capital.
- He built a new city called 'Nagalpura' in memory of his mother Nagalmba.

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- He built a large number of Rayagopurams (towers).
- During Sadashiva Raya's reign the real power laid in the hands of Rama Raya.
- The Deccan sultans except Berar joined hands to defeat Vijayanagar in the Battle of Talikota (1565).
- After the battle of Talikota, Vijayanagar government was shifted first to Penukonda and then to Chandragiri.
- King was considered equal to God.
- Achyutadeva Raya had his coronation performed in the Tirupati temple.
- The Vijayanagar kings generally nominated their heirs, usually the eldest prince as appointed Yuvaraja.
- The king had a council of ministers who met in a hall called 'Venkatavilas mandapa.'
- The pradhani was the Prime Minister.
- Ministers bore the title of 'Dandanayaka.'
- The rayasani was an officer who recorded the oral orders of the king.
- The Karanikam was an accountant.
- *Nayakara system* : In this system the king distributed land to his dependents called Nayaks.They enjoyed great freedom.
- *Amaram* : The feudatories bounded by military obligation held amaram tenure and were known as Amar Nayaks.
- Harihara-I issued Hanuman type coins. Buka-I also issued Hanuman type coins.
- Krishnadevaraya issued Venkatesha and BalaKrishna type coins.
- Achyuta Raya issued Garuda type coins.
- Tirumala issued Varaha type coins.
- Land tax was also called 'sist'.
- Krishna devaraya got the land surveyed.

THE BAHMANI KINGDOM

- The Bahmani kingdom was founded by Zafar Khan in 1347.
- Zafar Khan took in title of Alauddin Hasan Bahman Shah.
- The capital of the Bahmani kingdom was at Gulbarga.
- Gulbarga was renamed as Ahsanabad.
- The greatest Bahmani ruler was Tajuddin Firoz Shah.
- Firoz Shah was a good calligraphist and poet and often composed extempore verses.
- According to Farishta, Firoz Shah was well versed not only in Persian, Arabic and Turkish but also in Telugu, Kannada and Marathi.
- The most remarkable step taken by Firoz Shah Bahmani was the induction of Hindus in the administration on a large scale, particularly, Deccani Brahmans in the revenue administration.
- Firoz Shah Bahmani encouraged the Pursuit of astronomy and built an observatory near Daulatabad.
- Chaul and Dabhol were main ports of Bahmani Kingdom.

- Firoz Shah Bahmani married a daughter of Deva Raya-I of Vijayanagar.
- In 1419 Firoz Shah Bahmani was defeated by Devaraya-I.
- Ahmad Shah-I is called a wali (saint) on account of his association with the famous Sufi Gesu Deraz.
- Ahmad Shah-I shifted Bahmani capital from Gulbarga to Bidar.
- Mahmud Gawan was a great personality of Bahmani kingdom. He was Vakil as well as the wazir of Muhammad Shah-III between 1463-1481. He was an Iranian by birth and was at first a trader.
- Gawan was granted the title of chief of the merchants (Malik-ul-Tajjar)
- Mahmud Gawan conquered Konkan, Goa and Krishna-Godavari delta. He waged a series of battles agaisnt Mahmud Khalji over Berar.
- Mahmud Gawan carried out many internal reforms. He divided the kingdom into eight provinces or tarafs headed by governors or tarafdars.
- In every province, a trade of land (Khalisa) was set apart for the expenses of the Sultan.
- Mahmud Gawan was a great patron of arts. He built a magnificent madarsa or college in the capital, Bidar.
- Bahmani ruler Humayun Shah was known as Zalim.
- Kalimullah was the last ruler of Bahmani dynasty.
- The Bahmani kingdom was divided into five states.

BAHMANI SUCCESSOR STATES (DYNASTY)

State (dynasty)	Founder	Capital	Duration
1. Nizamshahis	Malik Ahmad Bahri	Ahmadnagar	1490-1633
2. Adilshahis	Yusuf Adil Shah	Bijapur	1490-1686
3. Imadshahis	Fateullah Khan Imad-ul-mulk	Berar	1490-1574
4. Qutubshahis	Quli Qutubshah	Golconda	1518-1687
5. Baridshahis	Amir Ali Barid	Bidar	1528-1619

RULERS OF THE VIJAYNAGAR EMPIRE : AT A GLANCE

Sangama Dynasty (1336-1485)

1.	Harishara-I	1336-1356
2.	Bukka-I	1356-1377
3.	Harihara-II	1377-1404
4.	Buka-II	1404-1406
5.	Devaraya-I	1406-1422
6.	Vira Vijaya	1422
7.	Devaraya-II	1422-1446
8.	Mallikarjuna	1446-1465
9.	Virupaksha	1465-1485
10.	Praudha Deva	1485

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Saluva Dynasty (1485-1505)

1.	Saluva Narasimha	1485-90
2.	Timmaraya	1490-91
3.	Immadi Narasimha	1491-1505

Tuluva Dynasty (1505-1570)

1.	Narasa Nayak	1505
2.	Vira Narasimha	1505-1509
3.	Krishnadevaraya	1509-1529
4.	Achyutadeva	1529-1542
5.	Venkata-I	1542-1543
6.	Sadasiva	1543-1570

Arividu Dynasty (1570-1652)

1.	Tirumala	1570-1572
2.	Sri Ranga	1572-1585
3.	Venkata-II	1585-1614
4.	Sri Ranga-II	1614
5.	Ramadeva	1614-1630
6.	Venkata-III	1630-1642
7.	Sri Ranga-III	1642-1652

RULERS OF THE BAHMANI DYNASTY : AT A GLANCE

Ala ud Din Hasan Bahman Shah	:	1347-1358
Muhammad-I	:	1358-1375
Ala ud Din Mujahid	:	1375-1378
Daud	:	1378
Muhammad-II	:	1378-1397
Shams ud Din	:	1397
Firoz	:	1397-1422
Ahmad I Vali	:	1422-1436
Ala ud Din Ahmad-II	:	1436-1458
Ala ud Din Humayun Zalim	:	1458-1461
Nizam	:	1461-1463
Muhammad-III Lashkari	:	1463-1482
Mahmud	:	1482-1518
Ahmad-III	:	1518-1521
Ala ud Din	:	1521-1522
Valiullah	:	1522-1525
Kalimullah	:	1525-1527

TOWNS AND FOUNDERS

Towns		Founder
Pataliputra	:	Udayan
Jaunpur	:	Firoz Tughlaq
Jodhpur	:	Rao Jodha
Hyderabad	:	Md. Quli Qutub Shah
Ahmedabad	:	Ahmad Shah (in place of old town Aswal)

Mustafabad	:	Mahmud Begarah
Muhmmadabad	:	Mahmud Begarah
Delhi/Dhilika	:	Anangpal Tomar
Firozabad	:	Firoz Shah Tughlaq
Shah Jahanabad	:	Shahjahan
Fatehpur Sikri	:	Akbar
Mahabalipuram	:	Narsimhavarman-I
Bikaner	:	Rao Bika
Fatehabad	:	Firoz Shah Tughlaq
Hisar	:	Firoz Shah Tughlaq
Firozpur	:	Firoz Shah Tughlaq
Amritsar	:	Guru Ramdas
Gangaikondacholapuram	:	Rajendra Chola-I
Ajmer	:	Ajayraj
Agra	:	Sikander Lodhi
Nauraspur	:	Ibrahim Adil Shah-II
Vijayanagar	:	Harihar-I
Calcutta	:	Job Charnauk
Tughlaqabad	:	Ghiyasuddin Tughlaq
Jahanpanah	:	Muhammad-bin-Tughlaq
Dinpanah	:	Humayun
Daulatabad	:	Muhammad-bin-Tughlaq
Allahabad	:	Akbar
Siri	:	Alauddin Khilji
Jaipur	:	Sawai Raja Jai Singh
Srinagar	:	Ashoka
Hoshangabad	:	Husang Shah
Khizrabad	:	Khizr Khan

ESTABLISHMENT OF THE MUGHAL RULE

BABUR (1526-1530)

- Zahiruddin Muhammad Babur was the founder of the Mughal empire in India.
- Babur was the king of Farghana in Afghanistan.
- Taking advantage of the political conditions prevailing in India, Babur marked towards India.
- Babur defeated Ibrahim Lodi in first Battle of Panipat in 1526 A.D.
- Before the Battle of Panipat (1526 A.D.) Babur had made four expeditions to India.
- In 1519 (first-Indian expedition) he used gun powder for the first time in India to storm fort of Bhira.
- His second expedition in 1519, captured Peshawar.
- Third expedition in 1520, occupied Bajaur, Bhira, Sialkot and Sayyadpur.
- 4th expedition in 1524-Daulat Khan Lodi (Governor of Lahore) sent son Dilawar Khan and Alam Khan Lodi to join Babur.

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- Rana Sanga sent a message to Kabul, inviting him.
- 5th expedition in 1526 Battle of Panipat against Ibrahim Lodi here used Rumi (ottoman) device and Tulugama tactics.
- In 1527 he defeated Rana Sanga of Mewar in battle of Khanwa on the bank of river Piliakhar.
- In 1529 he defeated Ibrahim Lodi's younger brother, Mahmud Lodi in battle of Ghaghara.
- His Indian empire extended from Himalayas in north to Gwalior in South and from Khyber pass in west to border of Bengal in east.
- Babur had the prestige of being a descendent of the two most famous warriors of Asia, Ghangez and Taimur.

HUMAYUN (1530-1540, 1555-1556 A.D.)

- Nasiruddin Muhammad Humayun succeeded Babur.
- Humayun ruled from 1530 A.D. to 1540 A.D. and again from 1555-1556 A.D.
- Humayun built Dinpanah at Delhi as his second capital.
- In 1532, defeated Afghans udner Mahmud Lodhi at Daurah.
- In 1530, attacked Kalinjar.
- In 1539, Afghan leader Sher Shah defeated him at Chausa (Bihar).
- In 1540 Sher Shah again defeated him in battle of Kannauj.
- After battle of Kannauj (1540) Humayun fled, took shelter for a few days at Amarkot (ruler Rana Virsala)
- In 1545, he went to Shah Tahmasp's court in Persia (Iran) who aided him in conquering Kandhar.
- In 1551 Askari was exiled to Mecca.
- In 1553 Kabul was occupied and Kamran was blinded and sent to Mecca.
- Captured Lahore in 1555 from Sikandar Sur, Governor of Punjab then Delhi and Agra.
- Humayun died in 1556 A.D. of fall from his library Sher Mandal.
- Humayun's tomb is situated in Delhi.
- Humayun's tomb was built by his widow Hamida Banu Begum.
- Mirza Inayatullah was the chief architect of Humayun's tomb.
- Humayun brought two painters from Iran, Mir Sayyid Ali and Abdus Samad.

SHER SHAH (1540-1545 A.D.)

- Sher Shah's childhood name was Farid.
- Sher Shah was born to Hasan, the Jagirdar of Sasaram.
- He received the title of Sher Shah from Bahar Khan Lohani, the Afghan Governor of South Bihar,
- Sher Shah gained Chunar by marrying the widow, Malika.
- He defeated Humayun in the battle of Chausa. He adopted the title of Sher Shah and proclaimed himself the emperor of Hindustan.
- He again defeated Humayun in the battle of Kannauj or Bilgram.

- Sher Shah's last campaign was against Kalinjar. He succeeded but died from an explosion in 1545.
- He was succeeded by his son Islam Shah.
- Humayun defeated Sikandar Suri and occupied Delhi in 1555.
- Sher Shah established a highly centralised Government.
- He divided his empire into 47 Sarkars (districts) which were divided into several pargana (sub-districts). Village was the lowest unit of administration. He made the local village headmen (muqaddams) and zamindars responsible for local crime.
- He built many sarais.
- He built the grand trunk road from Sonargaon to Attock.
- He improved the land revenue system by adopting Zabti-i-Har-Sal
- Sher Shah abolished all internal customs and duties.
- Sher Shah built three important roads, Agra-Jodhpur-Chittor, Lahore-Multan, and Agra-Burhanpur.
- Sher Shah built 1700 sarais which also worked as dak chaukis.
- Sher Shah ascended the throne of Delhi at the ripe age of 67.
- Abbas Khan Sarwani was the historian of Sher Shah.
- Sher Shah's roads and sarais have been called "The arteries of the Empire".
- Sher Shah also built a new city on the bank of the Yamuna near Delhi.
- The sole survivor of this is the Old Fort (Purana Qila) in Delhi.
- Sher Shah was succeeded by his second son, Islam Shah.

AKBAR (1556-1605 A.D.)

- Akbar was born in Amarkot in the palace of Virasal in 1542 A.D.
- Akbar's full name was Jalaluddin Muhammad Akbar.
- He was crowned at Kalanaur at the age of 13 years.
- Akbar defeated Hemu in the second battle of Panipat in 1556 A.D.
- Bairam Khan was his regent from 1556 to 1560. Bairam Khan was a Shia.
- Bairam Khan was assassinated by Mubarak Khan at Patan (Gujarat) on his way to Mecca.
- Bairam's widow Salima Begum was married to Akbar and her son (from Bairam, Abdur Rahim joined the court of Akbar later became the Khan-i-Khanan.
- Akbar's full name was Jalaluddin Mohammed Akbar.
- His chief advisor was Mir Abdul Latif.
- In 1562, abolished the system of making war captives as slave.
- In 1563, abolished pilgrim tax.
- In 1564, abolished Jaziya.
- His tomb was at Sikandara, near Agra.
- Laid the foundation of Fateh Pur Sikri as his capital.
- Learnt the principles of Sulah-i-Kul from his teacher Mir Abdul Latif.

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- In 1564, Garh Katanga was attacked. It was under the regency of Durgavati, the Chandella princess of Mahoba on behalf of her mi... nor son Vir Narayan. Her capital Chauragarh was stormed by Asaf Khan.
- In 1668, Chittor under Rana Udai Singh of Mewar was invaded. Here two Rajput warriors fought bravely against Akbar-Jaimal and Patta.
- Akbar had the statues of Jaimal and Patta installed at Agra fort.
- In 1569 campaign agaisnt Ranthambhor, Rao Surajan Hara sub... mitted and joined the imperial service.
- In 1569-1570 campaign agaisnt Kalinjar, Ramchandra offered sub... mission to Majnun Khan.
- In 1601 captured fortress of Asirgarh his last conquest Khandesh (1601)
- Got translated into Persians-Ramayana, Mahabharata, Lilavati, Rajatarangini, Panchatantra, and Nal Damyanti, Atharvaveda.
- Tried to ban sati system, and legalised widow marriage. Increased marriagable age (girls 14 years, boys 16 years)
- European paintings was introduced in Mughal court during Akbar's region.
- Akbar was fond of gardening.
- Akbar was himself architect of his tomb, completed by Jahangir.
- Set up Ibadat-khana at Sikri for religious discussion, held on ev... ery Thursday evening from 1575.
- Later Ibadat-khana was opened to Scholars of all faiths.
- In 1579 Akabr read the Khutba (written by poet Faizi) in his own name like the Prophet and Caliphs.
- In 1579 proclamation of the Mahzar, all imams signed it where by he became Imam-i-Adil, the supreme interpreter of Islamic law in all controversial matters, it made him higher than a Mujtahid (interpreter of Islamic Law)
- In 1582 Tauhid-i-Ilahi (Divine monothesim) was initiated,80 years later it came to be called Din-i-Ilahi. It was sufistic.
- After returning from Gujarat campaign, Akbar appointed officials called Karoris.
- Akbar divided the empire into 12 Subas in 1580
- In 1585 Akbar moved to Lahore and remained there for 12 years.
- Akbar nominate Salim as his successor who ascended the throne with the title of Jahangir.
- In 1605 Akbar died of dysentery.
- Hakim Ali was his personal physician while Raja Salivahan was his court physician.
- Buried at Sikandara.
- Sheikh Farid Bukhari was his last Mir Bakshi.
- Started giving loan from royal treasury, as Musadat.
- Loan to farmers was called takavi.

- Started worshipping light (Prakash Pujas) in court.
- With the help of Raja Todarmal (revenue minister) began land settlement and launched Ain-i-Dahsala system.
- Issued round and square size silver coins called Rupaya and Jalali.
- Adopted Persian as court language.
- Laid foundation of Fatehpur Sikri in 1572-1580. Here main buildings Buland Darwaza, Diwan-i-Am, Diwan-i-Khas, palace of Sultana, Panch Mahal etc.
- Expert exponent of music. He played Nakkara (drum).
- His court musicians-Tansen, Baba Ramdas, Baz Bahadur etc.
- Famous painters in his court Khwaja Abdus Samad, Daswant, Basawan etc.
- Akbar set up a department of painting headed by Khwaja Abdus Samad with title Shirin Kalam.
- Got Mahabharata translated into Persian as Razmnama.
- Contemporary Hindu scholars Ramdas, Suradas, Tulsidas, Raskhan, Abdur Rahim Khan-Khanan and Birbal (Raja Mahesh Das).
- Famous Persian scholars-Abul-Fazaal, Faizi, Budayuni, Abbas Khan Sarwani, Utbi, and Naziri.
- Organised army and started Mansabdari system in 1575-1576.
- Todar Mal, Abul Fazal, Faizi, Birbal, Tansen, Abdur Rahim Khan-i-Khanan, Mullah do Pyaza and Man Singh were gems of his court.

JAHANGIR (1605-1627 A.D.)

- Jahangir was born at Lahore in 1569 A.D.
- Jahangir's full name was Nuruddin Muhammad Jahangir.
- Jahangir was popularly known as Salim.
- Jahangir banned slaughter of animals on Sunday and Thursday.
- He established Zanjir-i-Adal at Agra Fort for the seekers of royal justice.
- Jahangir also married Jodha Bai of Marwar, and a Kachchwaha princes.
- His son Khusrau, who received patronage of Guru Arjun Dev, revolted agaisnt Jahangir. The fifth Sikh Guru Arjun Dev was later sentenced to death for his blessings to the rebel prince.
- Khurram (Shahjahan) supported by his father-in-law, Asaf Khan, also revolted against Jahangir but the two soon reconciled.
- His military general, Mahabat Khan revolted and abducted him but Nurjahan saved him due to her diplomatic efforts.
- He was well read and wrote his memoirs Tuzuk-i-Jahangiri in Persian.
- Jahangir's sons-Khusrau Parvez Khurram, Shahryar and Jahandar.
- Shahryar married to Ladli Begum.
- James-I sent captain Hawkins and Sir Thoams Roe to Jahangir's court to get concession in trade for English.

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- Laid many gardens, like Shalimar Bagh in Kashmir.
- Jahangir built a mosque in Lahore, Itmaduddaula's tomb in Agra (first building to have Peutra Deura), completed Akbar's tomb in Sikandara.
- During Jahangir, Mughal painting was on climax.
- Portrait painting and paintings of animals & birds started. Mansur was expert in this style.
- He was hismelf expert painter and claimed to recognise painting at a particualr painter at a glance.
- Introduced Du-Aspa and Sih-Aspa systems in Mansabdari system.
- Lover of music, painting and arts.
- Jahangir met Nur Jahan on Nauroz (new years day) in Mina Bazar of Agra, married her in 1611.
- Ladli Begum, daughter of Nur Jahan from Sher Afghan.
- In 1613 Nur Jahan was made Padshah Begum (the first lady).
- In 1616, Nur Jahan got title Nur Mahal.
- Farmans had signature and coins were struck in her name.
- Itmad-ud Daula (father of Nur Jahan) was given mansabdari of 7000 Zats.
- Nur Jahan's brother, Abul Hasan was appointed Mir-i-Saman (in charge of the royal household) with title of Asaf Khan later wazir with 6000 mansab.
- Khusrau was blinded and in 1620 he was killed on the orders of Khurram at Burhanpur.
- John Hawkins resided at Agra for two years (1609-1611). He was given the mansab of 400.
- Sir Thomas Roe (1615-1618) was ambassador of James-I.

SHAHJAHAN (1628-1657 A.D.)

- Shahjahan was born at Lahore in 1592 A.D.
- Shahjahan's childhood name was Khurram.
- Shahjahan's full name was Shihabuddin Muhammad Shah Jahan.
- Shahjahan was born to Jagat Gosain, daughter of Mota Raja Udai Singh of Jodhpur.
- In 1612 Shahjahan married Arzumand Banu Begum who became famous as Mumtaz Mahal.
- Mahabat Khan was given 7000 Zat and Sawar and title Khan-i-Khanan.
- In 1628 Pir Khan Khani-i-Jahan Lodi governor of the Deccan rebelled and joined the Nizam Shahis but was defeated at Tal Sahonda.
- In 1628-1629 Jujhar Singh Bundella of Orchha rebelled but later submitted. He again rebelled in 1635 by attacking Prem Narain of Chauragarh (Gondwana) and was defeated by Aurangzeb. Devi Singh was installed at Orchha.
- Champat Rai of Mahoba also rebelled. His son Chhatrasal rebeled during Aurangzeb's reign.

- In 1630 Deccan famine, witnessed by Peter Mundi, led to large scale relief measures by the state.
- In 1631 Mumtaj Mahal died in a child brith at Burhan Pur. She was first buried at Burhan Pur but later transferred to Agra (Taj Mahal).
- Shah Jahan's six children from Mumtaj Begum-Jahanara Begum, Dara Shikoh, Shah Shuja, Roshan Ara Begum, Aurangzeb (born at Daulatabad) and Murad Baksh.
- Shah Jahan introduced 1/3, 1/4, 1/5 method in Mansabadari system. According to this a mansabdar had to keep horsemen 1/3, 1/4, 1.5 of his sawar rank.
- Built Taj Mahal in memory of Mumtaj Mahal in 1632-1654 of marbles (white).
- Built Moti Masjid (Pearl Mosque) in Agra Fort.
- Built Jama Masjid and Red Fort of Delhi and laid foundation of Shahjahanabad (the 7th city of Delhi). These were made of red sand stone.
- Jagannath Pandit was his court poet.
- Shah Jahan was an expert musician and his voice was very melodious.
- Appointed Amins whose main function was to assess revenue.
- Constructed Peacock throne (1628-1635).
- Attacked Hooghly agaisnt portuguese and captured it in 1632.
- Foreign travellers who visit his court were Bernier (France). Travernier (France) and Manucci (Italy).
- His period was the climax of Mughal architecture.

AURANGZEB (1658-1707 A.D.)

- Aurangzeb's full name was Muihiuddin Muhammad Aurangzeb.
- Aurangzeb was the third son of Mumtaz Mahal.
- Aurangzeb had to fight war of succession to gain the throne.
- He took the title of 'Alamgir' in 1659.
- He was called as Zinda Pir, the living saint.
- In 1662, Mir Jumla, Aurangzeb's ablest general led the expedition agaisnt Ahoms.
- He forbaded inscription of Kalma on the coins.
- He ended the celebration of Navroz festival.
- Mutasib (regulator of moral conduct) were appointed.
- He ended Jharokha darshan, use of almanacs and weighing of the emperor.
- Aurangzeb compiled Fatwa-i-Alamgiri.
- Jaziya was re-introduced.
- Built Moti Masjid (Pearl Mosque) in Red Fort of Delhi.
- No new temples were to be constructed. But old ones were not to be destroyed and they were allowed to be repaired.
- In 1669, the Vishwanath temple of Banaras and the Keshav Raj temple of Bir Singh Bundela at Mathura were destroyed.

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- The proportion of Hindus mansabdars was highest in Aurangzeb's reign.
- Guru Govind Singh wrote letters to Aurangzeb, their collection is called Zafarnama.
- Guru Govind Singh died at Nanded, on way to meet Aurangzeb. Aurangzeb had died earlier.
- Shambhaji (son of Shivaji) was captured at Sanghameshwar (1689) and executed.
- Bijapur (1686) and Golconda (1687) were annexed.
- His tomb is located in Aurangabad.
- Expert Vina player.
- Banned singing in court, but allowed Royal Band (Naubat).
- Restarted Pilgrim tax.
- Disallowed cultivation of Hemp (Bhang).
- In 1669, Jats under Gokla revolted.
- In 1672, Satnamis, nick-named Mundiya Sadhus, founded by Birbhan near Narnaul revolted.
- In 1685, second Jat rebellion under Raja Ram and his successor Churaman.
- In 1667, Yusufzai tribe of Afghans, under the Raushanai movement led by Bhagu rebelled.
- In 1672, second Afghan rebellion by the Afridi tribe led by Akmal Khan.

MUGHAL GARDENS

Garden	Place	Built by
1. Hast Bahist Rambagh	Agra	Babur
2. Shalimar Bagh	Srinagar	Jahangir
3. Nishat Bagh	Srinagar	Asaf Khan
4. Shailimar Bagh	Lahore	Shah Jahan
5. Hayat Bagh	Delhi	Shah Jahan
6. Shalimar Bagh	Delhi	Shah Jahan
7. Wazir Bagh	Kashmir	Dara Shikoh
8. Char Burji Bagh	Near Lahore	Zebunnisa

MUGHAL RULERS : AT A GLANCE

Zahiruddin Babur	:	1526-1530
Nasiruddin Humayun	:	1530-1540
Nasiruddin Humayun	:	1555-1556
Jalaluddin Akbar	:	1556-1605
Nuruddin Jahangir	:	1605-1627
Shihabuddin Shajahan	:	1628-1657
Aurangzeb Alamgir	:	1658-1707
Azam Shah	:	1707
Kam Bakhsh (in the Deccan)	:	1707
Shah Alam-I	:	1707-1712
Azim ush Shah	:	1712
Muizz-ud din Jahandar	:	1712-1713
Farrukhsiyar	:	1713-1719

Shams-ud din Rafi ud Darajat	:	1719
Nikusiyar	:	1719
Nasir-ud din Muhammad	:	1719-1748
Ahmad Shah Bahadur	:	1748-1754
Aziz ud din Muhammad	:	1754-1760
Shah Jahan-III	:	1760
Shah Alam II (First reign)	:	1760-1788
Bidar Bakht	:	1788
Shah Alam II (second reign)	:	1788-1806
Muin-ud bin Akbar-II	:	1806-1837
Siraj-ud bin Bahadur Shah-II	:	1837-1857

RELIGIOUS MOVEMENTS OF MEDIEVAL INDIA

- The Bhakti Movement began in South India in the 7th Century.
- The Alvars (Vaishnavites) and Naynars (Shaivites) popularised the Bhakti cult in South India.
- There were 12 Alvar Vaishnavite and 63 Naynar Saivite Saints.
- The Saivite Saint Appar, is said to have Converted the Pallawa king, Mahendravarman, to Saivism.
- Sambandar and Manikkavasagar were other great Bhakti Saints.
- The Writings of these saints were collected in the Tirumurai.
- The Tirumurai has been called as the Tamil Veda.
- Periya Puranam was composed by Shekkilar in the reign of the Chola king Kulottunga I.
- Ramananda was the first great Bhakti saint of North India.
- Raidas, Kabir, Dhanna, Pipa were his disciples.
- Kabir (1440-1518) belonged to a family of weavers.
- Kabir spent greater part of his life in Banaras.
- Kabir's verses were included in Adi Granth.
- Raidas was a tanner.
- Dhanna was a Jat peasant from Rajasthan.
- Guru Nanak (1469-1539) was born at Nankana Sahib.
- Kabir and Nanak were Nirguna Bhakti saints.
- Vallabhacharya was a Telugu Brahmana.
- Vallabhacharya was the founder of Pushti marga (way of grace)
- Chaitnya (1486-1533) was the most prominent Vaishnav saint of Bengal.
- Chaitanya popularized Krishna Bhakti.
- Chaitanya was looked upon as living Krishna.
- Jnaneswar (1275-1296) was the pioneer Bhakti Saint of Maharashtra.
- Jnaneswar wrote Jnaneswari.
- Jnaneswari is a commentary on Bhagavad Gita.
- Jnaneswar was the author of many hymns called Abhangas.
- Namdeva (1270-1350) was a tailor by caste.
- Namdeva travelled to North India and Punjab.
- Namdev's Bhakti Songs have been included in the Adi Granth.

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- Namdeva is considered to be a part of the Varkari tradition.
- Lal Ded was a Saiva Bhakti saint of Kashmir.
- In Assam, Sankaradeva (1449-1568) introduced bhakti.
- Sankaradeva's sect is called Mahapurushiya dharma.
- Dadu (1544-1603) was inspired by Kabir's doctrine.
- Tukaram's tarlings are in the form of Avangas or dohas.
- Tukaram founded the Varkari Sect.
- Ramdasa wrote Dasabodha.
- Ramdasa was the Guru of Shivaji.
- The Lingayat Sect was founded by Basava.
- The biography of Chaitanya is 'Chaitanya Charitamrta'.
- The biography of Chaitanya was written by krishnadas Kaviraj.
- The disciples of Kabir later formed the Kabirpanthi sect.
- Jagjivan Das founded the Satnami sect.
- Tulsidas wrote Ramcharitmanas, Vinaypatrika, Kavitavali.
- Surdas wrote Sur Surawali, Sahitya Ratna, Sursagar.
- Mirabai was a Rajput Princes of Merta.
- Mirabai married to Bhojraja, son of Rana Sanga.
- Mirabai was famous for her devotion to Krishna.
- Mirabai advocated image-worship and observance of special fasts.
- Mirabai wrote Several poems like Padavali;
- Ramanuja advocated the philsophy of Vishistaodvaitavada.
- Madhvacharya founded the Dvaita philosophy.
- Nimbarka propounded the Dvaitadvaita philosophy.
- Nimbarka founded the Sanak Sampradaya.

SIKH GURUS

GURU NANAK (1469-1539)

- **Guru Angad** (1539-52) invented Gurumukhi.
- **Guru Amar Das** (1552-74) struggled against Sati System and pardah system. Established 22 Gaddiyan to propagate religion.
- **Guru Ram Das** (1574-81) : Akbar granted a plot of land to him, on which the Golden temple was constructed later. He founded the city of Amritsar.
- **Guru Arjun Dev** (1581-1606) : Founded Swarna Mandir, composed Adigranth (Granth Sahib) and appointed Masnad for religious works. Emperor Jahangir tortured him to death.
- **Guru Hargovind** (1606-45) : Transformed Shikhs into a militant community, established Akal Takht and fortified Amritsar and shifted his headquarters to Kirtharpur in Kashmir hills.
- **Har Rai** (1645-61)
- **Har Kishan** (1661-64)
- **Teg Bahadur** (1664-75) : Executed by Aurangzeb on the pretext that he had instigated the Brahmans of Kashmir to resist him.
- **Govind Singh** (1675-1708) : He was the last Guru, Thereafter the Gurushipended. He founded Khalsa Pantha.

SUFI MOVEMENT

- Sufism is the mystical movement in Islam.
- Al Hujuiri was the earliest Sufi saint to have settled in India.
- Al Hujuiri wrote 'Kashful Mahjub'.
- The Chishti and Suhrawardi orders were the most prominent.
- The Chishti order was founded by Muinuddin Chishti.
- He arrived around 1192 A.D. and established his centre at Ajmer.
- Muinuddin Chisti's disciple was Hamiduddin Nagauri.
- Qutubminar is named after the Chishti saint Qutubuddin Bakhtiyar Kaki.
- His disciple was Farid Ganj-i-Shakar.
- He built his Jamaat Khana in Ajodhan (Punjab).
- The Sufis adopted the local language of the region in which they lived.
- The Suhrawardi order in India was founded by Bahauddin Zakaria of Multan.
- The Suharwardi sufis established themselves mainly in North-West India.
- Iltutmish appointed Shaikh Bahauddin Zakaria the Shaikh-ul Islam.
- Shaikh Ruknuddin of Suharwardi order was also venerated by Sultans of Delhi.
- The Chishti mystics believed in the spiritual value of Music.
- Khwaja Qutubuddin Bakhtiar Kaki died in a state of ecstasy under the spell of Music.
- Khwaja Fariduddin Masud was known as Baba Farid.
- Shaikh Nizamuddin Auliya was the Chief disciple of Baba Farid.
- Nizamuddin Auliya had problem with Mubarak Khalji and Ghayasuddin Tughlaq.
- He was succeeded by Nasiruddin Chiraag-i-Delhi, who had trouble with Mohd. Bin Tughlaq.
- After the death of Baba Farid, the Chishti order was divided into Nezamia and Sabiria orders.
- Shaikh Burhanuddin settled at Daulatabad.
- Shaikh Husamuddin and Shah Barkatullah were prominent Sufis in Gujarat.
- Shaikh Abdul Quddus Gangohi was a mystic of the Sabiria order.
- Shaikh Musa had joined Akbar's Service.
- Akbar was greatly devoted to Salim Chishti of Fatehpur.
- Shattari order was founded by Abdul Shattar.
- Tansen was the disciple of Mohd. Ghaus.
- Qadariya order was started by Niatamullah Qadari.
- Dara belonged to the Qadariya order.
- Naqshabandi order was introduced in India by Baqi Billah.
- Shah Waliullah (1702-1762) was a saint of Naqshabandi order.
- Shah Waliullah tried to reconcile the two doctrines of Wahadat-ul Wujud and Wahadat-ul-Shuhud.
- Khwaja Mir Dard was the famous Urdu Poet.
- Mullah daud Wrote Chhanda in Hindavi.
- Shaikh Nasiruddin was known as Chiragh-i-Delhi.

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LITERARY DEVELOPMENTS DURING THE MEDIEVAL PERIOD

Book		Authors
Navasahasankacharitam	:	Padamgupta
Kathasaritsagar	:	Somadeva
Brihat Kathamanjari	:	Kshemendra
Prabodha Chandrodaya	:	Krishna Mishra
Adipurana	:	Jinasena
Ganitasara Samgraha	:	Mahaviracharya
Amaghvritti	:	Saktayana
Harvilasam	:	Srinath
Bhaktmala	:	Nabhadasa
Taj-ul-masir	:	Hasan Nizami
Tabaqat-i-Nasiri	:	Minhajud-din Siraj
Tughlaqnama	:	Amir Khusrau
Laila-Majnu	:	Amir Khusrau
Ghurrat-al-kamal (on music)	:	Amir Khusrau
Ashiqa	:	Amir Khusrau
Nuh Sipihar	:	Amir Khusrau
Tarikh-i-Firozshahi	:	Barni
Tarikh-i-Firozshahi	:	Sams-i-siraz Afif
Fatuhat-i-Firozshahi	:	Firoz shah Tughlaq
Tarikh-i-Mubarakshahai	:	Sarhindi
Sur Sarawali	:	Surdas
Sahitya Ratn	:	Surdas
Amuktamalyada	:	Krishna devaraya
Manucharitam	:	Allasani Peddana
Maduravijayam	:	Gangadevi
Ain-i-Akbari	:	Abul Fazal
Humaun Namah	:	Gulbadan Begum
Panduranga Mahatmya	:	Tanali Ramalinga
Jambavati Kalyanam	:	Krishna devaraya
Jnaneswari	:	Jnandeva
Hir-Ranjha	:	Warish Shah
Shanti Purana	:	Ponna
Akbar Namah	:	Abul Fazl
Hasnat-ul-Arifin	:	Dara Shikoh
Sakinat-ul-Auliya	:	Dara Shikoh
Tabuqat-i-Akbari	:	Nizamuddin Ahmed
Tarikh-i-Shershahi	:	Abbas khan Sherwani
Tarikh-i-Alfi	:	Mulla Daud
Chandayan	:	Mulla Daud
Mintakhab-ul-Tawarikh	:	Abdul Qadir Badyuni
Tabaqat-i-Akbari	:	Nizammuddin Ahmad
Maasir-i-Jahangiri	:	Kamgar Khan
Iqbalnama-i-Jahangiri	:	Mutamid Khan
Shahjahanama	:	Inayat Khan
Majm-ul-Bahrain	:	Darasikoh
Muntakhab-ul-Lubab	:	Khafi Khan
Alamgirnama	:	Mirza Muhammad Qazim
Masir-i-Alamgiri	:	Iswar Das Nagar
Nuskha-i-Dil Khusha	:	Bhimsen
Khulsat-ut-Tawarikh	:	Sujan Rai
Akbarshahi Sringardarpan	:	Padma Shankar
Bhanuchandracharita	:	Siddhichandra Upadhayaya
Ras-Gangadhar	:	Jagganath Pandit
Ganga Lahri	:	Jagganath Pandit

FOREIGN TRAVELLERS DURING THE MEDIEVAL PERIOD

Period	Traveller	During the reign of
1288-1292 A.D.	Marco Polo (Italy)	Pandayas
1333-1342	Ibn Batuta (Morocco)	Muhammad bin Tughlaq
1420-1422	Nicolo Conti (Italy)	Devaraya I (Vijaynagar)
1421-1431	Cheng-Hi	Jalauddin (Bengal)
1442-1443	Abdur Razak (Persia)	Devaraya II (Vijayanagar)
1470-1474	Nikitin (Russia)	Muhammad III
1503-1508	Varthalema Dias	Deccan
1516-1518	Edwardo Barbosa	Krishnadevaraya
1520-1522	Domingo Paes	Krishnadevaraya
1535-1537	Fernao Nuniz	Achyut Devaraya
1578-1582	Anthony Monserrate	Akbar
1585-1591	Ralph Fitch	Akbar
16th Century	Caesar Fredrick	Vijaynagar
16th Century	John Lisconten	Vijaynagar
16th Century	Lama Taranath	East India
1608-1613	Captain Hawkins	Jahangir
1608-1612	William Fitch	Jahangir
1608-1617	John Jourdian	Jahangir
1608-1615	Nicholas Downton	Jahangir
1612-1616	Nicholas Withington	Jahangir
1612-1617	Thomas Coryet	Jahangir
1615-1619	Sir Thomas Roe	Jahangir
1616-1619	Edward Terry	Jahangir
1615-1625	Paul Cannin (British)	Jahangir
1620-1627	Fransisco Pelasert	Jahangir
1622-1633	Pietra dellavale	Jahangir
1626-1633	John Lait	Shah Jahan
1627-1681	John Fryer	Shah Jahan
1630-1634	Peter Mundy	Shah Jahan
1641-1687	Tavernier	Shah Jahan and Aurangzeb
1656-1687	Manucci	Aurangzeb
1658-1668	Bernier	Aurangzeb
1666 to 1668	Jean de Thevenot	Aurangzeb
1695 to 1699	Gemelli Careri	Bijapur

THE MARATHAS

- Shivaji was born in the fort of Shivner in {Poona in 1627.
- Shivaji belonged to Bhonsle clan.
- Shivaji's father Shahji Bhonsle was in the service of Ahmadnagar.
- Dadaji Kondadeo and Guru Ramdas had great influence on the life of Shivaji.
- Guru Ramdas wrote 'Dasabodh'.
- Shahji gave Shivaji the jagir of Poona.

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- Shivaji first captured Torna in 1646 A.D.
- Shivaji began his real career of conquest in 1656 when he conquered Javli from the maratha Chief Chandra Rao More.
- The conquest of Javli made him the master of the Mavala area. Mavali foot soldiers became a strong part of his army.
- He murdered Afzal Khan of Adil Shahi kingdom of Bijapur with baghnakh (tiger claw) in 1659.
- In 1663, Shivaji injured Shaista Khan, the Mughal Governor.
- In 1664 Shivaji sacked Surat for the first time.
- The treaty of Purandhar was signed on June 24, 1665 A.D.
- Shivaji surrendered 23 out of the 35 forts to Mughals.
- Shivaji's son Sambhaji was awarded a Mansab of 5000.
- Shivaji visited Agra in 1666,
- On August 29, 1666, Shivaji escaped from Agra.
- In October 1670 Shivaji sacked Surat a second time.
- Shivaji was coronated at Rajgarh in 1674.
- Shivajai assumed the title of Chhatrapati Haindava Dharmodharak.
- Shivaji died in 1680 at the age of 53.
- Shivaji was succeeded by Sambhaji (1680-89)
- Shivaji introduced various administrative and revenue reforms.
- Shivaji's council of Ministers was called Ashtapradhan
- Shivaji maintained a regular standing army.
- The cavalry was divided into two classes : the Bargis and Silahdars.
- Bargis were supplied with horses and arms by the state.
- Silahdars had to keep their own equipment.
- Chauth was 1/4 of the land revenue paid to the Marathas to that land would not be sullied to the Maratha raids.
- Sardeshmukhi was an additional levy of 10%, which Shivaji demanded on the basis of being the hereditary Sardeshmukh.
- Shivaji discouraged revneue farming system.
- Kathi was measuring in rods.
- Annaji Datto introduced various reforms in revenue in 1679.
- Chauth and Sardeshmukhi both were land tax collected from Mughal territory.

ASHTAPRADHANA	
1. Peshwa	General Administration; like Prime Minister.
2. Sar-i-Naubat	Senapati
3. Mazumdar	Accountant
4. Waqia-i-navis	Intelligence, posts and household affairs.
5. Surnavis or Chitnis	Correspondence
6. Dabir/Sumant	Foreign affairs and master of ceremonies.
7. Nyayadhis	Justice
8. Panditrao	religious affairs.

MARATHA PESHWAS (1714-1818 A.D.)

1714-1720	:	Balaji Vishwanath
1720-1740	:	Baji Rao I
1740-1761	:	Balaji Baji Rao
1761-1772	:	Madhava Rao Ballal
1772-1773	:	Narayan Rao
1773-1774	:	Raghunath Rao
1774-1796	:	Madhava Rao Narayan
1796-1818	:	Baji Rao II

MODERN INDIA

DECLINE OF THE MUGHAL EMPIRE

- After the death of Aurangzeb, Muaazam emerged victorious in the war of succession.
- Muaazam ascended the throne with the name of Bahadur Shah-I in 1707 at the age of 67.
- During Bahadur Shah's reign Jaziya was abolished.
- Bahadur Shah gave a high Mansab to Guru Govind Singh.
- Bahadur Shah released the Maratha Prince Sahu.
- Jahandar Shah came to the throne in 1712 A.D.
- He was dominated by his mistress Lal Kunwar. She imitated the style of Nur Jahan.
- Administration was virtually in the hands of Zulfiqar Khan.
- Jahandar Shah was the first later Mughal ruler to get the throne with the help of nobles.
- The policies of Aurangzeb were reversed.
- Jai Singh of Amber as given the title of Mirza Raja Sawai and appointed Governor of Malwa.
- Ajit Singh of Marwar was awarded the title of Maharaja and appointed governor of Gujarat.
- Sahu was granted Chauth and Sardeshmukhi of Deccan.
- Farrukh Siyar came to the throne in 1713 A.D. with the help of Sayyid Brothers.
- Sayyid brothers were known as King makers.
- Sayyid brothers dominated mughal court and empire from 1713 to 1719, the elder brother Abdullah Khan was Wazir and younger, Hussain Ali Khan was Mir Bakshi.
- Sayyid brothers belonged to Hindustani group of Mughal nobility.
- In 1719, the Sayyid brothers deposed Farrukh Siyar and killed him.
- After Farrukh Siyar, Sayyid brothers placed Rafi-ud-darajat on the throne but he died soon
- Muhammad Shah came to the throne in 1719 A.D.
- Muhammad Shah was known as "Rangila".
- Nadir Shah, the Napoleon of Iran invaded India and inflicted a crushing defeat on Mughal army at Karnal on Feb 13, 1739.

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- Nadir Shah captured Delhi and Muhammad Shah was imprisoned. He plundered Delhi.
- Nadir Shah's total plunder has been estimated at Rs. 70 crores. He also carried away the famous Koh-i-Noor diamond and the jewel studded Peacock Throne of Shah Jahan.
- Various provinces became independent like Bengal, Hyderabad, Awadh, Carnatic etc.
- The Jats under Badan Singh established themselves in the districts of Agra and Matuhra and founded the Jat state of Bharatpur.
- Sayyid brothers were murdered in 1720 A.D.
- Ahmad Shah came to the throne in 1748 A.D.
- Safdar Jang, the Nawab of Awadh became the wazir of the Empire.
- His wazir (after Safdar Jang), Imad-ul-Mulk blinded him and placed Alamgir-II on the throne.
- Ahmad Shah Abdali invaded India thrice during his reign.
- Alamgir-II came to the throne in 1754 A.D.
- Ahmad Shah Abdali invaded fourth time in his reign in 1755.
- The Marathas were invited by his wazir to save guard the empire against Abdali.
- In 1759 he was murdered by his wazir, Imad-ul-mulk.
- Real name of Shah Alam II was Ali Gauhar.
- Along with Mir Qasim and Shuja-ud-daulah he was defeated by English at the battle of Buxar in 1764.
- He lived for several years at Allahabad as a pensioner of the East India Company.
- He regained the throne of Delhi with the help of Maratha sardar Mahadji Scindhia in 1772.
- British under Lord Lake captured Delhi and Agra in 1803.
- He was killed by Ghulam Qadir in 1806.
- English concluded treaty of Allahabad (1765)
- Bahdur Shah Zafar was the last Mughal Emperor.

COMING OF EUROPEANS

- Vasco da Gama landed at Calicut in 1498 A.d.
- Vasco Da Gama returned to Portugal in 1499 with cargo worth 60 times of his expenses.
- Arrival of Pedro Alvarez Cabral in 1500 A.D.
- Second trip of Vasco da Gama to India in 1502.
- Portuguese set up trading stations at Calicut, Cochin, and Cannore in 1502.
- Cochin was the early capital of Portuguese in India. Later Goa replaced it.
- In 1503 Alfanso de Albuquerque arrived in India as commander of a squadron.
- Vasco da Gama bombarded Calicut on the Zamorin's refusal to expel Muslim traders.
- In 1503, Raja of Cochin let Vasco build first fort.
- De Almeida was the first Portuguese governor (1505-1509) in India.
- Albuquerque was appointed second governor of Portuguese in India in 1509.
- Albuquerque captured Goa in 1510 from Bijapur.

- Albuquerque encouraged his country men to marry Indian womens. He persecuted the Muslims.
- At the time of Albuquerque's death in 1515 Portuguese was the strongest naval power in India.
- Nino da Cunha (Governor 1529-38) transferred his capital from Cochin to Goa in 1530.
- In 1530 Nino da Cunha acquired Diu and Bassein from Bahadur Shah of Gujarat.
- Martin Alfanso de Souza (Governor 1542-45) arrived in India with the famous Jesuit saint Francisco Xavier.
- Francisco de Almeida created fortresses at Kilwa, Anjadiva, Mannaur and Cochin.
- Portuguese lost Hoogli in 1631 during the reign of Shahjahan.
- In 1661, the Portuguese king gave Bombay to Charles-II of England for marrying his sister.
- The Marathas captured Salsatte and Bassien in 1739.
- In March 1602, the Dutch east India company was formed.
- The name of the company was 'Vereenigde Oost Indische Companie'.
- Till 1690 Pulicat was their main centre in india, thereafter Nagapattam replaced it.
- Their final collapse with their defeat by the English in the battle of Badera in 1759.
- Loss of their settlements one by one to the East India company of Britain.
- They were expelled from their last possession in India by the British in 1795.
- The English east India company was formed by a group of merchants known as "The Merchant Adventurers' in 1599.
- Captain Hawkins arrived at Jahangir court in 1609 and was given a mansab of 400.
- Sir Thomas Roe was an ambassador of James-I to Jahangir's court.
- Hawkins had been given mansab of 400 by Jahangir.
- In 1668, Bombay was transferred to East-India company by James II for 10 Rs. per year.
- In 1687, Bombay became seal of the western Presidency, it replaced Surat.
- In 1661 Shah Jahan's Nishan granted free trade in Bengal for Rs. 3000 P.a.
- East-India Company was regulated by Court of Directors.
- Queen Elizabeth was the largest share holder of East India Company.
- Charter of 1632 empowered the company to control and punish its employees in India.
- Bombay was fortified by Charles Boon in 1720.
- Company's mint was located in Bombay.
- Free Merchants were called interlopers by the EIC.
- Charles Eyre was the first President (Governor) of Fort William.
- General Aungier was the first governor of Bombay (1669-1677).
- Masulipatam (1611) was first English settlement on East-coast.
- In 1717 Farrukh Siyar confirmed the privileges (farman) of 1691 and extended them to Gujarat and Deccan also.
- The Danes formed an East India Company in 1616.
- Serampore was their headquarter in India.

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- They sold their settlements to British in 1845.
- Establishment of the first French factory at Surat by Francois Caron in 1668.
- Establishments of a factory at Masulipatam by Marcara in 1669.
- In 1673, acquisition of village of Valikondapuram (Pondicherry) and Bellanger de Lespinay by Francois
- Martin from Muslim governor, Sher Khan Lodi.
- Francois Martin was the first governor of Pondicherry.
- In 1690 they got Chandernagar in Bengal from Mughal governor, Shaista Khan.
- Arrival of Dupleix, French Governor in India in 1742 and the beginning of the Anglo-French conflict (Carnatic wars), resulting in defeat of French power in India.
- French were finally defeated in the battle of Wandiwas (1760) by English and they lost almost all Indian settlements (by the treaty of Paris in 1763) to English.

IMPORTANT SETTLEMENTS OF EUROPEANS IN INDIA

1. Portuguese : Portuguese settlements on west coast : Calicut (1500), Cochin (1501), Cannore (1503), Quilon (1503), Cheliyam (1531), Rahole (1535), Krengannore (1536), Mangalore (1568), Hanawer (1568), Diu (1509), Goa (1510), Surat (1599), Daman (1599) and Bhavanagar **Portuguese settlements on East coast :** Meliyapur (San Thome), Chittagong, Hoogli and Bandel.

2. Dutch : Dutch factories : Masulipatnam (in 1605 by Vande Hagen), Pettappoli (Nizampatnam), Devanampettam/Tegnapattam (Called st. David under English), Palicut (1610, fort Geldiria), Surat (in 1616 by Van Broecke).

3. English : Masulipatanam (1611), Surat (1613), Madras (1639), In 1633, Hariharpur (Orissa), Balasore, Pipli (1661) Hoogli (1651) Patna, Qasim bazar, Rajmahal.

4. Danes : Tranquebar, Serampore

5. French : Pondicherry, Chandernagar, Surat, Masulipatinam.

ENTRY OF EUROPEAN POWERS

Portuguese → Dutch → English → Danes → French

Company	Year of Estd.
Estado da India (Portuguese Company)	1498
British East India Company	1600
Verrenigde Oost Indische Companie (Dutch)	1602
Compagnie des Indes Orientales (French)	1664
Danish East India Company	1616

ESTABLISHMENT OF BRITISH RULE

- The Carnatic Wars, Battle of Plassey and Buxar, Anglo-Maratha wars, Anglo-Mysore wars established British Supremacy.

THE CARNATIC WARS

- These were the anglo-French conflicts.
- These wars were continued for 20 years from 1744 to 1763 A.D.

- **First War (1744-1748) :** French Captured Madras
- French defeated Nawab of Hyderabad at St. Thome.
- Treaty of Aix-La-Chapelle, (1748) ended the War of Austrian Succession.
- **Second War (1749-1754):** Dupleix aligned with Muzaffar Jung (Hyderabad) and Chanda Sahib (Carnatic).
- After initial reverses, Robert Clive emerged victorius.
- **Third War (1758-1763) :** French, Count de Lally captured 'Fort St. David'.
- French were defeated at Wandiwash (1760).
- Pondicherry was returened to French by the Treaty of Paris.

CONQUEST OF BENGAL

- Nawab Sirajuddaulah was against the misuse of Dastaks.
- Nawab Sirajuddaulah seige the English factory at Qasim Bazaar.
- On 20th June, 1756 Fort William (Calcutta) was caputred.
- The Nawab placed Calcutta under the charge o Manik chand.
- The Black Hole Episode took place at Calcutta.
- Calcutta recovered by Clive in early 1757.
- Nawab was forced to sign the Treaty of Alinagar in February 1757.
- Battle of Plassey was fought on 23rd June, 1757..
- Mir jaffar, Manikchand, Aminchand, Jagat Seth betrayed Nawab.
- Mir Jaffar was proclaimed Nawab of Bengal.
- The company recieved the Zamindari of 24 Parganas.
- The company recieved free trading rights in Bengal, Bihar and Orissa.
- Mir Jaffar was replaced by Mir Qasim in 1760 A.D.
- Mir Qasim-Shifted capital to Monghyr.
- Mir Qasim ceded Burdwan, Midnapore and Chittagong.
- Mir Qasim Checked the misuse of the Farman of 1717.
- War with the company began in 1763.
- Mir Qasim fled to Awadh and formed a confederacy.
- Shujauddaulah and Shah Alam were part of the confederation.
- Battle of Buxar was fought on 22nd October, 1764.
- Mir Qasim was defeated by Major Munro.
- Mir Jaffar was again placed on throne.
- After the death of Mir Jaffar Nizam-ud-daulah was placed on the throne.
- Nizam-ud-daulah signed the Treaty of Allahabad in 1765.
- The company got the Diwani of Bihar, Bengal and Orissa.
- The Diwani was granted by Mughal Emperor.
- Clive introduced the Dual system of government.
- Warren Hestings ended the Dual system in 1772.

ANGLO MYSORE WARS

- **First War (1766-1769) :** Haider Ali defeated the British army.
- The Treaty of Madras Signed.
- **Second War (1780-1784) :** Warren Hestings attacked French port Mahe, which was in Haider Ali's territory.
- Haider Ali led a joint front with Nizam and Marathas and captured Arcot.
- In 1781, Haider Ali was defeated at Porto Novo by Eyre Coot.
- Treaty of Mangalore (1784) was signed by Tipu Sultan.
- **Third War (1789-1792) :** Marathas and Nizam aided the British,

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Cornawallis captured Bangalore. By Treaty of Srirangapatnam, Tipu ceded half of his territories.

- **Fourth War (1799) :** Lord Wellesley attacked and Tipu died.

ANGLO-MARATHA WARS

- First Anglo Maratha War was fought from 1775-1782 A.D.
- The Primary cause was the political interference of the British.
- The Britishers signed Treaty of Surat with Raghunath Rao (1775).
- The Treaty of Purandhar was made in 1775.
- The Treaty of Salbai (1782) gave 20 years of peace.
- The Second Maratha war was fought from 1803-1806 A.D.
- The Primary cause was the Treaty of Bassein (1802).
- The Scindhia and the Bhonsle were defeated.
- The Third Anglo Maratha War was fought in 1817-1818.
- Hesting's moves against Pindaris transgressed the authority of the Marathas.
- The Maratha confederacy was completely destroyed.

ANGLO-SIKH WAR

- Period of political instability prevailed after Ranjit Singh.
- The First War was fought in 1845-1846.
- The Sikhs were defeated in four battles.
- Battle of Sabraon is also known as 'Battle of guns.'
- Treaty of Lahore (1846) ended the War.
- The Second War was fought in 1848-1849.
- The Sikhs were defeated.
- Lord Dalhousie annexed Punjab in 1849.

1857 REVOLT

- On 29th March, 1857 the sepoys at Barrackpore refused to use the greased cartridge.
- Mangal Pandey attacked and fired on the Adjutant.
- The 34 Native Infantry was disbanded.
- 85 sepoys of 3rd cavalry were court-martialled on their refusal to use the greased cartridge.
- General Hewitt was the commanding officer at Meerut.
- Delhi was seized by the rebels on 12th May 1857.
- Lt. Willoughby was the officer in charge of magazine at Delhi.
- The British officer of Delhi, Col. Ripley was killed.
- The British army entered Delhi on 14 sept. 1857, after 5 days, of battle.
- Sadruddin led the revolt in Mewat.
- Rao Tularam led the revolt in Rewari (Haryana).
- Devi Singh led the revolt in Mathura.
- Kadam Singh was an important Murut.
- Rango Bapuji Gupte led the revolt in Maharashtra.
- Copy of the manifesto of Nana Saheb was pasted in Pune college.
- Chinta Bhupati revolted in Golkonda region.
- Deepuji Rana revolted in Goa.
- Nana Saheb issued a manifesto for Deccan on 18 April, 1858.
- Major Changes were introduced through the proclamation of Queen Vitoria (1858)

THE SPREAD OF MUTINY AND CIVIL REBELLION (1857-1858)

- 2nd February, 1857 : Mutiny of the 19th Native Infantry at Berhampur.
- 29th March, 1857 : Mangal Pandey killed his British commander and was hanged at Barrackpore.
- 10 May, 1857 : Mutiny of Sepoys at Meerut and march to Delhi.
- 11-30 May, 1857 : Outbreaks in Delhi, Ferozepur, Bombay, Aligarh, Etawah, Bulandshahar, Nasirabad, Bareilly, Moradabad, Shahjehanpur and other stations in U.P.
- The Mughal emperor proclaimed as the Emperor of India.
- June 1857 : Mutinies at Gwalior, Bharatpur, Jhansi, Allahabad, Faizabad, Sultanpur, Lucknow etc.
- The civil rebellion spreads through the Indo-Gangetic plain, Rajputana, Central India and some parts of Bengal.
- July 1857 : Mutinies at Indore, Mhow, Sagar and certain Places in the Punjab like Jhelum Sialkot etc.
- August 1857 : Civil rebellion spreads throughout Sagar and Nerbudda districts.
- September 1857 : The English recapture Delhi. Further outbreaks in Central India.
- October 1857 : Revolt spreads to Kota State.
- November 1857 : The rebels defeat General Windham outside Kanpur.
- December 1857 : Sir Colin Campbell wins the battle of Kanpur.
- Tatia Tope escapes.
- March 1858 : Lucknow recaptured by the English.
- April 1885 : Jhansi falls to the English. Fresh rising in Bihar led by Kunwar Singh.
- May 1858 : The English recapture Bareilly, Jagdishpur and Kalpi
- Indian rebels begin guerrilla warfare in Rohilkhand.
- July-December 1858 : English authority re-established in India.

1857 REVOLTS : AT A GLANCE

Centre	Leaders	Time Period	Officer Who Suppressed the Revolt	Date of Suppression
Delhi	Bahadur Shah, Bakht Khan	11 May, 57	Nicholson and Hudson	20 Sep., 57
Kanpur	Nana Saheb, Tatia Tope	5 June, 57	Colin Campbell	Dec., 57
Luckow	Hazrat Mahal, Birjis Qadir	4 June, 57	Colin Campbell	31 Mar., 58
Jhansi, Gawalior	Rani Laxmibai, Tatia Tope	4 June, 57	Gen. Hugh Rose	17 June, 1858
Jagdishpur	Kunwar Singh, Amar Singh	12 June, 57	Major William Taylor	December, 1858
Faizabad	Maulvi Ahmadullah	June 1857	—	5 June, 1858
Allahabad	Liakat Ali	June 1857	Col. Neill	1858
Bareilly	Khan Bahadur	June 1857	Campbell	1858

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BOOKS AND WRITERS ASSOCIATED WITH 1857 REVOLTS

Authors	Books
S. N. Sen	1857
P. C. Joshi	Rebellion, 1857
H. P. Chattopadhyaya	Sepoy Mutiny 1857
R.C. Majumdar	Sepoy Mutiny and the Revolt of 1857
Maulana Azad	Eighteen Fifty Seven
V.D. Savarkar	First War of Indian Independence
S. B. Chaudhari	Civil Rebellion in the Indian Mutinies, Theories of Indian Mutiny.
A. T. Embree	1857 in India

MAJOR TRIBAL MOVEMENTS : AT A GLANCE

Tribal Movement	Area	Year	Leader
Chuars	W. Bengal	1768-1832	—
Bhils	Khandesh	1818-1848	Sevaram
Ho	Chota Nagpur	1820-32	—
Kolis	Sahyadri Hills	1824-48	—
Khasis	Khasi Hills	1829-32	Tirut Singh and Barmanik
Singh Phos	Assam	1830-39	—
Kols	Chota Nagpur	1831-32	Budho Bhagat
Koyas	Andhra Pradesh	1840-1924	Alluri Sitaram Raju
Kachnagas	Chacher (Assam)	1882	Sambhudan
Ahom	Assam	1828-33	Gomdhan Kunvar
Khonds	Orissa	1846-1914	Chattre Bisayi
Santhals	Rajmahal hills	1855-56	Siddhu and Kanhu
Naikadas	Gujarat	1858-68	Rup Singh and Jogia Bhagat
Mundas	Chota Nagpur	1899-1900	Birsa Munda
Bhils	South Rajasthan	1913	Govind Guru
Oraons	Chota Nagpur	1914-1915	Jatra Bhagat
Kukis	Manipur	1917-19	Jadonang and Rani Gaidiniliu
Chenchus	Nallamalla Hills	1921-22	Motilal Tejawat
Kherwar	Jharkhand	—	Bhagirath
Konda Dora	Visakhapatnam	1900	Korra Mallaya
Rampa	Andhra Pradesh	1916	Alluri Sitaram Raju

SOME SOCIO-RELIGIOUS REFORM MOVEMENTS AND ORGANISATIONS

Movement/ Organisation	Year	Place	Founder	Objectives
Dharma Sabha	1830	Calcutta	Radha Kanta Deva	Opposed to liberal and radical reforms, including Sati.
Namdhari/ Kuka Movement	1841-1871	N.W.F. Province and Bhaini (Ludhiana)	Bhai Balak Singh and Baba Ram Singh	A politico-religious movement of the Sikhs.
Rahanumai Mazdayasan Sabha	1851	Bombay	S.S. Bangali, Naoroji Fundonji, J.B. Nacha, ect.	Founded for the restoration of Zoroastrian religion to its pristine glory and social regeneration of the Parsi community through modern education and emancipation of women.
Radha Swami Satsang	1861	Agra	Tulsi Ram also known as Shiv Dayal Saheb	Belief in one Supreme Being, religious unity, emphasis on simplicity of social life and social service.
Indian Reform Association	1870	Calcutta	Keshab Chandra Sen	To create public opinion against child marriages and for legalising the Brahmo form of civil marriage. To promote the intellectual and social status of Indian women.
Deccan Education Society	1884	Pune	M.G. Ranade, V. G. Chibdonkar, G. G. Agarkar, etc.	To contribute to the cause of education and culture in Western India. The Society founded the Forguson College, Pune in 1885.
Seva Sadan	1885	Bombay	Behramji M. Malabari	Campaign against child marriages and enforced widowhood and care for socially exploited women.
Indian National Social Conference	1887	Bombay	M.G. Ranade and Raghunath Rao	To focus attention on matters relating to social reforms.

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Movement/	Year	Place	Founder	Objectives
Deva Samaj	1887	Lahore	Siva Narain Agnihotiri	Religious ideas closer to Brahmo Samaj. Impressed upon its followers to follow social code of conduct and ethics, such as not to accept bribe, indulge in gambling, consume intoxicants and non-vegetarian food.
Madras Hindu Association	1892	Madras	Viresalingam Pantalu	A social purity movement concerned with the plight of widow and to combat the Devadasi System.
Bharat Dharma Mahamandala	1902	Varanasi	Pandit Madan Mohan Malaviya and Pandit Din Dayal Sharma	orginisation of the orthodox Hindus, pupularly known are Sanatamdharmis to counter the teaching of the Arya Samaj. movement.
The Servants of India Society	1905	Bombay	Gopal Krishna Gokhale	To work for social reforms, and to train "national missionaries for the service of India".
Poona Seva Sadan	1909	Pune	G.K. Devadhar and Ramabai Ranade (wife of M.G. Ranade)	Establish institutions for the economic uplift and useful employment of women.

MUSLIM SOCIO-RELIGIOUS REFORM MOVEMENTS AND ORGANISATIONS

Movement/ Organisation	Year	Place	Founder	Objectives
Faraizi or Faraidi Movement	1804	Faridpur, Bengal	Haji Shariatullah and dadu Miya	To rid the Mislim society of non Islamic social customs, rituals and practices. Anti-landlord and anti-British movement.

Movement/ Organisation	Year	Place	Founder	Objectives
Taayuuni Movement	1839	Dacca	Karamati Ali Jaunpur	Opposed to the Faraizi movement and supported the British rule.
Dar-ul-ulum (A school of Islamic Theology at Deoband, Sharanpur, U.P.)	1867	Deoband	Muhammad Qasim Nanauravi and Rashid Ahmad Ganohi	To improve the spiritual and moral conditions of Indian Muslims. This movement supported the INC and was opposed to the pro-British Aligarh movement.
Aligarh Movement	1875	Aligarh	Sir Syed Ahmad Khan	Liberalisation of Indian Islam and modernisation of Indian Muslims through religious reinterpretation, social reform and modern education.
Ahamadiya Movement	1889-1890		Faridkot Ahmad of Qadiyan	Mirza Ghulam Believed in the universal religion of all humanity, opposed to Islamic orthodoxy and spread of western liberal education among Indian Muslims.
Nadwatal Ulama	1894-1895		Lucknow Numani	Maulana Shibli To reform the traditional Islamic system of education, to strengthen Hindu-Muslim unity and to arouse nationalism among Indian Muslims.

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LOWER CASTE MOVEMENTS AND ORGANISATIONS

Movement/ Organisation	Year	Place	Founder	Objectives
Satya Shodhak Samaj	1873	Maharashtra	Jyotiba Phule	Opposed to untouchability, Priestly of Brahmin domination, belief in social equality and uplift of the lower castes by educating them.
Aravippuram Movement	1888	Aravippuram, Kerala	Shri Narayan Guru (1856-1928)	Opposed to religious disabilities against lower castes, believed in social equality, attacked Brahmin domination and worked for the uplift of lower castes by educating them. Demanded free entry of the people of lower castes to the temples.
Shri Narayan Dharma Paripalana Yogam or S.N.D.P. Movement	1902-1903	Kerala	Shir Narayan Guru Dr. Palpu and Kumaran Asan	In 1920, T.K. Madhavan launched the temple entry movement.
The Depressed Class Mission Society	1906	Bombay	V.R. Shinde	Launched by the Prarthana Samaj as an independent association to organise education facilities for lower castes.
Bahujan Samaj	1910	Satara, Maharashtra	Mukund Rao Patil	Opposed to the exploitation of the lower castes by the upper caste Brahmins, landlords, merchants and moneylenders.
Justice (Party) Movemnet	1915-1916	Madras, Tamil Nadu	C.N. Mudaliyar T.M. Nair and P. Tyagaraja Chetti	A movement of the intermediate castes. Opposed to Brahmin predominance in education, service and politics.
Depressed Classes Welfare Institute (Bahiskirt Hitkarini Sabha	1924	Bombay	Dr. B. R. Ambedkar	To propagate the gospel of social equality among caste Hindus and untouchables. Demanded constitutional safeguards for the depressed classes.
Self-Respect Movement	1925	Madras (Tamilnadu)	E. V. Ramaswami Naicker 'Periyar'	Anti-Brahmin and Hindu Orthhodoxy radical movement, which advocated wedding without priests, forcible temple entry, total defiance of Hindu social laws and also theism at times.
Harijan Sevak Sangh	1932	Pune	Mahatma Gandhi	An all-India organisation for the removal of untouchability and all social discriminations against untouchables and other lower castes. To provide medical, educational and technical facilities to untouchables.

POPULAR MOVEMENTS

Movement	Period	Leader's	Place	Causes
Faqir Uprising	1776-1777	Majnum Shah, Devi Chaudhrani	Bengal	
Sanyasi Uprising	1770-1820	—	Bengal	The immediate cause was the restrictions imposed upon pilgrims visiting holy places.
Pagal Panthis	1813-1833	Tipu	North-East	Resentment of peasants against oppression of Zamindars
Wahabi Movement	1820-1870	Syyaid Ahmed of Rae Bareile	North West, Central India	To revive and restore Muslim power in India by overthrowing the sikhs and the British
Kuka Revolt	1860-1870	Jawahar Mal, Ram Singh	Punjab	In about 1840, its aim was to purify the sikh religion. After the conquest of Pujab by the British. The revival of sikh

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Movement	Period	Leader's	Place	Causes
Ramosi Uprising	1822-1825	Chittur Singh	Satara	sovereignity become their chief programme. In protest against heavy assessment of land revenue and very harsh methods of its collection. In 1825-1826 again rose in rebellion on account of acute famines and scarcity in Pune.
Gadkari Uprising	1844	—	Kolhapur	Against arbitrary methods of land revenue collection and then dismissal from service.
Sawantwadi Revolt	1844	Phond Sawant, Anna Sahib		Appointment of a British administrator.
Revolt of Velu Thampi	1808-1809	Velu Thampi	Travancore	To drive away the British. The revolt later transformed into a popular movement. Against the British attempts to remove his from the Dewanship and the heavy burden imposed on the state through the subsidiary Alliance system.
Kittur Chennamma Uprising	1824-1829	Chennamma	Kittur in (Karnataka)	When the British refused to recognise heir to the Gaddi of Kilur and took over the administration.
Visakhapatnam Revolts	1827-1830	—	Visakhapatnam	Due to attachment of properties of Zamindars and other harsh measures for non-payment of revenue.

PEASANT MOVEMENTS

Movement	Place	Year	Leaders
Indigo Revolt	Bengal	1859	Bishnu and Digambar Biswas
Pabna	Bengal	1870	Ishwar Roy, Sabu Pal, Khoodi Mollah
Deccan Riots	Maharashtra	1879	Vasudev Balwant Phadke

Movement	Place	Year	Leaders
Ramosi Movement	Maharashtra	1879	Vasudev Balwant Phadke
Moplah	Kerala	1921	Sayyad Ali and Saiyed Fazl
Bijolia	Rajasthan	1913	Sitaram Das, Vijay Pathak Singh
Champaran	Bihar	1917	Gandhiji ji
Kheda	Gujarat	1918	Vallabh Bhai Patel and Gandhi
Bardoli/Borsad	Gujarat	1928	Vallabh Bhai Patel
Tebhaga	Bengal	1946	Vallabh Bhai Patel
Telengana	Andhra	1946	
UP Kisan Sabha	Uttar Pradesh	1918	Indra Dwivedi and Gouri Shankar Mishra
Awadh Kisan Sabha	Uttar Pradesh	1920	Baba Ramchandra
Eka Movement	Awadh	1921	Madari Pasi
Forest Satyagrah	South India	1931	N V Rama Naidu, N G Ranga
All India Kisan Sabha	Lucknow	1936	Sahajananda Saraswati

POLITICAL AND NATIONALIST ORGANISATIONS OF MODERN INDIA

Year	Organisation	Founder	Place
1838	Landholders Society	Dwarikanath Tagore	Calcutta
1839	British India Society	Willian Adams	London
1843	British India Society	—	Calcutta
1851	British India Association	Devendranath Tagore	Calcutta
1852	Madras Native Association	—	Madras
1852	Bombay Association	Jaganth Shankar	Bombay
1862	London India committee	C. P. Mudaliar	London
1866	East India Association	Dadabhai Nauroji	London
1867	National India Association	Mary Carpenter	London
1872	Indian Society	Anand Mohan Bose	London
1876	Indian Association	Anand Mohan Bose, S.N. Banerjee	Calcutta
1883	Indian National Society	Shishir Chandra Bose	Calcutta
1884	Indian National Conference	S. N. Banerjee	Calcutta
1885	Bombay Presidency Association	F. S. Mehta and K. T. Telang	Bombay

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Year	Organisation	Founder	Place
1888	United India Patriotic Association	Sir Syed Ahmad Khan	Aligarh
1905	Servants of India Society	G. K. Gokhale	Bombay
1916	Home rule league	B. G. Tilak and Annie Besant	Pune and Adyar
1918	U. P. Kisan Sabha	M. M. Malviya, Gauri Shankar and Indra Narayan	Lucknow
1920	Communist Party of India	M. N. Roy	Tashkent
1920	Indian Trade Union Congress	N. M. Joshi (founder) Lala Lajpat Rai (President)	Lucknow
1923	Swaraj Party	Moti Lal Nehru & C. R. Das	Delhi
1924	All India Communist Party	Satyabhakta	Kanpur
1925	Rashtriya Swayamsevak Sangha	K. B. Hedgewar	—
1927	All Women Conference	Lady Sadashiva Iyer	Madras
1928	Labour Swaraj Party	Qazi Nazrul Islam	—
1929	Khudai Khidmatgar	Abdul Gaffar Khan	Peshawar
1934	Congress Socialist Party	Acharya Narendra Dev and Jaiprakash Narayan	—
1936	Progressive Writers Group	Munshi Prem Chand	Lucknow
1936	All India Kisan Sabha	Sahjananda and N.G. Ranga	Lucknow
1939	Forward Block	Subhash Chandra Bose	Calcutta
1939	India Party Bolshevik	N. D. Majumdar	Calcutta
1940	Radical Democratic Party	M. N. Roy	Calcutta
1941	Indian Bolshevik Lenin Party	Ajit Rai and Indrasen	Calcutta
1942	Revolutionary Socialist Party	Satyendra Nath Tagore	Calcutta

INDIAN NATIONAL CONGRESS - FACTS TO REMEMBER

- Founded in 1885 by A.O. Hume
- Venue of first session - Gokul das Tejpal Sanskrit School of Bombay

- First President - W. C. Banerjee
- First women President - Annie Besant (1917 Calcutta)
- First Indian women President-Sarojini Naidu. (1925, Kanpur)
- First English President - George Yule.
- First Muslim President - Badaruddin Tayabji
- Women Presidents - Annie Besant (1917), Sarojini Naidu (1925) and Nalin Sengupta (1933).
- Thrice Presidents (Maximum times) - Dadabhi Nauroji (1886, 1893, 1906), J.L. Nehru (1929, 1936, 1937).
- First split of congress - 1907 (Surat).
- First-joint session of congresss and Muslim league-Lucknow (1916).
- Word Swaraj was first used from congress platform (1906) Calcutta.
- Only session presided over by Gandhi-Belgaum (1924).
- Complete Independence was demand for the first time-(1929). Lahore
- For the first time National song was sung in the Calcutta session (1896) of INC. i.e. Vande Mataram.
- For the first time National Anthem (Jana-Gana-Mana) was sung in Calcutta session (1911) of INC.
- Maulana Abul Kalam Azad was the youngest president of INC.
- The first session of congress (Bombay, 1885) was attended by 72 representatives.
- During Guwahati session of INC (1926), wearing of Khadi was made compulsory for its workers.
- During Madras session of INC (1908) its constitution was framed.
- In Madras session of INC (1927), proposals for independence and to boycott Simon Commission were passed. Gandhi did not participate.
- During Karachi session (1931) Fundamental Rights and Economic Policy Proposals Passed.
- During its 1932 and 1933 session Government had declared it an illegal organisation.
- During Lucknow session (1936), J.L. Nehru explained socialism for the first time.
- During Faizpur session (1937) congress decided to take part in election of 1937.
- 1938 session of congress held in a village Haripura.
- In Ramgarh session (1940), decision on Individual Satyagraha.

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ANNUAL SESSIONS OF THE INDIAN NATIONAL CONGRESS

Year	Place	President
1855	Bombay	W. C. Banerjee
1886	Calcutta	Dadabhai Nauroji
1887	Madras	Badruddin Tayyabji
1888	Allahabad	George Yule
1889	Bombay	William Wedderburn
1890	Calcutta	F. S. Mehta
1891	Nagpur	P. Anand Charlu
1892	Allahabad	W. C. Banerjee
1893	Lahore	Dadabhai Nauroji
1894	Madras	Mr. Webb
1895	Poona	S. N. Banerjee
1896	Calcutta	M. A. Sayani
1897	Amravati	M.C. Sankaran
1898	Madras	A. M. Bose
1899	Lucknow	Ramesh C. Dutt.
1900	Lahore	H. G. Chandavarkar
1901	Calcutta	Dinshaw E. Wacha
1902	Ahmadabad	S. N. Banerjee
1903	Madras	Lal Mohan Bose
1904	Bombay	Henry Cotton
1905	Varanasi	Gopal Krishna Gokhale
1906	Calcutta	Dadabhai Nauroji
1907	Surat	Ras Bihari Bose
1908	Madras	Ras Bihari Bose
1909	Lahore	Madan Mohan Malviya
1910	Allahabad	Sri William Wedderburn
1911	Calcutta	Bishan Narayan Dhar
1912	Bankipur	R. N. Mudhukar
1913	Karachi	Nawab S. Muhammad
1914	Madras	Bhupendra Nath Bose
1915	Bombay	S. P. Sinha
1916	Lucknow	Ambika Charan Majumdar
1917	Calcutta	Annie Besant
1918	Delhi	Madan Mohan Malviya
1919	Amritsar	Moti Lal Nehru
1920	Calcutta	Lala Lajpat Rai (suspended)
	Nagpur	C. Vijayraghava Chariar (Annual)
1921	Ahmadabad	C. R. Das (in prision) Hakim Ajaml Khan (acting)
1922	Gaya	C. R. Das
1923	Delhi	Maulana Abul Kalam Azad (suspended)
	Kakinada	Mohammad Ali (Annual)

Year	Place	President
1924	Belgaum	Mahatma Gandhi
1925	Kanpur	Sarojini Naidu
1926	Gauhati	S. Srinivas Iyengar
1927	Madras	M. A. Ansari
1928	Calcutta	Moti Lal Nehru
1929	Lahore	Jawahar Lal Nehru
1930	—	No session due to CDM
1931	Karachi	Vallabhbhai Patel
1932	Delhi	Amrit Ranchoddas Seth (session banned)
1933	Calcutta	Mrs. Nelline Sengupta (session banned)
1934	Bombay	Rajendra Prasad
1936	Lucknow	Jawahar Lal Nehru
1937	Faizpur	Jawahar Lal Nehru
1938	Haripura	Subhash Chandra Bose
1939	Tripuri	Subhash Chandra Bose (later Rajendra Prasad)
1940	Ramgarh	Maulana Abul Kalam Azad
1946	Meerut	Acharya J. B. Kriplani
1948	Jaipur	Pattabhi Sitarammayya

IMPORTANT CONGRESS SESSION

Year	Place	Importance
1885	Bombay	at Gokuldas Tejpal Sanskrit College, 72 delegates
1886	Calcutta	436 delegates
1887	Madras	Tayyabji became first Muslim President
1888	Allahabad	George Yule became first English President
1889	Bombay	Congress represented all areas of British India
1890	Calcutta	Decision taken to organise a session of Congress in London
1895	Poona	Demand for a representative body only for educated class
1898	Madras	Social reform was set as the main goal
1907	Surat	Congress split
1908	Madras	Constitution for the Congress
1916	Lucknow	Congress merger, Pact with Muslim League, Gandhi attended
1917	Calcutta	Annie Besant became first women President
1920	Nagpur	Gandhian programme was adopted. Change in Congress Constituion

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Year	Place	Importance
1921	Ahmedabad	Hosrat Mohani demanded for complete independence.
1922	Gaya	Formation of Swaraj Party
1924	Belgaun	Gandhi became President.
1925	Kanpur	Sarojini Naidu became first Indian women President
1927	Madras	Nehru and S C Bose moved resolution for independence and it was passed for the 1st time
1928	Calcutta	First All India Youth Congress
1929	Lahore	Poorna Swaraj Resolution and pledge for Independence day on 26 January 1930
1931	Karachi	Resolution for Fundamental Rights and National Economic Policy
1934	Bombay	Formation of Congress Socialist Party
1936	Lucknow	Support for socialism through democracy
1937	Faizpur	Demand for Constituent Assembly
1938	Haripura	Poorna Swaraj was to cover also princely states
1939	Tripuri	S C Bose resigned due to differenece with Gandhi

SECRET REVOLUTIONARY SOCIETIES

Socity/Organisation	Year	Founder	Features
Anushilan Samiti Dacca	1902	Pulin Das	Earliest Secret Socity in Bengal
Anushilan Samiti (Calcutta)	1907	Barindra Kumar Ghosh & P. Mitra	—
Mitra Mela (Maharashtra)	1902	V. D. Savarkar	Earliest Secreat Socity in Maharashtra
Abhinav Bharat (Maharashtra)	1904	Ganesh Savarkar	Ganesh was the elder brother of V.D. Savarkar
Hindustan Republican Association (HRA)	1924	Sachindra Sanyal & J. Chatterjee	It was an all India level organization
Ghadar Party (San Fransisco)	1913	Lala Hardayal and Sohan Singh Bhakna	—
India Independence League (Japan)	1942	Ras Bihari Bose	—

FAMOUS CASES

Case	Date	Accused
Nasik conspiracy	1909-1910	Vinayak Savarkar
Alipore Case	1908	Aurobindo Ghosh
Hawrah Case	1910	Jatin Mukherjee
Dacca Case	1910	Pulin Das
Delhi Case	1915	Amir Chand, Awadh Bihari and Bal Mukund
Lahore Case	1929-1930	Bhagat Singh, Rajguru and Sukhdev
Banaras Case	1915-1916	Sachin Nath Sanyal
Kakori Case	1925	Ram Prasad Bismil and Ashfaqullah Khan

REVOLUTIONARY ORGANISATION OUTSIDE INDIA

Year	Association/ organisation	Founder	Country
1904	India House	Shyamaji Krishna Verma	London (England)
1906	Abhinav Bharat	V. D. Savarkar	London (England)
1907	India Independence Leauge	Taraknath Das	America
1913	Gadar Party	Lala Hardayal	San Fransisco (America)
1914	India Independence League	—	Berlin (Germany)
1915	India Independence League and Government	Raja Mahendra Pratap	Kabul (Afghanistan)
1942	India Independence League.	Ras Bihari Bose	Tokyo (Japan)
1942	Indian National Army (INA)	Ras Bihari Bose (In 1943 reorg-anized by Netaji in Singapore)	Tokyo (Japan)

GOVERNOR GENERAL AND VICEROYS

Governor-General of Bengal

Name	Period	Important Events
Warren Hastings	(1772-1785)	o Became governor of Bengal in 1772 and Governor-General in 1773 throught the Regulating Act. o Abolished Dual system of administration.

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		○ Wrote introduction to the *first English translation of the Gita by Charles Wilkins.*
		○ Founded the Asiatic Society of Bengal with William Jones in 1784.
		○ Rohilla War (1774)
		○ 1st Anglo-Marathan War (1776-1782)
		○ 2nd Anglo-Mysore War (1780-1784).
Lord Cornwallis	(1786-1793)	○ Separated the revenue administration from the administration of justice.
		○ Created post of district judge.
		○ Introduced Permanent Settlement in Bengal.
		○ Cornwallis is called the father of civil service in India.
		○ Fought 3rd Anglo-Mysore War.
Sir John Shore	(1793-1798)	○ Introduced the 1st Charter Act.
		○ Planned the permanent settlement and later succeeded Cornwallis as Governor General.
		○ Battle of Kharda between Niazm and the Marathas (1795).
Lord Wellesley	(1798-1805)	○ Started Subsidiary Alliance system to achieve British paramountcy in India.
		○ Madras Presidency was formed during his tenure.
		○ 4th Anglo-Mysore War (1799)–defeat and the death of tipu Sultan.
		○ 2nd Anglo-Martha War, (1803-1805) defeat of the Seindhia, the Bhonsale and the Holkar.
		○ Treaty of Bassein (1802).

George Barlow	(1805-1807)	○ Subsidiary alliance with Holkar by Treaty of Rajpurghat.
		○ Vellore Mutiny.
		○ Second Anglo-Maratha war ended.
Lord Minto-I	(1807-1813)	○ Concluded Treaty of Amritsar with Ranjit Singh (1809).
		○ Charter Act of 1813 was passed.
Lord Hastings	(1813-1823)	○ Anglo–Nepalese War (1813-1823)
		○ 3rd Anglo-Maratha War (1817-1818). Hastings forced humiliating treaties on Peshwa and the Sindhia.
		○ Introduced the Ryotwari settlement in Madras by Thoms Munro, the Governor.
Lord Amherst	(1823-1828)	○ 1st Burmese War (1824-26).
		○ Acquisition of territories in Malay Peninsula.
		○ Capture of Bharatpur (1826).

GOVERNOR GENERAL OF INDIA

Lord William Bentick	(1828-1834)	○ Most liberal and enlightened Governor General of India.
		○ Regarded as the Father of Modern Western Education in India.
		○ Abolished sati and other cruel rites (1829).
		○ Suppressed *Thuggee* (1830), Curbed by Colonel Sleeman.
		○ Annexed Mysore (1831), Coorg (1834), Central Cachar (1834) on the plea of misgovernment. Concluded a treaty of perpetual friendship with Ranjit Singh.

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Sir Charles Metcalfe	(1834-1836)	o He is known as the Liberator of Press. o Passed the Press law
Lord Auckland	(1836-1842)	o First Afghan war (1836-1842) o Treaty with Sikhs and Amirs of sindh.
Lord Ellenborough	(1842-1844)	o Brought an end to Afghan War. o Annexation of Sindh (1843). o War with Gwalior (1843).
Lord Hardinge-I	(1844-1848)	o First Sikh War (1845-1846) o Treaty of Lahore (1846) o Prohibition of female Infanticide o Gave prefrence to English educated in employment.
Lord Dalhousie	(1848-1856)	o Widow Remarriage Act (1856). o Introduced Doctrine of Lapse. Captured Satra (1848), Jaipur and Sambhalpur (1049) Baghat (1850), Udaipur (1852) Jhansi (1853) and Nagpur (1854). o Fought the Anglo-Sikh War and annexed the whole of the Punjab. o 2nd Burmese War (1852) and annexation of Lower Burma or Pegu. o Annexation of Berar in 1853. o Annexation of Awadh in 1856. o Started the first railway line in 1853 (connecting Bombay with Thana).
Lord Canning	(1856-1858)	o Revolt of 1857 o He was the last Governor-General of East India Company.

VICEROYS OF INDIA

Lord Canning	(1858-1862)	o Passed the Act of 1858, which ended the rule of the East India Company. o Withdrew Doctrine of Lapse. o The Indian Councils Act of 1861 was passed, which proved to be a landmark in the constitutional history of India. o The Indian Penal Code of Criminal Procedure (1859) was passed. o The Indian-High Court Act (1861) was enacted. o Income Tax was introduced for the first time in 1858.
Lord Elgin-I	(1862-1863)	o Suppressed Wahabi Movement.
Sir John Lawrence	(1864-1868)	o High courts were established at Calcutta, Bombay and Madras in 1865. o Expanded canal works and railways. o Bhutan War (1865). o Advocated State-managed railways. o Created the Indian Forests Department and reorganized the native judical service.
Lord Mayo	(1869-1872)	o He established the Rajkot College at Kathiawar and Mayo College at Ajmer for the Indian princes. o He organised the Statistical Survey of India. o He established the Department of Agriculture and Commerce. o He was the only Viceroy to be murdered in office by a convict in the Andamans in 1872.
Lord Northbrook	(1872-1876)	o Kuka rebellion in Punjab (1872)

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		○ Famine in Bihar (1874) ○ Resigned over Afghanistan Question.
Lord Lytton	(1876-1880)	○ Most unpopular Governor-General ○ Pursued free trade and abolished duties on 29 British manufactured goods which accelerated drain of India. ○ Arranged the Grand Darbar in Delhi (in 1877) when the country was suffering from a severe famine. ○ Passed the Royal Title Act (1876) and Queen Victoria was declared as the Kaiser-a-Hind. ○ Arms Act (1878) made it mandatory for Indians to acquire license for arms. ○ Passed the infamous Vernacular Press Act (1878).
Lord Rippon	(1880-1884)	○ Repeal of the Vernacular Press Act, 1882. ○ The first Factory Act, 1881 to improve labour condition. ○ Resolution on Local Self Government in 1882. ○ Resolution on Land Revenue Policy ○ Appointed Hunter commission (for education reform) in 1882. ○ The Illbert Bill controversy erupted during his time.
Lord Dufferin	(1884-1888)	○ Third Burmese War ○ Annexation of Burma (1885) ○ Congress founded in 1885
Lord Lansdowne	(1888-1894)	○ Bengal Tenancy Act (1885) ○ The Factory Act of 1891. ○ Categorisation of Civil Services into imperial, provincial and subordinate.

		○ Indian Council Act of 1892 (Introduced elections which was indirect). ○ Appointment of the Durand Commission.
Lord Elgin-II	(1894-1899)	○ The Santhal uprising of 1899. ○ Convention delimiting the frontier between China and India was ratified. ○ Great famine of 1896-1897. ○ Lyall Commission appointed after famine. ○ Assassination of two British officials by the Chapekar brothers in 1897.
Lord Corzon	(1899-1905)	○ Appointed a Police Commission in 1902 under Andrew Frazer. ○ Set up the Universities Commission and accordingly the Indian Universities Act of 1904 was passed. ○ Set up the Department of Commerce and Industry. ○ Calcutta Corporation Act (1899). ○ Passed the Indian Coinage and Paper Currency Act (in 1899) and put India on a gold standard. ○ Partition of Bengal took place in 1905
Lord Minto-II	(1905-1910)	○ Swadeshi Movement. ○ Surat session and split in the Congress (1907). ○ Newspapers Act, 1908. ○ Morely-Minto Reforms, 1909.
Lord Hardinge-II	(1910-1916)	○ Foundation of the Muslim League, 1906. ○ Annulment of the partition of Bengal. ○ Transfer of capital from Calcutta to Delhi. ○ Durbar in Delhi and Coronation of George-V and Queen.

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		o Establishment of Hindu Mahasabha by Madan Mohan Malviya, 1915.
Lord Chelmsford	(1916-1921)	o Lucknow Pact in 1916 between Congress and Muslim League. o Arrival of Gandhi, and Champaran Satyagraha in 1916. o Montague's August Declaration (1917). o Kheda Satyagraha and Satyagraha at Ahmedabad in 1918. o Government of India Act (1919). o Constitutional Refrom of 1919. o Repressive Rowlatt Act (1919). o Massacre at Jalianwala Bagh (1919). o Saddler Commission of Education in 1917. o Khilafat Movement. o Non-Cooperation Movement.
Lord Reading	(1921-1926)	o Repeal of Press Act (1910) and Rowlatt Act of 1919. o Chauri-Chura incident. o Voilent Mooplah rebellion in Kerala (1921) o CPI founded in 1921. o RSS founded in 1925. o Nagpur Kakori robbery in 1925.
Lord Irwin	(1926-1931)	o Simon Commission announced in 1927. o Butler Commission in 1927. o All India Youth Congress, 1928 o Nehru Report, 1928. o Lahore session of the Congress and Poorna Swaraj declaration. o Civil Disobedience Movement 1930.

		o Dandi March (March 12th, 1930). o 1st Round Table Conference, 1930. o Gandhi-Irwin Pact, March 5, 1931.
Lord Willingdon	(1931-1936)	o Civil Disobedience Movement. o Second Round Table Conference in September 1931. o Announcement of Communal Award (1932). o Third Round Table Conference, 1932. o Foundation of Congress Socialist Party, 1934. o Government of India Act, 1935. o Burma separated from India, 1935. o All India Kisan Sabha 1936.
Lord Linlithgow	(1936-1944)	o 1st General Election (1936-1937). o Congress ministries in 1937 and Resignation of Congress ministries in 1939. o Forward Block founded in 1939. o Deliverance day by Muslim League → 1939 o August offer, 1940, Lahore Resolution, 1940. o Cripps Mission, 1942. o Quit India Movement, 1942.
Lord Wavell	(1943-1947)	o CR Formula 1944. o Wavell Plan and Shimla Conference in 1945. o End of 2nd World War in 1945. o INA Trials and the Naval mutiny in 1946. o Cabinet Mission, 1946 and acceptance of its proposals by Congress.

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Lord Mountbatten	(1947-1948)	o Announced the 3 June, 1947 Plan. o Introduction of Indian Independence Bill in the House of Commons. o Appointment of Two boundary commissions under Sir Cryil Raddcliffe. o Last British Viceroy of British India. o First Governor-General of Free India.
C Raj Gopalachari	(1948-1950)	o Only Indian Governor General o Last Governor-General of free India.

MAJOR COMMITTIES/COMMISSION

Committies/ Commission	Year	Viceroy	Associated With
Charles Wood Despatch	1854	Lord Dalhousie	Education
Hunter Commission	1882	Lord Ripon	Education
Raleigh Commission	1902	Lord Curzon	Education
Sadler Commission	1917	Lord Chelmsford	Education
Hartog Commission	1929	Lord Irwin	Education
Sargent Plan	1944	Lord Wavell	Education
Campbell Commission	1866	Sir John Lawrence	Famine
Stratchy Commission	1880	Lord Lytton	Famine
Lyall Commission	1896	Lord Elgin-II	Famine
MacDonnel Commission	1900	Lord Curzon	Famine
Mansfield Commission	1886	Lord Dufferin	Currecny
Fowler Commission	1898	Lord Elgin-II	Currency
Babington Smith Commission	1919	Lord Chelmsford	Currency
Hilton young Commission	1939	Lord Linlithgow	Currency
Skeen Commission	1925	Lord Reading	Army
Garren Commission	1932	Lord Willingdon	Army
Chatfield Commission	1939	Lord Linlithgow	Army
Hunter Commission	1919	Lord Chelmsford	Punjab Disturbances
Fraser Commission	1902	Lord Curzon	Agriculture
Butler Commission	1927	Lord Irwin	Indian States
Whitley Commission	1929	Lord Irwin	Labour
Sapru Commission	1935	Lord Linlithgow	Unemployment
Floud Commission	1940	Lord Linlithgow	Tenancy in Bengal

IMPORTANT PERSONALITIES OF FREEDOM STRUGGLE

Name	Birth	Death	Famous For
Asaf Ali	1888	1953	Member of Congress working Committee, Member of Executive Council (1946-47), Ist Indian Ambassador to USA (1947-48).
Acharya Narendra Dev	1889	1956	Founder Member of the Congress Socialist Party, Vice Chancellor of Banaras Hindu University.
Acharaya Vinoba Bhave	1895	1982	Participated in the Dandi March, Salt Satyagraha, Individual Satyagraha, Bhoodan Movement.
Abudl Gaffar Khan	1890	1988	Called as Frontier Gandhi founded Khudai Khidmatgar, Participated in Non-Cooperation, Civil Disobedience and Quit India Movements.
Ashfaqullah Khan	1900	1927	A revolutionary associated with the Hindustan Republican Association, Participated in Kakori hold up, sentenced to death.
A.O. Hume	1829	1922	British Civil Servant known as the founder of Congress.
Abul Kalam Azad	1888	1958	Congress President from 1940 to 1946, published papers like Al-Hilal, Al-Balagh, Al-Nadawah.
Annie Besant	1847	1933	Came to India in 1839 assocaited with Theosophical Society, founded Central Hindu College (1898), found Home Rule League (1915).
Ajit Singh	–	1947	Founded the Bharat Mata Society, worked with Ghadar Party. uncle of Bhagat Singh
Anand Mohan Bose	1847	1906	Founded National Conference (1883), Presi-

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B.R. Ambedkar	1891	1956	dent of Madras Session of INC (1898). Foudned the Depressed Class Institute (1924), launched various movements, Chairman of the Drafting Committee.
Bhai Balmukund	1891	1919	He was a revolutionary, arrested in the Hardinge Bomb case and hanged.
Bankim Chandra Chatterjee	1838	1894	Bengali poet and novelist wrote *Durgeshnandini* composed the song *Bande Matram*.
Barindra Kumar Ghosh	1880	1959	Started Bengali weekly, the 'Jugantar' organised Maniktala Party for revolutionary activities.
Bhai Parmanand	1874	1947	Leading figure of the Ghadar Party, became the chacellor of National College Lahore, associated with Hindu Mahasabha.
Chittaranjan Das	1870	1925	Founder of the Swarajya Party, presided over the AITUC session at Lahore (1923) and Ahemdabad (1924).
Achyut S. Patwardhan	1905	1971	Founder member of the Congress Socialist Party (1934), participated in Quit India Movement
Alluri Sitaram Raju	1897	1924	Led the Rampa tribal uprising (1923-24) in Andhra Pradesh
Badruddin Taiyyabji	1844	1906	Associated with Bombay Presidency Association and Indian National Congress, Presided over Madras Session, (1887).
Bal Gangadhar Tilak	1857	1920	Known as Lokamanaya started two newspapers 'Mahratta' and 'Kesari' an extremists leader of the congress.

Bipin Chandra Pal	1858	1932	Known as the father of revolutionary thought in India, Member of Congress, one of the famous trio–Lal, Bal, Pal.
Bhulabhai Desai	1877	1946	Prominent lawyer, congress leader, famous for INA trial.
Bhagat Singh	1907	1931	A revolutionary leader, founded 'Naujawan Bharat Sabha' killed Saunders, sentenced to death in Lahore conspiracy case.
C. Rajgopalachari	1878	1972	Chief Minister of Madras (1937-39), first and last Indian Governor–General.
Chandra Shekhar Azad	1906	1931	Associated with Hindustan Socialist Republican Army, shot himself dead at Alfred Park, Allahabad
C.F. Andrews	1871	1940	Actively participated in Trade Union Activities, joined Viakom Satyagraha (1925).
C.Y. Chintamani	1880	1941	One of the founder of the Liberal Party, edited papers like The 'Leader', 'Hindustan Review'.
Dadabhai Nauroji	1825	1917	'Grand Old Man of India' founded 'the London India Society,' gave the 'Drain theory.'
Kamala Nehru	1899	1936	Married to J.L. Nehru in 1916, participated in various movements, led the Civil Disobedience movement.
David Hare	1775	1842	Founder of the Hindu college in Calcutta, associated with 'Young Bengal Movement.'
D.K. Karve	1858	1962	Was a social reformer supported widow remarriage, started Widow Homes.
Dinabandhu Mitra	1830	1873	Author of 'Neel Darpan' showing exploitation of indigo cultivators

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Dayanand Saraswati	1824	1899	Founded 'Arya Samaj' wrote 'Satyarth Prakash', was in favour of widow remarriage and opposed untouchability.
E.V. Ramaswamy Naicker	1879	1973	Lower caste leader, launched Self Respect Movement (1925), President of the Justice Party.
Govind Ballabh Pant	1889	1961	Freedom fighter, demonstration against the Simon Commission (1927), Chief Minister of U.P. (1946)
G.G. Agarkar	1856	1895	Launched the weekly 'Sudharak', editor of papers like 'Mahratta' and the 'Kesari,' great social reformer.
Gopal Krishna Gokhale	1866	1915	Foudned 'Servants of India Society' (1905), Moderate leaders of Congress.
Ishwar Chandra Vidyasagar	1820	1891	Well known social reformer, supported valiantly widow remarriage, founded various schools for girls.
Jamna Lal Bajaj	1889	1942	Treasurer of Congress (1920-42), founder of 'Gandhi Seva Sangh'
Yogesh Chandra Chatterji	1895	1969	One of the founders of the 'Hindustan Socialist Republican Association,' arrested in Kakori conspiracy case, associated with 'Anushilan Samiti.'
Jatindra Nath Das	1904	1929	Great revolutionary, died in Lahore jail after 63 days fast.
Jadonang	1905	1931	Naga tribal freedom fighter from Manipur, was sentenced to death and hanged in 1931.
Jatindranath Mukherjee	1879	1915	Member of revolutionary soceities like 'Jugantar,' 'Anushilan Samiti' and 'Ghdar Party,' popularly known as Bagha Jatin.

Jawahar Lal Nehru	1889	1964	Freedom fighter, Prime Minister from 1947 to 1964 Auhtor of the 'Discovery of India,' 'Glimpses of World History.'
K.T. Telang	1850	1893	Co-founder of the 'Bombay Presidency Association,' President of 'National Social Conference,' One of the founders of congress.
Kasturba Gandhi	1869	1944	Wife of Mahatma Gandhi, died on Fed. 24, 1944 in prison.
Khudiram Bose	1889	1908	Young revolutionary arrested in Muzaffarpur conspiracy case and sentencted to death.
Madan Mohan Malviya	1861	1946	INC President (1909), was a founder member of the Hindu Mahasabha, founded the Banaras Hindu Universtiy in 1916 and remained its V.C. from 1919 to 1938.
Motilal Nehru	1861	1931	Father of J.L. Nehru, eminent lawyer, founder leader of the 'Swarajist Party.'
Maulana Muhammad Ali	1878	1931	Associated with the "Khilafat Movement," INC President in Kakinada Session (1923), well-known journalist.
M.A. Ansari	1880	1936	Muslim League leader, founded Jamia Millia Islamia, organised the All India Medical mission to Turkey in 1912-13.
Mahadev Desai	1892	1942	Mahatma Gandhi's Secretary for 25 years, edited. The "Independent" and "Navjivan" died on 15 August 1942.
Khurshedji Rustamji Cama	1831	1909	Parsian businessman, supported social reforms on Parsis, father-in-law of Madam Bhikaji Cama

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Kalpana Datta	1913	1978	Women revolutionary of Bengal, sentenced to transporation of life in the Chittagong Armoury Raid Case.
K.M. Munshi	1887	1971	Freedom fighter, educationist founder of Bharatiya Vidya Bhawan.
Lala Lajpat Rai	1865	1928	Known as "Punjab Kesari," brutally lathi charged in anti Simon Commission procession in Lahore, died after 18 days.
Lala Hardayal	1884	1939	Founder of the Ghadar Party in USA, started a paper "The Bandematram" and a journal "Ghadar", was a professor at the Berkeley University.
Madan Lal Dhingra	1887	1909	Associated with the Indian Home Rule society, Abhinav Bharat Society and the India House, shot dead curzon wyllie.
Madam Bhikaji Cama	1861	1936	Famous women revolutionary In 1907 attended the socialist congress at stuttgrat and unfurled the Indian National Flag.
Mahatma Gandhi	1869	1948	'Father of the Nation', leading figure in the Indian National Movement.
Manindra Nath Bannerji	—	1934	A revolutionary, involved in the Kakori conspiracy case, died after 66 days of hunger strike.
Muhammad Iqbal	1873	1938	Famous Urdu poet, wrote the famous Nationalist Song "Sare Jahan Se Accha Hindustan Hamara."
M.R. Jaykar	1873	1959	Leader of the Swarajya Party, attended the Round Table conference, lawyer by profession.

Mohammad Ali Jinnah	1875	1948	Leader of Muslim League, formulated 14 points in 1929, formulated two nations theory, known as Qaid-e Azam.
N.M. Joshi	1875	1955	Founded the All India Trade Union Congress in 1921, called as father of the Trade Union Movement in India.
Meera Behn	1892	1982	Real name was Madeleine Slade, disciple and associate of Mahatma Gandhi
M.G.Ranade	1842	1901	Founded the Deccan Educational Society, a founder of the Indain National Congress.
M.N. Roy	1887	1954	Communist leader, arrested in Kanpur Conspiracy Case, formed Indian Federation of Labour, founder of Communist Party of India.
Nabh Gopal Mitra	1842	1894	Popularly–known as National Mitra was a Bengali poet and playwrigter.
Narayana Guru	1845	1928	A great socio-religious reformer from Kerala, fought against Brahmin domination, worked for the spread of education in Kerala.
Ferozeshah Mehta	1845	1915	Founder of the Bombay Presidency Association and INC, was a moderate leader.
Pattabhi Sitaramiah	1880	1959	Congress leader in 1939, he lost the Congress presidential election to Subhas Bose.
P. Anand Charlu	1843	1908	One of the founders of Congress President of INC (1891), associated with Madras Mahajan Sabha.
Preetilata Waddekar	1911	1932	Women revolutionary, member of Jugantar and the Chittagong Republican Army.

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Ram Prasad Bismil	1897	1927	A revolutionary, member of Hindustan socialist republican army, participated in Kakori Train Dacoity.
Rajendra Prasad	1884	1963	Congress leader from Bihar, became the first President of India.
Ram Manohar Lohiya	1910	1968	Foudner member of Congress Socialist Party, edited the Journal "The Congress Socialist" after independence founded the Socialist Party.
Rajkumari Amrit Kaur	1889	1964	Belgoned to the ruling family of Kapurthala, a follower of Gandhi, served as indepedent India's first Health Minister.
Rani Lakshmi Bai	1835	1858	Second wife of the ruler of Jhansi, defended Jhansi from Britishers, captured Gwalior, died fighting heroically.
Raasbihari Bose	1886	1945	Revolutionary leader, assocaited with Yugantar and Ghadar Party, founded 'India Independence League' and 'Indain National Army.'
Ras Bihari Ghose	1845	1921	A leading moderate leader of Congress, Presided over Surat Session of Congress (1907).
Rajendra Nath Lahiri	1898	1927	A great revolutionary, member of the Hindustan Socialist Republican Association (HSRA), participated in Kakori Dacoity.
Rabindra Nath Tagore	1861	1941	Multifaced personality, won the Nobel Prize for Literature in 1913.
Surendranath Banerjee	1848	1925	One of the founders of INC, successfully completed for Indian Civil Service in 1896, eminent journalist and educationist.

Sohan Singh Bhakna	1870	1968	Founded (Hind Association) in 1913, published Ghadar News paper, associated with 'Kamagatamaru' ship incident.
Subhash Chandra Bose	1897	1945	Successfully competed in civil services exam, presided over the Haripura session of the Congress (1938), founded Forward Block.
S. Subramaniam Iyer	1842	1924	President of the All-India Home Rule League, one of the founders of the Congress.
Saiyyad Ahmed Khan	1817	1899	Founder of Aligarh Movement, founded the Mohammadan Anglo Oriental College (Aligarh).
Sarojini Naidu	1879	1949	First Indian women President of Congress (1925), Governor of U.P. (1947-48), eminent poetess.
S. Rajguru	1908	1931	Tried in the Lahore conspiracy case and sentenced to death along with Bhagar Singh and Sukhdev.
Tej Bahadur Sapru	1875	1949	Moderate leader of Congress, jurist from Allahabad, elected to the membership of privy Council.
Vallabhbhai Patel	1875	1950	Launched Bardoli Satyagraha, deputy Prime Minister after independence, called as 'Iron Man of India.'
Vithalbhai Patel	1873	1933	Lawyer by profession, represented INC at the London conference (1919).
V.D. Savarkar	1883	1966	A great revolutionary founded Mitra Mela he called the 1857 Revit as the First war of Independence.
Wyomesh Chandra Bannerjee	1844	1905	First congress president at Bombay in 1885, financed the British committee of the congress in London and its journal *India*.

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Vasudeo Balwant Phadke	1845	1883	A great revolutionary, organised a secret society, organised militant tribes like Kolis and Ramoshis.
Sachidnra Nath Sanyal	1895	1945	A great revolutionary, associated with the activity of Ghadar Party, founder of Hidnustan Republican Association, arrested in Kakori Conspiracy Case.
Swami Sahajanand	1889	1950	Kisan leader from Bihar, participated in Gandhian movements, founded Bihar kisan Sabha in 1929.
S. Satyamurti	1887	1943	A great leader from South India, participated in Civil Disobedience and Quit India Movements.
Surya Sen	1894	1934	Revolutionary leader from Bengal, founded the Chittagong Republican Army, captured in 1933 and sentenced to death.
Swami Sraddhanand	1856	1926	A great Arya Samajist educationist started a weekly (Satya Dharma Pracharak) murdered in 1926.
T.K. Madhvan	1886	1930	Launched the Temple Entry Movement, vaikom Satyagraha editor of Deshabhimani.
T. Prakasam	1872	1957	Known as 'Andhra Kesari' took part in Salt Satyagraha.
Udham Singh	1899	1940	A great revolutionary leader from Punjab, murdered Michael O'Dwyer was sentenced to death.
Zakir Husain	1897	1969	Formulated Wardha scheme of education, served as vice-chancellor of Jamia Millia (1926-53), Governor of Bihar (1953-62), and Vice President of India (1962-67), elected as President of India in 1967, died in office.

NEWSPAPERS OF BRITISH INDIA

Newspapers	Year	Founder/Editor
Bengal Gazzette (India's first newspaper)	1780	James Augustus Hickey
Madras Courier	1784	—
Bombay Herald	1789	—
Samachar Darshan (Bangla) (oldest in Indian language)	1818	Kaire, Marshman
Calcutta Journal	—	James Silk Buckingham
Sambad Kaumudi (Bangla)	1821	Raja Ram Mohan Roy
Bombay Samachar (Gujarati)	1822	Fardoorejee Majban
Mirat-ul-akhbar (Farasi)	1822	Raja Ram mohan Roy
Udant Martand	1826	Jugul Kishore (first news paper of Hindi)
Sambad Prabhakar	1830	Ishwar Chandra Gupta
Jam-e Jamshed	1831	P.M. Motiwala
Bombay Times (English)	1838	Bennet Colloman & Co.
Hindu Patriot	1853	Harishchandra Mukherjee
Som Prakash	1858	Ishwar Chandra Vidyasagar
Rast Goftar	1861	Dada Bhai Nauroji
Pioneer (English)	1865	Allahabad, now from Lucknow and Delhi (Changed)
Amrit Bazar Patrika (Bangla-Calcutta)	1868	S.K. Ghosh, Motilal Ghosh, Tusarkanti Ghosh
Madras Mail	1868	First evening news paper
Statesman	1875	Robert Night, Sunanda Dutta Roy
The Tribune (Chandigarh, Punjab	1877	Sir Dayal Singh Mazithia
Hindu (English-Madras)	1878	Vir Raghvachari, Kasturi Brothen
Paridashak	1880	Bipin Chandra Pal, Aurobindo Ghosh
Kesari (Marathi)	1881	Bal Gangadhar Tilak
Maratha (English)	1881	Bal Gangadhar Tilak
Sudharak (Marathi)	1888	Gopal Ganesh Agarkar
Bande Matram	1906	Bipin Chandra Pal, Arvind Ghosh
Al-Hilal	1912	Maulana Abul Kalam Azad
Bombay Chronicle	1913	Feroz Shah Mehta
Madras Standard	1914	Anie Besant
Common Weal	1914	Anie Besant
New India	1914	Anie Besant
Don (Now from Pakistan)	—	Md. Ali Jinnah
Star	—	Paper of Muslim League
Searchlight	1918	Sachidanand Sinha
Punjab Kesari	—	Lala Jagat Narayan, Lala Hardayal
Sahsik	—	Sardar Ajit Singh, Sufi Amba Prasad
Independent	1919	Motilal Nehru
Young India	1919	Mohanlal Karam Chanda Gandhi
Socialist	1922	S.A. Dnage
Hindustan Times	1922	K.M. Pannikar (Swarajya Party)
Free Press Journal	1930	S. Sadanand
Harijan	1933	Mohandas Karam Chand Gandhi

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BOOKS OF FREEDOM STRUGGLE

Book		Author
Gana Devta	:	Tarashankar Bandopadhyaya
Philosophy of the Bomb	:	Bhagwati Charan Vohra
Why Socialism	:	Jaiprakash Narayan
Gandhi Verses Lenin	:	S.A. Dange
Problem of the East	:	Lord Curzon
Neel Darpan	:	Deen Bandhu Mitra
India Today	:	R.P. Dutt
India Wins Freedom	:	Abul Kalam Azad
Thakurmar Jholi	:	D.M. Majumdar
India Unrest	:	Valentine Chirol
Prachya aur Pashchatya	:	Swami Vivekanand
Nibandhmala	:	Vishnu Krishna Chiplunkar
Gau Karunanidhi	:	Swami Dayananda
Letters from Russia	:	Rabindranath Tagore
Wither India	:	J.L. Nehru
Soviet Asia	:	J.L. Nehru
Pather Debi	:	Avanindranath Tagore
History of Hindu Chemistry	:	P.C. Rai
Peasantry of Bengal	:	R.C. Dutt
Vande Matram	:	Aurobindo Ghosh
New Lamps for Old	:	Aurobindo Ghosh
Bhawani Mandir	:	Aurobindo Ghosh
Hind Swaraj	:	Mahatma Gandhi
Gora	:	Rabindranath Tagore
Ghare Baiyre	:	Rabindranath Tagore
Discovery of India	:	J.L. Nehru
Essays in Indian Economics	:	M.G. Ranade
Rise of the Maratha power	:	M.G. Ranade
Arctic Home of the Vedas	:	B.G. Tilak
Geeta Rahasya	:	B.G. Tilak
Poverty and Unbritish rule in India	:	Dada Bhai Nauroji
Durgesh Nandini	:	Bankim Chandra Chatterjee
Bang Darshan	:	Bankim Chandra Chatterjee
Anand Math	:	Bankim Chandra Chatterjee
India in Transition	:	M.N. Roy
The Economic History of British India	:	R.C. Dutt
The Indian Struggle	:	Subhash Chandra Bose
Indian Musalmans	:	Hunter

INDIA'S FREEDOM STRUGGLE AT A GLANCE

- 1885, December 28 : First session of Indian National Congress at Bombay.
- 1905 : Partition of Bengal to come into force from October, 15, 1905.
- 1906, December 31 : Muslim League founded at Dacca.
- 1907 : The Surat Split.
- 1908, April 30 : Khudiram Bose executed.
- 1908, July 22 : Tilak sentenced to six years on charges of sedition.
- 1909, May 21 : Minto-Morely Reforms or Indian Councils Act, 1909.
- 1911 : The coronation or Delhi durbar held at Delhi in which the partition of Bengal was cancelled.
- 1912 : Delhi becomes the new capital of India.
- 1912, December 23 : Bomb thrown on Lord Hardinge on his state entry into Delhi.
- 1913, November 1 : Ghadar party formed at San Francisco.
- 1914, January 16 : B.G. Tilak released from jail.
- 1914, August 4 : Outbreak of the 1st World War.
- 1915, January : Gandhiji arrives in India.
- 1915, February 19 : Death of Gopal Krishna Gokhale.
- 1916, April 28 : B.G. Tilak founded Indian Home Rule league with its headquarters at Poona.
- 1916, September 25 : Another Home Rule League started by Annie Besant.
- 1917, April : Mahatma Gandhi launches the Champaran campaign in Bihar to focus attention on the grievances of indigo planters.
- 1918 : Beginning of trade union movement in India.
- 1918, April : Rowlatt (Sedition) Committee submits its report. Rowlatt Bill introduced on February 16, 1919.
- 1919, April 3 : Jallianwala Bagh tragedy.
- 1919, April 6 : All India hartal over Rowlatt Bills.
- 1919, December 5 : The House of Commons passes the Montague-Chelmsford Reforms or the Government of India Act, 1919. The new reforms under this Act came into operation in 1921.
- 1920 : First meeting of the All–India Trade Union Congress.
- 1920, December : The Indian National Congress (INC) adopts the Non-Cooperation Resolution (started in August 31, 1920).
- 1920-22 : Non-Co–operation Movement suspended on February 11-12, 1922 after the violent incidents at Chauri Chaura on February 5, 1922
- 1922, August : Moplah rebellion on the Malabar coast.
- 1923 January 1 : Swarajist Party formed by Motilal Nehru and others.
- 1924 : The Communist Party of India starts its activities first at Kanpur.
- 1925, August : Kakori Train Conspiracy Case.

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- 1927, November 8 : The British Prime Minister announces the appointment of the Simon Commission to suggest future constitutional reforms in India. Simon Commission arrives in Bombay on February 3, 1928 and all-India hartal. Lala Lajpat Rai assaulted by police at Lahore.
- 1928 : Nehru Report recommends principles for the new Constitution of India. All-Parties Conference considers the Nehru Report, August 28-31, 1928.
- 1929, March 9 : All-Parties Muslim Conference formulates the 'Fourteen Points' under the leadership of Jinnah.
- 1929, April 8 : Bhagat Singh and Batukeshwar Dutt dropped bombs in the Central Legislative Assembly.
- 1929, October 31 : Lord Irwin's announcement that the goal of British policy in India was the grant of the Dominion status.
- 1929, December 31 : The Lahore session of the INC adopts the goal of complete independence-'poorna swaraj'-for India.
- 1930, January 1 : Jawaharlal Nehru hoisted the tricolour of Indian Independence on the banks of the river Ravi at Lahore.
- 1930, January 26 : First Independence Day observed.
- 1930, February 14 : The Working Committee of the INC meets at Sabarmati and passes the Civil Disobedience resolution.
- 1930, March 12 : Mahatma Gandhi launches the Civil Disobedience Movement with his epic Dandi March (March 12 to April 5). First phase of the Civil Disobedience Movement : Mach 12, 1930 to March 5, 1931.
- 1930, November 30 : First Round Table Conference begins in London to consider the report of the Simon Commission.
- 1931, March 5 : Gandhi-Irwin Pact signed. Civil Disobedience Movement suspended.
- 1931, March 23 : Bhagat Singh, Sukh Dev and Rajguru executed.
- 1931, September 7 : Second Round Table Conference begins in London.
- 1931, December 28 : Gandhiji returns from London after the deadlock in Second Round Table Conference. Launches Civil Disobedience Movement. The INC declared illegal.
- 1932, Janaury 4 : Gandhiji was arrested and imprisoned without trial.
- 1932, August 16 : British Prime Minister Ramsay MaCdonald announces the infamous "Communal Award".
- 1932, September 20 : Gandhiji in jail, begins his epic "fast unto death" against the Communal Award and ends the fast on September 26 after the Poona Pact.
- 1932, November 17 : The third Round Table Conference begins in London (November 17 to December 24).
- 1933, May 9 : Gandhiji released from prison as he begins fast for self-purification. INC suspends Civil Disobedience Movement but authorises Satyagrah by individuals.

- 1934 : Gandhiji withdraws from active politics and devotes himself to "constructive programmes" (1934-39).
- 1935, August 4 : The Government of India Act (1935) passed.
- 1937 : Elections held in India under the Act of 1935 (February 1937). The INC contests election, and forms ministries in seven provinces (July 1937).
- 1938, February 19–20 : Haripura Session of INC. Subhas Chandra Bose elected Congress president.
- 1939, March 10-12 : Tripuri Session of the INC.
- 1939, April : Subhas Chandra Bose resigns as the president of the INC.
- 1939, October 27-November 5 : The Congress ministries in the provinces resign in protest against the war policy of the British Government.
- 1939, December 22 : The Muslim League observes the resignation of the Congress ministries as 'Deliverance Day'.
- 1940, March : Lahore Session of the Muslim League passes the Pakistan Resolution.
- 1940, August 10 : Viceroy Linlithgow announces 'August Offer'
- 1940, August 18-22 : Congress Working Committee rejects the 'August Offer'.
- 1940, October 17 : Congress launches individual Satyagraha Movement.
- 1941, January 17 : Subhas Chandra Bose escapes from India, arrives in Berlin (March 28).
- 1942, March 11 : Churchill announces the Cripps Mission.
- 1942, August 7-8 : The INC meets in Bombay; adopts 'Quit India' resolution.
- 1942, August 9 : Gandhiji and other Congress leaders arrested.
- 1942, August 11 : Quit India Movement begins; the Great August uprising.
- 1942, September 1 : Subhash Chandra Bose established the Indian National Army 'Azad Hind Fauj'.
- 1943, October 21 : Subhash Chandra Bose proclaims the formation of the Provisional Government of Free India.
- 1943, December : Karachi Session of the Muslim League, adopts the slogan (Divide and Quit).
- 1944, Janaury 25 : Wavell calls Simla Conference in a bid to form the Executive Council of Indian political leaders.
- 1946, February 18 : Mutiny of the Indian naval ratings in Bombay.
- 1946, March 15 : British Prime Minister Attlee announces Cabinet Mission to propose new solution to the Indian deadlock; Cabinet Mission arrives in New Delhi (March 14); issues proposal (May 16).
- 1946, July 6 : Jawaharlal Nehru takes over as Congress president.
- 1946, August 6 : Wavell invites Nehru to form an interim Government; Interim Government takes office (September 2).

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- 1946, Decemebr 9 : First session of the Constituent Assembly of India starts. Muslim League boycottec it.
- 1947, February 20 : British Prime Minister Attlee declares that the British Government would leave India not later than June 1948.
- 1947, March 24 : Lord Mountbatten, the last British Viceroy and Governor-General of India, sworn–in (March 24, 1947 to June 21, 1948).
- 1947, January 3 : Mountbatten Plan for the partition of India.
- 1947, June 4 : The announcement that transfer of power will take place on August 15.
- 1947, August 15 : India wins freedom

INDIA AFTER INDEPENDENCE

1947

- **14-15 August 1947 :** Appointment of Lord Mountbatten as Governor of Dominion of India.
- **August 15 :** Formation of the first Cabinet of Independent India. It had following members :

1.	J.L. Nehru	:	P.M. and Minister for External and Commonwealth Relations and Scientific Research
2.	Sardar Vallabhabhai Patel	:	Home, Information and Broadcasting and States
3.	Dr. Rajendra Prasad	:	Food and Agriculture
4.	Maulana Abul Kalam Azad	:	Education
5.	Dr. John Mathai	:	Railway and Transport
6.	Sardar Baldev Singh	:	Defence
7.	Rafi Ahmed Kidwai	:	Communications
8.	Raj Kumari Amrita Kaur	:	Health
9.	Dr. B.R. Ambedkar	:	Law
10.	R. K. Shanmukham Chetty	:	Finance
11.	Dr. Shyama Prasad Mukherjee	:	Industries and Supplies
12.	N.V. Gadgil	:	Works, Mines and Power

- **August 15 :** India wins freedom. Jawaharlal Nehru is sworn-in as first Prime Minister.
- **August 23 :** Vallabhbhai Patel is appointed Deputy Prime Minister.
- **August 29 :** Pakistan tribesmen invade India under the banner of Azad Kashmir Forces.
- **October 25 :** Maharaj Hari Singh of Kashmir appeals for help to India.
- **October 27 :** Kashmir Maharaja signs the Instrument of Accession to India.

- **On November 17 :** G.V. Mavalankar elected Speaker of Indian Sovereign Dominion Parliament (On November 17).
- **On December 12 :** Financial agreement between India and Pakistan was announced in Indian Parliament by Sardar Patel.

1948

- **January 1 :** India communicated to the United Nations the possibility of sending troops against Pakistan.
- **January 13 :** Mahatma Gandhi went on fast-in New Delhi. It was his last fast.
- **January 20 :** Security–Council divided to set up a three–member UN Commission for investigation and mediation in the Kashmir dispute (January 20).
- **January 30 :** Mahatma Gandhi was shot dead by Nathuram Vinayak Godse at 5.10 P.M. while he has going for his daily evening prayer meeting in the Birla House, New Delhi.
- **June 21 :** C. Rajagapalachari becomes the first and only Indian Governor–General of India.
- **July 7 :** Damodar Valley Corporation, India's first public corporation, formed.
- **September 13 :** Indian troops annex Hyderabad to Indian territory.
- **November 9 :** Junagarh State annexed to India.

1949

- **January 15 :** Lt. Gen. K.M. Cariappa becomes the first Indian C-in-C.
- **February 1 :** Press Trust of India set up.
- **March 2 :** Death of Sarojini Naidu.
- **March 30 :** Rajasthan State comes into being.
- **May 19 :** India decides to remain within the Commonwealth of Nations.
- **August 19 :** Bhubaneswar is declared capital of Orissa.
- **September 9 :** Hindi is declared National Language of India.
- **September 17 :** Dravida Munnetra Kazhakam formed by C.N. Annadurai in Tamil Nadu.
- **November 26 :** Constitution of India adopted by the Constituent Assembly.
- **November 30 :** Government of India issued a communique, on India's decision to establish diplomatic relations with the new Government of China.
- **October 6 :** Nehru laid the foundation stone of the National Defence Academy at Khadakavasla. The NDA was opened on January 16, 1955.
- The Banking Regulation Act, 1949 was passed. It governs the regulation of all banks in India.

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1950

- **January 1 :** India was elected a member of the UN Security–Council for a period of 2 years.
- **January 24 :** Rajendra Prasad was elected the first President of India.
- **January 26 :** Constitution of India came into force and India proclaimed as Sovereign Democratic Republic.
- **January 26 :** Dr. Rajendra Prasad took the oath as the first President of Indian Republic.
- **January 28 :** Supreme Court of India inaugurated.
- **October 7 :** Missionaries of Charity founded by Mother Teresa.
- **December 5 :** Death of Sri Aurobindo.
- **December 15 :** Death of Vallabbhai Patel, the Deputy PM; Planning Commission set up.

1951

- **February 1 :** Enumeration work of the first Census of Independent India begins.
- **March 4 :** The first Asian Games in New Delhi.
- **July 9 :** The first Five–Year Plan published by Planning Commission.
- **August 18 :** The first Indian Institute of Technology opened in Kharagpur.
- **December 5 :** Abanindranth Tagore, famous Indian painter and sculptor passed away in Calcutta.
- **December 16 :** Salar Jung Museum opened at Hyderabad by Nehru.

1952

- Sindri fertilizer factory in Bihar (now in Jharkhand) was inaugurated by Nehru. It is the largest of its kind in Asia and one of the largest in the world.
- Indian National Congress party secures absolute majority in the first Lok Sabha in General Elections.
- Dr. Rajendra Prasad was re-elected President of India after the first Presidential election held under the Indian Constitution.
- **May 12 :** The first Session of India's new Parliament opened in New Delhi.
- **May 15 :** G.V. Mavalankar was elected first Speaker of Lok Sabha.
- Lt. Gen. Rajendra Sinha nominated to succeed General K.M. Cariappa as C-in-C of Indian Army.
- The first Indo-Soviet trade agreement signed.
- Potti Sriramula, who fasted for 58 days for the creation of Andhra Pradesh, died.

1953

- **January 29 :** Sangeet Natak Akademi formed.
- **February 2 :** Constitution of All India Khadi and Village Industries Board.

- **May 29 :** Conquest of Mount Everest by Tenzing Norgay and Edmund Hillary.
- **August 1 :** Indian Airlines and Air India Corporation formed.
- **October 1 :** Andhra Pradesh becomes a separate State.
- **October 14 :** Death Duty is effective.

1954

- **January 1 :** The Prime Minister laid the foundation stone of the Tata Institute of Fundamental Research.
- **April 29 :** Sino-India agreement on Tibet was signed. The Colombo Conference of Asian Prime Ministers held.
- Government of India constituted a National Film Board and decided to establish a Film Production Bureau and a Film Institute.
- Mr. Chou En-lai, the Chinese Prime Minister arrived in New Delhi, for talks with Nehru.
- India and China outlined Five Principles (Panchsheel) for the regulation of relations between the nations.
- Inauguration of Bhakhara Nangal Canals by Nehru. India accepted the Chairmanship of the three supervisory commissions for Vietnam, Laos and Cambodia.
- Separate department of Atomic Energy under the direct charge of the P.M. was created.
- The P.M. announced a National Health Scheme for the entire country.
- **October 19 :** J.L. Nehru went to China.

1955

- **January 16 :** official opening of the National Defence Academy at Khadakvasla.
- **June 1 :** Untouchability (offence) Act comes into force.
- **July 1 :** Imperial Bank of India is nationalised and renamed State Bank of India.
- **July 15 :** Bharat Ratna was conferred upon J.L. Nehru.
- **August 31 :** the States Reorganisation Bill got Presidential assent.
- **October 2 :** Inauguration of Integral Coach Factory at Perambur.
- **November 18 :** Soviet leaders Bulgarin and Khrushchev visited India.

1956

- **February 19 :** Acharya Narendra Dev died.
- **April 29 :** Government approved the draft of Second Five–Year Plan.
- **June 18 :** Hindu Succession Act passed.
- **August 4 :** Apsara, India's first nuclear research reactor, is commissioned.
- **September 1 :** Life Insurance Corporation inaugurated.

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- **September 1 :** Oil and Natural Gas Commission established.
- **November 1 :** Reorganisation of Indian States on linguistic basis; Madhya Pradesh created. Delhi is made a Union Territory. So are Andaman and Nicobar Islands; and Lakshadweep. Kerala State is formed merging Travancore, Cochin and Malabar.
- **November 28 :** Chinese PM Chou En-lai comes to India.
- **December 6 :** Death of Dr. B.R. Ambedkar.

1957

- **January 20 :** 'Apsara' inaugurated.
- **February 24 :** Second General Election began.
- **March 22 :** National Calendar adopted.
- **April 1 :** Naya Paisa, introduced.
- **April 5 :** The first Communist Ministry installed in Kerala-the first in Asia.
- **August 10 :** National Book Trust set up.
- **November 14 :** Nehru's birthday is made Childrens Day (Bal Divas).

1958

- **February 22 :** Death of Maulana Abul Kalam Azad.
- **September 17 :** Mihir Sen becomes the first Indian to cross the English Channel.
- **October 1 :** India signed the Brussels Convention of the International Union for the Protection of Literary and Artistic works, known as the Berne Convention.
- **October 1 :** Metric system (decimal) of weights introduced.

1959

- **March 17 :** Dalai Lama, fleeing Tibet, reaches India.
- **June 4 :** Formation of Swatantra Party by C. Rajagopalachari.
- **September 15 :** New Delhi has a Television Centre as a UNESCO-aided programme.
- **September 29 :** Arati Saha swims the English Channel.
- **December 12 :** US President Dwight D. Eisenhower visits India.

1960

- **May 1 :** The States of Maharashtra and Gujarat are formed from former Bombay State.
- **September 8 :** Death of Feroz Gandhi, M.P. and husband of Indira Gandhi.
- **November 26 :** Kanpur-Lucknow STD introduced, the first in India.
- **December 19 :** Indus Water Treaty with Pakistan signed in Karachi.

1961

- **January 21 :** British Queen Elizabeth II arrived.
- **March 7 :** G. B. Pant died.

- **March 4 :** INS Vikrant Commissioned.
- **April 26 :** Maharaja Hari Singh died.
- **December 18 :** Goa, Daman, Diu and Nagar Haveli liberated from Portuguese.

1962

- **May 13 :** Dr. S. Radhakrishnan became the President.
- **September 8 :** Chinese incursion into Indian Territory.
- **26 October :** a State of Emergency declared.
- **November 21 :** China declared unilateral cease-fire.

1963

- **February 28 :** Dr. Rajendra Prasad passed away.
- **March 11 :** Chittaranjan locomotive works commissioned at Varanasi.
- **December 1 :** Nagaland came into existence.

1964

- **27 May :** Jawaharlal Nehru passed away in Delhi.
- **27 May 27 :** Gulzarilal Nanda sworn–in as interim Prime Minister.
- **June 9 :** Lal Bahadur Shastri sworn–in as Prime Minister.

1965

- **April 20 :** Indo-Pak conflict : Fighting in the Rann of Kutch between troops.
- **May 20 :** Conquest of Everest by the first Indian team headed by Commander M.S. Kohli; Nawang Gombu at the summit second time.
- **September 1 :** Pak army invades Chhamb and Dewa region.
- **September 23 :** Cease-fire signed between India and Pakistan.
- **December 2 :** Border Security Force formed.

1966

- **January 10 :** India and Pakistan signed Tashkent Agreement.
- **January 11 :** Prime Minister Lal Bahadur Shastri dies at Tashkent.
- **January 23 :** Indira Gandhi becomes Prime Minister.
- **June 6 :** Nuclear Scientist Homi Bhabha died in an air crash.
- **November 17 :** Rita Faria became Miss World.
- **November 1 :** Punjab divided into Punjab and Haryana.

1967

- **February 15 :** Fourth general election to Lok Sabha.
- **March 12 :** Indira Gandhi became Prime Minister again.
- **May 13 :** Dr. Zakir Hussain becomes President of India.
- **August 4 :** Nagarjunasagar Dam commissioned.

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1968

- **October 16 :** Hargovind Khorana wins Nobel Prize.
- **November 22 :** Lok Sabha approves renaming of Madras State as Tamil Nadu.

1969

- **March 1, :** The first super fast train Rajdhani Express introduced between New Delhi and Howrah.
- **March 22 :** IPCL, the first public sector petro–chemicals organisation inaugurated.
- **April 1 :** India's first atomic powers station at Tarapore is operational.
- **May 3 :** Death of President Zakir Hussain.
- **July 9 :** Lion is chosen as the national animal.
- **July 19 :** Nationalisation of 14 commercial banks.
- **August 24 :** V.V. Giri is the fourth President of India.

1970

- **April 2 :** Meghalaya becomes an autonomous hill State within the State of Assam.
- **November 21 :** Death of C.V. Raman.
- **November 29 :** Haryana achieves 100 per cent electrification of the villages.

1971

- **January 25 :** Himachal Pradesh became the 18th State of India.
- **August 9 :** 20-year Indo-Soviet Treaty signed.
- **December 3 :** Indo-Pakistan war breaks out. National Emergency declared.
- **December 16 :** Pakistan army in East Pakistan surrenders.
- **December 30 :** Death of Vikram Sarabhai.

1972

- **January 20 :** Meghalaya becomes a State; Arunachal Pradesh is a Union Territory.
- **January 21 :** States of Manipur, Tripura and U.T. of Mizoram came into being.
- **January 26 :** "Amar Javan", the national memorial at India Gate, inaugurated.
- **March 18 :** First World Book Fair opens in New Delhi.
- **March 19 :** 25-year Peace and Friendship Pact between India and Bangladesh signed.
- **May 1 :** Nationalisation of coking coal mines.
- **June 28 :** Death of Prof. P.C. Mahalanobis.
- **July 2 :** Shimla Agreement between India and Pakistan signed by Indira Gandhi and Z.A. Bhutto.
- **August 15 :** PIN Code of six digits introduced.
- **November 18 :** Tiger chosen as national animal.
- **December 25 :** Death of C. Rajagopalachari.

1973

- **January 2 :** Gen. S.H.F.J. Manekshaw becomes Field Marshal.
- **November 1 :** The State of Mysore becomes Karnataka.

1974

- **May 18 :** India's first nuclear detonation at Pokhran.
- **August 24 :** Fakhruddin Ali Ahmed is the 5th President of India.
- **September 25 :** The Fifth Five–Year Plan launched.

1975

- **April 17 :** Death of Dr. S. Radhakrishnan.
- **April 19 :** 'Aryabhatta, the country's first satellite, launched.
- **April 24 :** 2500th anniversary of Lord Mahavira's Nirvana Jayanthi.
- **May 16 :** Sikkim becomes the 22nd State of India.
- **June 25 :** Internal emergency declared by President.
- **July 1 :** P.M. announces 20-point economic programme.
- **October 2 :** K. Kamraj died.

1976

- **November 2 :** Lok Sabha passes the 42nd Constitution Amendment Bill making India a Socialist, Secular Republic and laying down the fundamental duties of citizens.
- **November 5 :** Lok Sabha votes to extend its own life by another year.

1977

- **February 11 :** President Fakhruddin Ali Ahmed passed away.
- **March 22 :** Janata Party and its allies gained absolute majority in Lok Sabha.
- **March 24 :** Morarji Desai sworn–in as the Prime Minister.
- **July 25 :** N. Sanjeeva Reddi sworn–in as the new President.

1978

- **April 1 :** Sixth Five–Year Plan started.
- **October 1 :** Marriageable age of girls and boys raised to 18 and 21 year respectively.

1979

- **June 7 :** Bhaskara–I, India's Second Satellite launched.
- **June 15 :** Morarji Desai resigned from the post of Prime Minister.
- **July 28 :** Charan Singh became new Prime Minister.
- **August 22 :** Lok Sabha dissolved.

1980

- **January 14 :** Indira Gandhi became Prime Minister.
- **June 23 :** Sanjay Gandhi died in a plane crash.
- **December 8 :** Soviet President Leonid Brezhnev visited New Delhi.

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1981

- **January 17 :** Mizoram became a full-fledged State.
- **June 30 :** President's rule imposed in Assam.

1982

- **March 17 :** President's rule imposed in Kerala.
- **July 25 :** Zail Singh became President.
- **September 7 :** Sheikh Abdullah passed away.
- **November 15 :** Acharya Vinoba Bhave died.

1983

- **July 2 :** Nuclear Power Station at Kalpakkam attained criticality.
- **November 22 :** The Union Government reduced the upper age limit for Civil Service Examination from 28 to 26.

1984

- **April 5 :** Squadron leader Rakesh Sharma, India's first spaceman, goes into space.
- **May 23 :** Miss Bachendri Pal becomes the first Indian woman to conquer Mount Everest.
- **June 2 :** Army takes control in Punjab.
- **June 5 :** Operation Blue Star : Jarnail Singh Bhindranwale and over 325 killed.
- **October 31 :** Indira Gandhi assassinated by two of her own security guards. Rajiv Gandhi sworn–in PM.
- **November 2 :** Violence following Mrs. Gandhi's assassination takes heavy toll.
- **November 12 :** Rajiv Gandhi elected Congress (I) President.

1985

- **August 3 :** Baba Amte awarded with Ramon Magsesay Award.
- **October 23 :** Rajiv Gandhi visited New York for the 40th anniversary of the UN.

1986

- **February 1 :** Pope John Paul II arrived in Delhi.
- **July 6 :** Jagjivan Ram passed away.
- **August 6 :** India's first test tube baby born.

1987

- **February 20 :** Mizoram became 23rd State of India.
- **May 11 :** President's rule imposed in Punjab.
- **May 29 :** Former PM Charan Singh died.
- **May 30 :** Goa became 25th State of India.
- **Sep 4 :** Roop Kanwar committed Sati.

1988

- **January 20 :** Khan Abdul Gaffar Khan died.
- **July 22 :** INSAT-IC launched.
- **September 7 :** President's rule imposed in Mizoram.
- **November. 18 :** Mikhail Gorbachev arrived in New Delhi.
- **December 18 :** Rajiv Gandhi visited China.

1989

- **July 15 :** Rajiv Gandhi visited Pakistan.
- **December 2 :** V.P. Singh sworn–in as India's 7th Prime Minister.

1990

- **August 15 :** Akash test–fired.
- **November 7 :** V.P. Singh's National Front Government voted out of power.
- **November 10 :** Chandra Sekhar becomes India's 8th Prime Minister, Devi Lal Dy. P.M.
- **December 1 :** Death of Vijayalakshmi Pandit.

1991

- **March 6 :** P.M. Chandrashekhar resigned.
- **May 21 :** Rajiv Gandhi killed in a bomb blast.
- **August 7 :** Mandal Commission report accepted.
- **November 28 :** President's rule imposed in Assam.

1992

- **April 1 :** 8th Five–Year Plan launched.
- **May 5 :** "Prithvi" missile test–fired.
- **July 25 :** Dr. Shanker Dayal Sharma sworn–in as the ninth President.
- **December 6 :** Babri Masjid demolished.

1993

- **September 7 :** Mandal Commission recommendation brought into effect.
- **September 29 :** National Human Rights Commission was set up.
- **October 1 :** Two more Election Commissioners appointed.
- **December 31 :** President's rule imposed in Manipur.

1994

- **March 30 :** G-15 Summit organised in Delhi.
- Shusmita Sen became Miss Universe.
- Aishwarya Rai became Miss World.
- **December 25 :** Gnani Zail Singh passed away.

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1995

- **April 10 :** Morarji Desai passed away.
- **October 18 :** President's rule imposed in UP.
- **December 7 :** INSAT-2C launched.
- **December 9 :** Pulse Polio Programme inaugurated.

1996

- **May 16 :** A.B. Vajpayee sworn–in as the Prime Minister.
- **May 28 :** B.J.P. led coalition Government of A.B. Vajpayee quits.
- **June 1 :** H.D. Dev Gowda became Prime Minister.
- **July 8 :** T.N. Sheshan awarded with Ramon Magsaysay award.
- **December 11 :** M.S. Gill became new Chief Election Commissioner.

1997

- **April 21 :** I.K. Gujral became Prime Minister.
- **June 4 :** INSAT-2D placed in the orbit.
- **July 25 :** K.R. Narayanan became 10th President of India.
- **September 5 :** Mother Teresa passed away.
- **November 23 :** Diana Hayden became Miss World.

1998

- **March 19 :** A.B. Vajpayee became Prime Minister for the second time.
- **May 1 :** Konkan Railway was dedicated to the Nation.
- **May 11 :** India carried out three Nuclear Tests at Pokhran.
- **May 13 :** India carried out two more Nuclear Tests at Pokhran.
- **October 14 :** Amartya Sen won the Nobel Prize for Welfare Economics.

1999

- **February 20 :** P.M. Vajpayee visited Pakistan.
- **May 26 :** "Operation Vijay" launched in Kargil area.
- **October 10 :** 13th Lok Sabha constituted.
- **November 5 :** Pope John Paul II arrived in New Delhi.
- **December 24 :** Indian Airlines plane highjacked to Kandahar.

2000

- **February 24 :** The Kargil report was tabled in the Parliament.
- **June 1 :** FEMA replaced FERA.
- **October 1 :** Bharat Sanchar Nigam Limited (BSNL) came into being.
- **November 1 :** Chhattisgarh as a separate state came into existence.

- **November 9 :** Uttaranchal came into existence as 27th State of India.
- **November 15 :** Jharkhand came into existence as 28th State of India.

2001

- **January 26 :** Major earthquake hits Gujarat.
- **March 11 :** Gopi Chand won All England Badminton Championship.
- **April 18 :** India's first GSLV launched.
- **July 15 :** General Musharraf took part in the Agra Summit.
- **August 30 :** Madhav Rao Scindia passed away.
- **December 10 :** Famous actor Ashok Kumar died.
- **December 13 :** Terrorist attack on the Parliament.

2002

- **January 24 :** INSAT-3C launched.
- **February 27 :** Sabarmati Express set fire by a group of people near Godhra railway station.
- **March 2 :** N.D. Tiwari became the Chief Minister of Uttaranchal.
- **March 3 :** Lok Sabha Speaker G.M.C. Balayogi killed in helicopter crash.
- **March 26 :** Government allowed commercial cultivation of Bt. Cotton.
- **July 25 :** A.P.J. Abdul Kalam became 12th President of India.
- **September 24 :** 26 killed as terrorists strike on Akshardham Temple.
- **October 7 :** Anju George wins gold in long jump at Asian Games.
- **October 12 :** Paes-Bhupati won gold at Men's doubles at Busan Asian Games.
- **December 13 :** 32nd National Games opened at Hyderabad.

2003

- **January 2 :** President gave his assent to the Representation of People (Amendment) Bill, 2002.
- **January 9 :** India successfully test-fired the short range variant of the Nuclear capable Agni missile.
- **January 10 :** President gave his assent to the Freedom of Information Bill, 2002.
- **January 15 :** Decision was taken that UTI would split formally into UTI-I and UTI-II from February, 1, 2003.
- **February 3 :** R.A. Mashelkar presented with Dadabhai Naoroji Memorial Award for 2002.
- **February 12 :** Supersonic missile Brahmos test–fired.
- **February 19 :** N.N. Vohra appointed as centre's interlocutor for Kashmir talks.

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- **March 2 :** Mammen Mappillai, Chairman of MRF, passed away.
- **March 4 :** D.D. Lepang sworn-in as the new Chief Minister of Meghalya.
- **March 26 :** India successfully test-fired the 150 km rang Prithvi missile.
- **April 20 :** India reopened its embassy in Iraq.
- **May 1 :** World Health Organisation declared India SARS free.
- **May 13 :** Shivshankar Menon appointed High Commissioner to Pakistan.
- **August 1 :** Tejas, the light combat aircraft, attained supersonic speed.
- **September 18 :** Centre announced an increase in the minimum wages from Rs. 50 to Rs. 66.
- **October First :** Government decided to set up five new IITs.
- **October 24 :** I Afro-Asian Games began at Hyderabad.
- **November 23 :** Union Minister Murasoli Maran died in Chennai.
- **November 24 :** Comedian Actress 'Tun Tun' died in Mumbai.
- **December 6 :** Uma Shankar Mishra appointed as CBI Director.
- **December 22 :** Parliament passed the Citizenship (Amendment) Bill 2003.

2004

- **January 17 :** Cabinet Committee on Security approves Rs. 2,800 crore deal for russian aircraft carrier Admiral Gorshkov.
- **March 4 :** A gazette notification issued banning tobacco advertising from Ist May.
- **May 3 :** Dr. A.P.J. Abdul Kalam visits line of control (LOC) in Jammu and Kashmir, the first ever by a President of India.
- **October 27 :** Naval version of Prithvi, Prithvi-III successfully test fired at Chandipur.
- **November 14 :** Prasar Bharti start its Direct-To-Home (DTH) service.
- **December 11 :** Sachin Tendulkar equals Sunil Gavaskar's world record of 34 Test centuries.

2005

- **January 2 :** Indian Navy launches 'Operation Gambhir' in Indonesia.
- **January 16 :** India and the United States enter into an open sky aviation agreement.
- **April 13 :** Dr. Manmohan Singh dedicates to the nation 54.85 km. long Jammu – Udhampur rail line.
- **April 16 :** General Musharraf arrives in New Delhi to hold talks with Manmohan Singh.

- **June 13 :** Indian Airlines got its first woman Chairperson and Managing Director after Sushma Chawla took over charge from Sunil Arora.
- **August 1 :** Indian doctor V. Shanta was selected for Ramon Megsaysay Award-2005 in Public Service Category.

2006

- **January 24 :** The first Amritsar-Lahore bus, named "Punj-aab" (Five rivers) is flagged off.
- **February 18 :** The Union Government confirms the country's first outbreak of the deadly H5N1 avian flu virus among chicken in Maharashtra.
- **August 1 :** The Government bans from October 10, 2006, the employment of children as domestic servants or in the hospitality sector, including dhabas, teashops, restaurants, hotels and resorts.
- **October 25 :** The Protection of Women from Domestic Violence Act, 2006 comes into effect.
- **December 18 :** United States President George W Bush signs the historic legislation allowing civilian nuclear trade with India.

2007

- **January 11 :** In a landmark judgement, a nine-judge Bench of the Supreme Court holds that there can be no blanket immunity from judicial review of laws inserted in the Ninth Schedule of the Indian Constitution.
- **February 13 :** 'India-China Year of Friendship Through Tourism-2007' is launched in New Delhi.
- **April 3 :** Inaugurating the 14th SAARC Summit in New Delhi, Prime Minister Dr. Manmohan Singh says that India will allow "Zero-duty access" for goods from Bangladesh, Afghanistan, Nepal, Maldives and Bhutan by the end of 2007 and will "further reduce" the sensitive lists in respect of these countries.
- **April 27 :** The Government sets up a four-member commission on Centre-State relations headed by the former Chief Justice of India, M M Punchhi.
- **May 7 :** The first stretch of the Dahej-Panvel-Dabhol gas pipeline from Dahej to Surat is commissioned by Petroleum and Natural Gas Minister Mr. Murli Deora.
- **May 26 :** The ambitious Multipurpose National Identity Card (MNIC) scheme becomes operational.
- **June 22 :** An amphibious landing platform dock *INS Jalashwa* is commissioned into Indian Navy at an elegant ceremony in Norfolk. This is the first American vessel in the Indian inventory.

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- **July 21 :** The country gets its first woman president as United Progressive Alliance-Left nominee Pratibha Devisingh Patil wins the Presidential elections by 3,06,810 votes.
- **August 26 :** The country's first private sector steel unit, Tata Steel, turns hundred. Jamshetji Nusserwanji Tata founded it in 1907.
- **October 29 :** *INS Tarangini*, the Indian Navy's sole sailing ship returns in Kochi after a 10 month voyage around the globe.
- **November 19 :** Prime Minister Dr. Manmohan Singh launches the Indira Gandhi National Old Age Pension Scheme that will provide a monthly pension to people over 65 years and living below the poverty line.
- **December 6 :** The Parliament approves the Maintenance and Welfare of Parents and Senior Citizens Bill, 2007, providing for three months' imprisonment for those who abandon their parents. It gives no scope for an appeal against the punishment.

2008

- **February 19 :** President Pratibha Devisingh Patil signs the notification for implementing the recommendations of Delimitation Commission redefining parliamentary and Assembly Constituencies in all States and Union Territories except Assam, Arunachal Pradesh, Manipur, Nagaland and Jharkhand.
- **April 1 :** The National Rural Employment Guarantee Scheme (NREGS) is extended to all 604 districts of the country.
- **April 26 :** Prime Minister Dr. Manmohan Singh dedicates to the nation 390 MW Dul Hasti Power station of NHPC Limited.
- **May 6 :** The Government introduces in the Parliament the much delayed Constitution (108th Amendment) Bill, popularly known as Women's Reservation Bill.
- **May 13 :** Seven bombs explode in series in Jaipur, the Pink City, killing at least 60 people.
- **July 1 :** Union Science and Technology Minister Kapil Sibal inaugurates the permanent research base 'Hamadri' at the North Pole at Ny-Alesund.
- **July 2 :** Prime Minister Dr. Manmohan Singh announces the linking of all State capitals in the Northeast with rail lines as he unveils the 'North Eastern Region Vision 2020'.
- **July 31 :** The Union Cabinet approves an additional Rs. 1,000 crore for the Aam Aadmi Bima Yojna (AABY) for including one crore more rural landless households.
- **August 5 :** The third generation hit-to-kill anti-tank missile, Nag is successfully testfired at Pokhran in Rajasthan.
- **August 12 :** Kerala becomes the first Indian state to reserve posts in government job for HIV positive candidates.
- **August 17 :** Employees' State Insurance Corporation launches the 'Project Sankalp' to prevent new STI/HIV infections among the beneficiaries of ESI scheme in Karnataka.

- **August 29 :** The Government notifies the recommendations of the Sixth Central Pay Commission benefiting over 50 lakh employees. The Central Civil Services (Revised Pay) Rules, 2008 come into force from January 1, 2006.
- **September 8 :** Singer Bhupen Hazarika is conferred the 'Asom Ratna' on his 83rd birthday.
- **October 2 :** The ban on smoking in public places – hotels, restaurants, pubs, offices and international airports – comes into force.
- **October 11 :** The Prime Minister Dr. Manmohan Singh flags off the first train connecting Srinagar to Rajwanshar in south Kashmir's Anantnag district.
- **October 31 :** The Chandrayaan-1 sends the first photograph of earth showing Australian southern coast.
- **November 4 :** Eminent Hindustani vocalist Pandit Bhimsen Joshi is chosen for the Bharat Ratna Award for 2008.
- **November 9 :** The 105-year-old railway line that meanders through the hills between Kalka and Shimla is officially declared a World Heritage Site by the UNESCO.
- **November 14 :** India reaches on the Moon after the Moon Impact Probe (MIP) on board Chandrayaan–1 successfully ejects and lands on the lunar surface.
- **December 31 :** With President Pratibha Devisingh Patil giving her assent to the National Investigation Agency (NIA) Bill and the Unlawful Activities (Prevention) Amendment Bill, the new anti-terror regime comes into force about a month after the 26/11 terror attacks in Mumbai that claimed nearly 200 lives.

2009

- **January 8 :** Prime Minister Dr. Manmohan Singh inaugurates the new Indian Naval Academy (INA) at Ezhimala near Kannur in Kerala.
- **January 15 :** Radha Vinod Raju, a senior IPS officer of Jammu and Kashmir cadre, is appointed the first Director-General of the National Investigation Agency (NIA).
- **February 8 :** The first model e-court in the country is launched by the Gujarat High Court in Ahmedabad.
- **March 6 :** Squadron Leader Veena Saharan has become the first woman pilot to fly Indian Air Force's gigantic transport plane IL-76, nicknamed Gajraj.
- **March 23 :** Unveiled first in January 2008, the Tata Nano car is launched commercially in Mumbai amid great fanfare and expectations.
- **April 20 :** The Polar Satellite Launch Vehicle C-12 (PSLV-C-12) blasts off from the Satish Dhawan Space Centre and puts into orbit Radar Imaging Satellite (RISAT-2) procured from Israel and Anusat, built by Anna University, Chennai.

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- **May 18 :** The 14th Lok Sabha is dissolved by President Pratibha Patil on the recommendation of the Union Cabinet, paving the way for the constitution of the newly elected 15th Lok Sabha.
- **May 19 :** Amphibious ship INS Airavat is commissioned by Chief of Naval Staff, Sureesh Mehta.
- **May 22 :** Dr. Manmohan Singh is sworn in Prime Minister of India for a second successive term along with 19 Cabinet colleagues as part of the first phase of government formation.
- **June 3 :** Congress leader Ms. Meira Kumar is unanimously elected as the first Dalit woman Speaker of the Lok Sabha.
- **June 25 :** Nandan M Nilekani, co-chairman of the Board of Directors of Infosys Technologies is appointed chairman of the Unique Identification (UID) Authority of India.
- **July 26 :** India's first indigenously built nuclear-powered submarine, equipped with ballistic missiles, *INS Arihant* is launched by flooding the dry dock at the Shipbuilding Centre, Vishakhapatnam.
- **August 27 :** The United Progressive Alliance government raises reservation for women at all tiers of the panchayati raj system from 33 to at least 50 per cent. The Cabinet, presided over by Prime Minister Manmohan Singh, also cleared the proposal to amend Article 243(D) of the Constitution for the purpose.
- **August 29 :** The Indian Deep Space Network (IDSN) at Byalalu village near Bangalore abruptly loses contact with Chandrayaan-1 and thus the moon mission comes to an end in ten months instead of its slated life of two years.
- **September 3 :** All of 24 hours after the helicopter in which he was travelling went missing, the body of Andhra Pradesh Chief Minister YS Rajasekhara Reddy is recovered from its wreckage. After that Finance Minister Konijeti Rosaiah is sworn in Chief Minister to fulfil the constitutional responsibility.
- **October 2 :** The Centre renames the National Rural Employment Guarantee Act (NREGA) as the Mahatma Gandhi Rural Employment Guarantee Act.
- **November 23 :** The Centre launches the Jawaharlal Nehru National Solar Mission. It is one of the eight key missions of the National Action Plan on Climate Change.
- **November 25 :** The 74-year old President Pratibha Devisingh Patil makes history by becoming the first woman Head of State to fly in a fighter jet Sukhoi.
- **November 27 :** France becomes the second after Russia to fully operationalise the inter-country nuclear agreement with India.
- **December 2 :** Bharat Ratna Lata Mangeshkar is conferred the Insignia of Officer de La Legionne d' Honneur on the occasion of the opening of the French Film Festival in Mumbai.

- **December 12 :** Karnataka Governor HR Bhardwaj confers the honorary Doctorate in Laws of the University of Mysore on Chief Justice of India KG Balakrishnan in Bangalore.
- **December 13 :** India successfully testfires the nuclear capable ballistic missile *Dhanush* from a warship in the Bay of Bengal off Orissa.
- **December 19 :** Nitin Gadkari of Maharashtra is appointed the president of the Bharatiya Janata Party, succeeding Rajnath Singh.

2010

- **January 4 :** The former President APJ Adbul Kalam inaugurates the three-day Children's Science Congress organised as part of the 97th Indian Science Congress on the Kerala University campus at Kariavattom.
- **January 17 :** Jyoti Basu, the patriarch of Communist Party of India (Marxist) and the colossus of Indian politics, passes away of septicaemia due to pneumonia at the age of 95.
- **January 23 :** Bengali Film *Antaheen* is chosen as the Best Feature Film, while Upendra Limye and Priyanka Chopra bag the Best Male and Female actor awards respectively at the 56th National Film Awards for 2008.
- **February 16 :** Palakkad district of Kerala is declared the first total electrified district in the country.
- **March 17 :** ICGS Vishwast, the first of the new class of off-shore patrol vessels indigenously designed and built by Goa Shipyard Ltd. (GSL) is commissioned in the Indian Coast Guard.
- **March 20 :** The former Supreme Court judge, P Venkatarama Reddy, is appointed chairman of the 19th Law Commission.
- **April 14 :** Jamia Millia Islamia Vice-Chancellor Najeeb Jung confers the degree of Doctor of Letters on Prince Salman Bin Abdul Aziz, Governor of Riyadh, at a special convocation in New Delhi.
- **April 23 :** Navies of India and the United States begin annual war exercises — MALABAR — involving anti-submarine warfare surface firings, visit board, search and seizure and submarine operations.
- **April 30 :** The coveted title of Pantaloons Femina Miss India (PFMI) World 2010 goes to Mumbai girl Manasvi Mamgai, Neha Hinge wins the PFMI International 2010 crown while Nicole Faria from Bangalore is annoited PFMI Earth.
- **May 6 :** Senior Bharatiya Janata Party leader Murli Manohar Joshi is appointed chairman of the Public Accounts Committee for 2010-11.
- **May 12 :** Justice Sarosh Homi Kapadia, the senior most judge of the Supreme Court, is sworn-in as the 38th Chief Justice of India.

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- **June 7 :** The retired Chief Justice of India Justice KG Balakrishnan takes over as the sixth Chairman of the National Human Rights Commission.
- **June 8 :** The Himachal Pradesh Government launches the "Har Gaon Ki Kahani" scheme at the national level.
- **June 16 :** Nearly six months after his expulsion from Samajwadi Party, Amar Singh announced launch of Akhil Bharitya Lok Manch with himself as president and actor-politician Jaya Prada his deputy.
- **June 17 :** Yogendra Pratap Singh is appointed the first Ambassador to the Republic of Niger.
- **June 22 :** Ratan Tata, Chairman of the Tata Group of Companies, is made an Honorary Doctor of Law by the University of Cambridge in recognition of his business achievements and philanthropic work.
- **July 3 :** Prime Minister Dr. Manmohan Singh is conferred the degree of Doctor of Science *honoris causa* at the convocation of IIT-Kanpur.
- **July 12 :** In a flawless launch, five satellites, including the advanced high resolution cartography satellite Cartosat-2B, are placed in orbit by the Indian Space Research Organisation's Polar Satellite Launch Vehicle (PSLV-C15) rocket from Sriharikota.
- **July 20 :** Milon Kumar Banerjee, the former Attorney-General of India, passes away at the age of 80.
- **August 1 :** KM Mathew, Chief Editor of the mass circulation Malayalam newspaper *Malayala Manorama*, passes away at the age of 93.
- **August 1 :** Jantar Mantar, Jaipur's celebrated astronomical observatory built in early 18th century, is granted World Heritage status by UNESCO.
- **August 17 :** Prime Minister Dr. Manmohan Singh tops *Newsweek*'s list of 10 world leaders who have won respect, but India figures at 78th place in the list of 100 best countries.
- **August 18 :** President Pratibha Devisingh Patil confers the Outstanding Parliamentarian Awards to the former Union Minister, Priya Ranjan Dasmunsi; senior Samajwadi Party leader Mohan Singh; and Bharatiya Janata Party leader Murli Manohar Joshi for the years 2007, 2008 and 2009 respectively.
- **August 20 :** The 18th Rajiv Gandhi National Sadbhavna award is given to Maulana Wahiddudin Khan.
- **August 28 :** Music composer AR Rahman launches the Commonwealth Games 2010 theme song, "Jiyo Utho Badho Jeeto" (Live, Rise, Progress, Win) in Gurgaon, Haryana.
- **September 3 :** Air Chief Marshall PV Naik, Chief of the Air Staff, awards the honorary rank of Group Captain to Master Blaster Sachin Tendulkar at a special function in New Delhi.

- **September 14 :** The Government launches a new series of wholesale price index (WPI) with 2004-05 as base. At present, 1993-94 is used as base year to calculate WPI.
- **September 25 :** Eminent Hindi writer-journalist Kanhaiya Lal Nandan passes away at the age of 77.
- **September 26 :** Union Finance Minister Pranab Mukherjee launches 'Swavalamban', a pension scheme for workers in the unorganised sector who do not have access to the social security net.
- **September 29 :** The first set of 12-digit Unique Identification numbers is distributed to 10 tribals in Tembli, Maharashtra. Ranjana Sonawane become the first Indian to get the UID and Tembli becomes the first AADHAR village in India.
- **September 30 :** Sixty years after the matter first went into litigation, a Special Full Bench of the High Court of Allahabad has ruled that the disputed land in Ayodhya where the Babri Masjid stood for 500 years until it was demolished in 1992 shall be divided into three parts. A two-thirds portion is to be shared by two Hindu plaintiffs and one-third will be given to the Sunni Muslim Waqf Board.
- **October 5 :** Bhutan's King Jigme Khesar Namgyel Wangchuk receives the Honorary Degree of Doctor of Laws from West Bengal Governor and Chancellor of the University of Calcutta M.K. Narayanan at the annual convocation in Kolkata.
- **October 16 :** Rustom 1, a medium – altitude and long endurance Unmanned Aerial Vehicle (UAV), developed by the Bangalore-based Aeronautical Development Establishment (ADE), is successfully test-flow in Bangalore.
- **October 20 :** To improve maternal and child health, the Cabinet Committee on Economic Affairs approves the Indira Gandhi Matritva Sahyog Yojana (IGMSY) – a monetary scheme for pregnant women and lactating mothers – on a pilot basis in 52 districts in this Five-Year Plan.
- **November 6 :** US President Barack Obama reaches Mumbai on his first visit to India.
- **November 9 :** The Lok Sabha passes two bills– The Orissa (Alteration of Name) Bill 2010 and Constitution (113th Amendment) Bill, 2010 – to change the name of Orissa to Odisha and the name of language Odia.
- **November 16 :** Union Railway Minister Mamata Banerjee inaugurates the 1806 km eastern freight corridor which extends from Dankui to Ludhiana.

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- **November 16 :** The UNESCO (United Nations Educational, Scientific and Cultural Organisation) inscribes three Indian performing-art forms, the Mudiyettu, a ritual theatre of Kerala; the Chhau dance, a tradition from eastern India; and the Kalbelia folk songs and dances of Rajasthan in the Representative List of the Intangible Cultural Heritage of Humanity.
- **November 16 :** The Centre formally confers the coveted Maharatna status on Oil and Natural Gas Corporation (ONGC), Indian Oil Corporation (IOC) and National Thermal Power Corporation (NTPC).
- **November 19 :** Union Home Minister P Chidambaram launches 'Sabla' or the 'Rajiv Gandhi Scheme for Adolescent Girls' as a pilot project in 200 most backward districts of the country.
- **November 25 :** Union Telecom Minister Kapil Sibal launches the Mobile Number Portability (MNP) era at Rohtak, Haryana.
- **December 3 :** French President Nicolas Sarkozy arrives in Bangalore with his wife Carla Bruni on a four-day visit to India.
- **December 19 :** The joint military exercise between India and Mongolia named 'Namadic Elephant' concludes in Belgaum.
- **December 22 :** With an aim to encourage "scientific temper among the youth and to spread the message of "science for a billion people", the 98th Indian Science Congress Vigyan Jyot, a nationwide inspirational drive is flagged from New Delhi.
- **December 23 :** The former Chief Minister of Kerala and veteran Congress leader, K Karunakaran passes away at the age of 93.

2011

- **January 3 :** Prime Minister Dr. Manmohan Singh inaugurating the 98th Indian Science Congress at SRM University, Kattankulathur near Chennai.
- **January 7 :** The joint exercises between Indian and French navies – Varuna 2010 – begins in Goa.
- **January 12 :** Vivekanand National Awards 2011 are given away to N Vittal, Dr. Ashok K Chauhan, Dr. Vijay Kumar Saraswat and Ustad Amjad Ali Khan.
- **January 17 :** Former Chairman of the Atomic Energy Commission, Anil Kakodkar receives the Homi Bhabha Lifetime Achievement Award in Mumbai.
- **January 20 :** The Union Cabinet decides to observe January 25 as 'National Voters Day' from 2011 as part of an exercise to get youth to participaate in the election process in greater numbers.
- **January 24 :** Pandit Bhimsen Joshi, the doyen of Hindustani classical music, breathes his last in Pune.
- **January 25 :** Montek Singh Ahluwalia, Brajesh Mishra, Azim Premji, A. Nageswara Rao, Kapila Vatsyayan, Homai Vyarawalla and K. Parasaran, are among this year's 13 Padma Vibhushan awardees.

WORLD HISTORY

WORLD HISTORY : CHRONOLOGY OF EVENTS

B.C.	
200,000	Homo sapiens originated in Africa.
50,000	Emergence of Modern humans in Asia
7500	First evidence of agriculture and domestication of sheep and goats
7000	Walled settlements at Jericho
3000	Building of the Great Pyramid
776	First Olympiad in Greece
753	Foundation of Rome
490	Greeks defeated the Persians at the Battle of Marathon
360	The period of Aristotle and Plato
332	Egypt conquered by Alexander
323	Alexander dies at Babylon
214	Work on the Great Wall of China begins
55	Julius Ceasar attacks Great Britain
A.D.	
29	Crucifixion of Jesus Christ
37	Tiberius died and Caligula succeeded him
78	Book published by Pliny the elder
105	China made paper
200	Afghanistan invaded by Huns
330	Byzantium renamed constantinople
375	Invasion of Europe by Huns
452	Founding of Venica
500	Huns established control over N W India
570	Prophet Mohammad born at Mecca
572	War between Byzantine Empire and Persia
616	Khmer Empire founded in SE Asia
618	Beginning of Tang dynasty in China
622	Flight of Mohammad from Mecca to Medina
641	Arabs conquered Egypt
711	Moors invade spain
712	Muslim conquered Sindh
771	Charlemagne conquered saxony
809	Death of Haroun-al Rashid
846	Arabs attacked Rome
1015	Arabs conquered sardinia
1027	Conard II crowned as Holy Roman Emperor
1042	Constantine IX became Byzantine Emperor

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1060 Henry–I of France died
1096 Start of the first crusade
1106 Henry IV died succeeded by Henry V
1135 King Henry I of England died
1167 Oxford University founded
1174 Leaning Tower of Pisa built
1197 Henry VI died, succeeded by Otto IV
1212 Fredercik II elected German King
1223 Mongols invaded Russia
1230 Pact of San Germano between the Emperor and the Pope
1256 Hundred Years War between Venice and Genoa
1265 English Parliament is set up.
1272 Henry III of England died, succeeded by Edward
1280 Roger Bacon invents gunpowder
1287 Mongols invaded Burma
1294 Death of Kublai Khan
1324 Marco Polo, Venetian traveller died
1338 The Hundred years war broke out
1340 Queen's College, Oxford founded
1348 English faces Black Death Plague
1377 Edward III dies, succeeded by Richard II
1405 Timur died
1407 Louis, Duke of Orleans, murdered
1421 Beijing became capital of China
1434 Pope Eugene IV flees to Florence
1453 Turks captured Constantinople; Renaissance in Europe
1492 Discovery of America by Columbus
1498 Sea-route to India discovered by Vasco-de-Gama
1499 Amerigo Vespucci charted a part of the South American Coast
1500 Pedro Cabral discovers Brazil
1521 Turks captured Belgrade, Spain conquered Mexico
1533 Ivon IV became Czar of Russia
1534 Final rift between England and Rome; Jesuit order founded by Ignatius Loyola (1491-1556). Martine Luthur completes translation of the Bible.
1535 English clergy adjure authority of the Pope. Sir Thomas More, who refuses the oath of the King's supermacy, tried fort reason and executed (canonised 1935). Lima founded.
1536 Michelangelo paints "Last Judgement" on altar wall of Sistine Chapel; Queen Anne executed. Union of England and Wales.
1537 The Pilgrimage of Grace and similar risings are put down; Robert Aske is sentenced to death for treason and executed.

1538 Mercator used the name America for the first time. Spain conquered Bolivia.
1539 Spain annexed Cuba; First Christmas tree, at Strasbourg Cathedral.
1542 First Portuguese navigators reached Japan.
1555 Peace of Ausburg
1558 Elizabeth I became Queen of England
1580 Spain conquer Portugal
1582 Pope Gregory XIII puts in use the Gregorian Calendar.
1593 C. Marlowe murdered
1594 Galileo's Golden Rule
1595 Mercator's atlas published (posth); Warsaw became capital of Poland. Franco-Spanish war begins.
1596 Shakespeare: The Merchant of Venice. Tomatoes introduced in England.
1600 The East India Company established.
1603 Death of Elizabeth I.
1618 Thirty year's war begin.
1625 Charles I succeeded as King of England.
1636 Foreign visits by Japan banned.
1641 Cotton Goods begins to be manufactured in Manchester.
1642 English Civil War begins; Income and property tax introduced in England. Motreal founded; Newton born.
1643 English Civil War; Italian physicist Evangelista Torricelli (1608-1647) invents the barometer; Parcel post established in France.
1644 Ming dynasty in China ends, Manchu dynasty in Power (–1912).
1646 English Civil War ends with surrender of Oxford to roundheads; English occupy Bahamas.
1647 First newspaper advertisement appears.
1648 Peace of West Phalia ends Thirty Year's War.
1649 In Great Britain, English becomes language of all legal documents in place of Latin. Charles I executed.
1653 Cromwell dissolved Parliament and becomes Lord Protector.
1659 Treaty of Pyrenes between Francis of Spain
1660 Monarchy restored in England.
1665 The Great Plague of England.
1668 Glorious Revolution in England.
1687 Issac Newton expounds the Principle of Gravitation.
1694 Founding of the Bank of England.
1696 New coinage in England.
1697 China conquers wester Mongolia. France gets Haiti.
1698 Tax on beard in Russia.

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1699 Peter the Great declares that New Year in Russia will begin on Jan. 1 instead of Sept. 1. Sultanate of Oman setup.
1700 Death of Charles II of Spain.
1715 Coronation of Louis XV.
1725 Death of Peter the Great.
1727 George II becomes King of England.
1740 George Anson (1697-1762) sets out on voyage around the world. Maria Theresa is queen of Austria.
1741 Czar Ivan VI deposed and imprisoned; Elizabeth, daughter of Peter the Great becomes Czarina (-1762).
1742 First Silesian War ends; Swiss astronomer Anders Celsius (1701-1744) invents centigrade thermometer.
1743 French defeated by English.
1744 France declares war on England; second Silesian War begins.
1746 Alliance between Russia and Austria against Prussia.
1747 Nadir Shah murdered; Afghanistan united. Ahmed Shah becomes King of Afghanistan.
1766 England revoked Stamp Act.
1776 Declaration of American Independence.
1787 American Constitution drafted.
1798 Battle of River Nile.
1801 Peace Treaty of Luneville between France and Austria.
1805 Battle of Trafalagar and Nelson's death.
1815 Battle of Waterloo; Napolean exiled to St. Helena.
1821 Death of Napolean.
1832 Reforms Bill passed in England.
1837 Queen Victoria's accession to the throne of England.
1840 Queen Victoria of Great Britain marries Prince Albert; End of Afghan War; Britain issues Penny postage (world's first stamp). Britain annexed New Zealand.
1841 Britain's soveriegnty proclaimed over Hong Kong; The first university degree granted to women in America.
1842 Treaty of Nanking ends Opium War between Britain and China and confirms accession of Hong Kong to Great Britain.
1843 Military revolt in Spain drives General Espartero from power; Isabella II (b. 1830) declared Queen of Spain.
1850 Cavour appointed Prime Minister of Sardinia.
1852 Napolean III becomes King of France.
1868 Abolition of Shogun systen in Japan.
1878 Congress of Berlin.
1894 Japan declared war on China.
1899 The Boer war begins.

1902 The Boer war ends.
1904 Russia-Japan war.
1905 Japan defeated Russia; Discovery of the theory of Relativity of Einstein.
1911 Chinese Revolution.
1912 Republic of China established.
1914 Beginning of World War I.
1917 Russian Revolution.
1918 End of World War I.
1919 Treaty of Versailles signed.
1920 Formation of the League of Nations.
1923 Turkey declared Republic.
1933 Hitler became the Chancellor of Germany.
1936 Beginning of the Spanish Civil War.
1939 World War II begins.
1941 Russia invaded by Hitler, Pearl Harbour invaded by Japan.
1942 Japanese capture Singapore and Rangoon; Americans defeated Japanese; The first automatic computer developed in the U.S.; Millions of Jews are in Nazi gas chambers; Quit India Movement.
1943 Mussolini dismissed; Allies invaded Italy; Churchill, Stalin and Roosevelt hold Teheran conference.
1944 D-Day landings in Nromandy June 6; first flying bomb dropped on London. Ho Chi Minh is Vietnam President.
1945 Establishment of UNO; End of World War II; Hiroshima and Nagasaki experience the first dropping of the Atom Bomb; Death of President Roosevelt.
1946 Civil War in China.
1948 Burma and Ceylon get independence.
1949 Indonesia get independence; The Communists capture power in China.
1952 General Eisenhower elected as the American President.
1954 Military Aid Pact betweern China and Pakistan; Chou-En Lai visits India.
1955 Austria gets independence; Bandung Conference.
1956 Suez Canal nationalised by President Nasser, Egypt attacked by the forces of Britain; France and Israel.
1957 First artificial satellite launched by Russia.
1958 Egypt and Syria united and renamed United Arab Republic (UAR).
1959 Chinese captured Tibet; Dalai Lama flees to India; Sputnik launched by Russia.
1960 Explosion of an atom bomb device by France; Election of John F. Kennedy as President of USA.

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1961 Yuri Gagarin of USSR becomes the first spaceman.
1963 Partial Nuclear Test-Ban Treaty signed; Malaysia established; John F. Kennedy assassinated.
1965 Death of Sir Winston Churchill; Singapore becomes the sovereign independent nation; outbreak of Indo-Pak war.
1966 Tashkent Pact; A Russian aircraft lands on moon.
1967 Chinese explode hydrogen bomb; Arab-Israel War; Suez Canal closed.
1968 Martin Luther King Murdered.
1969 Dr. Ho-Chi-Minh passes away.
1970 Fiji gets independence.
1971 Outbreak of Indo-Pak war; Birth of Bangaldesh; Surrender of 93,000 Pakistani troops; Khruschev died; Z.A. Bhutto new President of Pakistan.
1972 Sheikh Mujibar Rahman freed from Pakistani Jail and assumed the office of P.M. Bangaldesh; Nixon of USA visited China; King Mahendra of Nepal died; USA and the USSR sign Strategic Arms Limitations Treaty.
1973 Outbreak of fourth Arab Israeli war; Fourth non-aligned summit in Algiers.
1975 Sheikh Mujibur Rahman, President of Bangladesh assassinated; King Faisal of Saudi Arabia, assassinated; Suez Canal reopened; Red Cross force Cambodia Government to Surrender.
1976 Chou-En Lai, P.M. of China, died; Seychelles gets independence; Viking I lands on Mars; Mao Tse-Tung died; Jimmy Carter elected President of USA.
1978 Agreement between Israel and Egypt; Vietnam attacked Cambodia; Z.A. Bhutto, former P.M. of Pakistan, sentenced to death.
1979 Margaret Thatcher becomes first woman P.M. of Britain.
1980 Free Zimbabwe is born. Marshall Tito of Yugoslavia passes away.
1981 President Zia ur Rahman of Bangladesh is shot dead; President Anwar Sadat of Egypt is assassinated; AIDs is officially recognised for the first time in USA.
1982 In Bangladesh a military coup by Lt. Gen. Ershad; The Vatican and UK reestablish full diplomatic relations; Introduction of the supercomputer Cray I.
1983 Benigno Aquino of Philipinnes assassinated; President Reagan announces the "Star Wars" programme.
1984 Indian PM Indira Gandhi is assassinated; succeeded by son Rajiv Gandhi; Bhopal gas tragedy.
1985 Death of Soviet premier Chernenko, Mikhail Gorbachev succeeds him; Salvage experts locate the wreck of the ship Titanic.

1986 Swedish PM Olaf Palme is assassinated; Chernobyl nuclear disaster; Mikhail Gorbachev institutes his policy of Glasnost.
1987 In Czechoslovakia far-reaching political and economic reforms; World-wide stock exchange crash; Glass fiber cable is laid across the Atlantic Ocean.
1988 Pakistan : Premier Gen. Zia killed in a plane crash, succeeded by the first woman leader of a Muslim country, Benazir Bhutto.
Yasser Arafat becomes first President of Palestine.
1989 Soviet Union Disintegrated
1991 Yugoslavia expelled from U.N.O.
1992 Eriteria becomes a new Nation.
1993 125 nations signed the final draft of the GATT negotiations;
1994 Israeli PM Yitzhak Rabin and PLO leader Yasser Arafat sign historic accord giving Palestinians self-rule in Gaza strip and Jericho; China conducts nuclear tests; Israel and Jordan sign Peace Treaty.
1995 World Trade Organisation (WTO) comes into effect; NPT made a permanent international arrangement, India refuses to sign the NPT; Israeli PM Yitzhak Rabin assassinated.
1996 France's sixth nuclear tests; Ceasefire between Russian forces and Chechen rebels; Taliban captured Kabul.
1997 US Spacecraft 'Path Finder' lands on Mars, Mother Teresa died.
1998 US President Clinton faces impeachment, Pakistan test fires – 'Gauri' Missiles.
1999 Euro comes into effect, Kosovo crisis to Balkan war, Military Coup in Pakistan.
2000 Ariel Sharon elected President of Isreal.
2001 George W.Bush, sworn in as 43rd President of United States.
2002 'Euro' becomes the official currency of 12 European countries.
2003 Kalpana Chawla and six other crew of STS-107 space shuttle mission were killed.
2004 12th SAARC summit concludes at Islamabad, EU emerges as world's largest trading block. George Bush wins a Second term as US President, Yasser Arafat passes away.
2005 King Gyanendra of Nepal declared emergency (Feb), NASA Space Craft 'Deep Ipact' blasted off (Jan), New Zealand introduces carbon tax (May); Kuwaiti Parliament grants women the right to vote (May).
2006 NASA launches the first space mission to Pluto as a powerful rocket hurdled the New Horizons spacecraft on a nine year, 4.5 billion km. journey to the edge of the solar system.
2007 Mr. Ban Ki-moon of South Korea takes over as the new UN Secretary General, succeeding Mr. Kofi Annan of Ghana.

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2008 The new members of the European Union, Cyprus and Malta, adopt the euro, bringing to 15, the number of countries using the currency with increasing clout over the slumping US dollar.

— Kosovo declares independence from Serbia, ending a long chapter in the bloody breakup of Yugoslavia.

— Mr. Jigmi Thinley takes over as Bhutan's first elected Prime Minister, a post he held twice under the monarchy.

— The world's longest cable stayed bridge, 1088m across, officially opens in eastern China, linking the two banks of the Yangtze river.

— The 15th South Asian Association for Regional Cooperation (SAARC) summit concludes in Colombo with the adoption of the Colombo Declaration titled "Partnership for growth of our people". The 16th SAARC summit will be held in Maldives in 2009.

— The world's largest particle collider, called the Large Hadron Collider (LHC), successfully completes its first major test by firing a beam of protons around a 27-km tunnel on the border of France and Switzerland.

— Rupiah Banda is sworn in as Zambia's fourth President. he was acting President since August 2008 after the death of President Levy Mwanawasa.

— Mr. Mohammed 'Anni' Nasheed is sworn in as the President of Maldives in the country's capital Male.

— Television journalist Muntazer al-Zaidi shouting "It is the farewell kiss, you dog", throws two shoes at the United States President George W Bush during a news conference with Iraq Prime Minister Nouri al-Maliki in Baghdad.

2009 Barack Obama becomes the 44th President of the United States, shattering American racial barriers as the first black leader of the nation he promises to free from the grip of its profound economic troubles and steer away from wars in two distant lands.

— Saudi Arabia's King Abdullah selects Norah al-Faiz as the first ever woman deputy education minister for the conservating monarchy.

— Danny Boyle's *Slumdog Millionaire* dominates the 81st Academy Awards in Los Angeles winning eight Oscars -for best picture, best director, best film editing, best sound mixing, best adapted screenplay, best song, best cinematography and best original score. A R Rahman wins two Oscars-one with Gulazar, while Resul Pookutty gets an Ossar for sound mixing alongwith Ian Tapp and Richard Pryke.

— The 10-nation ASEAN concludes its 14th annual summit in Bangkok with a pledge to become a European Union style economic community by 2015.

SOME ANCIENT CIVILIZATIONS

Civilization	Date	Location	Famous cities
Akkadian	2350-2230 B.C.	Mesopotamia, Syria, Asia Minor	Akkad, Ur, Erich
Assyrian	1800-900 B.C.	Mesopotamia, Syria	Assur, Nineveh
Babylonian	1728-1686 B.C.	Mesopotamia, Syria	Babylon
Egyptian	2850-715 B.C.	Nile Valley	Thebes, Memphis, Tanis
Greek	900-200 B.C.	Greece	Athens, Sparta, Thebes
Hittite	1650-1200 B.C.	Asia Minor, Syria	Hattusas, Nesa
Indus	2500-1500 B.C.	North-West India, Pakistan Lothal	Harappa, Valley Mohenjodaro
Minoan	3000-1100 B.C.	Crete	Knossos
Persian	559-330 B.C.	Iran, Asia Minor	Persepolis
Phoenician	1100-330 B.C.	–	Sidon, Tyre, Byblos
Roman	500B.C.-300A.D	Mediterranean region, Asia Minor	Rome, Byzantium
Sumerian	3200-2360 B.C.	Mesopotamia	Ur, Nippur, Kish

WORLD HISTORY : IMPORTANT FACTS

- 3400 B.C. – 2700 B.C. constitutes the Age of Pyramids.
- Pyramids of Egypt were constructed by the Pharaohs of Egypt.
- The great Pharaoh Akhnaton ruled from 1375 B.C. – 1358 B.C.
- Cleopetra was the most beautiful queen of the Ancient World.
- Mesopotamian civilization flourished in the Tigris – Euphrates Valley.
- Sargon of Akkad unified the whole of Mesopotamia.
- The Han dynasty of China started conducting Civil Services Examinations.
- Mandarins were the civil servants in Chinese Empire.
- Confucius was born in the state of Lu.
- Confucius dies in 479 B.C.
- Tqaism was founded on the basis of the writings of Lao Tze (604 B.C – 517 B.C.).
- Mencius (372 B.C - 289 B.C.) was a great chinese philosopher.
- Indian Buddhist monks Kashyapa Matanga and Dharamarakshita helped in the spread of Buddhism in China.
- Shi-Huang-Ti constructed the Great wall of China.
- The Aegean Empire flourished between 2500-1400 B.C.
- The Aegean civilization on the Island of crete was destroyed by a Volcano.
- Homer wrote epic-poems Iliad and Odyssey.
- Athens, Sparta, Corinth, Thebes were Greek city States.
- In Greece Zeus was the Sky God and Apollo, the Sun-God.
- Olympic games were organized in Ancient Greece once in four years.

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- Olympic games were organised in the honour of God, Zeus.
- Alexander occupied the Greek throne in 336 B.C.
- Aristotle was the tutor of Alexander.
- Alexander died at the age of 33 in 323 B.C.
- The Roman Republic was established in 509 B.C.
- Julius Caesar was the famous Roman General.
- Julius Caesar introduced the Julian Calender.
- Egypt under Queen Cleopatra became an ally of Rome.
- Julius Caesar was assassinated in 44 B.C.
- Queen Cleopatra committed suicide by taking poison of an asp.
- Augustus established Pax Romana (Roman Peace).
- Jesus Christ was born in 4 B.C. in Bethlehem near Jerusalem.
- It was in the Roman Empire that Christianity grew into a great religion.
- Mohammad was born at Mecca in 570 A.D.
- Mohammad belonged to the Hashmita family of the Quraishi tribe.
- The retreat of Mohammad in Medina is called Heijra (621-22).
- Mohammad died in 632 A.D.
- The pilgrimage to holy city of Mecca is called Hajj.
- After the murder of Hussain, Muslims were divided into Sunni and Shias.
- The term Middle Ages in the history of Europe refers to the period which lie between the fall of the Roman Empire and the discovery of America.
- The Renaissance in Europe was an intellectual movement in 14th century.
- Petrarch wrote 'Sonnets to Laura'.
- Machia Velli (1469-1527) wrote 'The Prince'.
- Medici family of Florence patronised various artists.
- 'Monalisa' and 'The last supper' are the creations of Leonardo Da Vinci.
- 'The Last Judgement' is the most famous work of Michel Angelo.
- Sir Thomas More wrote 'Utopia'.
- The Reformation was a movement aimed towards reforming the Roman Catholic Church.
- The Reformation Movement in Germany was led by Martin Luther.
- Zwingli and Calvin led the movement in Switzerland.
- The earliest Nation state to emerge in Europe was England.
- The Elizabethan age is regarded as the 'Golden Age' in the history of England.
- Elizabeth I ruled from 1558-1603 A.D.
- After Elizabeth's death England came to be ruled by Stuart rulers.
- James I (1605-1625) was the first Stuart ruler.
- King Henry IV founded the House of Bourbons.
- Bourbon dynasty continued till the French Revolution (1789 A.D.).
- Louis XIV declared "I am the State".
- Spain was liberated from the Moors in 1492.

- During the first half of the 16th century, Spain was ruled by the Holy Roman Emperor, Charles V.
- Phillip II married the English Queen, Mary.
- In 1664, the English renamed New Amsterdam as New York.
- Seven Year's war continued from 1756-63.
- The incident called 'Boston Tea Party' occurred on December 16, 1773.
- Thomas Paine wrote the pamphlet 'Common Sense'.
- Thomas Jefferson wrote 'The Declaration of American Independence.'
- The Declaration of Independence was issued on 4th July 1776.
- In 1783, the British signed the Treaty of Paris, by which she recognized the independence of the 13 colonies.
- The Americans fought for their Independence under the command of George Washington.
- The Constitution of America came into force on June 21, 1788.
- George Washington was elected the first President of America.
- The period of 18th century is called as the "Age of Enlightenment".
- Montesquieu (1689-1755) was a French Philosopher.
- 'The Spirit of Laws' is the most famous book of Montesquieu.
- Voltaire's ideas had great impact on the French Revolution.
- Rousseau wrote the famous book 'Social Contract'.
- Rousseau wrote in 'Social Contract' that "Man is born free but he is everywhere in chains".
- The slogans of equality, liberty and fraternity during the French Revolution were inspired by Rousseau's ideas.
- Saint Simon wrote the famous book "The New Christianity" (1825).
- The 'Communist Manifesto' was published in 1848.
- The first volume of 'Das Capital' was published in 1867.
- "First International" was formed in 1864.
- "Second International" was formed in 1889.
- Karl Heinrich Marx was born in 1818 in Germany.
- Karl Marx died in 1883 in London.
- The French Revolution begin with the siege of Bastille on July 14, 1789.
- Louis XVI was the ruler at the time of French Revolution.
- Louis XVI was executed in 1793.
- The period of September 1792 – July 1794 is known as the reign of trerror.
- In 1795 the exective power was vested with the Directory.
- Napolean Bonaparte was born at Ajaccio on the island of corsica in 1769.
- Napolean defeated the Egyptians in the battle of Pyramids.
- Napolean ruled France from 1799 to 1815.
- Napolean faced crushing defeat in the battle of Leipzig.
- Napolean was banished to the island of Elba.
- The battle of Waterloo (1815) finally ended the career of Napolean.
- Napolean went into exile in the island of St. Helena.

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- Napolean died in 1821.
- The task of Italian unification was carried at by Mazzini Cavour and Garibaldi.
- Garibaldi is known as "the sword of Italian unification".
- Zollverein was the custom union formed by Prussia.
- Otto Von Bismarck was the architect of Germany's unification.
- Bismarck followed the policy of 'Blood and Iron'.
- Czar Nicholas II (1894-1917) was the ruler during the Russian Revolution (1917).
- Rasputin was the notorious Minister of Czar Nicholas.
- The Czar was forced to abdicate in March 1917.
- The Social Democratic Party was formed in 1898.
- In 1903 the Social Democratic Party bifurcated into Bolsheviks and Mensheviks.
- The events of 12 March 1917 has been called the February Revolution.
- A provisional government was set up under Alexander Kerensky.
- Nikolai Lenin (1870-1924) was the leader of the Bolsheviks.
- Lenin promised to people "Peace, Land and Bread".
- The overthrowing of Provisional Government on November 7, 1917, is known as October Revolution.
- New Economic Policy (NEP) was introduced in 1921.
- Lenin died in 1924.
- Joseph Stalin (1879-1953) assumed charge as the leader of Russia.
- The assassination of Archduke Francis Ferdinand and his wife in Sarjevo on 28 June 1914 provided the immediate cause for the outbreak of World War I.
- In 1882 Triple Alliance was formed by Germany, Austria-Hungary and Italy.
- On 1 August 1914 Germany declared war on Russia and on 3 August on France.
- France, Russia and their allies came to be known as Allied Powers.
- Germany, Austria and their allies came to be known as the Central Powers.
- Woodrow Wilson presented the Fourteen Points.
- The Paris Peace conference was organised in January, 1919.
- The Treaty of Versailles was signed with Germany on 28 June, 1919.
- The Paris Peace Conference led to the creation of the league of Nations.
- The League Headquarters were located in Geneva (Switzerland).
- The USA and Soviet Union remained outside the League of Nations.
- Mussolini was popularly known as Duce.
- The Economic Depression in Europe continued from 1929 to 1933.
- The Nazis were popularly known as the Brownshirts.
- On 30 January, 1933 Hitler was appoined as the Chacellor of Germany.
- Hitler was an Austrian by birth.

- Hitler's organisation came to be known as the National Socialist Party.
- Hitler wrote the book Mein Kampf (My battle) in Prison.
- In 1934 Hitler became the President as well as the Chacellor.
- Second World war was began in September, 1939.
- German forces attackd Poland on September 1, 1939.
- Britain and France declared war on Germany on 3rd September, 1939.
- The Pearl Harbour was attacked on December 7, 1941, on August 6, 1945 U.S. dropped the first atom bomb on Hiroshima.
- On August 9, 1945, U.S. dropped the second atom bomb on Nagasaki.
- The Japanese forces surrendered on September 2, 1945.
- Yalta conference was organised from 4 to 11 February, 1945.
- Dumbarton Oaks conference (1944) was organised to discuss the formation of the United Nations Organisations.
- The United Nations charter become effective on 24 October 1945.
- May Fourth Movement started on 4 May, 1919 in China.
- In 1921 the communist party of China was formed.
- In 1868 the rule of Shogun ended in Japan and Meiji came in to power.
- Cold war developed between USA and USSR after the second World War.
- In 1949 Germany was divided into Eastern and Western Germany.
- The North Atlantic Traty Organisation (NATO) was formed on April 4, 1949.
- In 1955, the communist countries formed the Warsaw Pact.
- Germany was reunited on 3 October, 1990.
- The Korean War broke out in 1950.
- In 1954, the South-East Asia Treaty Organisation (SEATO) was set up.
- In January 1959, there was a revolution in Cuba under Fidel Castro.
- In 1961, East Germany built a wall between East and West Berlin.
- U.S. started its 'star-Wars programme' in 1980s.
- On 26 December, 1991 the Soviet Union broke up into 15 Independent Republics.
- In 1960, 17 African countries became Independent.
- The system of racial segregation called apartheid was practised in South Africa.
- The African National Congress (ANC) led the movement against apartheid.
- Nelson Mandela was released from Jail in 1990 after about 26 years.
- The Arab League was set up in 1945.
- ASEAN was set up in 1967.
- SAARC was set up in 1985.

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IMPORTANT WARS IN WORLD HISTORY

Battle	Period	Features
Hundred Year's War	1347-1453	Fought between France and England
War of Spanish Succession	1702	English England and France
Seven Years War	1756-1763	England and Prussia defeated Austria, France, Poland and Russia.
American War of Independence	1763-83	Between Forces were defeated.
Battle of Nille	1798	English Britain and France
Battle of Trafalgar	1805	British fleet defeated French and Spanish fleet
Battle of Waterloo	1815	Napolean was defeated
Crimean War	1853-56	Fought between Russia and combined forces of England, France and Turkey
Russo-Japanese War	1904-05	Japan defeated Russia.
World War I	1914-18	Murder of Archduke Ferdinand of Austria was the immediate cause. Austria attacked Serbia.
World War II	1939-45	Hitler attacked Polland Britain and France declared war on Germany
Korean War	June 1950	North Korea invaded South Korea
Arab-Israel War	1967	Fought between Israel on one side and Egypt, Syria, Jordan on the other.
China-Vietnam War	1979	China invaded Vietnam and established control over large areas of Vietnam.
Gulf War	Jan 17, 1971 to feb 26, 1991	Forces under US command attacked Iraq
U.S.– Iraq War	20 March 2003	Force under US command invaded Iraq.

IMPORTANT TREATIES AND AGREEMENTS

Treaty / Agreement	Year	Importance
Treaty of Paris	1763	The Seven Years war came to an end
Treaty of Paris	1783	The American war of Independence came to an end
Treaty of Amiens	1802	Singed between England and France
Treaty of Tilsit	1807	Russia came under the domination of Nepolean
Treaty of Nanking	1842	Signed between England and China and it proved fatal for China
Treaty of Kanagawa	1854	It was concluded between commodore Perry (America) and Japan. This treaty opened Japan.
Treaty of Paris	1856	The treaty further complicated the Eastern Question
Treaty of Prague	1866	Bismarck concluded the treaty with Austria
Treaty of Frankfurt	1871	It created a long lasting hostility between France and Germany
Congress of Berlin	1878	It failed to resolve the problem of Balkan states
Berlin Confernece	1885	It failed to stop the plunder of Africa by European Nations
Treaty of Shimonoseki	1895	It was concluded between China and Japan on the question of Korea
Treaty of Portsmouth	1905	It was concluded between Japan and Russia
Treaty of London	1913	It was signed after 1912 war between the Balkan States and Turkey
Treaty of Bucharest	1913	The Second Balkan war came to an end with it
Treaty of Brest-Litovsk	1918	Through this Treaty Russia detached herself from the World War
Treaty of Versailles	1919	It was concluded for the establishment of peace after world war I
Treaty of St. Germaine	1919	It was concluded between the defeated Austria and Allied powers after World War I
Treaty of Neuilly	1919	It was concluded between Bulgaria and Allied Powers
Treaty of Severs	1920	It was concluded between Turkey and the Allied Powers
Treaty of Lausanne	1923	Turkey amended the humiliating Treaty of Sevres
Munich Pact	1938	This pact was the culmination of the policy of Appeasement.

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INDIAN POLITICAL SYSTEM AND CONSTITUTION

The democratic political system of our country is based on the values and principles enshrined in the constitution. After the long dark night of foreign domination, India entered into a new era on 15th August, 1947. The constitution which was formed for the free India was based on the issues raised during the freedom struggle and on the vision of towering leaders like Jawahar Lal Nehru, Sardar Patel and Dr. B. R. Ambedkar. The constitution outlined the goal to be achieved i.e., of a welfare state and also provided the means and methods to accomplish those goals. The study of Indian Constitution thus is a journey into the mind and heart of a growing and developing Nation.

EVOLUTION OF THE CONSTITUTION OF INDIA

- A constitution is a document of people's faith and aspirations possessing a special legal sanctity.
- It is the fundamental law of the country and all other laws and customs of the country in order to be valid must conform to it.
- A constitution sets out the framework and the Principal Function of various organs of the Government as well as relations between the Government and its citizens.

THE REGULATING ACT, 1773

- This act provided for the centralisation of administration of company's territories in India.
- Governor of Bengal became Governor-General for all British territories in India.
- Supreme Court to be set up at Calcutta.

THE PITTS INDIA ACT, 1784

- Subordinated the Bombay and Madras Presidency to Bengal in all questions of war, diplomacy and revenues.
- Strength of Governor-General in council reduced to 3.

THE CHARTER ACT, 1793

- This Act gave the power to the Governor-General to override his council.

THE CHARTER ACT, 1813

- The Act provided rules and procedures for the use of Indian revenue.

THE CHARTER ACT, 1833

- Governor-General of Bengal to be Governor-General of India.
- Government of Madras and Bombay deprived of legislative powers.
- Law member added to the council of Governor-General.

THE CHARTER ACT, 1853

- The Act for the first time created a separate legislative machinery consisting of 12 members legislative council.
- Law member was made a full member of the Executive Council of the Governor-General.

THE GOVERNMENT OF INDIA ACT, 1858

- Secretary of state for India was created.
- The Secretary of state was assisted by a 15-member council.
- Governor-General was to be called as the Viceroy.
- A highly centralised administrative structure created.

THE INDIAN COUNCIL ACT, 1861

- Government started associating Indians in legislation.
- A fifth member added to the Viceroy's executive council.
- For legislative purposes, executive council of Viceroy was enlarged by 6 to 12 members.

THE INDIAN COUNCIL ACT, 1892

- Introduction of indirect elections for the non-official members of the Imperial and Provincial Legislative Councils.
- The councils at both levels were to have the power of discussing the Budget but not of voting.

THE MORLEY-MINTO REFORMS (THE INDIAN COUNCIL ACT, 1909)

- Provision of indirect elections to the legislative councils introduced.
- Additional members in Central Legislative increased to 60.
- The membership of the Legislative Councils of the different provinces enlarged.
- The members were given the right of discussion and asking supplementary questions.

THE GOVERNMENT OF INDIA ACT, 1919 (MONTAGUE-CHELMSFORD REFORMS)

- Dyarchy system introduced in the provinces.
- The Provincial Subjects of administration were to be divided into 'Transferred' and 'Reserved' Subjects.
- Indian legislature became 'bicameral'.
- Communal representation extended to Sikhs.

THE GOVERNMENT OF INDIA ACT, 1935

- Dyarchy introduced at the centre.
- Provincial autonomy replaced dyarchy in provinces.
- Provision for the establishment of an All India Federation consisting of the British Provinces and Princely States.
- Establishment of a Federal Court.

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- Three fold division of powers–Federal, Provincial and Concurrent Lists.
- Separate electorate extended to include Anglo-Indians, Indian Christians and Europeans.

IMPORTANT FACTS

- The Constitution of India was formally enacted on 26 November, 1949.
- The Constitution of India came into force on 26 January, 1950.
- There were 395 Articles and 8 Schedules in the Constitution when it was finally passed.
- At present the Constitution consists of 444 Articles and 12 Schedules.
- The constitution of India was framed and adopted by the Constituent Assembly of India.
- As per the Cabinet Mission Plan of 1946, the Constituent Assembly was set up in November 1946.
- The members were elected indirectly by the Provincial Assemblies in the ratio of one member per one million population.
- There were a total of 389 members in the Constituent Assembly of which 296 were elected by the members of the Provincial Assemblies and the rest were nominated by the Princely States.
- The first meeting of the Constituent Assembly was held on 9th December, 1946 with Sachidanand Sinha as the interim President.
- Later Dr. Rajendra Prasad was elected as the President of the Constituent Assembly on 11th December, 1946.
- The historic "Objective Resolution" was moved in the Constituent Assembly by Pt. Jawahar Lal Nehru on 13th December, 1946 which ultimately became the Preamble of our Constitution.
- The Constituent Assembly formed 13 important committees for framing the Constitution.
- A drafting committee of 7 members was set up on 29th August, 1947 under the Chairmanship of Dr. B. R. Ambedkar.
- The Constituent Assembly worked in three phases.
  - **(i) Ist Phase :** As Constituent Assembly under the limitations of Cabinet Mission Plan-6th December, 1946 to 14th August, 1947.
  - **(ii) 2nd Phase :** As Constituent Assembly, a sovereign body + Provisional Parliament – 15th August, 1947 to 26th November, 1949
  - **(iii) 3rd Phase :** As a Provisional Parliament-27th November, 1949 to March, 1952.
- The Constituent Assembly took 2 years 11 months and 18 days to frame the Constitution.
- The design of the National Flag was adopted by the Constituent Assembly on July 22, 1947.

- The National Anthem was adopted by the Constituent Assembly on January 24, 1950.
- The first meeting of the Constituent Assembly was boycotted by the Muslim League.
- Shri B. N. Rau was appointed as the legal Advisor of the Constituent Assembly.
- The song 'Jana-gana-Mana' was adopted by the Constituent Assembly as the National Anthem on 24th January 1950.

THE PREAMBLE

- The Objective Resolution moved by J. L. Nehru ultimately became the Preamble of the Constitution.
- The Objective Resolution was passed by the Constituent Assembly on the 22nd January, 1947.
- The final paragraph of the Preamble puts on record the exact date when the Constitution was adopted.
- The preamble makes clear that the source of the Constitution is the people of India.
- The preamble helps where the language of the Constitution is vague.
- The world 'Socialist,' 'Secular' and the 'Unity and integrity' of the nation were added by the 42nd Amendment Act of 1976.
- The Supreme Court expressed the view that the "Preamble is the key to its makers".
- Justice Madhokar said in Sajjan Singh Vs. Rajasthan State case that the preamble is the sum and substance of the Constitution.
- In the Golaknath Vs. Punjab State case, Justice Hidaytullah remarked that the preamble is the synopsis of those principles on which the government has to work upon.
- The objective of the constitution is to secure Justice, Liberty, Equality and Fraternity for every citizen.

PREAMBLE

It provides a key to the intention of the framers of the Constitution. The Preamble to the Constitution of India reads : "**WE THE PEOPLE OF INDIA**, having solemnly resolved to constitute India into a **SOVEREIGN, SOCIALIST, SECULAR, DEMOCRATIC REPUBLIC** and to secure to all its citizens, **JUSTICE**, social economic and political; **LIBERTY** of thought, expression, belief, faith and worship; **EQUALITY** of status and opportunity; and to promote among them all **FRATERNITY** assuring the dignity of the individual and the unity and integrity of the Nation. **IN OUR CONSTITUENT ASSEMBLY** this twenty-sixth day of November 1949, we do **HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.**

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DIFFERENT COMMITTEES

Committee	Chairman
1. Drafting Committee	— B. R. Ambedkar
2. Flag Committee	— J. B. Kripalani
3. Union Power Committee	— J. L. Nehru
4. Fundamental Rights and Minority Committee	— S. V. B. Patel
5. Provincial Constitution Committee	— S. V. B. Patel
6. Union Constitution Committee	— J. L. Nehru

MEMBERS OF THE DRAFTING COMMITTEE

1. Dr. B. R. Ambedkar – Chairman
2. Alladi Krishna Swami Ayyar
3. K. M. Munshi
4. N. G. S. Ayangar
5. Md. Sadullah
6. N. Madhav Rao (In place of B. L. Mitra)
7. D.P. Khetan (T. Krishnamachari after Khetan's death in 1948).

SALIENT FEATURES OF THE CONSTITUTION

- The constitution of India is the second lengthiest and the most comprehensive of all the written Constitutions of the World.
- The Constitution establishes a Parliamentary form of Government both at the Centre and the States.
- The Constitution of India has features of both regidity and flexibility.
- The Constitution declares certain fundamental rights of the individual.
- The Constitution of India has made provision to provide an independent and impartial judiciary.
- The Constitution of India has conferred on the Judiciary the power of Judicial Review.
- The system of universal adult suffrage has been adopted by the constitution.
- The Constitution of India provides for the establishment of Secular State.
- The Constitution of India has established single and uniform citizenship for the whole of India.
- The Constitution of India has made some special provisions for Scheduled Castes and Tribes.
- The Constitution of India has provided a single and unified Judiciary with the Supreme Court at its apex.

- The Constitution of India has made provision for a federation with strong centralising tendency.
- The Constitution of India has provided certain Directive Principles of State Policy to secure a truly welfare state.

FACTS TO REMEMBER

- The provisions of Independence of Judiciary and Judicial Review have been taken from the US Constitution.
- The provision of Parliamentary system with Ministerial responsibility has been taken from the U.K. Constitution.
- Method of Election of the President has been taken from Irish Constitution.
- The provision regarding nomination of members of the Rajya Sabha by the President has been taken from Irish Constitution.
- The first sitting of the Union Parliament, following the first General Elections in 1951-1952 was held on 13 May, 1952.
- The legislature of the USA is known as the Congress.
- The idea of concurrent list has been borrowed from Australia.
- The first State in India to be formed on a linguistic basis was Andhra Pradesh.
- The constitution describes India as a Union of States.
- The salaries of the Jugdes of the Supreme Court are drawn from the Consolidated Fund of India.

FUNDAMENTAL RIGHTS

- These Fundamental Rights Finalised by a committee of the Constituent Assembly headed by Sardar Vallabh Bhai Patel.
- Are protected by the constitutional remedy by way of an application directed to Supreme Court under Article 32 and High Court under Article 226.
- They can be altered only through constitutional amendment.
- Vital for the full development of the human personality, promoting an individual's dignity and welfare.
- Aim to establish 'a Government of law and not of man'.
- Article 13 prohibts the state from making any law, taking away or abridging the rights in Part III. However, this restriction doesn't apply to a constitutional amendment.
- Fundamental Rights don't give absolute powers to the individual, so, they are restricted rights.
- Article 17 and 24 are the absolute rights.
- Article 29 (Cultural and Education rights–This article stipulates that the states shall not impose upon it any culture other than the community's own culture.
- Article 32 (Right to Constitutional Remedies)–The article guarantees to a person the right to move the Supreme Court directly for the enforcement of his fundamental rights.

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- Article 32 has been called the cornerstone of the entire edifice set up by the Constitution.
- Dr. Ambedkar called it the very heart and 'soul of the Constitution'.
- Article 33, Parliament has the power to modify the application of the fundamental rights to the members of the Armed Forces or Police Forces.
- Article 35 stipulates that Parliament alone can legislate on certain matters to give effect to some of provision of this part.
- Parliament amended Article 13 and Article 368 by the 24th Amendment Act, 1971 to empower itself to amend Part III of the Constitution.
- Under Article 352, the Indian Constitution contains provisions for automatic suspension of the Fundamental Rights under certain circumstances (e.g. during emergency).
- Under Article 359, the President has the power to suspend any or all the Fundamental rights by issuing a proclamation during a National Emergency.
- The 44th Amendment Act, 1978 prohibits the suspension of Article 20 and 21 even during a national emergency.
- Article 22 affords protection against arbitrary arrest and detention.
- Article 24 prohibits the employment of children below 14 years of age in factories, mines and hazardous occupations.

FUNDAMENTAL RIGHTS WITH NEGATIVE EXPRESSIONS

- **Article 14 :** No man is above the law of the land and every person is subject to the jurisdiction of the courts.
- **Article 15(1) :** State shall not discriminate against a citizen on grounds only of religion, race, caste, sex or place of birth or any of them.
- **Article 16(2) :** No citizen can be discriminated against or be ineligible for any employment under the State on grounds only religion, race, caste, sex, descent, place of birth or residence.
- **Article 18 :** Prohibits the State to confer titles on anybody whether a citizen or a non citizen.
- **Article 22(1) :** No person who is arrested shall be detained in custody without being informed of the grounds for such arrest.
- **Article 28(1) :** No religious instruction shall be imparted in any educational institution wholly maintained out of state funds.

FUNDAMENTAL RIGHTS WITH POSITIVE EXPRESSIONS

- **Article 25 :** Guarantees to every person the freedom of conscience and the right to profess, practise and propagate religion.
- **Article 29(1) :** Guarantees to every section of the citizens residing in any part of India having a distinct language, script or culture of its own, the right to conserve the same.

- **Article 30(1) :** All minorities shall have the right to establish and administer educational institutions of their choice.
- **Article 16 :** Deals with equality of opportunity "in public employment".
- **Article 16(4)(A) :** Introduced by the constitution (77th Amendment) Act, 1995, provides for reservation of seats in promotion for SCs/STs.
- **Article 17 :** Abolishes 'Untouchability' and forbids its practice in any form.

FUNDAMENTAL DUTIES

- The Fundamental Duties are contained in Article 51-A of Part IV-A of the Constitution.
- The Fundamental Duties were inserted into the Constitution of India by the 42nd Amendment Act, 1976.
- These Duties were added on the recommendation of Swaran Singh committee.
- The basis for Fundamental Duties is the Japanes Model.
- These duties are incorporated with the purpose of making the citizens patriotic and promoting harmony.
- The duties are statutory duties and are enforceable by law.
- Violation of the duties can be met with punishment.
- The constitution does not impose penalty for the violation of the duties. It is left to the Legislatures.
- Japan is the only democratic country in the world which provides for a set of Fundamental Duties in its constitution.

TEN FUNDAMENTAL DUTIES

1. To abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem.
2. To cherish and follow the noble ideals which inspired our national struggle for freedom.
3. To uphold and protect the sovereignty, unity and integrity of India.
4. To defend the country and render national service when called upon to do so.
5. To promote harmony and the spirit of common brotherhood and preserve dignity of women.
6. To value and preserve the rich heritage of our composite cultures.
7. To protect and improve natural environment.
8. To develop the scientific temper, humanism and the spirit of inquiry and reform.
9. To safeguard public property and to abjure violence.
10. To strive for excellence in all spheres of individual and collective activity.
11. To provide opportunities for education to his child or, as the case may be ward between the age of six and fourteen years.

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DIRECTIVE PRINCIPLES OF STATE POLICY (IMPORTANT ARTICLES & ASSOCIATED PRINCIPLES)

- **Article 36 :** Definition of Directive Principles.
- **Article 37 :** Not enforceable by any court.
- **Article 38 :** The state will strive to promote the welfare of the people and complete development of the social system.
- **Article 39 :** The state will, in particular direct its policy towards securing :
  - (i) The men and the women equally have the right to earn their money for life.
  - (ii) That the ownership and control of the material resources of the community are so distributed as best to subserve the common goods.
  - (iii) That the operation of the economic system does not result in the concentration of wealth to common detriment.
  - (iv) That there is equal pay for equal work for both men and women.
  - (v) That the health and strength of workers, men and women and the tender age of children are not abused.
- **Article 40 :** The state shall take steps to organise village-panchayats as a unit of self-government.
- **Article 41 :** The state will within the limits of its economic capacity and development, make effective provision for securing the right to work, to education and to public assistance in cases of unemployment, old age, sickness and disablement.
- **Article 42 :** The state will make provisions for securing just and human conditions of work and for maternity relief.
- **Article 43 :** The state will endeavour to secure to all workers, agricultural, industrial or otherwise, work, a living wage and the state will responsible to promote cottage industries.
- **Article 44 :** The state will try to secure for the citizens a uniform civil code throughout the territory of India.
- **Article 45 :** The state will endeavour to provide, within a period of 10 years from the commencement of this Constitution free and compulsory education for all children until they complete the age of fourteen years.
- **Article 46 :** The state shall promote with special care for the educational and economic interests of the weaker sections of the people in particular of the scheduled castes and the scheduled tribes.
- **Article 47 :** The state will regulate the raising of the level of the nutrition and the standard of living of its people and the State will endeavour to bring about prohibition of drinks and of drugs, which are infurisous to health.

- **Article 48 :** The state will endeavour to protect and improve the environment and to safeguard the forest and wildlife of the country.
- **Article 49 :** State will protect every historical monument or place or object of artistic nature.
- **Article 50 :** The state will separate the judiciary from the executive in the public services of the state.
- **Article 51 :** The state will endeavour to :
  - (a) Promote international peace and security.
  - (b) Maintain honorable relations between nations.
  - (c) Respect for international law and people with one another.
  - (d) Encourage settlement of international disputes by arbitration.

DIRECTIVE PRINCIPLES ADDED AFTER 42ND AMENDMENT (1976)

- **Article 39(B) :** The children should be educated in fresh and prestigious environment.
- **Article 39(A) :** The legal system promotes justice on a basis of equal opportunity and will in particular provide free legal aid by suitable legislation.
- **Article 43(A) :** To secure the participation of workers in the management of undertaking engaged in any industry.
- **Article 48(A) :** To protect the environment and to safeguard the forests and wildlife of the country.

DIRECTIVE PRINCIPLES ADDED AFTER 44TH AMENDMENT (1978)

- **Article 39(B) :** The state shall, in particular strive to minimise the inequalities in income and endeavour to eliminate inequalities in status, facilities and opportunities not only amongs individuals but also amongst groups of people residing the different areas.

DIRECTIVE PRINCIPLES MENTIONED IN OTHER PARTS OF THE CONSTITUTION

- **Article 350 :** It is duty of the officers of concern states to provide primary education in mother tongue to the people of minorities particularly to children of minorities classes.
- **Article 351 :** It will be duty of the union to spread Hindi language amongst the people of India which will develop our cultural and social element.
- **Article 355 :** It will be under consideration to appoint the people of the scheduled castes and the scheduled tribes in and as union or state services.

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PRESIDENT AND VICE-PRESIDENT

PRESIDENT

- The President is the executive head of the Republic.
- The President is the first citizen of India and occupies the first position in the warrant of Precedence.
- All the executive decisions are taken in the name of the President.
- The executive power is exercised by the President on the advise of the Council of Ministers.
- The 42nd Amendment Act has made it obligatory for the President to accept the advice of Council of Ministers.
- The procedure of President's election is laid down in the constitution.
- The election is held in accordance with a system of proportional representation by means of a single transferable vote.
- The term of office is five years from the date of entry in the office.
- President takes oath in the presence of the Chief Justice of India.
- President can resign by giving a resignation in writing addressed to the Vice-President.
- President can be removed for violation of the constitution, by the process of Impeachment.
- Article 61 outlines the impeachment procedure for the President.
- When a vacancy occurs in the office of the President, the Vice-President acts as the President until a new President assumes the office (Article 62).
- The 44th Amendment gave him the power to send back to Council of Ministers an advice for reconsideration.
- The Budget is laid before Parliament in the name of the President.
- A money bill is introduced only on his recommendation.
- He appoints a Finance Commission every five years.
- All executive action of the Union must be taken in the name of the President (Article 77). All important officials are appointed by him.
- The President can appoint and also remove some of the officials.
- He has the right to be informed of all the important decisions of the Cabinet.
- The supreme command of the Armed Forces is vested in the President.
- The President of India represents India in international forums, sends and receives ambassadors.
- All international treaties and agreements are concluded on his behalf; however, they are subject to ratification by Parliament.

- Article 85 gives him the power to summon, prorogue the Houses of Parliament and dissolve the Lok Sabha.
- Certain bills can be introduced in Parliament only on the recommendation of the President.
- Article 80 gives him the power to nominate 12 members to the Rajya Sabha from amongst persons having special knowledge of literature, science, art and social service.
- Presidential assent is essential before a Bill becomes an Act.
- The President has the power to grant pardon, reprieve or remit of punishment or commute the sentence given by court martial.
- The President is the only authority for pardoning a sentence of death (Article 72).
- The President has the power to legislate by ordinance.
- Dr. Rajendra Prasad was the first President of India.
- Pratibha Devi Sing Patil is the current President of India.
- Neelam Sanjiva Reddy was elected President of India unopposed.
- President is entitled to rent free residence besides allowances.

VICE-PRESIDENT

- The Vice-President is elected indirectly by an electoral college of members of the two Houses of Parliament (Article 66).
- Election disputes are decided by the Supreme Court (Article 71).
- The qualification for the Vice-President are identical to those prescribed for the President, except that the candidate must be qualified to become a member of the Rajya Sabha.
- The term of office of the Vice-President is five years. It may terminate earlier by resignation or removal.
- He may by removed by a resolution of the Rajya Sabha passed by a two third majority of its members and agreed to by the House of the people (Article 67).
- According to Article 68, an election to fill the vacancy caused by expiration of the terms of office is to be complete before the expiration of the term.
- The Vice-President takes an oath before the President or some persons appointed in that behalf by him.
- The normal function of the Vice-President is to act as the ex-officio chairman of the Rajya Sabha (Article 64).
- It there occurs any vacancy in the office of the President by reason of his death, resignation, removal or otherwise, the Vice-President can act as president until the vacancy is filled.
- When the Vice-President acts as President, he ceases to perform the duties of the Chairman of the Rajya Sabha.

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IMPORTANT ARTICLES RELATED WITH THE PRESIDENT

- Article 53 : Executive Power is vested in the President.
- Article 54 : Election of the President.
- Article 55 : Process of President's election.
- Article 56 : Term of office of the President.
- Article 57 : Eligibility for re-election.
- Article 58 : Qualifications for election as President.
- Article 60 : Oath to the President.
- Article 61 : Impeachment of the President.
- Article 71 : Dispute regarding election of the President.
- Article 72 : Pardoning Power of the President.
- Article 74 : President vis-a-vis the aid and advice tendered by the Council of Ministers.
- Article 76 : Appointment of Attorney–General of India.
- Article 78 : Prime Minister to keep the President informed.
- Article 85 : Summon, Prorogue the Houses of Parliament and dissolution of Lok Sabha.
- Article 80 : Power to nominate 12 members to Rajya Sabha.
- Article 123 : Power to promulgate ordinance.
- Article 143 : Consultation with the Supreme Court of India.
- Article 352 : Proclamation of Emergency by war, external aggression or armed rebellion.
- Article 356 : Taking over the administration of a state.
- Article 360 : Proclamation of Financial Emergency.

THE COMPTROLLER AND AUDITOR-GENERAL OF INDIA

- The Comptroller and Auditor-General of India is appointed by the President.
- He holds office until he attains the age of 65 years or at the expiry of the 6 year term, whichever is earlier.
- He is the guardian of the Public Purse.
- He audit the accounts of the Union and the States and submit the report to the President or the Governor.
- In case of Union Territories having Legislative Assemblies he submits the audit reports to Lt. Governors.
- The accounts of the Union Territories are audited by him as part of the accounts of the Union of India.
- He ensures that all the expenditures from the Consolidated Fund of India or states are in accordance with the law.
- He is an officer of the Parliament and he is called Ears and Eyes of the Public Accounts committee.
- He is concerned only at the stage of audit after the expenditure has already taken place.
- He has no control over the issue of money firm the Consolidated Fund of India or of any state.

- He can be removed only on an address from both the Houses of the Parliament on the ground of proven misbehaviour and incapacity.
- His salary is charged on the Consilidated Fund of India.
- He is paid a salary equivalent to that of a Judge of the Supreme Court.
- On retirement, he shall be eligible for an annual pension.
- After retirement he is disqualified for appointment either under the Union or the State Governments.

THE ATTORNEY-GENERAL OF INDIA

- The Attorney-General is the first law officer of the Government of India.
- He is appointed by the President at according to article 76.
- He holds office during the Pleasure of the President.
- His duty is to give legal advice to the Government and the President.
- He has the right of audience in all courts in India.
- He is not a member of the Cabinet but he has the right to speak in the Houses of Parliament or any Parliamentary committee, though he has no right to vote in it.
- He is prohibited to take appointment as a director in any company.
- He is allowed to take up private practice provided, the other party is not the state.
- He doesn't get salary but a retainer that is determined by the President.
- He is entitled to all the privileges and immunities as a member of Parliament.
- He is assisted by two Solicitors-General and four assistant Solicitors-General.

THE ELECTION COMMISSION

- Article 324 provided for a single Election Commission for the country.
- It is entrusted with the power to superintend, direct and control all elections.
- The Chief Election Commissioner is appointed by the President.
- The President may appoint such number of Election Commissioners as he deems fit subject to laws made by legislature.
- The EC was a single member body till 1989. In October 1989 the President for the first time appointed two more Election Commissioners.
- The President shall consult CEC for removal of ECs only and not for appointment.
- By an ordinance of 1993, the powers of the members of EC have been made equal to that of the CEC.

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- Th EC is responsible for the conduct of elections of Parliament and state legislatures and also to the officer of the President and Vice President.
- CEC is appointed for a term of six years or till be attains the age of 65 years, whichever is earlier.
- CEC can only be removed by each House of Parliament by a special majority and on the ground of proven misbehaviour or incapacity.
- The other Election Commissioners shall not be removed by the President except on the recommendation by the CEC.
- The Election Commission is reponsible for the preparation of electoral rolls, recommendation of political parties and allotting symbols.
- Election Commission also advises President on question of disqualification of MP's in certain cases.

PUBLIC SERVICE COMMISSION

- The main function of the Public Service Commission are to conduct examinations for appointment to the services of Union or the states as the case may be.
- Public Service Commissions function in an advisory capacity and their recommendations are not obligatory to the Government.
- There is a Public Service Commission for the Union and one for each state.
- There are also Joint Public Service Commission for two or more states.
- Apart from Union and State services, the constitution also provides for All India Services.
- All India Services are common to the Union and the states.
- Article 312(2) provides that IAS, IPS shall be All India Services.
- The Parliament created Indian Forest Services in 1961.
- The chairman and members of the Union Public Service Commission and the chairman and members of Joint Commission are appointed by the President.
- The chairman and members of State Public Service Commission are appointed by the Governor.
- Half of the members of a Commission shall be persons who have held office under the Government of India or of a state for at least 10 years.
- A member shall hold the office for six years or until the age of 65 in case of Union Commission and 62 in case of State Commission and Joint Commission.
- A member may be terminated either by resignation or removal.
- If resigning, the member should address to the President, in the case of the union or to a joint commission, or the Governor in the case of a state commission.

PLANNING COMMISSION

- The Planning Commission came into existence in 1950 by a resolution of the Union Cabinet put forward by Jawaharlal Nehru.
- The Planning Commission was constituted for undertaking the comprehensive responsibility of socio-economic planning for the country.
- Since it was not set by any Parliamentary legislation or constitutional amendment, it is therefore, a non-statutory and extra-constitutional body.
- It works as an advisory body to the Government of India.
- The Prime Minister is the ex-officio chairman of the Planning Commission.
- It generally works under the Deputy Chairmen who has a cabinet rank.
- It is the duty of the Planning Commission to determine the National Priorities of development.
- The Planning Commission is to make an assessment of the material, capital and human resources of the country for planned development.

NATIONAL DEVELOPMENT COUNCIL

- National Development Council was set up in 1952.
- It is a non-statutory and extra-constitutional body.
- It prepare guidelines for the formulation of National Plans.
- It consider the National Plan as formulated by the Planning Commission.
- It review the working of the plan from time to time.
- The plan is presented to the Parliament for its final approval after it is passed by the National Development Council.
- It consists of the Prime Minister, Union Cabinet Ministers, Chief Ministers of the states, administrators of UTs and members of Planning Commission.
- The Secretary of Planning Commission is also the Secretary of National Development Council.
- It meets under the chairmanship of the Prime Minister.
- It is the highest decision making body for Planning in India.

FINANCE COMMISSION

- Article 280 provides for the appointment of a Finance Commission at five years intervals.
- Parliament enacted the finance commission (Miscellaneous Provisions) Act 1951.
- The Finance Commission is appointed by the President and consists of a chairman and four other members every five years.

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FINANCE COMMISSIONS

Finance Commission	Chairman	Constitution	Report
First Finance Commission	K. C. Neogi	1951	1953
Second Finance Commission	K. Santhanam	1956	1957
Third Finance Commission	A. K. Chanda	1960	1962
Fourth Finance Commission	Dr. Rajamannar	1964	1965
Fifth Finance Commission	Mahavir Tyagi	1968	1969
Sixth Finance Commission	Brahmanada Reddy	1972	1973
Seventh Finance Commission	Shelat	1977	1978
Eighth Finance Commission	Y. B. Chahvan	1982	1984
Ninth Finance Commission	N. K. P. Salve	1987	1989
Tenth Finance Commission	K. C. Pant	1992	1994
Eleventh Finance Commission	A. M. Khusor	1998	2000
Twelfth Finance Commission	C. Rangarajan	2002	2004
Thirteenth Finance Commission	Dr. Vijay L.Kelkar	2007	2009

NATIONAL INTEGRATION COUNCIL

- National Integration Council is an extra-constitutional Body.
- It was set up in 1986.
- It's basic objective was looking after the welfare measures for the minorities.
- It includes Union Ministers, Chief Ministers, representatives of National and regional political parties, labour, women public figures and media personalities.
- The issues addressed by the council are communal harmony, increased violence by secessionist forces.

THE PARLIAMENT

- The name of the Union Legislature of India is Parliament.
- Article 79 says that there shall be a Parliament for the Union which shall consist of the President and two Houses to be known respectively as the Council of States and the House of the People, (Rajya Sabha and Lok Sabha).
- The total number of Lok Sabha members is 545; two Anglo-Indian members are nominated for the Lok Sabha by the President.
- The total strength of Rajya Sabha is 250, twelve members are nominated by the President under Article 80.
- The term of Lok Sabha is five years.
- The term of Rajya Sabha is six years, one-third of the members retire after every two years.
- Statutory recognition has been accorded to the leaders of opposition in Lok Sabha and Rajya Sabha.
- The requisite strength of a group is 1/10 seats in the Houses for the leader of opposition to be chosen from it.
- Each House of Parliament shall have a separate secretarial staff (Article 98). This is under control of the speaker or the chairman, as the case may be.

- The speaker's conduct in the House will not be subject to the jurisdiction of any court.
- Whether a bill is a Money Bill, only the speaker's decision is final.
- The Secretary-General of the Lok Sabha is chosen and appointed by the speaker.
- He is answerable only to the speaker and advises the speaker, the House, and the members.
- He is permanent officer acting as a link.
- In speaker's absence, he authenticates the bills.
- The Secretary-General of the Rajya Sabha secretariat performs similar functions in relation to that house.
- Under certain circumstances, that Parliament can assume legislative powers for a subject falling within the sphere exclusively reserved for the states.
- Parliament participates in the election of the President and the Vice-President.

FACTS TO REMEMBER

- The President is an integral part of the legislature.
- The President is not a member of either House of Parliament.
- The Rjaya Sabha consists of two classes of members viz, nominated members and representatives of the states and Union.
- Union Territories of Delhi and Pondicherry are represented in the Rajya Sabha.
- There are no seats reserved for SCs & Sts in the Rajya Sabha.
- A resolution seeking the removal of the Vice-President can originate only in the Rajya Sabha.
- The 42nd Amendment Act 1976 extended the normal life of the Lok Sabha to six years.
- The 44th Amendment Act 1978 has set it at five years.
- A person should not be less than 25 years of age for the membership of Lok Sabha.
- A person should not be less than 30 years of age for the membership of Rajya Sabha.
- Matters of disqualification of a member are decided by the President in consultation with the Election Commission.
- The Speaker is the Presiding officer of the Lok Sabha.
- The Speaker and the Deputy speaker are elected by the members of the Lok Sabha amongst them selves.
- The Speaker does not vote in first instance.
- The Speaker exercise his casting vote only to remove a deadlock.
- The Speaker draws the same salary as that of the Deputy chairman of Rajya Sabha.
- The Speaker certifies a bill as a money bill.
- Permission of Speaker is compulsory on the question of bringing adjournment motion.
- Speaker is also the ex-officio chairman of certain committees of the Parliament.

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- The Vice-President is the ex-officio chairman of the Rajya Sabha.
- In his absence the Deputy Chairman Presides over the Rajya Sabha.
- The Deputy Chairman is elected by the members of the Rajya Sabha amongst themselves.
- A confidence and no–confidence motion can be initiated and passed only in Lok Sabha.
- Money and Financial Bills can be introduced only in the Lok Sabha.
- The Rajya Sabha cannot reject or amend a Money Bill.
- The joint sitting of the two houses is summoned by the President.
- The Budget presented to the Lok Sabha upon the recommendation of the President.
- Rajya Sabha is the Upper-house of the Parliament.
- Rajya Sabha was formed on 3 August, 1952.
- Presently the total membership of the Rajya Sabha is 245.
- One-third of its members retire every 2 years.
- The members of Rajya Sabha are elected by the elected members of the State Legislative Assemblies.
- The members of Rajya Sabha are elected for a period of six years.
- The Lok Sabha is the Lower-house of the Parliament.
- Lok Sabha members are directly elected by the people.
- The normal tenure of the Lok Sabha is 5 years.
- The Lok Sabha can be dissolved earlier by the President.
- If a member of the either House remains absent for 60 days without seeking the permission of the House, the House may declare his seat vacant.
- 61st Amendment Act, 1988, lowered the age limit for voting from 21 to 18 years of age.
- The members of Parliament enjoy freedom of speech, freedom from arrest and freedom from jury service.
- If a private member wishes to introduce a Bill, he must give one month's notice.
- The introduction of the Bill and its publication in the Gazette constitutes the first reading of the Bill.
- The Rajya Sabha has only recommendatory role to play in the passing of a Money Bill.
- After receiving a Money Bill, the Rajya Sabha within a period of 14 days must return the Bill to the Lok Sabha with or without recommendations.
- At the expiration of 14 days the Bill shall be deemed to have passed by both the Houses.
- The Parliament must meet atleast twice a year and six months should not intervene between two sessions.
- The power of the adjournment of the houses belongs to the respective presiding officers.
- The period between prorogation and re–assembly of Parliament is called 'recess'.
- The three sessions of the Parliament are– the Budget Session (Feb.-May), Monsoon Session (July-Aug.) and Winter Session (Nov.-Dec.).

- The Budget is a Government Bill and is classified as a Money Bill.
- The salaries and allowances of the Chairman and Deputy Chairman of Rajya Sabha and the speaker and Deputy Speaker of Lok Sabha are charged on the Consolidated Fund of India.
- The members of the Rajya Sabha are associated with all the committees except the Estimate Committee.
- The members of the Lok Sabha are associated with all the committees.
- As soon as the new Lok Sabha is constituted, the President appoints a Speaker Pro–tem.
- Speaker Pro-tem administer oath to the Lok Sabha members.
- Speaker Pro-tem presides over the election of a new Speaker.
- The office of the Speaker pro–tem sinks as soon as the Speaker is elected.
- The Quorum in Parliament is one-tenth of the total membership of the House.

CENTRE-STATE RELATIONS

- The Legislative authority is divided into three lists. The Union List, the State List and the Concurrent List.
- The Union List contains 96 subject, State List 61 subjects and Concurrent List 47 subjects.
- Both the Parliament and the state legislature can make lows on subjects given in the Concurrent List.
- Subjects covered under **Union List :**
  - Foreign Affair
  - Armed Forces
  - Posts and Telegraph
  - Inter-state Trade etc.
  - Defence
  - Communications
  - Foreign Trade
- Subjects covered under **State List :**
  - Public Order
  - Prisons
  - Agriculture
  - Administration of Justice
  - Local Government
  - Police etc.
- Subjects covered **Concurrent List :**
  - Criminal and Civil Procedure
  - Economic Planning
  - Labour Welfare
  - Newspapers
  - Population control and family planning etc.
  - Marriage and Divorce
  - Trade Unions
  - Electricity
  - Books and Printing Press

POWER TO THE PARLIAMENT TO LEGISLATE ON STATE LIST

- **Article-249 :** By a resolution passed by Rajya Sabha.
- **Article-252 :** If two or more states pass resolution.
- **Article-253 :** For implementing international agreements.
- **Article-356 :** Duffing President's rule in a state.

JUDICIARY

- The constitution of India has provided a unified and single Judiciary.
- At the apex of the Indian Judiciary stands the Supreme Court.

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- The Supreme Court is to act as the custodian and the final interpretetor of the Constitution.
- The Supreme Court is the highest court of appeal.
- The Judiciary in states consists of High Court and Subordinate Courts.

THE SUPREME COURT

- Article-124 and Article 147 deals with the Union Judiciary.
- There shall be a Supreme Court of India consisting of a Chief Justice and 25 other Judges (the original constitution provided for 7 Judges).
- The Judges of Supreme Court are appointed by the President after consultation with such judges of the Supreme Court or High Courts as be deems appropriate.
- While appointing a judge other than the Chief Justice, the President shall consult the Chief Justice of India.
- A judge of the Supreme Court shall hold office until he attains the age of 65 years.
- A person shall not be eligible to be appointed as judge of the Supreme Court unless :
  - he is a citizen of India, and
  - he has been judge of a High Court for five years continuously; or
  - he has been an advocate of a High Court for ten years in continuation; or
  - he is distinguished jurist in the opinion of the President.
- A judge of the Supreme Court may be removed from his office before the expiry of his term by the President on the ground of proved misbehavior or incapacity.
- The President shall make such order for removing a judge only after an address by each house of Parliament supported by a majority of the total membership of that House and not less than two-third majority of the members present and voting, has been presented to the President.
- The address for the removal of a judge shall be passed by each house separately in the same session of the Parliament.
- Every person appointed to be a judge of Supreme Court shall take an oath before the President in the form prescribed in the third schedule, before he enters upon his office.
- No person who has held office as a judge of the Supreme Court shall plead or act in any court in India. (Article 124).
- Every judge of the Supreme Court shall be entitled to get such salary as determined by Parliament by law and until such determination, he will be paid such salaries as provided in the second schedule.
- The salary and allowances of judges of Supreme Court shall not be altered to their disadvantage after their appointment. (Article 125).

- The original Jurisdiction of the Supreme Court is related to the federal character of the constitution.
- The writ Jurisdiction is related to infringement of the Fundamental Rights.
- The Appellate Jurisdiction of Supreme Court is three fold viz, constitutional, civil and criminal.
- The Supreme Court performs a consultative role if any question of law is referred to it by the President.
- The Supreme Court is empowered to review any judgement or order made by it.
- Sarosh Homi Kapadia is the present Chief Justice of the Supreme Court.

THE HIGH COURTS

- The Judiciary in the states consists of a High Court and the subordinate courts.
- Article 214, states that there shall be a High Court for each state.
- Article 215, states that every High Court shall be a court of record.
- Every High Court consists of a Chief Justice and such other Judges as appointed by the President from time to time.
- The constitution does not fix any maximum number of Judges for a High Court.
- High Courts can issue writs in case of infringement of both fundamental as well as legal rights.
- The High Courts control and supervise the working of the Courts subordinate to them and frame rules and regulations for the transaction of their business.

WRITS ISSUED BY COURTS

Habeas Corpus : It is issued against wrongful detention and the detained person is released after his innocence is proved. This can't be issued in the case of criminal offence.

Mandamus : It is issued to lower court, tribunal or a official to perform his duties through which Fundamental Rights of a person are enforced.

Prohibition : It forbids a lower court to perform an act which is outside its jurisdiction.

Quo Warranto : It restrains a person from acting in a public office to which he is not entitled.

Certiorary : It is issued when a court or tribunal acts beyond its jurisdiction. It differs from prohibition in that it is issued after the act is performed.

GOVERNOR

- Article 153 provides for an office of Governor in the states.
- The Governor is the constitutional head of state having the executive power of the state.

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- The Governor of a state is appointed by the President (Article 155) after seeking the opinion of the Prime Minister.
- His usual term of office is five years but he holds office during the pleasure of the President (Article 156).
- He can also be transferred from one State to another by the President.
- A person may be appointed as a Governor for any number of terms.
- The Constitution lays down the following two qualifications for the appointment of a person as a Governor (Article 157).
  (i) He should be a citizen of India.
  (ii) He should have completed the age of 35 years.
- The constitution lays down the following conditions for the Governor's office (Article 158).
  (i) He should not be a member of either House of the Parliament or of the House of the State Legislature.
  (ii) He should not hold any other office of profit.
  (iii) His emoluments, allowances and privileges shall be determined by the Parliament of India.
  (iv) When the same person is appointed as the Governor of two or more States, the emoluments and allowances payable to him shall be allocated among the States in such proportion as determined by the President of India.
  (v) His emoluments and allowances should not be diminished during his term of office.
- The Governor appoints judges of courts below the High Court.
- While appointing High Court judges, President consults the Governor.
- By Article 161, the Governor can grant pardons, reprieves, remissions of punishment to persons convicted under state laws.
- The Governor has no power to pardon a sentence of death or remit sentence by court martial.
- Article 162 defines the extent of executive powers of a state.
- Article 166 stipulates that all executive actions of the state are to be taken in the name of the Governor.
- All major appointments of the state are made by the Governor.
- The Governor can recommend President's rule in the state.
- During President's rule, he acts as President's representative and assumes wide powers.
- He can dismiss a ministry if he is convinced it has lost majority support.
- He can dissolve the Legislative Assembly.
- He can reserve certain bills for the consideration of the President.
- He can submit a report to the President in the wake of Constitutional machinery failure in the state.
- Article 163 says that the courts can not call in question the matters in which the Governor chooses to use his discretion.

- He can also nominate one member of the Anglo-Indian community to the Legislative Assembly.
- In states having legislative councils, he has the power to nominate One-sixth members from amongst distinguished persons in art, literature, science and social services (Article 171).
- Article 200 states that the Governor's assent is necessary for bills passed by the state legislature to become laws.
- Article 213 empowers the Governor to issue ordinance.

FINANCIAL POWERS OF THE GOVERNOR

- According to Article 203, no demand for grant can be made except on the recommendation of the Governor.
- The Governor administers the contingency fund of the state and can advance money out of it to meet unforeseen expenses.

DISCRETIONARY POWERS OF THE GOVERNOR

- Reservation of a bill for the consideration of the President.
- Recommendation for the imposition of the President rule in the State.
- While exercising his functions as the administrator of an adjoining Union Territory (in case of additional charge).
- Appointment of the Chief Minister when no party has clear cut majority in the State-Legislature.
- Seeking information from the Chief Minister with regard to the administrative and legislative matters of the State.
- Dismissal of the Council of Ministers when it can not prove the confidence of the State Legislative Assembly.
- Dissolution of the State Legislative Assembly if the Council of Ministers has lost its majority.
- Determining the amount payable by the State of Assam to the autonomous Tribal District Council as royalty accruing from licenses for mine exploration.
- The Governor has certain special responsibilities to discharge according to the directions issued by the President. In this regard, the Governor though has to consult the Council of Ministers, acts finally in his individual judgement and discretion.

SARKARIA COMMISSION REPORT ON THE OFFICE OF GOVERNOR

- The State must be consulted before the appointment of a person to the office of the Governor.
- The Governor should not belong to the same State.
- He should be an eminent figure in any walk of life.
- He should not have detached himself from the local politics of that State.
- He should not have been actively involved politics in recent past.
- He should not be a politician of the ruling party at the Centre, if the State to which he is being is ruled by some other party (parties).

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- Persons of the minority groups should continue to be given a chance.
- System of sending fortnightly report to the President by the Governor must continue.
- The power of the the Governor to refer any Bill to the Centre for the President's assent must continue.

ARTICLES RELATED WITH GOVERNOR

Article-153	:	Provision for the office of the Governor.
Article–154	:	Executive powers of Governor.
Article-155	:	Appointment of the Governor.
Article-156	:	Terms of the office.
Article-157	:	Qualifications for the appointment of the Governor.
Article-158	:	Conditions for the Government's office.
Article-159	:	Oath of the office to the Governor.
Article-161	:	Judicial powers of the Governor.
Article-164	:	Appointment of Ministers by the Governor.
Article-165	:	Appointment of the Advocate-General.
Article-166	:	All executive actions of state are formally taken in his name.
Article-168	:	Governor is an integral part of the state legislature.
Article-174	:	Right of summoning, proroguing and dissolving.
Article-200	:	Reservation of Bill for President's consideration.
Article-202	:	Laying of state budget before the legislature.
Article–213	:	Power to promulgate Ordinances.
Article-233	:	Appointment and posting of District Judges by the Governor.

THE STATE LEGISLATURE

- The Legislature of every State consists of Governor and one or two Houses.
- The Legislatures of Jammu and Kashmir, Bihar, Maharashtra, Karnataka and Uttar Pradesh are bicameral i.e., having both the Legislative Assembly and the Legislative Council. And all the other states having unicameral legislatues i.e., there exists only the State Legislative Assembly.
- As per the Constitution, the number of members of the Legislative Council is not to exceed one-third of the total strength of the State Assembly. Howerve, its strength should not be less than 40 either.
- The members of the Legislative Council are derived from various sections and streams of the society.
  (a) Not less than one-third to be elected by the Panchayats, Municipalities, District Boards, etc.
  (b) Not less than one-third to be elected by the Legislative Assembly.

  (c) Not less than one-twelfth to be elected by the graduates of three years standing residing in the State.
  (d) Not less than one-twelfth to be elected by the persons having teaching experience of three years in educational institutions.
  (e) The remainder one-sixth to be nominated by the Governor from among the distinguished persons of the society in the field of literature, science, arts, co-operative movement and social services.
- Just like the Upper House at the Centre, the Legislative Counicl in a State is never dissolved. The members are elected for a term of 6 years and One-third of its members retire every two years.
- The Parliament, under Article 169, is empowered to create or abolish the Legislative Council in a State.

SPECIAL STATUS OF JAMMU AND KASHMIR

- The special status of Jammu and Kashmir is guaranteed in Article 370 of the Constitution.
- This status has been provided on the basis of an agreement concluded at the time of Jammu and Kashmir's accession to India.
- Jammu and Kashmir has its own Constitution, apart from the Indian Constitution. Its Constitution was framed by a Constituent Assembly of its own and came into being on the 26th January, 1957.
- The Parliament can not make law with regard to Jammu and Kashmir on subjects in the State List.
- The residuary power lies with the Legislature of Jammu and Kashmir and not with the Parliament.
- It follows duel citizenship, only the citizens of Jammu and Kashmir can take part in the elections to the State Assembly and acquire, own and dispose of immovable property in Jammu and Kashmir.
- Only national emergency proclaimed on grounds of war or external aggression shall have automatic extension to Jammu and Kashmir. National emergency proclaimed on the basis of armed rebellion shall not be automatically extended to Jammu and Kashmir.
- Apart from the President's rule, Governor's rule can also be imposed for a maximum period of six months, in case of Constitution break-down in the State.
- The Parliament can not change the name, boundary or territory of Jammu and Kashmir, without the concurrence of the State Legislature.
- The State Government shall be consulted by the Centre before appointing a person as the Governor of Jammu and Kashmir.
- No preventive detention law made by the Parliament can have automatic extension to Jammu and Kashmir.
- The Union has no power to proclaim a financial emergency to Jammu and Kashmir.

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IMPORTANT AMENDMENTS TO THE CONSTITUTION

1. The Constitution (First Amendment) Act, 1950–This amendment provided for several new grounds of restrictions to the right to freedom of speech and expression and the right to practise any profession or to carry on any trade or business as contained in Article 19 of the Constitution. These restrictions related to public order, friendly relations with foreign States or incitement to an offence in relation to the right to freedom of speech, and to the prescribing of professional or technical qualifications or the carrying on by the State, etc., of any trade, business, industry or service in relation to the right to carry on any trade or business. The amendment also inserted two new Articles, 31A and 31B and the Ninth Schedule to give protection from challenge to land reform laws.

2. The Constitution (Second Amendment) Act, 1952-By this amendment, the scale or representation for election to the Lok Sabha was readjusted.

3. The Constitution (Third Amendment) Act, 1954–This amendment substituted entry 33 of List IIi (Concurrent List) of the Seventh Schedule to make it correspond to Article 369.

4. The Constitution (Fourth Amendment) Act, 1955–Article 31 (2) of the Constitution was amended to re-state more precisely the State's power of compulsory acquisition and requisitioning of private property and distinguish it from cases where the operation of regulatory or prohibitory laws of the State results in "deprivation of property". Article 31A of the Constitution was also amended to extend its scope to cover categories of essential welfare legislation like abolition of zamindaris, proper planning of urban and rural areas and for effecting a full control over the mineral and oil resources of the country, etc. Six Acts were also included in the Ninth Schedule. Article 305 was also amended to save certain laws providing of State Monopolies.

5. The Constitution (Fifth Amendment) Act, 1955–This amendment made a change in Article 3 so as to empower President to specify a time for state legislatures to convey their views on the proposed Central laws affecting areas, boundaries, etc., of the their states.

6. The Constitution (Sixth Amendment) Act, 1956–This amendment made some changes in Articles 269 and 286 relating to taxes on sale and purchase of goods in the course of inter-state trade and commerce. A new entry 92 A was added to the Union List of the Seventh Schedule to the Constitution.

7. 7th Constitutional Amendment Act, 1956–Through this amendment the implementation of State Reorganisation Act, was made possible. Therefore, the then existing categorisation of State into Part A, Part B and Part C was henceforth ceased. Part C states were redesignated as Union Territories. The seats in the Rajya Sabha and in the Union and State Legislatures were reallocated. It also effected changes with regard to the appointment of additional and acting judges, High Courts and their jurisdictions etc.

8. The Constitution (Eight Amendment) Act, 1960–Article 344 amended to extend the period of reservation of SC/STs in Parliament for a period of ten years.

9. The Constitution (Ninth Amendment) Act, 1960–To give effect to the transfer of Certain territories to Pakistan.

10. The Constitution (Tenth Amendment) Act, 1961–This Act amended Article 240 and the First Schedule in order to include areas of Dadra and Nagar Haveli as a Union Territory and to provide for its administration under the regulation making powers of President.

11. The Constitution (Eleventh Amendment) Act, 1961–The purpose of this amendment was to amend Articles 66 and 71 of the Constitution to provide that the election of President or Vice President could not be challenged on the ground of any vacancy in the appropriate electoral college.

12. The Constitution (Twelth Amendment) Act, 1962–This amendment sought to include Goa, Daman and Diu as a Union Territory and to amend Article 240 for the purpose.

13. The Constitution (Thirteenth Amendment) Act, 1962–By this amendment, a new Article 371A was added to make special provisions with respect to state of Nagaland in pursuance of an agreement between Government of India and Naga People's Convention.

14. The Constitution (Fourteenth Amendment) Act, 1962–By this Act, Pondicherry was included in the First Schedule as a Union Territory, and this Act has also enabled the creation of Legislature by Parliamentary law for Himachal Pradesh, Manipur, Tripura, Goa, Daman and Diu and Pondicherry.

15. The Constitutional (Fifteenth Amendment) Act, 1963–It raised the age of retirement of a High Court Judge from 60 to 62, extended the jurisdiction of a High Court to issue writs under Art. 226 to a Government or authority situated outside its territorial jurisdiction where the cause of action arises within such jurisdiction, modifying the procedure imposed by Art. 311 upon the pleasure of the President.

16. 16th Constitution (Sixteenth Amendment) Act, 1963–This effect changes in Art. 19 to enable the Parliament to make laws providing reasonable restrictions on the freedom of expression in the larger interests of sovereignty and integrity of India. It also brought amendment in the form of oath contained in the Third Schedule and emphasised on upholding the sovereignty and integrity of India.

17. The Constitution (Seventeenth Amendment) Act, 1964–Article 31A was further amended to prohibit the acquisition of land under personal cultivation unless the market value of the land is paid as compensation and the definition of "estate" as contained in that Article had also been enlarged with retrospective effect. The Ninth Schedule had also been amended to include 44 more Acticles.

18. The Constitution (Eighteenth Amendment) Act, 1966–Article 3 was amended by this Act to specify that the expression "State" will include a union territory also and to make it clear that the power

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to form a new state under this Article includes a power to form a new state or union territory by uniting a part of a state or a union territory to another state or union territory.

19. The Constitution (Nineteenth Amendment) Act, 1966–Article 324 was amended to effect a consequential change as a result of the decision to abolish Election Tribunals and to hear election petitions by High Courts.

20. The Constitution (Twentieth Amendment) Act, 1966–This amendment was necessitated by the decision of the Supreme Court in Chandramohan vs. State of Uttar Pradesh in which certain appointments of District Judges in State of Uttar Pradesh were declared void by Supreme Court. A new Article 233A was added and the appointments made by Governor were validated.

21. The Constitution (Twenty-first Amendment) Act, 1967–By this amendment, Sindhi Language was included in the Eighth Schedule.

22. The Constitution (Twenty-second Amendment) Act, 1969–This act was enacted to facilitate the formation of a new autonomous state of Meghalaya within state of Assam.

23. The Constitution (Twenty-third Amendment) Act, 1969–Article 334 was amended so as to extend the safeguards in respect of reservation of seats in Parliament and State Legislatures for Scheduled Castes and Scheduled Tribes as well as for Anglo-Indians for a further period of ten years.

24. The Constitution (Twenty-fourth Amendment) Act, 1971–This amendment was passed in the context of a situation that emerged with the verdict in Golaknath's case by Supreme Court. Accordingly, this act amended Article 13 and Article 368 to remove all doubts regarding the power of Parliament to amend the Constitution including the Fundamental Rights.

25. The Constitution (Twenty-fifth Amendment) Act, 1971–This amendment further amended Article 31 in the wake of the Bank Nationalisation case. The word 'amount' was substituted in place of 'compensation' in the light of the judicial interpretation of the word 'compensation' meaning 'adequate compensation'.

26. The Constitution (Twenty-sixth Amendment) Act, 1971–By this amendment, the privy and privileges of the former rulers of Indian states were abolished. This amendment was passed as a result of Supreme Court decision in Madhav Rao's case.

27. The Constitution (Twenty-seventh Amendment) Act, 1971–This amendment was passed to provide for certain matters necessitated by the reorganisation of north-eastern states. A new Article 239B was inserted which enabled the promulgation of Ordinances by Administrators of certain union territories.

28. The Constitution (Twenty-eighth Amendment) Act, 1972–The amendment was enacted to abolish the special privileges of the members of Indian Civil Services in matters of leave, pension and rights as regard to disciplinary matters.

29. The Constitution (Twenty-ninth Amendment) Act, 1972–The Ninth Schedule to the Constitution was amended to include there in two Kerala Acts on land reforms.

30. The (Thirtieth Constitution Amendment) Act, 1972–It curtailed the appeals to the Supreme Court and provided that only such appeals can be brought which involve a substantial question of law. This valuational aspect of Rs. 20,000 for appeals in civil cases to the Supreme Court were abolished.

31. The (Thirty-First Constitution Amendment) Act, 1973–By this amendment, the seats of the Lok Sabha was increased from 525 to 545, but it reduced the representation of Union Territories from 25 to 20.

32. The Constitution (Thirty-second Amendment) Act, 1973–This Act provided the necessary constitutional authority for giving effect to the provision of equal opportunities to different areas of the State of Andhra Pradesh and for the Constitution of an Administrative Tribunal with jurisdiction to deal with grievances relating to public services. It also empowered Parliament to legislate for the establishment of a Central University in the State.

33. The Constitution (Thirty-third Amendment) Act, 1974–By this amendment, Articles 101 and 190 were amended in order to streamline the procedure for resignation of Members of Parliament and State Legislatures.

34. The Constitution (Thirty-fourth Amendment) Act, 1974–By this Act, twenty more land tenure and land reforms laws enacted by various State Legislatures were included in the Ninth Schedule.

35. The Constitution (Thirty-fifth Amendment) Act, 1974–By this Act a new Article 2A was added there by conferring on Sikkim the status of an associate State of Indian Union. Consequent amendments were made to Articles 80 and 81. A new schedule, i.e., Tenth Schedule, was added laying down terms and conditions of association of Sikkim with the Union.

36. The Constitution (Thirty-sixth Amendment) Act, 1975–This was enacted to make Sikkim a full-fledged State of Indian Union and to include it in the First Schedule to the Constitution and to allot to Sikkim one seat each in the Council of States and in the House of the People. Article 2A and the Tenth Schedule inserted by the Constitution (Thirty-fifth Amendment) Act were omitted and Articles 80 and 81 were suitably amended.

37. The Constitution (Thirty-seventh Amendment) Act, 1975–By this Act, Union Territory of Arunachal Pradesh was provided with a Legislative Assembly. Article 240 of the Constitution was also amended to provide that as in the case of other union territories with Legislatures, the power of President to make regulations for the Union Territory of Arunachal Pradesh may be exercised only when the assembly is either dissolved or its functions remain suspended.

38. The Constitution (Thirty-eight Amendment) Act, 1975)–This Act amended Articles 123, 213 and 352 of the Constitution to

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provide that the satisfaction of President or Governor contained in these Articles would be called in question in any court of law.

39. The Constitution (Thirty-ninth Amendment) Act, 1975–By this Act, disputes relating to the election of President, Vice-President, Prime Minister and Speaker are to be determined by such authority as may be determined by Parliamentary Law. Certain Central enactments were also included in the Ninth Schedule by this Act.

40. The Constitution (Fortieth Amendment) Act, 1976–This act provided for vesting in the Union of all mines, minerals and other things of value lying in the ocean within the territorial waters or the continental shelf or the exclusive economic zone of India. It further provided that all other resources of the exclusive economic zone of India shall also vest in the Union. This act also provided that the limits of the territorial waters, the continental shelf, the exclusive economic zone and the maritime zones of India shall be as specified from time to time by or under any law made by Parliament. Also some more Acts were added to the Ninth Schedule.

41. The Constitution (Forty-first Amendment) Act, 1976–By this Act, Article 316 was amended to raise the retirement age of Members of State Public Service Commissions and Joint Public Service Commissions from 60 to 62 years.

42. The Constitution (Forty-second Amendment) Act, 1976–This act made a number of important amendments in the Constitution. These amendments were mainly for purpose of giving effect to the recommendations of *Swaran Singh Committee*.

The main provisions of this amendment were :

- 'SOCIALIST', 'SECULAR', and 'INTEGRITY' added to the Preamble.
- Fundamental Duties were added in Part IVA and made a new Article 51A.
- 'Directive Principles were given precedence over Fundamental Rights and any law made to this effect by the Parliament was kept beyond the scope of judicial review by the Courts. Thus, it made the power of Parliament supremecy insofar as amendment of the Constitution was concerned.
- It authorised the Supreme Court to transfer certain cases from one High Court to another and redefined the writ jurisdiction of the High Courts.
- It provided Administrative Tribunals for speedy justice.
- Empowered the Centre to deploy armed forces in any State to deal with the grave law and order situation.
- Authorised the President to make Proclamation of Emergency for any part of the country as well.
- By this amendment it was made obligatory for the President to act on the advice of the Council of Ministers.
- Tenure of the Lok Sabha and the State Assemblies was increased by one year.

43. The Constitution (Forty-third Amendment) Act, 1977–The 43rd Amendment omitted many articles inserted by 42nd Amendment. It restored the writ jurisdiction of the Supreme Court and the High Courts, which had been deprived by the 42nd Amendment.

44. The Constitution (Forty-Foruth Amendment) Act, 1978–This amendment was brought by the Janata Party Government which repealed some of the changes effected by 42nd Amendment, omitted a few and provided alterations, the most important of them are as follows :

- Right to property was taken away from the list of Fundamental Rights and placed in a new Article 300A as mere legal right.
- Constitutionality of the Proclamation of Emergency by the President can be question in a court on the ground of malafide. (42nd Amendment had made it immune from judicial review).
- It brought the revocation of a Proclamation under Parliamentary control.
- Under National Emergency the words 'internal disturbance' have been substituted by the words 'armed rebellion'.
- It limited the duration of Proclamation made under Art. 356 to a period of one year unless a Proclamation under Art. 352 is in operation and Election Commission certifies the impossibility to hold election to state assembly concerned in which case it may be extended upto three years, by successive resolutions for continuance being passed by both Houses of Parliament.
- It authorised the President to refer back the advice to the Council of Ministers for reconsideration, but made it binding for the President to act on the reconsidered advice.
- The power of the Courts to decide disputes regarding election of Prime Minister and Speaker was restored.
- Constitutional protection on publication of proceedings of Parliament and State legislatures was provided.

45. The Constitution (Forty-fifth Amendment) Act, 1980–This was passed to extend reservation of seats in Parliament and State Assemblies for SC/STs for a further period of ten years.

46. The Constitution (Forty-Sixth Amendment) Act, 1982–Act 269 was amended so that the tax levied on the consignment of goods in the course of inter-state or commerce shall be assigned to the State. A new entry 928 was also inserted in the Union List to enable the levy of tax on the consignment of goods where such **consignment** taken palce in the course of inter-state trade or commerce.

47. The Constitution (Forty-seventh Amendment) Act, 1984–This amendment is intended to provide for the inclusion of certain land Reforms Acts in the Ninth Schedule to the Constitution with a view to obviating the scope of litigation hampering the implementation process of those Acts.

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48. The Constitution (Forty-eighth Amendment) Act, 1984–The Proclamation issued by President under Article 356 of the Constitution with respect to the State of Punjab cannot be continued in force for more than one year unless the special conditions mentioned in clause (5) of the said Article are satisfied. As it is felt that the continued force of the said Proclamation is necessary, therefore, the present amendment had been effected so as to make the conditions mentioned in clause (5) of Article 356 inapplicable in the instant case.

49. The Constitution (Forty-ninth Amendment) Act, 1984–Tripura Government recommended that the provisions of the Sixth Schedule to the Constitution may be made applicable to tribal areas of that State. The amendment involved in this Act is intended to give a constitutional security to the autonmous District Council functioning in the State.

50. The Constitution (Fiftieth Amendment) Act, 1984–By Article 33 of the constitution, Parliament is empowered to enact laws determining to what extent any of the rights conferred by Part III of the constitution shall, in their application to the members of the armed forces or the forces charged with the maintenance of public order, be restricted or abrogated so as to ensure proper discharge of their duties and maintenance of discipline among them.

It was proposed to amend Article 33 to as to bring within its ambit :

(i) the members of the Force charged with the protection of property belonging to or in the charge or possession of the state; or

(ii) persons employed in any bureau or other organisation established by the state for purposes of intelligence or counter-intelligence; or

(iii) persons employed in or in connection with the telecommunication systems set up for the purposes of any Force, bureau or organisation.

Experience has revealed that the need for ensuring proper discharge of their duties and maintenance of discipline among them is of paramount importance in the national interest.

51. The Constitution (Fifty-first Amendment) Act, 1984–Article 330 has been amended by this Act for providing reservation of seats for Scheduled Tribes in Meghalaya, Nagaland, Arunachal Pradesh and Mizoram in Parliament and Article 332 has been amended to provide similar reservation in the Legislative Assemblies of Nagaland and Meghalaya to meet the aspirations of local tribal population.

52. The Constitution (Fifty-second Amendment) Act, 1985–It amends the Constitution to provide that a Member of Parliament or a State Legislature who defects or is expelled from the party which set him up as a candidate in the election or if an independent member of the House joins a political party after expiry of six months from the date on which he takes seat in the House shall be disqualified to remain a member of the House. The Act also makes suitable provisions with respect to splits in and merger of political parties.

53. The Constitution (Fifty-third Amendment) Act, 1986–It elevated the Union Territory of Mizoram to the status of a State.

54. The Constitution (Fifty-fourth Amendment) Act, 1986–This Act increases the salaries of Supreme Court and High Court judges as follows :

Chief Justice of India	Rs. 10,000 per month
Judges of Supreme Court	Rs. 9,000 per month
Chief Justice of High Court	Rs. 9,000 per month
Judges of High Courts	Rs. 8,000 per month

This Act amended Part 'D' of the Second Schedule to the Constitution to give effect to the above increases in the salaries of judges an to make an enabling provision in Articles 125 and 221 to provide for changes in the salaries of judges in future by Parliament by law.

55. The Constitution (Fifty-fiveAmendment) Act, 1986–The formation of Arunachal Pradesh took place with special powers given to the Governor. It also provided for a 30-members State Assembly.

56. The Constitution (Fifty-sixth Amendment) Act, 1987–Goa was made a full fledged State with a provision for a State Assembly but Daman and Diu stayed as Union Territory.

57. The Constitution (Fifty-seventh Amendment) Act, 1987–It provided reservation of seats for Scheduled Tribes of Nagaland, Meghalaya, Mizoram and Arunachal Pradesh, in the Lok Sabha and in the State Assemblies of Nagaland and Meghalaya.

58. The Constitution (Fifty-eight Amendment) Act, 1987–By this amendment an authoritative text of the Constitution in Hindi was provided to the people of India by the President.

59. The Constitution (Fifty-ninth Amendment) Act, 1988–It amended Art. 365(5) of the constitution to provide that the declaration of emergency may remain in operation up to 3 years and also authorised the Government to proclaim emergency in Punjab on grounds of 'internal disturbance'. The amendment made in Art. 352 thus provided that the emergency with respect to Punjab shall operate only in that State.

60. The Constitution (Sixtieth Amendment) Act, 1988–To increase the ceiling of Taxes on professions, trades, callings and employment from Rs. 250 per annum to Rs. 2500 per annum.

61. The Constitution (Sixty-first Amendment) Act, 1989–It provided for the reduction of voting age from 21 to 18 years by bringing an amendment to Art. 326.

62. The Constitution (Sixty-second) Amendment Act, 1989–It had increased the period of reservation of seats provided to the Scheduled Castes and Scheduled Tribes for another 10 years i.e. upto the year of 2000 A.D. The reservation for Anglo-Indians through nomination in case of their inadequate representation, was also extended for the same period.

63. The Constitution (Sixty-third Amendment) Act, 1989–The Constitution (Fifty-ninth Amendment) Act, 1988 was enacted in March

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1988 making certain changes in regard to making a Proclamation of Emergency in Punjab and to the duration of President's rule in State. On reconsideration, the Government decided that the special powers in regard to the Proclamation of Emergency in Punjab as envisaged in the said amendment is no longer required. Accordingly the provision to clause (5) of Article 356 and Article 359A of the Constitution have been omitted.

64. The Constitution (Sixty-fourth Amendment) Act, 1990–This Act amends clauses (4) and (5) of Article 356 of the Constitution with a view to facilitate the extension of the proclamation issued under clause (1) of Article 356 of the Constitution on 11 May 1987 upto a total period of three years and six months in relation to the State of Punjab.

65. The Constitution (Sixty-fifth) Amendment Act, 1990–A National Commission for Scheduled Castes and Scheduled Tribes with wide powers was provided to take care for the cause of SCs/STs. The composition of the Commission included a chairperson, a vice-chairperson and five other members to be appointed by the President.

66. The Constitution (Sixty-sixth) Amendment act, 1990–This amendment provided for the inclusion of new land reform Acts passed by the State into the Ninth Schedule.

67. The Constitution (Sixty-seventh Amendment) Act, 1990–The three year period in the case of proclamation issued on 11 May, 1987 with respect to the State of Punjab was extended to three years and six months by the Constitution (Sixty-fourth Amendment) Act, 1990. This Act further amends clause (4) of Article 356 so as to further extend the period upto a total period of four years.

68. The Constitution (Sixty-eighth Amendment) Act, 1991–The three year period in the case of proclamation issued on 17 May 1987 with respect to the State of Punjab was earlier extended to four years by the Constitution (sixty-seventh Amendment) Act, 1990. This Act further amends clause (4) of Article 356 so as to further extend the period upto a total period of five years.

69. The Constitution (Sixty-ninth Amendment) Act, 1991–Articles 239-AA and 239 AB were inserted in the Constitution to provide a National Capital Territory designation to Union Territory of Delhi with a Legislative Assembly and Council of Ministers.

70. The Constitution (Seventieth Amendment) Act, 1992–It brought alteration in Article 54 to provide for the inclusion of member of Legislative Assemblies of Union Territories of Delhi and Pondicherry in the electoral college for the election of the President.

71. The Constitution (Seventy-first Amendment) Act, 1992–In included Konkani, Manipuri and Nepali languages in the VIII Schedule, making the total languages included in it to 18.

72. The Constitution (Seventy-second Amendment) Act, 1992–To implement the Memorandum signed with the Tripura National Volunteers in 1988.

73. The Constitution (Seventy-third Amendment) Act, 1993–With this amendment, the institution of Panchayati Raj received constitutional guarantee, status and legitimacy in the direction of power to the people at grass-root level. A separate Scheduled XI was added to deal with it. It also inserted Part IX, containing Arts. 243, 243 A to 243 O.

74. The Constitution (Seventy-fourth Amendment) Act, 1993–This amendment provided constitutional sanctity to Nagarpalika or Municipalities by inserting Part IX-A, containing Arts. 243P to 243ZG and a separate Schedule XII which deals with the items concerning Municipalities.

75. The Constitution (Seventy-Fifth Amendment) Act, 1994–Setting up of state-level Rent Tribunals and to exclude the jurisdiction of all courts, except that of Supreme Court.

76. The Constitution (Seventy-sixth Amendment) Act, 1994–It provided for the inclusion of Tamil Nadu Reservation List (i.e. to provide for 69 per cent reservation for educational institutions and government jobs in the State) in the Ninth Schedule to make it immune to judicial review.

77. The Constitution (Seventy-seventh) Amendment Act, 1995–By this amendment a new clause 4A was added to Art 16 which authorised the State to make provisions for Scheduled Castes and Scheduled Tribes with regard to promotions in Government jobs.

78. The Constitution (Seventy-eighth Amendment) Act, 1995–This amendment has amended the Ninth schedule of the Constitution and inserted 27 Land Reform Act of various States in the Ninth Schedule.

79. The Constitution (Seventy-ninth Amendment) Act, 1999–By this Act the Government has extended the reservations of seats for the Scheduled Castes and the Scheduled Tribes as well as for the Anglo-Indians in the House of the People and in the Legislative Assemblies of the States for another ten years.

80. The Constitution (Eightieh Amendment) Act, 1999–Based on the 10th finance Commission recommendation. Under the new scheme of devolution of revenue between Union and States, 26 per cent out of gross proceeds of Union taxes and duties is to be assigned to the states in lieu of their existing shares in the income-tax, excise duties, special excise duties and grants in lieu of tax on railway passenger fares.

81. The Constitution (Eighty-first Amendment) Act, 2000–The unfilled vacancies of a year which reserved for the SCs and the STs for being filled up in that year in accordance with any provision for reservations made under Article 16 of the Constitution, shall be considered as a separate class of vacancies to be filled up in any succeeding year or years.

82. The Constitution (Eighty-second Amendment) Act, 2000–The members of the Scheduled Castes and the Scheduled Tribes for relaxation in qualifying marks in any examination or lowering the stan-

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dards of evaluation for reservation in matters of promotion to any class or classes of services or posts in connection with affairs of the Union or of a State.

83. The Constitution (Eighty-third Amendment) Act, 2000–The Act amended Article 243M of the Constitution to provide that no reservation in Panchayats need be made in favour of the Scheduled Castes in Arunachal Pradesh wholly inhabited by tribal population.

84. The Constitution (Eighty-fourth Amendment) Act, 2001–The Act amended Provisions to article 82 and 170 (3) of the Constitution to readjust and rationalise the territorial constituencies in the states, without altering the number of seats allotted to each state in House of people and Legislative Assemblies of the states, including the Scheduled Castes and Scheduled Tribes Constituencies.

85. The Constitution (Eighty-fifth) Amendment Act 2001–To provide consequential seniority in the case of promotion by virtue of rule of reservation for the Government servants belonging to the Scheduled Castes and the scheduled Tribes.

86. The Constitution (Eighty-sixth Amendment) Act, 2002–Compulsory and free education is the fundamental right for all the children of 6 to 14 years age. The Act deals with insertion of a new *Article 21A* after Article 21.

87. The Constitution (Eighty-seventh Amendment) Act, 2003–The 2001 Census are the basis for delimitation of constituencies of the Lok Sabha and State Legislative.

88. The Constitution (Eighty-eigth) Amendment Act, 2003–Service tax levied by union and collected and appropriated by the union and the states.

89. The Constitution (Eighty-ninth Amendment) Act, 2003–It provides for constitution of a national commission for the Scheduled Tribes. (Earlier, there was a combined national commission for both SC/STs).

90. The Constitution (Ninetieth Amendment) Act, 2003–It provides that the representation of the Scheduled Tribes and Non-scheduled Tribe in the constituencies included in the Bodoland Territorial Areas District (BTAD) as existing prior to the constitution of BTAD shall be maintained for the purpose of elections to Legislative Assembly of the state of Assam.

91. The Constitution (Ninety-first Amendment) Act, 2003–To amend the Anti-defection Law as contained in the Tenth Schedule to the constitution and to provide that the size of the Council of Ministers should not be more than 10 per cent of the strength of House or Houses concerned.

92. The Constitution (Ninety-second Amendment) Act, 2003–Inclusion of Bodo, Dogri, Maithili and Santhali in the Eighth Schedule to the Constitution later the inclusion of these languages in the righth schedule, the total noumber of languages in our Constitution are twenty two.

93. The Constitution (Ninety-third Amendment) Act, 2006–To enable provision of reservation for other backward classes (O.B.C.) in government as well as private educational institutions.

94. The Constitution (Ninety-fourth Amendment) Act, 2006 : For the setting up of a separate three member National commission for scheduled Tribes. The National commission for scheduled Tribes is being created to protect the rights of the tribal community as enshrined in the constitution.

95. The Constitution (Ninety-Fifth Amendment) Act : To empower both the centre and the states to levy and appropriate tax on services. The 95th constitution amendment bill aimed at augmenting their revenues to compensate any loss with the implementation of value added tax.

96. The Constitution (Ninety-Sixth Amendment) Act : The Lok Sabha on May 6, 2003 unanimously approved the 96th constitutional amendment bill that seeks to make the 2001 census the basis for delimitation of constituencies of the lower house of parliament and state assemblies.

97. The Constitution (Ninety-Seventh Amendment) Act : The Lok sabha on December 16, 2003 passed the 97th constitutional Amendment bill that automatically disqualifies a legislator if he or she defects from the party from which he or she has been elected and also limits the number of ministries to 15 percent of tile total strength of the Lok sabha and state assemblies.

98. The Constitution (Ninety-Eighth Amendment) Act : The constitution 98th amendment bill seeks to constitute a National Judicial commission (NJC) by including chapter IV A in part V of the constitution which will be in charge of appointing judges to the higher judiciary and for transferring High court judges.

99. The Constitution (Ninety-Ninth Amendment) Act : The 99th constitutional Amendment bill seeks the creation of Bodo Territorial council in order to protect the rights of non tribal and the exiting representation of scheduled tribes and non-scheduled Tribes in the Assam Assembly.

100. The Constitution (One-Hundredth Amendment) Act : The constitution (one Hundredth Amendment) bill, 2003 included Bodo, Santhali, Maithili and Dogri in the eighth schedule of the constitution taking the number of official languages to 22.

103. Amendment Bill : The Constitution (One Hundred and Third Amendment) Bill, 2004 along with National Commission for Minorities (Repeal) Bill, 2004 was introduced in Lok Sabha on December 23, 2004. Bills were referred to the Department-related Parliamentary Standing Committee on Social Justice and Empowerment. Chairperson of this committee was Smt Sumitra Mahajan and the committee submitted its report on February 21, 2006.

104. Amendment Act : It seeks to reserve seats in non-aided private educational institutions for the students belonging to SC, ST and OBC categories apart from government institutions. However, private institutions of minority classes are kept aside.

105. Amendment Act : It set aside the provision for a separate Ministry of Tribal Affairs in Bihar.

106. Amendment Bill : Constitution (One Hundred and Sixth Amendment) Bill, 2006 was introduced in the Lok Sabha on May 22, 2006. It was referred to the Department Related Standing Committee on Agriculture which submitted its report on August 20, 2007. Chairperson of this committee was Prof. Ram Gopal Yadav. In August 2008

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Union Cabinet gave approval for moving certain official amendments in the Constitution (One Hundred Sixth Amendment) Bill, 2006. This decision included benefits like empowerment of cooperatives by inserting article 43B in Part-IV of the Constitution providing for voluntary formation, antonoumous functioning, democratic control and professional management.

107. Amendment Bill : The Constitution (One Hundred Seventh Amendment) Bill, 2007 had been introduced in Lok Sabha on November 30, 2007. The Sixth Schedule to the Constitution (Amendment) Bill, 2007 was also introduced with the same bill. This bill got lapsed.

108. Amendment Bill : Constitution (108th Amendment) Bill or Women's Reservation Bill has been the most highlighted amendment bills of recent time. This bill was introduced in Rajya Sabha on May 6, 2008 and passed in Rajya Sabha on March 9, 2010. This bill is pending.

109. Amendment Bill : Constitution (109th Amendment Act) 2009 was passed by Rajya Sabha on the 3rd August, 2009 & Lok Sabha on the August 4, 2009 and ratified by the legislatures of not less than one-half of the states, and assented to on 18 January, 2010.

110. Amendment Bill : The Constitution (One Hundred Tenth Amendment) Bill, 2009 was introduced in the Lok Sabha on November 26, 2009 by the Minister of Panchayati Raj, Shri C.P. Joshi.Article 243D of the Constitution provides that a minimum of one-third of the total number of seats filled by direct elections in the Panchayats shall be reserved for women. The seats may be allotted by rotation to different constituencies in a Panchayat. The bill is pending. The Bill was referred to the Department related Standing Committee on Rural Development (Chairperson: Smt Sumitra Mahajan), which has to submit its report.

111. Amendment Bill : The Constitution (One Hundred Eleventh Amendment) Bill, 2009 was introduced in the Lok Sabha on November 30, 2009 by Sh. Sharad Pawar , Minister of Agriculture, Consumer Affairs and Public Distribution System.

The Bill adds a new Directive Principles of State Policy stating that the "State shall endeavour to promote voluntary formation, autonomous functioning, democratic control and professional management of co-operative societies."It further inserts a new part IX B in the Constitution (adding Articles 243ZH through 243ZT), which outlines certain guidelines for running co-operative societies.

112. Amendment Bill : The Constitution (112 th Amendment) Bill was introduced in the Lok Sabha on November 24, 2009 and this bill seeks to seeks to amend many clauses of Article 243T of the Constitution, providing for reservation of seats for Scheduled Castes and Scheduled Tribes and also for the women in Urban local Bodies. This Bill has been approved and now has been referred to the Departmentally-related Parliamentary Standing committee on Urban Development for examination and report in March 2010. Parliamentary Standing committee on Urban Development now invites suggestions the same bill.

113. Amendment Bill : The latest amendment bill is Constitution (One Hundred Thirteenth Amendment) Bill, 2010 which was introduced on March 15, 2010. The Constitution (One Hundred and Thirteenth Amendment) Bill, 2010 seeks to change of name of the language mentioned in the Eighth Schedule of the Constitution of India, from 'Oriya' to 'Odia'. This bill is pending in the Lok Sabha.

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133. Appellate jurisdiction of Supreme Court in appeals from High Courts in regard to civil matters.
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184. Power of the Deputy Chairman or other person to perform the duties of the office, or act as, Chairman
185. The Chairman or the Deputy Chairman not to preside while a resolution for his removal from office is under consideration.
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191. Disqualifications of membership.
192. Decision on questions as to disqualifications of members.
193. Penalty for sitting and voting before making oath or affirmation under Article 188 or when not qualified or when disqualified.

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195. Salaries and allowances of members.

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199. Definition of "Money Bills".
200. Assent to Bills.
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207. Special provisions as to financial Bills.

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220. Restriction on practice after being a permanent judge.
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223. Appointment of acting Chief Justice.
224. Appointment of additional and acting judges.
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States and Union Territories (Capital, Area, Language)

States/Union Territories	Capital	Area in (Sq. Km.)	Language
Andhra Pradesh	Hyderabad	2,75,045	Telugu
Arunachal Pradesh	Itanagar	83,743	Nyishi, Dafla, Miji, Wancho etc.
Assam	Dispur	78,438	Assamese
Bihar	Patna	94,163	Hindi, Maithili
Chhattisgarh	Raipur	1,35,133	Hindi
Goa	Panji	3,702	Marathi and Konkani
Gujarat	Gandhinagar	1,96,024	Gujarati
Haryana	Chandigarh	44,212	Hindi
Himachal Pradesh	Shimla	55,673	Hindi and Pahari
Jammu & Kashmir	Srinagar (Summer) Jammu (Winter)	2,22,236	Kashmiri, Urdu, Dogri
Jharkhand	Ranchi	79,714	Hindi, Santhali
Karnataka	Bangalore	1,91,791	Kannada
Kerala	Thiruvananthapuram	38,863	Malayalam
Madhya Pradesh	Bhopal	3,08,313	Hindi
Maharashtra	Mumbai	3,07,713	Marathi
Manipur	Imphal	22,327	Manipuri
Meghalaya	Shillong	22,429	Khasi, Garo and English
Mizoram	Aizawl	21,081	Mizo and English
Nagaland	Kohima	16,579	Sema, English
Orissa	Bhubaneswar	1,55,707	Oriya
Punjab	Chandigarh	50,362	Punjabi
Rajasthan	Jaipur	3,42,239	Hindi and Rajasthani
Sikkim	Gangtok	7,095	Bhutia, Nepali, Lepcha and Limbu
Tamil Nadu	Chennai	1,30,058	Tamil
Tripura	Agartala	10,492	Bengali, Kakboark, Manipuri
Uttar Pradesh	Lucknow	2,38,566	Hindi and Urdu
Uttarakhand	Dehradun	55,845	Hindi
West Bengal	Kolkata	88,752	Bengali

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States/Union Territories	Capital	Area in (Sq. Km.)	Language
Andaman & Nicobar Island	Port Blair	8,249	Bengali, Hindi, Nicobarese, Tamil, Telugu, and Malayalam
Chandigarh	Chandigarh	114	Hindi, Punjabi
Dadara and Nagar Haveli	Silvassa	491	Gujarati and Hindi
Daman and Diu	Daman	112	Gujarati
Delhi	Delhi	1483	Hindi, Punjabi and Urdu
Lakshadweep	Kavaratti	32	Malayalam
Pondicherry	Pondicherry	492	Tamil, Telugu, Malayalam, English and French

FOREIGN ELEMENTS IN INDIAN CONSTITUTION

- Fundamental Rights : USA
- Nature & Function of Supreme Court : USA
- Vice President : USA
- Parliamentary System : UK
- Process of Parliament & Assemblies : UK
- Federal System : Canada
- Emergency : Germany
- Directive Principle of State Policy : Iris Constitution
- Fundamental Duties : Soviet Union
- Republic : France
- Concurrent List : Australia
- Amendment Process : South Africa
- Due Process of Law under Art. 21 : Japan

TABLE OF PRECEDENCE

1. President
2. Vice President
3. Prime Minister
4. Governor of States within their respective states
5. Former Presidents
5a. Deputy Prime Minister
6. Chief Justice of India, Speaker of Lok Sabha
7. Cabinet Ministers of the Union; Chief Ministers of States within their respective states; Dy. Chairman, Planning Commission; Former Prime Minister; Leaders of opposition in Rajya Sabha and Lok Sabha.
7a. Holders of Bharat Ratna decoration.
8. Ambassadors extraordinary and plenipotentiary and High Commissioners of Commonwealth countries accredited to India. Chief Ministers of states outside their respective states; Governors of states outside their respective states.
9. Judges of the Supreme Court
9a. Chief Election Commissioner; Comptroller and Auditor-General of India.
10. Dy. Chairman, Rajya Sabha; Dy. Chief Ministers of states; Dy. Speaker; Lok Sabha; Members of Planning Commission; Ministers of State of the union and any other minister in the ministry of defence for defence matters.
11. Attorney-General of India; Cabinet Secretary; Lt. Governors within their respective Union Territories.
12. Chiefs of Staff holding the rank of full General or equivalent rank
13. Envoys extraordinary and ministers plenipotentiary accredited to India.
14. Chairman and Speaker of state legislatures within their respective states; Chief Justice of high courts within their respective jurisdiction.
15. Cabinet Ministers in states within their respective states; CMs of UTs within their respective UTs; Deputy Ministers of the Union.
16. Officiating chiefs of staff holding their rank of Lt. General or equivalent rank.
17. Chairman, CAT; Chairman, Minorities Commission; Chairman, SC and ST Commission; Chairman, UPSC; Chief Justices of high courts outside their respective jurisdictions;
18. Cabinet ministers in states outside their respective states; Chairman and Speakers of state legislatures outside their respective states; Chairman MRTP Commissions; Dy. Chairman and Dy. Speakers of state legislatures within their respective states;
19. Chief Commissioners of UTs to having councils of ministers, within their respective UTs; Dy. Ministers in states within their respective states; Dy. Speakers of legislative assemblies in UTs, within their respective UTs
20. Dy. Chairman and Dy. Speakers of state legislatures outside their respective states; Ministers of State in states outside their respective states; Puisne judges of high courts outside their respective jurisdictions
21. MPs

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IMPORTANT OFFICES OF INDIA

FICE	Minimum (Age)	Maximum (Age)	Salary (Monthly)
The President	35 years	–	Rs. 150,000
The Vice President (Chairman of Rajya Sabha)	35 years	–	Rs. 125,000
Lok Sabha Speaker	25 years	–	Rs. 125,000
Lok Sabha Deputy Speaker	25 years	–	–
Chief Justice of India	–	65 years	Rs. 100,000
Other Judges of the Supreme Court	–	65 years	Rs. 90,000
Members of Lok Sabha	25 years	–	Rs. 50,000 and other
Members of Rajya Sabha	30 years	–	Rs. 50,000 and other
Attorney General	–	65 years	Rs. 90,000 (As decided by the Parliament)
Comptroller and Auditor General	–	65 years	Rs. 90,000 (As decided by the Parliament)
Chairman U.P.S.C.	–	65 years	Rs. 90,000
Members, U.P.S.C.	–	65 years	Rs. 80,000
Governor	35	–	Rs. 110,000
Chief Minister	25	–	–
Members of Legislative Assembly	25 years	–	–
Members of Legislative Council	30 years	–	–
Advocate General	–	62 years	(As decided by the Governor)
Members of State Public Service Commission	–	62 years	Rs. 90,000
Chief Justice of High Court	–	62 years	Rs. 80,000
Other Judges of High Court	–	62 years	Rs. 80,000

CONSTITUTIONAL OFFICES OF INDIA

Office/	Election/	Oath	Resignation
The President	Electoral College-the elected members of both the Houses of Parliament and elected members of Legislative Assemblies	Chief Justice of the Supreme Court	Vice-President
Vice-President	Electoral college-All members of the Lok Sabha and Rajya Sabha	President	President
Prime Minister	President appoints leader of the majority party	President	President
Lok Sabha speaker	Elected by the members of Lok Sabha	President	Deputy Speaker of Lok Sabha
Deputy Speaker of Lok Sabha	elected by the members of Lok Sabha	President	Lok Sabha speaker
Chief Election Commissioner	President	President	President
Attorney General	President	President	President
Comptroller and Auditor General	President	President or (any person appointed by the President)	President
Solicitor-General	President	President	President
Chairman Public Service Commission	President	President	President
Chairman, Planning Commission	President	President	President
Members, Planning Commission	Prime Minister	Prime-Minister	Prime-Minister
Governor, RBI	President	President	President
Governor	President	Chief Justice (High Court)	President
Chief-Minister	Governor (appoints leader of the majority Party)	Governor	Governor
Chief Justice (High Court)	President (after Consulting the Chief Justice of Supreme Court and the Governor of the Concerned state	Governor	President
Other Judges of High Court	President (after consulting the Governor, and Chief Justice of High Court	Governor	President
Advocate -General	Governor	Governor	Governor
Accountant-General	Governor	Governor	Governor
Chairman, State Public Service Commission	Governor	Governor	Governor
Members, State Public Service, Commission	Governor	Governor	Governor

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PRESIDENTS OF INDIA

Name	Tenure
Dr. Rajendra Prasad (1884-1963)	26 January 1950 - 13 May 1962
Dr. Sarvepalli Radhakrishnan (1888-1975)	13 May 1962 - 13 May 1967
Dr. Zakir Husain (1897-1969)	13 May 1967- 3 May 1969
Varahagiri Venkatagiri (1884-1980)	3 May 1969 - 20 July 1969 (Acting)
Justice Mohammad Hidayatullah (1905-1992)	20 July 1969 - 24 August 1969 (Acting)
Varahagiri Venkatagiri (1894-1980)	24 August 1969 - 24 August 1974
Fakhruddin Ali Ahmed (1905-1977)	24 August 1974-11 February 1977
B. D. Jatti (1913-2002)	11 February 1977- 25 July 1977 (Acting)
Neelam Sanjiva Reddy (1913-1996)	25 July 1977 - 25 July 1982
Giani Zail Singh (1916-1994)	25 July 1982 - 25 July 1987
R. Venkataraman (b-1910)	25 July 1987 - 25 July 1992
Dr. Shanker Dayal Sharma (1918-1999)	25 July 1992 - 25 July 1997
K. R. Narayanan (b-1920)	25 July 1997 - 25 July 2002
Dr. A. P. J. Abdul Kalam (b-1931)	25 July 2002 - 25 July, 2007
Pratibha Devi Singh Patil (b-1934)	25 July 2007 - till date

VICE-PRESIDENTS OF INDIA

Name	Tenure
Dr. Sarvepalli Radhakrishnan (1888-1975)	1952-1962
Dr. Zakir Husain (1897-1969)	1962-1967
Varahagiri Venkatagiri (1894-1980)	1967-1969
Gopal Swarup Pathak (1896-1982)	1969-1974
B. D. Jatti (1913-2002)	1974-1979
Justice Mohammad Hidayatullah (1905-1992)	1979-1984
R. Venkataraman (b-1910)	1984-1987
Dr. Shanker Dayal Sharma (1918-1999)	1987-1992
K. R. Narayanan (b-1920)	1992-1997
Krishan Kant (1927-2002)	1997-2002
Bhairon Singh Shekhawat (b-1923)	2002 - 2007
Mohammad Hamid Ansari (b-1937)	2007 - till date

PRIME-MINISTERS OF INDIA

Name	Tenure
Jawaharlal Nehru (1889-1964)	15 August 1947 - 27 May 1964
Gulzari Lal Nanda (1898-1997)	27 May 1964 - 9 June 1964 (Acting)
Lal Bahadur Shastri (1904-1966)	9 June 1964 - 11 January 1966
Gulzari Lal Nanda (1898-1997)	11 January 1966 - 24 January 1966 (Acting)
Indira Gandhi (1917-1984)	24 January 1966 - 24 March 1977
Morariji Desai (1896-1995)	24 March 1977 - 28 July 1979
Chaudhari Chran Singh (1902-1987)	28 July 1979 - 14 January 1980
Indira Gandhi (1917-1984)	14 January 1980 - 31 October 1984
Rajiv Gandhi (1944-1991)	31 October 1984 - 1 December 1989
Vishwanath Pratap Singh (b-1931)	2 December 1989 - 10 November 1990
Chandra Shekhar (b-1927)	10 November 1990 - 21 June 1991
P. V. Narasimha Rao (1921-2005)	21 June 1991 - 16 May 1996
Atal Bihari Vajpayee (b-1926)	16 may 1996 - 01 June 1996
H. D. Deva Gowda (b- 1933)	01 June 1996 - 20 April 1997
I. K. Gujral (b-1933)	21 April 1997 - 19 March 1998
Atal Bihari Vajpayee (b- 1926)	19 March 1998 - 13 October 1999
Atal Bihari Vajpayee (b-1926)	13 October 1999 - 22 May 2004
Dr. Manmohan Singh (b-1932)	22 May 2004 - till date
	22 May 2009 - 2nd Term

SPEAKERS OF LOK SABHA

Speaker(s) Name	Duration
1. G. V. Mavalankar	15.05.1952 – 07.02.1956
M. A. Ayyanger	08.03.1956 – 10.05.1957
2. M. A. Ayyanger	11.05.1957 – 06.04.1962
3. Hukum Singh	17.04.1962 – 16.03.1967
4. N. Sanjiva Reddy	17.03.1967 – 19.07.1969
Dr. G. S. Dhillon	08.08.1969 – 19.03.1971
5. Dr. G. S. Dhillon	22.03.1971 – 01.12.1975
Baliram Bhagat	05.01.1976 – 25.03.1977
6. N. Sanjiva Reddy	26.03.1977 – 13.07.1977
K. D. Hegde	21.07.1977 – 21.01.1980
7. Dr. Balram Jakhar	22.01.1980 – 15.01.1985
8. Dr. Balram Jakhar	16.01.1985 – 18.12.1989
9. Rabi Ray	19.12.1989 – 09.07.1991
10. Shivraj V. Patil	10.07.1991 – 22.05.1996
11. P. A. Sangma	23.05.1996 – 23.03.1998
12. G. M. C. Balyogi	24.03.1998 – 21.10.1999
13. G. M. C. Balyogi	22.10.1999 – 03.03.2002
14. Manohar Joshi	10.05.2002 – 02.06.2004
15. Somnath Chatterjee	04.06.2004 – 18.05.2009
16. Mrs. Meera Kumar	03.06.2009 – till date

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CHIEF JUSTICES OF INDIA

Name	Tenure
Harilal J. Kania	26 January 1950 - 6 November 1951
M. patanjali Sastri	7 November 1951 - 3 January 1954
Mehar Chand Mahajan	4 January 1954 - 22 December 1954
B. K. Mukherjee	23 December 1954 - 31 January 1956
S. R. Das	1 February 1956 - 30 September 1956
Bhuvaneshwar Prasad Sinha	1 October 1959 - 31 January 1964
P. B. Gajendragadkar	1 February 1964 - 15 March 1966
A. K. Sarkar	16 March 1966 - 29 June 1966
K. Subba Rao	30 June 1966 - 11 April 1967
K. N. Wanchoo	12 April 1967 - 24 February 1968
. Hidayatullah	25 February 1968 - 16 December 1970
C. Shah	17 December 1970 - 21 January 1971
M. Sikri	22 January 1971 - 25 April 1973
N. Ray	26 April 1973 - 27 January 1977
. H. Beg	28 January 1977 - 21 February 1978
V. Chandrachud	22 February 1978 - 11 July 1985
rafullachandra	12 July 1985 - 20 December 1986
. S. Pathak	21 December 1986 - 18 June 1989
S. Venkataramaiah	19 June 1989 - 17 December 1989
Mukherjee	18 December 1989 - 25 September 1990
anganath Mishra	26 September 1990 - 24 November 1991
N. Singh	25 November 1991 - 12 December 1991
. H. Kania	13 December 1991 - 17 November 1992
M. Sharma	18 November 1992 - 11 February 1993
. N. Venkatachalaiah	12 February 1993 - 24 October 1994
M. Ahmadi	25 October 1994 - 24 March 1997
S. Verma	25 March 1997 - 17 January 1998
. M. Punchhi	18 January 1998 - 9 October 1998
A. S. Anand	10 Ocotber 1998 - 31 October 2001
S. P. Bharucha	1 November 2001 - 5 May 2002
B. N. Kirpal	6 May 2002 - 7 November 2002
G. B. Patnaiak	8 November 2002 - 18 December 2002
V. N. Khare	19 December 2002 - 2 May 2004
S. Rajendra Babu	02 May 2004 - 01 June 2004
R. C. Lahoti	01 June 2004 - 31 Oct. 2005
Y. K. Sabhrwal	01 November 2005 - January 2007
K.G. Balakrishnan	14 January 2007 - 11 May 2010
Sarosh Homi Kapadia	12 May 2010 - till date

CHIEF ELECTION COMMISSIONERS OF INDIA

Name	Tenure
Sukumar Sen	21 March 1950 - 19 December 1958
K. V. K. Sundaram	20 December 1958 - 30 September 1967
S. P. Sen Verma	1 October 1967 - 30 September 1972
Dr. Nagendra Singh	1 October 1972 - 6 February 1973
T. Swaminathan	7 February 1973 - 17 June 1977
S. L. Shakdhar	18 June 1977 - 17 June 1982
R. K. Trivedi	18 June 1982 - 31 December 1985
R. V. S. Peri Sastri	1 January 1986 - 25 November 1990
Smt. V. S. Rama Devi	26 November 1990 - 11 December 1990
T. N. Seshan	12 December 1990 - 11 December 1996
M. S. Gill	12 December 1996 - 13 June 2001
J. M. Lyngdoh	13 June 2001 - 8 February 2004
T. S. Krishna Murthy	8 February 2004 - 16 May 2005
B. B. Tandon	16 May 2005 - 7 February 2006
N. Gopalaswamy	8 February 2007 - 20 April 2009
Navin Chawla	21 April 2009 - 22 July, 2010
Mr. S Y Quraishi	30 July 2010 - till date

HIGH COURTS OF INDIA

Name	Year	Territorial establishment Jurisdication	Seat
Allahabad	1866	U.P.	Allahabad,(Bench at Lucknow)
Andhra Pradesh	1954	Andhra Pradesh	Hyderabad
Bomay	1862	Maharashtra, Goa, Dadra and Nagar Haveli and Daman and Diu	Bombay (Benches at Nagpur, Panaji and Aurangabad
Calcutta	1862	West Bengal	Kolkata (Circuit Bench at Port Blair)
Chhattisgarh	2000	Bilaspur	Bilaspur
Delhi	1966	Delhi	Delhi
Guwahati	1948	Assam, Manipur, Meghalaya, Nagaland, Tripura, Mizoram and Arunachal Pradesh	Guwahati (Bench Kohima, and circuit Aizawl, Imphal, Shillong and Agartala)
Gujarat	1960	Gujarat	Ahmedabad
Himachal Pradesh	1971	Himachal Pradesh	Shimla
J & K	1957	J & K	Srinagar and Jammu
Jharkhand	2000	Jharkhand	Ranchi
Karnataka	1884	Karnataka	Bangalore
Kerala	1956	Kerala and Lakshadweep	Ernakulam
Madhya Pradesh	1956	Madhya Pradesh	Jabalpur (Benches at Gawalior and Indore)
Madras	1862	Tamil Nadu	Chennai and Pondicherry
Orissa	1948	Orissa	Cuttack
Patna	1916	Bihar	Patna
Punjab and Haryana	1966[3]	Punjab, Haryana and Chandigarh	Chandigarh
Rajasthan	1949	Rajasthan	Jodhpur (Bench at Jaipur)
Sikkim	1975	Sikkim	Gangtok
Uttaranchal	2000	Uttaranchal	Nainital

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WOMEN CHIEF MINISTERS OF INDIA

	Name	State	Period	Party
1.	Sucheta Kripalani	Uttar Pradesh	Oct. 1963 to Mar. 1967	Congress
2.	Nandini Satpaty	Orissa	June 1972 to Mar. 1974 & Mar. 1974 to Dec. 1976	Congress
3.	Sashikala Kodokar	Goa	13 Aug. 1973 to 7th June 1977 & 7th June 1977 to 28th Apr. 1979	Maharash-rawadi Gomantak Party
4.	Syeda Anwara Taimur	Assam	Dec. 1980 to June 1981	Congress
5.	Janaki Ramachandran	Tamil Nadu	7th to 30th Jan. 1988	A.D.M.K. (Janaki)
.	J. Jayalalithaa	Tamil Nadu	June 1991 to May 1996 14th May to 21th Sep. 2001 Since 2nd Mar. 2002	A.I.A.D.M.K.
.	Mayawati	Uttar Pradesh	June 1995 to Oct. 1995 & Mar. 1997 to Sept. 1997 3rd May 2002 to 29th Sept. 2003	B. S. P.
.	Rajinder Kaur Bhattal	Punjab	Apr. 1996 to Feb. 1997	Congress
.	Rabri Devi	Bihar	25th July 1997 to 12th Feb. 1999 & 9th Mar. 1999 to 3rd Mar. 2000 & Since 11th Mar. 2000 to Jan. 2005	R. J. D.
.	Sushma Swaraj	Delhi	12th Oct. to 3rd Dec. 1998	B. J. P.
.	Sheila Dixit	Delhi	Since 3rd Dec. 1998 15th Dec. 2003 till date.	Congress
	Uma Bharti	M.P.	8th Dec. 2003 to 23rd Agu. 2004	B. J. P.
	Vasundhara Raje	Rajasthan	8th Dec. 2003 to 11 Dec. 09	B.J.P.
	Mayawati	U.P.	13th May, 2007-till date	B.S.P.
	J. Jayalalitha	Tamil Nadu	16th May, 2011-till date	A.D.M.K.
	Mamata Banerjee	West Bengal	20th May, 2011-till date	Trinmool Congress

SPECIAL STATUS GRANTED TO STATES

State	:	Year
Assam	:	1969
Nagaland	:	1969
Jammu and Kashmir	:	1969
Himachal Pradesh	:	1971
Meghalya	:	1972
Manipur	:	1972
Tripura	:	1972
Sikkim	:	1975-1976
Mizoram	:	1986-1987
Arunachal Pradesh	:	1986-1987
Uttarakhand	:	2001

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GEOGRAPHY

MEANING OF GEOGRAPHY

The word Geography is a combination of two Greek words, 'geo' (= earth) and 'graphy' (= writing about). Thus, in simple language Geography can be defined as a study of the earth. However, this elementary definition fails to provide a clear picture of the nature and scope of Geography. Geography as a subject not only deels with the features and patterns of the surface of the earth, it also tries to scientifically explain the inter-relationship between Man and nature. The scope of the subject matter of Geography is gradually widening and its methods and techniques are developing both in precision and sophistication.

The widening scope of Geography is very well-reflected in its diverse branches and sub-branches. Geography has been divided into a variety of branches to have more focused and specialised research in specific areas.

Broadly, Geography has two distinct sub-fields-physical and human. The physical or natural features are the creations of Nature and these are independent of human actions. These include mountains, rivers, flora and fauna.

The human or man-made features are those created by human actions and which are essential for their survival and development. These are also known as cultural features.

UNIVERSE AND SOLAR SYSTEM

Universe

- The vast surrounding space is called Universe. It incorporates everything that exists, the stars, planets, satellite as well as our earth and all the objects on it.
- Light year and Parsec are the units of measuring distances in the Universe.
- One Light year is the distance travelled by light in one year. 1 Light Year = 9.46×10^{12} kilometers.
- The nearest star to the earth 'alpha centuari' is about 4.3 light years away from the earth.
- Parsec is an astronomical unit of distance which is equal to 3.26 light years. 1 Parsec = 3.26 light years.
- The science dealing with the nature and origin of the Universe is known as Cosmology.

Galaxy

- A galaxy is a vast collection of billion of stars, dust and hydrogen gas, isolated in space from similar system.
- The two most important galaxies in the Universe are Milky Way Galaxy and Andromeda galaxy.
- Our own Sun and its family of planets belong to the Milky Way galaxy.
- Three basic shapes of galaxies are :
  (i) Spiral Galaxy, (ii) Elliptical Galaxy, (iii) Regular Galaxy

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- Milky Way galaxy is spiral type of galaxy.
- Indian name of Milky Way galaxy is 'Akash Ganga'.
- Some of the brightest galaxies are elliptical galaxies.

Constellations

- The stars which appear in the form of closed groups and form recognizable shapes are known as constellations.
- The Indian name for constellation is 'Nakshatras'. About 80 constellations are known.
- Some of the important constellations are :

Ursa Major	:	'Saptarishi'	Ursa Minor	:	'Laghu Saptarishi'
Orion	:	'Mirga'	Scorpio	:	'Vrischika'
Pleides	:	Kruttika	Cassiopeia	:	'Sarmistha'

Stars

- Stars are the heavenly bodies like the Sun that are extremely hot and have light of their own.
- Stars are made up of vast clouds of hydrogen gas, helium and dust.
- The star which lies immediately above the earth's North Pole and around which all other stars seem to revolve is called Pole Star.

Life of Stars : Stars pass through a definite evolutionary sequence. The first step in the formation of a star from gases is the Protostar.

(a) A Protostar : It is formed by the gravitational contraction of gases present in the Galaxy. A Protostar is a highly condensed cloud of gases. mainly hydrogen and helium.

(b) Red Giants : The continued Nuclear fusion upset the overall equilibrium of the star and to readjust it star's outer region expands while the core shrinks. Due to the large expansion of the outer shell, the star becomes very big, and its colour changes to red.

(c) Novae and Supernovae : A giant star phase may end in a Novae/Supernovae stage. These are stars whose brightness increase suddenly by ten to twenty magnitudes or more due to a partial or outright explosion in the star. When brightness increases to 20 magnitudes or more, it is called a Supernovae.

(d) White dwarfs : A Novae/Supernovae explosion in a small star like our Sun (stars lighter than 1.2 solar mass) may leave behind a very dense core of that state. A star of this size cools and contracts to become a White Dwarf.

(e) Neutron star : A supernovae explosion in a star bigger than the Sun but not more than twice as big, may leave behind an extremely dense, residual core of that star, reaching a density of 10^{14} grans/cm^3, known as Neutron Star.

(f) Pulsar : A spinning neutron star emits radio waves and is called a Pulsar.

(g) Black Holes : A black hole is an object with such a strong gravitational field that even light cannot escape from its surface. Black holes are formed from neutron stars after the Supernoval explosions of big stars.

THE SOLAR SYSTEM

- The solar system consists of the Sun, the nine planets and their satellites and various other smaller heavenly bodies such as asteroids, comets and meteors.

The Sun

- The sun is a star. It is the star round which the earth and other planets revolve.
- It is the nearest star to the earth. It is at a distance of 150×10^6 kilometres from the earth.
- Light travelling at a speed of 300,000 km per second, takes about 8 minutes to reach us from the Sun.
- The next nearest star to earth is alpha centuari.
- The Sun is mainly composed of hydrogen. The glowing surface of the Sun which we see is called **'photosphere'.**
- Above the photospheres is the red cloud **'Chromosphere'.** Beyond the chromospheres is the **'corona',** which is visible during eclipses.
- The temperature of the photospheres is about 6000°C, that of the chromosphere about 32400°C, and that of the corona about 2,700,000°C.
- The core of the Sun has a temperature about 15 million degrees K.
- The dark lines in the corona are called **'Fraunhofer lines'.** The emission of hydrogen in all directions is called **'prominences'.**
- Sometimes they roll out of the atmosphere to be seen as **'Solar flares'.**
- The outward stream of protons flowing out from the corona are called **'solar winds',** which is made up of plasma.
- The earth's magnetosphere or Van allen belts, as they were earlier called, acts as a shield and deflects the solar winds.
- 'Sun spots' are dark patches notched on the surface of the Sun. They appear dark because they are cooler i.e. they have a temperature of about 1500°C.

Planets

- Planets are solid heavenly bodies which revolve round the Sun in closed elliptical paths.
- A Planet is made up of rock and metal.
- The Planets move round the Sun from west to east.
- There are nine major Planets including earth.

The Nine Planets (Grahas)

(1) Mercury (Budha)	(2) Venus (Shukra)
(3) Earth (Prithvi)	(4) Mars (Mangal)
(5) Jupiter (Brihaspati)	(6) Saturn (Shani)
(7) Uranus (Indra)	(8) Neptune (Varun)
(9) Pluto (Yama)	

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Asteroids : Asteroids are very small planets of rock and metal which revolve round the Sun mainly between the orbits of Mars and Jupiter.

Comets : A comet is a collection of gas and dust which appears as a bright ball of light in the sky with a long glowing tail.

Meteors : Meteors are the heavenly bodies from the sky which are seen as a bright streak of light in the sky. The meteors are also called as shooting stars.

Meteorite : A meteor which does not burn completely on entering the earth's atmosphere and lands on earth is known as meteorite.

SOLAR SYSTEM – FACT FILE

Sun

Period of rotation	:	25.38 days at equator
Diameter	:	1,384,000 km
Mass	:	330,000 × that of earth
Temperature	:	27 million degrees C at its core
Surface temperature	:	5,500°C

Mercury

Distance from the Sun	:	57.9 million km
Revolution around the Sun	:	88 days
Rotation	:	59 days
Diameter	:	4850 km
Density	:	5.4 × that of water
Mass	:	0.055 × that of earth
Surface temperature	:	430°C on day side; minus 180°C on night-side

Venus

Distance from the Sun	:	108.2 million km
Revolution around the Sun	:	225 days
Rotation	:	243 days
Diameter	:	12,140 km
Density	:	5.2 × that of water
Mass	:	0.8 × that of earth
Surface temperature	:	+ 480°C

Earth

Distance from the Sun	:	149.6 million km
Revolution around the Sun	:	365.2 days (1 year)
Rotation	:	23.9 hours
Diameter	:	12,756 km
Density	:	5.5 × that of water
Mass	:	6×10^{21} metric tonnes
Surface temperature	:	Variable, averages 15°C

Mars

Distance from the Sun	:	227.9 million km
Revolution around the Sun	:	687 days
Rotation	:	24.6 hours
Diameter	:	6780 km
Density	:	3.9 × that of water
Mass	:	0.1 × that of earth
Surface temperature	:	Variable, averages minus 50°C

Jupiter

Average Distance from the Sun	:	778.3 million km
Revolution around the Sun	:	11.9 years
Rotation	:	9.9 hours
Diameter	:	143,200 km
Density	:	1.3 × that of water
Mass	:	318 × that of earth
Temperature	:	Minus 130°C at cloud tops

Saturn

Average Distance from the Sun	:	1,427 million km
Revolution around the Sun	:	29.5 years
Rotation	:	10.7 hours
Diameter	:	120,000 km
Density	:	0.7 × that of water
Mass	:	95 × that of earth
Temperature	:	Minus 180°C at cloud tops

Uranus

Average Distance from the Sun	:	2870 million km
Revolution around the Sun	:	84 years
Rotation	:	17.2 hours
Diameter	:	52,900 km
Density	:	1.3 × that of water
Mass	:	14.4 × that of earth
Temperature	:	Minus 200°C at cloud tops

Neptune

Distance from the Sun	:	4,497 million km
Revolution around the Sun	:	165 years
Rotation	:	16.1 hours
Diameter	:	49,500 km
Density	:	1.6 × that of water
Mass	:	17.2 × that of earth
Temperature	:	Minus 200°C at cloud tops

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Pluto

Average Distance from the Sun	:	5,900 million km
Revolution around the Sun	:	248 years
Rotation	:	6.4 days
Diameter	:	2,800 km
Density	:	2 × that of water
Mass	:	0.003 × that of earth
Surface temperature	:	Minus 230°C

FACTS TO REMEMBER

- **Saturn** has maximum number of satellites.
- **Pluto** has the most electric orbit.
- **Jupiter** is the fastest rotating planet.
- **Venus** is the slowest rotating planet.
- **Venus** has the same period of rotation as revolution.
- The length of the day is nearly same on the planet Mars as that of the Earth.
- Jupiter, Saturn, Uranus and Neptune are the Jovian planets.
- The angle of inclination of Mars is nearly same as that of Earth.
- Jupiter, Saturn, Uranus and Neptune are the outer planets.
- Mercury, Venus, Earth and Mars are the inner planets.
- Venus rotates from East to West.
- Uranus roates from North to South.
- **Mercury** is the fastest revolving planet.
- Pluto is the slowest revolving planet.
- Planet revolves around the Sun in Anti-clockwise direction.
- Mercury is the nearest planet to Sun.
- Venus is the nearest planet of Earth.
- Neptune was farthest from Sun during 1979-99.
- Now Pluto is the farthest from the Sun after 1999 for the next 228 years.
- **Venus** is the hottest planet, its atmosphere contains 97% CO_2.
- **Pluto** is the coldest and smallest planet.
- **Jupiter** is the biggest planet.
- Earth is the densest planet.
- Venus is the brightest planet.
- Earth is the blue planet.
- **Mars** is the Red planet.
- Venus is the Morning and Evening Star.
- **Pluto** is the double planet.
- **Venus** is also called the Earth's twin.
- Saturn and Uranus is known as the planets with rings.
- **Pluto** is the Biplanet.
- **Pluto** has the longest year.
- **Mercury** has the shortest year.
- **Mercury** has the maximum diurnal range of temperature.

PLANETS AND THEIR SATELLITES

Planet	Natural Satellites
Earth	Earth's moon
Mars	Phobos, Deimos
Jupiter	Adrastea, Metis, Amalthea, Thebe, Io, Europa, Ganymede, Callisto, Leda, Himalia, Lysithea, Elara, Ananke, Carme, Pasiphae, Sinope
Saturn	Atlas, Prometheus, Pandora, Janus, Epimetheus, Mimas, Euceladus, Tethys, Calypso, Dione, Helene, Rhea, Titan, Hiperion, Iapetus, Phoebe.
Uranus	Cordelia, Ophelia, Bianca, Cressida, Desdemona, Juliet, Portia, Rosalind, Balinda, Puck, Miranda, Ariel, Umbriel, Titania, Oberon
Neptune	Naiad, Thalassa, Despoina, Galatea, Larissa, Porteus, Triton, Nereid
Pluto	Charon

OUR PLANET EARTH

- Our earth is a unique planet because it contains life.
- Earth's origin dates back to approximately 4,600 million years ago.
- Various Theories have been put forward to explain the origin of earth.
- These Theories includes :
  - (i) Planetesimal Hypothesis of Chamberlin & Moulton
  - (ii) The Tidal Theories of Jeans and Jeffreys
  - (iii) The Binary Star Hypothesis of Russel
  - (iv) The Supernoval Hypothesis of Hoyle & Lyttleton
  - (v) The Inter-stellor Dust Hypothesis of Otto Schmidt

EARTH'S MOVEMENTS

(i) Rotation : Earth rotates on its own axis that is tilted at an angle of 23½° to the vertical. It spins from west to east once in every 24 hours. The linear velocity of rotation varies, achieving a maximum of 1690 km/hr at the equator, reducing gradually to zero at the poles.

Effects of Earth's Rotation

- Causation of day and night.
- A difference of 1 hour between two meridians which are 15° apart.
- Deflection of ocean currents and winds.
- Rise and fall of tides every day.

(ii) Revolution : Earth revolves round the Sun once in every 365¼ days. Earth revolves on an elliptical orbit at a speed of 106,560 km/hr. As it is not possible to show a quarter of a day in the calendar, a normal year is taken to be 365 days, and an extra day is added every four years in a leap year.

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Effects of Revolution

- Change of seasons.
- Variation in the lengths of day and night at different times of year.
- Shifting of wind belts.
- Determination of latitudes.

TILT OF EARTH'S AXIS

- The axis of Earth is inclined to the plane of ecliptic at an angle of 66½°.
- It gives rise to different seasons and varrying lengths of day and night.
- The Sun is vertically overhead at the equator on two days in a year i.e. on March 21st and September 23rd. These days are called equinoxes meaning 'equal nights'.
- After the March equinox, the Sun appears to move northwards and is vertically at the Tropic of Cancer on June 21st, known as the Summer Solstice.
- During summer solstice, the Northern hemisphere will have longest day and shortest night.
- By December 22nd, the Sun is overhead at the Tropic of Capricorn. This is the Winter Solstice.
- In the Winter Solstice the Southern hemisphere will have longest day and shortest night.

LATITUDES AND LONGITUDES

So vast is the earth's surface that unless a mathematical grid is used, it is impossible to precisely locate any place. For this reason, imaginary lines have been drawn on the Globe.

- **Latitude :** Latitude is the angular distance of a point on earth's surface, measured in degrees from the centre of the earth. Imaginary lines joining the places of same latitude are called parallels of latitude since they are parallel to a line, the Equator which lies midway between the poles. These parallels are actually circles on the globe, becoming smaller poleward.
- Some important parallels are :
  - (i) 0° latitude : Equator
  - (ii) 23½°N : Tropic of Cancer
  - (iii) 23½°S : Tropic of Capricorn
  - (iv) 66½°N : Arctic Circle
  - (v) 66½°S : Antarctic Circle
- The parallel of 60° is half of the Equator in length and ¼th of the Equator.
- ***Longitude :*** *Longitude is the angular distance measured in degrees along the equator east or west of the Prime Meridian. On the globe the lines of longitude are drawn as a series of semi-circles the extend from the North Pole to the South Pole, cutting the Equator. They are also called meridians. The Prime Meridian (0°) is that meridian which passes through the* **Greenwich,** *near London and from which all other meridians radiate eastwards and westwards up to 180°*

1° of latitude or longitude represent 111 km approx. This distance is true for the longitudes along the equator only since the distance between the longitudes gradually decreases towards the poles to 0 km.

EARTH'S INTERIOR

The Crust : The outer layer of the earth is known as the crust. Its thickness ranges from 16 to 40 km. The crust is thicker beneath the continents than beneath the oceans.

- The crust is made up of two layers; an upper lighter layer called the Sial (Silicate + Aluminium) and a lower denser layer called Sima (Silicate + Magnesium). The average density of the earth's surface is less than 3 gm/c.c. The inner part of Lithosphere is partly molten.

he Mantle : Below the crust of the earth is a thick layer called antle. This layer extends upto a depth of 2900 km. The mantle onsists predominantly of solid rocks made up of silicates of magesium and iron and displays plastic properties.

The uppermost portion of the mantle on which the crust rests, is rigid. The crust and this solid uppermost mantle are together called Lithosphere.

Below the Lithosphere, the, upper mantle becomes so hot that it resembles hot plastic. This soft plastic layer in the upper mantle is called as the Asthenosphere.

e Core : Beyond a depth of 2900 km lies the core of the earth. is is made up of iron and nickel. This metallic core of the earth an average density of 11gm/c.c. This core of the earth is beed to be a reason for the earth's magnetism.

MAJOR DISCONTINUITY

ho Discontinuity	:	Between Crust and Mantle
ard Discontinuity	:	Between outer and Inner Crust
chert-Gutenberg continuity	:	Between Mantle and Core
tti Discontinuity	:	Outer and Inner Mantle
sition Discontinuity	:	Outer and Inner Core.

ROCKS AND SOILS

s are made up of individual substances, which are called minfound mostly in a solid state.

mineral usually contains two or more simple substances d elements of which the whole earth is made.

of about 2000 minerals, only twelve are common all over the n. These twelve minerals are called the rock-formers.

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- As many as 87 per cent of the minerals in earth's crust are silicates.
- The metal compounds of rocks is known as 'ores'.

CLASSIFICATION OF ROCKS

On the basis of the mode of formation, rocks are usually classified into three major types :

(1) Igneous Rocks

- Igneous rocks are ancestors of all other rocks and make up 85 per cent or more of the earth's crust.
- Igneous rocks are formed by the cooling, solidification and crystallization of molten earth materials, known as magma and lava.
- Igneous rocks are also called as Primary rocks or parent rocks because these were originated first during the formation of crust through the process of cooling of the earth surface.
- The igneous rocks are made many of silicates (SiO_2) and often combine with other oxides of aluminum, potassium, sodium, calcium, iron, magnesium etc. some of the important igneous rocks are granites, rhyolite, pegmatite, syetite, diorite, andestite gabbro, basalt, dolerite and peridotite.
- Igneous rocks are generally hard and water percolates through them with great difficulty along the joints.
- Since water does not percolate easily, these rocks are less affected by chemical weathering.
- These rocks are more prone to mechanical weathering due to their granular structure.
- These rocks are non-fossiliferous.

On the basis of mode of occurrence, Igneous rocks are classified into two major groups :

(i) Intrusive Igneous Rocks : When the rising magma is cooled and solidified below the surface of the earth, they are known as Intrusive Igneous Rocks. These are further sub-divided into : **(a) Plutonic Igneous Rocks :** They result from the cooling of magma very deep inside the earth. Due to very slow cooling at that great depth, large grains are developed, e.g.-Granite; **(b) Hypabyssal Igneous Rocks :** They are formed when magma cools and solidify just beneath the earth surface. They take different shapes and forms depending upon the hollow places in which they solidify.

(ii) Extrusive Igneous Rocks : These igneous rocks are formed by the cooling and solidification of molten lava on the earth's surface. Basalt is the most important example of extrusive igneous rocks, others being Gabbro and Obridian. These are generally fine grained or glassy because of quick rate of cooling of lava. The extrusive igneous rocks are divided into two sub-groups :

(a) Explosive Type : Volcanic materials of violent volcanic eruptions include 'bombs' (big fragments of rocks), lapilli (pea-sized fragments) and volcanic dusts and ashes.

(b) Quiet Type : In this, lava appear on the surface through cracks and fissures and their continous flow form extensive lava plateaus, e.g., Deccan Plateau, Columbia Plateau.

(2) Sedimentary Rocks

- Sedimentary rocks are constituted of sediments, a material from wind or running water that settle down.
- About 75% of the surface area of the globe is covered by the sedimentary rocks while rest 25% area is occupied by the igneous and metamorphic rocks.
- Though sedimentary rocks cover largest area of the earth's surface, they constitute only 5% of the composition of the crust while 95% of the crust is composed of igneous and metamorphic rocks.
- **The fossils** are found in the layers of sedimentary rocks. A fossil refers to any part of the once living things preserved in the rock. It may be entire body, a singe bone or a set of foot-prints. It tells up about the life in past and they help us to date environment. Fossils also show what kind of animals lived in the past.
- The layers of sedimentary rocks hold all reserve of coal, oil and natural gas.
- The mechanically formed sedimentary rock contain pieces of other rocks. Agents like running water, wind and moving ice break them into smaller pieces and deposits them at new sites where they form new sedimentary rocks.
- Organically formed sedimentary rocks consists of the remains of animals and plants. Limestone, chalk and corals are the most common of this type of sedimentary rocks.
- Chemically formed rocks are formed by the direct precipitation of mineral matter from solution. Rock-salt is an example of such rocks. Gypsum is also formed in a similar manner.
- **'Sandstone'** is a common sedimentary rock, is formed mainly of quartz particles cemented together by silica, lime or iron oxide.
- 'Shale' is most abundant of all sedimentary rocks. It is compacted silt and clay. Kaolin and clay minerals are abundant in it.
- **Rock gypsum** is a white to reddish in colour. Gypsum and rock salt are formed by the evaporation of sea water and salt lakes.
- 'Chalk' is a calcareous rock made up of microscopic skeletal elements from a varieties of limes secreting organism. It is composed of almost pure calcium carbonate.
- Most of the sedimentary rocks are permeable and porous but a few of them are also non-porous such as clay.

(3) Metamorphic Rocks

- In Greek language the word metamorphic means 'change of form'.
- When the original character of the rocks i.e. then colour, texture and mineral composition is partly or wholly changed, it gives rise to metamorphic rocks, under favourable conditions of heat and pressure.

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- The formation of metamorphic rock refers that in course of time shale may get changed to slate and schist, limestones to marble, sandstone to quartzite and granite to gneiss.
- The metamorphic rocks may be classified into two Categories : (i) The **Foliated** and (ii) **Non-Foliated**. The foliated rock is characterised by parallel arrangement of slaty minerals such as mica. In the non-foliated metamorphic rocks, the minerals grains are equi-diamensional e.g. quartzite and marble.

SOILS

- Soil is a mixture of many solids, liquid and gaseous substances. It forms the topmost layer of earth's crust.
- Soil has both the non-living and living matters like mineral particles, decaying plant remains, and insects living together with countless bacteria on its organic matter.
- Soil is the final product of the interactions between the weathering of underlying rock, the climate, plants and the activities of millions of insects and earthworm.

The Soil Profile

- The soil profile consists of the weathered material derived from the rock. But the bedrock itself does not form a part of it.
- A soil profile generally has three main horizons in it-true soil at the top, subsoil and the bedrock apart from it.
- Each horizon is quite distinct from the others by its own physical and chemical composition, and organic contents produced the long process of soil formation.
- Each soil type has physical properties like its colour, texture and the structure. They largely depend upon the nature of the bedrock from which they are derived.
- There are five soil forming factors-bedrock, local climate, plant and animal organisms, elevation, and the relief.

Soil Classification

- The two main zonal groups of soil are the Pedalfers and the Pedocals. These are further subdivided into twelve major soil types all over the Globe.
- Pedalfers are found in humid climates extending from high-latitude coniferous forests, mid-latitude deciduous forest lands to low-latitude tropical forests and grasslands.
- Pedocals group of soils are found in the arid, semi-arid and the sub-humid ones in the world.
- Pedocals are rich in calcium and mineral salts.
- The black earths or chernozomes are one of the richest soils of this group.

ATMOSPHERE

- The atmosphere is an insulating blanket protecting the Earth.
- It softens the intense light and heat of the Sun.

- It's ozone layer absorb most of the harmful ultraviolet rays from the Sun.

Composition

- The atmosphere is composed by various gases and water vapour, and in its uppermost reaches, it is charged with subatomic particles.
- Of the many constituents, carbondi oxide, dust particles, water vapour and ozone are of great importance for the earth's climatic conditions.
- Nitrogen serves mainly as a diluents and its main function is to regulate combustion by diluting oxygen.
- Carbon-dioxide, about 0.03 per cent of the dry air, is of great climatic significance. This gas emits about half of the absorbed heat back to the earth and hence a very important function in the heat energy budget.
- Ozone, less than 0.0005 per cent by volume, is not uniformly distributed in the atmosphere. It's greatest concentration is found between the altitude of 20 and 25 km. It absorbs the burning ultraviolet solar radiation.
- Water vapour content in the air may vary from 0.02 per cent by volume in the cold dry climate to nearly 4 per cent in humid tropics. It absorbs not only the long wave terrestrial radiation, but also a part of incoming solar radiation, thus regulating the energy transfer through the atmosphere. About 90 per cent of water vapour lies below 6 km. of the atmosphere. Only less than 1 per cent of the total atmospheric moisture in the atmospherie is found above 10 km.
- Dust particle include all the solid particles present in the air excepting the gases and water vapour. They absorb a part of the incoming short-wave solar energy. A certain percentage of solar radiation energy is reflected back by these solid particles.

COMPOSITION

Gas	Volume (in %)
Nitrogen (N2)	78.084
Oxygen (O2)	20.947
Argon (Ar)	00.934
Carbon Dioxide	00.314
Neon	00.0018
Helium	00.0005
Methane	00.0002
Krypton	00.0001
Hydrogen	00.00005

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STRUCTURE OF ATMOSPHERE

- The atmosphere has a layered structure.
- This is because of density stratification as a result of which lighter gases move up and denser one settles down.
- The atmosphere can broadly be divided into 5 layers, there are :

(1) Troposphere

- The troposphere is the lowest layer of the atmosphere.
- It extends roughly to a height of 8 km near the Poles and about 18km at the equator.
- Temperature decreases with height, roughly at the rate of 1°C for 165 meters of ascent. This is known as normal lapse rate.
- This layer contains dust particles and over 90 per cent of the earth's water vapour.
- All vital atmospheric processes leading to various climate and weather conditions take place in this layer.

(2) Stratosphere

- It lies beyond the Troposphere. The zone separating the two layers is known as the tropopause.
- The stratosphere extends upto a height of 50 km.
- In the lower part of this layer (upto 20 km) temperature remains constant. Afterwards it gradually increases upto a height of 50 km because of the presence of Ozone layer.
- Clouds are almost absent and there is very little dust or water-vapour.

(3) Mesosphere

- It extends upto a height of 80 km.
- Temperature decreases with height again and reaches upto-100°C at the height of 80 km.
- Bulk of the meteors are destroyed in this region.
- It is also called **'Chemosphere'.**
- In upper part of the Mesosphere (60-80 km) oxygen exists in its atomic form.

(4) Thermosphere

- It is located between 80 to 400 kms.
- In its lower part, there is an electrically charged layer called the **Ionosphere.**
- Radio waves transmitted from the earth are reflected back to the earth by this layer.
- Temperature again starts increasing with height because of radiation from the Sun.

(5) Exosphere

- It is the uppermost layer of the atmosphere extending beyond the Thermosphere above a height of 400 km.
- Here the atmospheric gases are very thin.

- This part is extremely rarefied and gradually merges with the outer space.
- Here the temperature may reach to astonishing high value of more than 5000°C.

Atmospheric Pressure

- Atmospheric Pressure is the weight of the column of air at any given place and time.
- It is measured by means of an instrument called a **Barometer.**
- It is measured as a force per unit area. The units used by meteorologists for this purpose are called Millibars (mb).
- The distribution of atmospheric pressure is shown on a map by Isobars.
- An Isobar is an imaginary line drawn through places having equal atmospheric pressure reduced to sea level.

WIND

- Horizontal movement of the air is called as wind. Due to horizontal differences in air pressure, air flows from areas of high pressure to areas of low pressure.
- The vertical or nearly vertical movement of air is referred to as air current.
- Winds and air currents together comprise a system of circulation in the atmosphere.

Types of Wind

(1) Planetary winds : These winds blow throughout the year from one latitude to the other in response to the latitudinal differences in air pressure, for example, the trade winds and the westerly winds.

- **Trade Winds :** The winds which blow from the sub-tropical high pressure towards the equatorial region of low pressure regularly throughout the year in many areas especially the oceans and the hot deserts from north-east in the northern hemisphere. It brings little rain except on the line of convergence of the two trade wind systems.
- **Westerlies :** The Westerly winds are those which blow with great frequency from the Horse Latitudes towards the polar region throughout the year with varying intensity and cause rain near the polar regions. Westerlies are stronger in the Southern Hemisphere because of the vast expanse of ocean water. Owing to their ferocious nature, they are also described as **"Roaring Forties", "Furious Fifties"** and **"Shrieking Sixties"** which were dreaded terms for navigation.
- **Doldrums :** Also known as inter-tropical convergence. It is the equatorial belt of low atmospheric pressure where the north-east and south east Trade winds converge it is a region of calmness. The calm periodically broken by storms, accompanied by heavy rains.

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- **Horse Latitude :** They are the sub-tropical belts of high atmospheric pressure over the oceans (near 30° latitude) between the regions of Trade winds and Westerlies. They are regions of calm, light variable winds and dry air. They are also known as calm of Cancer and calms of Capricorn.

(2) Periodic winds : The Winds changing their direction periodically with change in season are called periodic winds. Monsoons are the best examples of large scale modification of the planetary wind system.

- **Monsoon :** The word monsoon has been derived from the Arabic word "Mausam" which means season. The monsoon winds thus refers to the wind systems that have a pronounced seasonal reversal of direction.
- The monsoon winds blow over India, Pakistan, Bangladesh, Myanmar, Sri Lanka, Arabian Sea, Bay of Bengal, South-Eastern Asia, Northern Australia, China and Japan.

(3) Local Winds : Local winds develop as a result of local differences in temperature and pressure. They affect small areas and are restricted to the lowest levels of the troposphere.

- **Loo :** A very hot and dry wind (hot wave) in the North Western India and Pakistan which blows from the west in afternoon of May and June and may cause sunstroke.
- **Mistral :** The cold wind which originates over the snow-covered mountains of Alps and blows towards the Mediterranean Sea.
- **Chinook and Foehn :** Warm and dry local winds blowing on the leeward sides of the mountains are called Chinook in the USA and Foehn in Switzerland.
- **Tornado :** An extremely violent whirl-wind, covering a small area, sometimes wind velocity exceeds 300 km per hour. It occurs frequently in the Mississippi basin of the U.S.A. and Sahara.

Harmattan : The warm and dry winds blowing from north-east and east to west in the eastern parts of Sahara Desert are called "harmattan". Similar winds are called **'brickfielder'** in Australia, **'blackroller'** in USA, **'Shamal'** in Mesopotamia and Persian Gulf and **'Norwester'** in New Zealand.

Sirrocco : It is a warm, dry and dusty wind which blows in northerly direction from Sahara desert and after crossing Mediterranean Sea reaches Italy, Spain etc. Similar winds are known as **'Khamsin** in Egypt, **'Gibli'** in Libya, **'Chilli'** in Tunisia,

Humidity

- Humidity is the general term which describes the invisible amount of water vapour present in the air.
- Absolute Humidity is the weight of actual amount of water vapour present in a unit volume of air. It is expressed as grams per cubic meter of air.
- Specific Humidity is the weight of water vapour per unit weight of air. It is expressed as grams per kilogram of air.

- Relative Humidity is the ratio of the air's actual water vapour content to its water vapour capacity at a given temperature. It is expressed in percentage.
- Dew point is the temperature at which saturation occurs.

Evaporation and Condensation

- Evaporation is the process by which water is transformed from liquid to gaseous form.
- It takes approximately 600 colories of energy to convert one gram of water to water vapour.
- One calorie is the amount of heat required to raise the temperature of one gram of water to 1°C.
- Condensation is the process of change of state from gaseous to liquid or solid state.
- Dew, white frost, fog, mist, and clouds are various forms of condensation.
- When the moisture is deposite in the form of water droplets on cooler surface of solid objects such as stones, grass blacks and plant leaves, it is known as dew.
- The ideal conditions for dew formation are a clear sky, little or no wind, high relative humidity and cold and long nights.
- When condensation takes place at a dew point which is at or below freezing point, excess moisture is deposited in the form of minute ice crystals. It is called as white frost.
- Fog is defined as a cloud with its base at or very near the ground, Fogs are of different kinds depending upon the nature of the cooling process.
- Mist is also a kind of fog in which the visibility is more than one km but less then 2 km.
- Cloud is a mass of minute droplets of water or tiny crystals of ice formed by the condensation of the water-vapour in free air at considerable elevations.
- Generally there ar ten major types of clouds which are grouped under three main categories arranged according to their height.

Precipitation

- Condensation of water vapour in the air in the form of water droplets and ice and their falling on the ground is called precipitation.
- The precipitation in the form of drops of water is called rainfall.
- When the temperature is less than O°c precipitation takes place in the form of fine flakes of snow and is called snow-fall.
- Sleet is frozen raindrops and re-frozen snow water.
- Precipitation in the form of hard rounded pellets is known as hail.
- On the basis of its origin precipitation may be classified into three main types :

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(i) Convectional Precipitation : It is caused when moist winds are drawn into the convection currents of a hot region. It Generally occurs in equatorial region. The thundery rain of a summer afternoon is a typical example.

(ii) Orographic Precipitation : It is caused by the surface relief of the land, mainly, by the presence of mountain range. There is heavy rain on the wind-ward side.

(iii) Cyclonic Precipitation : It is associated with the passage of a cyclone or depression.

DRAINAGE

- The Drainage refers to a body of flowing water, ranging in scale from a rill to river.
- The evolution of drainage system in a particular region is determined by the nature of the original surface and the Geological structures.
- There are broadly two categories of drainage – Sequent Drainage System and Insequent Drainage System.

(1) Sequent Drainage System

(a) Consequent Stream : In the region of flooded structure, stream formed in the synclinical troughs is called synclinical consequent stream. Consequent stream follows the direction of the slope. Most of the stream draining the coastal plains of India are of this type.

(b) Subsequent Stream : When the master consequent stream is joined by its tributatary at right angles it is called subsequent stream. For example the river "Asan", a tributary of Yamuna and river **"Son"** a tributary of the Ganga are the subsequent streams.

(c) Obsequent Stream : It is the stream which flows following the direction of the slope opposite to master consequent stream. For example : the Mahabharat Range of lesser Himalayas, Ganga, Yamuna etc.

(d) Resequent Stream : Such stream follows the direction of master consequent stream that meets the subsequent stream at right angles.

(2) Insequent Drainage System

The streams which do not follow the regional slopes and drain across the geological structure are called insequent or inconsequent streams.

(a) Antecedent Drainage : The stream which originated before the upliftment of the surface on which they flow. For example, Indus, Sutlej and Brahmaputra are antecedent rivers as they originated before the upliftment of Himalayan Range and hence create deep George, along the Mountain Range.

(b) Superimposed Drainage : It is formed when the nature and characteristics of the valley and flow direction of a consequent stream develop on the upper geological formulation and structure are superimposed on the lower geological formation of the entirely different characteristics. For example, river Subarnarekha is superimposed on Dalma hills on the west of Chandil in the Chhotanagpur plateau region of Jharkhand.

EARTHQUAKES AND VOLCANOES

Earthquake

- An earthquake is basically the Vibration of Earth produced by the rapid release of energy.
- It is the movement of one rock mass against another that causes vibration.
- Focus, is the place of origin of earthquake inside the earth.
- Epicentre, is the point on the earth's surface vertically above the focus.
- Seismograph, is the instrument to record the earthquake. The intensity of earthquake is measured on **'Richter Scale'.**
- Isoseismal line, is the line joining place which experience the earthquake at the same time.
- It is estimated that over 30,000 earthquakes strong enough to be felt, occur world wide annually.
- The Longitudinal Waves (P. Waves), Transverse Waves (S. waves) and Surface Waves (L waves) are types of Seismic waves.
- About 68% of all earthquakes are observed in the vast region of The Pacific Ocean as a **'ring of fire'.**
- Around 21% of earthquakes occur in the Mid-World mountain belt extending parallel to the equator.

Volcano

- A volcano is a vent through which heated materials like gases, lava and rocks are ejected.
- Most volcanoes are an individual mountain or a hill nearly conical in shape.
- The top of the core has a depression known as the crater.
- A crater frequently turns into a lake later on.
- Lake Lonar in Maharashtra is an example of a crater.
- Lava blown out of the opening cools quickly in small solid pieces called Cinders.
- On the basis of frequency of eruption, volcanoes are classified into active, dormant and extinct volcanoes.
- The volcanoes which continue to erupt periodically are called active volcanoes. e.g. Etna and Vesuvius in Italy and Mona Loa in Hawaii island.
- The volcanoes which are devoid of any activity for a long time but in which there is a possibility of eruption are called "Dormant Volcanoes'.
  e.g. Fujiyama of Japan and Karakota of Indonesia.
- The volcanoes in which the eruption has completely stopped and is not likely to occur are called Extinct Volcanoes. e.g. Mt. Kilimanjaro in Africa.
- Most of the volcanoes in the world occur along linear belts or lines of weakness marked by intense folding and faulting.

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- The Pacific belt is known as the **'ring of fire'** because of the largest number of active volcanoes along the coasts of America and Asia around it.
- The Mid world volcanic belt occupies a second place running from west to east along the Alpine and Himalayan fold mountains and their extensions.

IMPORTANT ACTIVE VOLCANOES OF THE WORLD

Name	Location	Height (in metres)	Country
Ojos del Salado	Andes	6885	Argentina, Chile
Guallotiri	Andes		
Cotapaxi	Andes	6060	Chile
Tupungatito	Andes	5897	Equador
Lascor	Andes	5640	Chile
Popocatepeti	Altiplano de Maxico	5641	Chile
Nevado del & viz	Andes	5451	Maxico
Sangay	Andes	5400	Colombia
Klyuchevskaya	Sredinnyy Khrebet	5230	Equador
Soplea		4850	CIS
Purace	Andes	4590	Colambia
Wrangell	Wrangell mts.	4270	Alaska
Jajumulco	Guatemala	4220	Guatemala
Mauna Loa	Hawaii	4170	U.S.A.
Tacana	Sierra Medre	4078	Guatemala
Mt. Comeroon	Monarch	4070	Cameroon
Fuego	Serra Madre	3836	Guatemala
Erebus	Ross Island	3795	Antaractica
Rindjani	Lombok	3726	Indonesia
Pico de Teide	Tenerife Canary Island	3718	Spain
Someru	Java	3670	Indonesia
Nyiragongo	Viruga	3470	Zaire
Karyakskaya	Kamchat ka Peninsula	3456	CIS
Irazu	Cordilera	3452	Costa Central
Slamat	Java	3428	Indonesia
Mount Spurr	Alaska Range	3474	USA
Mont Etna	Sicily	3308	Italy
Agung	Bali	3142	Indonesia
Kilauea	Hawai	1247	USA
Stromboli	Islands	924	Mediterranean
Surtesey	Off SE Iceland	1963	–
Ana	Karakota Island	155	Indonesia

MOUNTAINS

Mountains

- An uplifted portion of the earth's surface is called a mountain.
- On the basis of their origin or mode of formation, the mountains are classified as structural, residual or dissected and volcanic.

Structural Mountains

- Such systems are hundreds of kilometers wide and thousands of kilometer long.
- Many of them lie near or parallel to continental coastlines.
- Both the fold and the block mountains are included in this type.
- **Fold Mountains :** These mountains have originated due to compressional tectonic forces and have been thrown up to form fold mountains e.g. Himalayas, Andes, Alps etc.
- On the basis of age the fold mountains can be grouped into

(i) **New or Young Fold Mountains :** *Example* : The Alps, the Himalayas, the Circum-Pacific Oceanic Mountains, etc. The main features of these mountains are the complex folding of the rocks, faulting, volcanic activities, the erosion & weathering caused by running water, ice, winds, etc.

(ii) **Old Fold Mountains :** *Example* : The Caledonion and Hercynian mountains of Central Europe, the Pennines, the Highland of Scotland, etc. These mountains were folded in very ancient times, then subjected to denudation and uplift; many faults were formed and the layers of the rock were wrapped. Many mountains exist as relics due to erosion.

- **Block Mountains :** These mountains are formed when great blocks of the earth's crust may be raised or lowered during the late stages of mountain–building.
- When the earth's crust cracks due to tension or compression, faulting takes place. A section of the landform may subside or rise above the surrounding level giving rise to Block Mountains or Horst or Rift valley or Graben. The Block Mountains have a steep slope towards the rift valley but the slope on the other side is long and gentle.
- An old fold mountain may also be left as block mountains due to continuous denundation.
- The Vosges in France, Black Forest in Germany and Salt Range in Pakistan are cited as typical examples of block mountains.

Volcanic Mountains

- These mountains are formed by the accumulation of volcanic material.
- The slope of the mountains becomes steep and the height increases due to the development of the cones of various types like Cinder cones, Composite cones, Acid lava cones, Basic lava cones, etc.

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- Well-known examples of this type are Popocatepetle of Maxico, Mount Raineer of Washington, Lessen Peak of California, the Visuvious of Italy, the Fujiyma in Japan, the Aconcagna in Chile etc.

Residual or Dissected Mountains

- They owe their present form due to erosion by different agencies.
- They have been worn down from previously existing elevated regions.
- This type of Mountains includes, Vindhyachal ranges, Aravallis, Satpura, Eastern and Western Ghats, Nilgiris, Parasnath, Girnar, Rajmahal.

HYDROSPHERE

- Hydrosphere is the water surface which includes the oceans, lakes and rivers.
- It is estimated that the hydrosphere contains about 1,460,000 cubic km of water.
- Of this 97.3% is in the oceans and inland seas. The rest 2.7% is found as glaciers and ice caps, fresh water lakes, rivers and underground water.

Oceans and Seas

- The oceans comprise more than 70.1% of the earth's surface.
- They exert a great influence upon the global and regional climates.
- They help to modify the distribution of temperature along the coastal areas.
- They help to sustain the hydrological cycle.
- Oceans are the repositiories of a large number of useful metallic and non-metallic minerals such as petroleum, gas, common salt, gold, diamond etc.
- The sea, as a biological environment is, the easiest available and an inexhaustible source of food and other products of value to man.
- Of all the marine resources, fish is the most abundant and important.

OCEAN RELIEF

- **Continental Shelf :** It is the seaward extension of the continent from the shoreline to the continental edge.
- The continental shelves provide the richest fishing ground in the world e.g. the Grand Banks off Newfound land, the North sea and the Sunda shelf.
- The shelves are also potential mining sites for minerals.
- A significant proportion of the world production of petroleum and natural gas comes from them.
- The average width of shelves is about 70km and the mean slope is less 1.

Continental slope

- It lies at the edge of the continental shelf, generally up to the depth of 2000 fathoms (3660 mt.) from the mean sea level.
- It has a steep slope with the angle of slope varying from 2° to 5°.
- It covers about 8.5% of the total oceanic area and individually about 12.4% of the Atlantic Ocean, 7.1% of the Pacific ocean and 6.5% of the Indian ocean.
- The continental blocks are supposed to end at the site of continental slope.
- The continental slope along the many coasts of the world is furrowed by deep canyons like trenches terminating as fan-shaped deposits at the base.
- There are five types of continental slopes-(a) fairly steep with elongated hills and basins, (b) gentle slope with elongated hills and basins, (c) faulted slope, (d) slope with terraces & (e) slopes with seamounts.

Continental Rise

- The place where the continental slopes end, the gentle sloping continental rise begins.
- The average slope is between 0.5° and 1° & its general relief is low.
- With increasing depth the Continental Rise becomes virtually flat and it merges with abyssal plain.

Abyssal Plains

- Beyond the Continental Rise it is found at the depth of 3000 to 6000 mt.
- They cover about 40% of the total ocean floor and generally are bounded by hills on the seaward side.
- They are almost flat with a gradient less than 1:100.
- They are covered by sediments both of terrigenus and shallow water origins. The irregular topography of the abyssal plain are burried forming relatively flat areas due to large supply of sediments.

Submarine Ridges

- These are the mountain ranges on the ocean
- A large number of submarine ridges are placed centrally in the oceans.
- At some places their summits may rise above the sea level forming islands.

Abyssal Hills

- A deep sea floor also contains numerous isolated abyssal hills, sea-mounts and guyots.
- A submarine mountain peak rising more than 1000 mt. above ocean floor are known as "seamount".
- Flat topped seamounts are known as "Guyots".
- All the above features are volcanic in origin.

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Submarine Trenches or Deeps

- A long narrow and steep sided depression on the ocean floor is called trench. These are the deepest part of the ocean.
- They are usually 5500 mt. in depth and lie along the fringes of the deep sea plains and usually run parallel to the bordering fold mountains or the island claims.
- They are believed to have resulted from faulting or down folds of the earth crust and so tectonic in origin.
- They are most common in the Pacific ocean like "Mariana Trench", off the Guam Island Chain which is deepest (11022 mt.) in the world.

Submarine Canyons

- These are the deep gorges on the ocean floor and are restricted to the continental shelves, slopes and rises.
- Some canyons begin at the edge of the continental shelf and extend down the continental slope. For example-"Oceanographer Canyon" near New-England.
- Some canyons have dendritic appearance like off the east coast of Southern California.
- Some begins at the river mouth and extends over the continental shelf as "Zaire", Mississipi" and "Indus" canyons.

Bank, Shoal and Reef

- These are the marine features which are formed through the processes of erosion, deposition and biological activity.
- Banks are almost flat topped elevation located in the continental margin. The depth of water is relatively small but adequate for navigation and are sites of rich fishing e.g. "Dogger Bank" (North Sea), "Grand Bank" (off Newfoundland).
- Sholes are detached elevation with shallow depth. They are dangerous for navigation as they only 18-20 mt. below the sea level.
- Reefs are the mound or rocky elevation like ridges made of organic deposit. 'Great Barrier Reef' (off Queensland, Australia) is the largest reef in the world.

SALINITY

- Salinity is expressed as the number of grams of dissolved salts in 1000 grams of sea water.
- The average salinity of oceans is about 35 per thousand or 35%.
- The amount of salinity determines the composition and movements of the sea water and the distribution of various marine lives.
- Salinity varies both horizontally and vertically.
- The average salinity of N-Hemisphere is 34% while for S-Hemisphere it is 35%.
- The greatest proportion of salt is found in two areas which lie about the Tropic of Cancer and the Tropic of Capricorn. From these regions the salinity decrease both towards equator and the poles.
- In general there is low salinity in equatorial zone, high in tropical belt, low in temperate zone and minimum in sub-polar zone.

OCEAN MOVEMENTS

- Ocean currents are swift moving, large masses of surface water that move in a fairly defined direction.
- Ocean currents are of two types-the warm currents and the cold currents.
- In the Northern Hemisphere, the current move to their right and in Southern Hemisphre to their left.
- In Northern Indian Ocean the currents change their direction in response to the reversal of the monsoon winds.
- The periodic phenomenon of alternate rise and fall in the sea levels is known as Tide.
- Tides are produced due to gravitational interaction of Earth, Moon and Sun.
- Moon exerts the strongest influence on tides because of its closeness to Earth.
- On the full moon and the new moon tides are the highest (Spring Tides)
- On the Ist and 3rd quarters, tides are lower than the usual (Neap tides).
- Waves are oscillatory movements in water mainly produced by winds.
- Tsunamis

MISCELLANEOUS INFORMATION

ZONES OF JURISDICTION

(i) **Territorial waters** : over which a state has full sovereignty. They are recognised as extending for 12 nautical miles from the coastline.

(ii) **Contiguous Zone or pursuit zone :** extends for further 12 nautical miles in which the coastal state can take action against those who break the law within the true territorial waters.

(iii) **Exclusive Economic Zone (EEZ) :** extends for 200 nautical miles, starting from the same base line as the territorial waters. Within the EEZ, the coastal state has the right to exploit all economic resources.

(iv) High Seas lie beyond all these zones, and are free to navigation by vessels of all nations.

OCEAN CURRENTS

Ocean	Currents	Nature
Pacific	Kuroshio	Warm
	Oyashio	Cold
	Okhotsk	Cold
	Alaskan	Warm
	California	Cold
	East Australian	Warm
	Peruvian/Humboldt	Cold

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Ocean	Currents	Nature
Atlantic	Antilles	Warm
	Florida	Warm
	North Atlantic Drift	Warm
	Gulf Stream	Warm
	Labroador	Cold
	Canaries	Cold
	Brazil	Warm
	Falkland	Cold
	Benguela	Cold
Indian	Mozambique	Warm
	Agulhas	Warm
	West Australian	Cold

MAJOR TRENCHES

Name	Location
Mariana Trench	Pacific Ocean
Kurile Trench	Pacific Ocean
Java Trench	Indian Ocean
Kermadec Trench	Pacific Ocean
Japanese Trench	Pacific Ocean
Aleutian Trench	Pacific Ocean
Tonga Trench	Pacific Ocean
Mindanao Trench	Pacific Ocean
Peru-Chile Trench	Pacific Ocean
Puerto Rico Trench	Alantic Ocean
Nares Trench	Atlantic Ocean

REGIONAL GEOGRAPHY

The Continents

Name	Area (sq.km.)	Percentage of Earth's area	Population estimates (million)
Asia	43,998,000	29.5	3721
Africa	29,800,000	20.0	818
N. America	21,510,000	16.3	453
S. America	17,598,000	11.8	387
Europe	9,699,550	6.5	727
Australia	7,699,000	5.2	21
Antarctica		9.9	Uninhabited

Continent	Mean Elevation (m)	Highest Elevation (m)	Lowest Elevation (m)
Asia	923	Mt Everest (8850)	Dead Sea (-396)
Africa	585	Mt Kilimanjaro (5951)	Lake Assal (-151)
N. America	615	Mt McKinley (6252)	Death Valley (-87)
S. America	554	Mt Aconcagua (7026)	Valdes Peninsula (-40)
Antarctic	1846	Vinson Massif (5189)	Bentley Subglacial Trench (-2538)
Europe	302	Mt El'brus (5687)	Caspian Sea (-28)
Australia	308	Mt Kosciusko (2251)	Lake Eyre (-16)

AFRICA–FACT FILE

- The African continent is separated from Europe by the Mediterranean Sea and from Asia by the Red Sea.
- Suez Canal is a 160 km long man-made canal which cuts through the isthmus between Egypt and Sinai Peninsula.
- Harmattan is a hot dry, dust laden wind blowing from the Sahara to the Guinea coast.
- One of the striking features of Africa is its Great Rift Valley.
- The northwest African countries of Morocco, Algeria and Tunisia are together called the Maghreb.
- Lake Victoria is the largest lake in Africa and the source of White Nile.
- Lake Tana in Ethiopia is the source of Blue Nile.
- Liberia is a leading producer of coffee and rubber.
- Lake Chad is the region of inland drainage.
- Madagascar is actually a huge block of Africa that separated from the mainland about 80 million years ago.

FACTS TO REMEMBER–AFRICA

Land of Gold and Diamonds	**South Africa**
New capitals of Nigeria & Tanzania	**Abuja, Dodoma**
Clove Bowl of the World	**Zanzibar & Pemba**
A hot local wind blowing from Sahara to Guinea Coast	**Harmattan**
Lake Nasser is on	**River Nile**
River boundary between S Africa and Botswana	**River Limpopo**
Akosombo dam is on	**River Volta**
Largest waterfall in the world	**Victoria Falls**
Victoria falls are on	**River Zambezi**
Two countries of Africa that were never colonized.	**Ethiopia, Liberia**

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➢ Falls discovered by Livingstone	**Victoria Falls**
➢ Kimberley is famous for	**Diamond**
➢ Witwatersrand is famous for	**Gold**
➢ African coutnry with the best quality magnetite ore	**Liberia**
➢ Pastoral tribe of Kenya	**Masai**
➢ River Orange is a boundary between	**S Africa & Namibia**
➢ A new country carved out of Ethiopia during 1992s	**Eritrea**
➢ Lourenco Marques was renamed as	**Maputo**
➢ S African farmer of Dutch descent	**Boer**
➢ Countries bordering Lake Victoria	**Tanzania, Kenya, Uganda**
➢ Gate of Tears	**Bab-el-Mandeb**
➢ A highly nutrutious crop of Ethiopian highlands	**Teff**
➢ Most tropical of all continents	**Africa**
➢ Place of origin of Coffee	**Ethiopia**
➢ A flightless bird of Kalahari desert	**Ostrich**
➢ Eastern most terminus of Tanzara railway which begins from Katanga mineral belt	**Dar-es-Salam**
➢ Country facing the strait of Bab-el-Mandeb	**Djibouti**
➢ Country with maximum HEP potential in Africa	**Zaire**
➢ Gold, Ivory, Slave and Grain coasts, arranged west to east	**Grain, Ivory, Gold, Slave coast**
➢ The religion followed by many tribes in Afric a which is based on love and respect of nature	**Animism**
➢ The Victoria Fall was discovered by	**David Livingston**
➢ The policy of segregating people on the basis of their race or their colour of skin	**Apartheid**
➢ The Pastoral tribe of Kenya and Tanzania	**Masai**
➢ The famous Cobora Bassa Dam is on the river	**Zambezi**
➢ The famous Kainji Dam is on the river	**Niger**
➢ The river forming the boundary between Zambia and Zimbabwe	**Zambezi**
➢ A region of inland drainage	**Lake Chad**
➢ Seat of legislature of S Africa	**Cape Town**
➢ Natural region with the greatest biodiversity	**Rain Forests**

➢ Judicial capital of South Africa	**Bloemfontein**
➢ The temperate grassland of S Africa	**High Veld**
➢ Countries witch form the Horn of Africa	**Ethiopia, Somalia, Djibouti**
➢ Nubian desert lies in	**Egypt**
➢ The only river that crosses the equator twice	**River Zaire**
➢ Aborigines of upper Nile	**River Zaire**
➢ Administrative capital of S Africa	**Pretoria**
➢ Land of Oil Palm	**Nigeria**
➢ The only river to cross the Tropic of Capricorn twice	**Limpopo**
➢ The hot dry wind blowing in the South Eastern part of South Africa	**Berg**
➢ The famous Copper Mines of Zaire	**Lubumbashi**
➢ The famous Copper and Cobalt Mines of Zaire-Zambia	**Katanga**
➢ The Ngana, tropical disease of cattle in Africa is carried by	**Tsetse fly**
➢ The Coal Mines of Zimbabwe	**Wankee**
➢ The tribes who are the forests dewellers of the Congo basin	**Pygmies**
➢ The Sirocco winds in Libya is known as	**Gibli**
➢ The leading producer of mienral oils in Africa is	**Nigeria**
➢ The largest producer of Sisal in Africa is	**Tanzania**
➢ The Desert in the North East of Sudan	**Nubian Desert**
➢ The South African town where Mahatma Gandhi, on being thrown out of the train, waved to fight racism	**Pietermoritzberg**
➢ The Kalahari desert is situated between the rivers	**Orange and Zambezi**
➢ The country having highest death rate and least life expectancy in world	**Sierra Leone**
➢ A hot lcoal wind blowing from Sahara to Mediterranean	**Sirocco**
➢ The oldest surviving African language	**Swahili**
➢ Most of Kalahari lies in	**Botswana**
➢ Farmers of Egypt are also called	**Fellahin**
➢ Three poitns where Africa almost touches Eurasia	**Gibraltar, Suez and Bab-el-Mandeb**
➢ Southernmost tip of Africa	**Cape of Agulhas**
➢ The highest peak in Africa	**Mt Kilimanjaro**

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➢ City of the confluence of Blue and White Nile	**Kahrtoum**
➢ The hottest place in the world	**Al-Azizhiya, Libya**
➢ The three Maghreb Republics	**Morocco, Algeria, Tunisia**
➢ Source of Blue Nile and White Nile	**L Tana, L Victoria**
➢ The Little and the Great Bitter lakes are along	**Suez Canal**
➢ A large geographically disadvantaged State	**Zaire**
➢ The lowest point in Africa	**Lake Assal, Djibouti**
➢ The nomadic herders of Sahara	**Tuaregs**
➢ The main entrepot of E Africa	**Zanzibar**
➢ A large lake in East Africa not lying in the Great Rift valley	**Lake Victoria**

FACTS TO REMEMBER-NORTH AMERICA

➢ Chicago is located on	**Lake Michigan**
➢ Niagra Falls lie between	**Lakes Erie and Ontario**
➢ The canal joining lakes Superior and Huron	**Soo Canal**
➢ The canal joining lakes Erie and ontario	**Welland canal**
➢ The 'Big Apple' describes the city of	**New York**
➢ North America is largest urban agglomeration	**New York**
➢ The rocket launching centre of USA	**Cape Kennedy, Florida**
➢ Busiest airport of the US	**J F Kennedy Airport, New York**
➢ The driest and the hottest place in USA	**Death Valley**
➢ The most recent federal territory of Canada	**Nunavut**
➢ The number of provinces and federal territories in Canada	**10 & 3 respectively**
➢ The largest provicne of Canada	**Quebec**
➢ The most populated province of Canada	**Ontario**
➢ The largest city of Canada	**Toronto**
➢ The smallest province of Canada	**Prince Edward Island**
➢ Canada is the largest producer of	**Paper and pulp**
➢ Highest tidal range is experienced in	**Bay of Fundy**
➢ The 'Detroit of Canada'	**Windser**
➢ The 'Birmingham of Canada'	**Hamilton**
➢ The Sudbury mines in Canada are famous for	**Lead, Zinc & Silver**

➢ The Strait separating N. America from Greenland	**Davis Strait**
➢ The Canadian Pacific Railway runs between	**St. John's in New Brunswick and Vancouver**
➢ The most famous Aircraft manufacturing Centre of the USA	**Seattle**
➢ Death valley is situated along the river	**Colorado**
➢ Fort worth and Dallas are called "Twin Cities" are situated at the bank of river	**Trinity**
➢ Washington DC is located on the bank of river	**Potomac**
➢ The two provinces of Canada from where 75% of mineral oil comes	**Alberta and Saskatchewan**
➢ The Latitude dividing USA and Canada	**49° N**
➢ The head office of the software giant Microsoft is in	**Seattle**
➢ The Canadian National Railway connects	**Halifax to Prince Rupert in British Columbia**
➢ Mediterranean type of climate is found in	**California**
➢ The confluence of Mississippi and Missouri	**St. Louis**
➢ The busiest inland waterway of North America	**St. Lawrence**
➢ The 49th and 50th States of USA are	**Alaska and Hawaii**
➢ The 'Old Faithful' Geyser is in	**Yellowstone National Park, Wyoming**
➢ The largest importer and consumer of oil	**USA**
➢ Smallest State of USA	**Rhode island**
➢ Most populated State of USA	**California**
➢ Longest river of USA	**Mississippi-Missouri**
➢ Highest peak in N. America	**Mt. Mckinley**
➢ Highest peak in conterminus USA	**Mt. Whitney**
➢ The river forming a boundary between USA and Mexico	**Rio Grande**
➢ Hollywood is in the State of	**California**
➢ The first President of the US	**George Washington**
➢ Great Lakes arranged from West to East	**Superior, Michigan, Huron, Erie and Ontario**

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➢ The lowest point in the USA is	**The Death Valley (86 m below sea level)**
➢ The city of Golden Gate	**San Francisco**
➢ Mackenzie, the longest river of Canada drains into	**Beaufort Sea**
➢ The State of USA which is the leading producer of cotton	**Texas**
➢ The representative station of Laurentian type of climate in N. America	**Toronto**
➢ The type of delta formed by the river Mississippi in the Gulf of Mexico	**Bird foot type**
➢ The area of inland drainage in the N. America	**The Great Basin area**
➢ Biggest naval and fishing port on the Pacific coast	**Victoria**
➢ The State of USA in which the famous Yellow stone National Park is situated	**Wyoming**
➢ The capital of Hawaii and known as "the cross roads of Pacific"	**Honolulu**
➢ The famous Hoover dams is on river	**Colorado**
➢ The country that leads in production of fine paper from grasses	**USA**
➢ The leading producer of Newsprint and Pulp in the world	**Canada**
➢ The Strait of Florida separates	**USA and Cuba**
➢ The Magnetic North Pole located on	**Prince of Wales Island (70°N 100°W)**
➢ The largest consumer and importer of mineral oil in the world	**USA**
➢ Canada's smallest and most densely populated province	**Prince Edward Island**
➢ The last province to Join Canada in 1949	**Newfoundland**
➢ The most famous Industrial Centre of USA having specialisation in automobile tires	**Akron**
➢ An intensly cold and strong wind accompanied by falling show bund in northern N. America	**Bilzzard**
➢ Iron and steel capital of the world	**Pittsuburgh**
➢ The shape of the famous corn belt of USA is	**Rectangular**
➢ The first Census in the USA was held in	**1790**

FACTS TO REMEMBER–SOUTH AMERICA

➢ Largest tributary of Amazon	**Maderia**
➢ Highest peak of South America	**Mt Aconcagua**
➢ Argentinian ranches are called	**Estancias**
➢ Largest city of South America	**Sao Paulo**
➢ Highest wood that is found only in South America	**Balsa**
➢ Highest navigable lake in the world	**Titicaca**
➢ Only country through which both equator and one of the tropics pass	**Brazil**
➢ South American countries which coasts along both Pacific and Atlantic oceans	**Colombia, Chile**
➢ Copper capital of the world	**Chuquicamata**
➢ Official language of Brazil	**Portuguese**
➢ Brazil shares its boundary with all South American countries except	**Chile and Equador**
➢ Buffer states between Argentina & Brazil	**Paraguay, Uruguay and Bolivia**
➢ Coffee soils of Brazil	**Terra Roxa**
➢ The highest active volcano in the world	**Mt Ojas del Salado**
➢ The flightless bird of South America	**Emu**
➢ People of mixed European and American Indian ancestry who work on cattle farms	**Gauchos**
➢ South America's largest steel making facility	**Tubarao, South Brazil**
➢ Coffee plantations of Brazil are called	**Fazendas**
➢ Land-locked countries of South America	**Bolivia, Paraguay**
➢ Countries in descending order of population	**I. Brazil II. Columbia III. Argentina IV. Peru**
➢ Trans-Andean railway connects	**Buenos Aires and Valpariso**
➢ Tropical grasslands of South America	**Llanos and Campos**
➢ Bolivia is named after	**Simon Bolivar**
➢ Hot winds blowing down the Andes in Argentina	**Zonda**
➢ Temperate Grasslands of Argentina	**Pampas**
➢ A violent cold wind in Argentina and Uruguay	**Pampero**
➢ Angel falls, the highest in the world is on	**Orinico river, Venezuela**

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➢ Lake Maracaibo, famous for crude oil is in	**Venezuela**
➢ Kouro, the French satellite launching station is in	**French Guiana**
➢ Caliche (Sodium Nitrate) is found in	**Atacama Desert**
➢ South American countries bordering Caribbean Sea	**Colombia, Venezuela, Guyana, Surinam, French Guiana and Brazil**
➢ South American country which is a member of OPEC	**Venezuela**
➢ Outport of Sao Paulo	**Santos**
➢ Trees that yield quinine	**Cinchona**
➢ Coffee pot of the world	**Brazil**
➢ Legal capital of Bolivia	**Sucre**
➢ Administrative capital of Bolivia	**La Paz**
➢ Southern most inhabited city in the world	**Punta Arenas, Chile**
➢ World's largest exploitable reserves of copper	**Chile**
➢ Most mineral rich State of Brazil	**Minas Gerais**
➢ Strait between South America and Antarctica	**Drake Passage**
➢ Driest place on earth	**Iqique, Atacama**

FACTS TO REMEMBER–AUSTRALIA

➢ The international airlines of Australia	**Qantas Airways**
➢ The southern most capital city of the world	**Wellington**
➢ Largest lake of Australia	**Eyre**
➢ The pride of Australia, Don Bradman, hails from the city of	**Brisbane**
➢ The Strait between North & South Island of New Zealand	**Cook Strait**
➢ The biggest city of New Zealand	**Auckland**
➢ The first European to discover New Zealand	**Abel Tasman**
➢ The most populous urban centre in New Zealand	**Auckland**
➢ The highest peak of New Zealand	**Mt. Cook**
➢ The chief farming region in New Zealand	**Canterbury Plains**
➢ The largest territory of New Zealand	**South Island**
➢ The highest uplifted coral island in the world	**Niue**

➢ The largest State of Australia	**Western Australia**
➢ The Trans-Continental Stuart Highway of Australia connects	**Northern Territory and South Australia**
➢ Australasia stands for	**Australia and New Zealand**
➢ The city of Australia known for lead-zinc and silver mines	**Sydney**
➢ Capital and chief harbour of Queens–land	**Brisbane**
➢ Centre of lignite and sub bituminous coal mining in Australia	**Ipswich**
➢ The tree of Australia which yields golden flowers in summer	**Wattle**
➢ Beside Kangaroo, the other two famous marsupial of Australia	**Koala & Wallby**
➢ The wild dog of Australia	**Dingo**
➢ The largest producer of Bauxite in the world	**Australia**
➢ The labourers working in the sheep stations of Australia are known as	**Jackaroos**
➢ The Australian province which has maximum number of sheep	**New South Wales**
➢ The Australian province having highest number of cattle	**Queens land**
➢ Two important varieties of Eucalyptus found in Australia	**Jarrah and Karri**
➢ The country which generates 7% of its energy from geo-thermal springs	**New Zealand**
➢ The most famous geysers of Maori town	**Pohutu Geyser**
➢ The Australian cities in decreasing order of population	**Sydney, Melbourne, Brisbane**
➢ The Australian Trans-Continental Railway connects	**Sydney to Perth**
➢ The major roads in Australia are called	**Commonwealth High-ways**
➢ A self-governing overseas territory of New Zealand	**Niue**
➢ The first coutnry to enfranchise women	**New Zealand**
➢ The largest city of New Zealand	**Auckland**
➢ The largest city of Australia	**Sydney**

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➢ The New Zealander who was the 1st to scale Mt. Everest	**Edmund Hillary**
➢ Plains of New Zealand famous for the dairy industry	**Taranaki**
➢ Region of inland drainage in Australia	**Lake Eyre**
➢ Natural fountains in Australia	**Great Artesian Wells**
➢ Highest mountain peak in Australia	**Mt. Kosciusko**
➢ Strait between Australia and Tasmania	**Bass Strait**
➢ Great Barrier reef lies off the coast of	**Queensland**
➢ The longest tributary of Murray-Darling	**Marambidgee**
➢ Kalgoorlie is famous for	**Gold Mining**
➢ An animal bird with 4 legs that lays eggs	**Platypus**
➢ National animal of Australia	**Kangaroo**
➢ Most industralised State of Australia	**Victoria**
➢ Mt. Tom Price is famous for	**Iron**
➢ Lead-Zinc-Silver are mined at	**Mt. Isa and Broken Hills**
➢ Weipa in Cape York Peninsula is famous for	**Bauxite**
➢ Australian Temperate Grasslands	**Downs**
➢ Strait between Australia and New Guinea	**Torres Strait**
➢ City of Canberra was designed by	**Water Burley Griffin**
➢ Outport of Perth	**Freemantle**
➢ Aborigines of Australia	**Bindibus**
➢ Canberra is located on river	**Molonglo**
➢ The city where 2000 Olympics were held	**Sydney**
➢ Dry interiros of Australia	**Australian Outback**
➢ The most populated of the Australian states	**New South Wales**
➢ Two federal territories of Australia	**Northern Territory; Australian**
➢ Capital of Tasmania	**Hobart**
➢ Sheep rearing farms in Australia are called	**Stations**
➢ Gippsland is famous for	**Petroleum**
➢ The aborigines of New Zealand of Polynesian descent	**Maoris**

FACTS TO REMEMBER – ASIA

➢ The lowest point of the world	**Dead Sea (400 m below sea level)**
➢ The saltiest lake in the world	**Lake Van (Turkey)**
➢ The salt lake in Chian which is the site of numerous nuclear testing	**Lake Lop Nor**
➢ The river which forms the boundary between Thailand and Cambodia	**Mekong**
➢ The region which is known as the "cross roads of culture"	**S.E. Asia**
➢ The river which forms the boundary between Russia and China	**Amur**
➢ World's longest artificial waterway from Beijing to Nanjing	**Ground Canal**
➢ The mountain which divides China into North and South China	**Quinling mountain**
➢ The channel which separates Andaman Nicobar Islands from Sumatra	**Great channel**
➢ The land of white elephant	**Thailand**
➢ The largest Buddhist Temple	**Borobudor (Java)**
➢ The two States of Malaysia located in the northern Borneo	**Sarawak and Sabah**
➢ The Singapore of future	**Pening**
➢ The land of golden Pagoda	**Myanmar**
➢ The countries forming the golden triangle, the region known for opium cultivation	**Laos, Myanmar and Thailand**
➢ The city which is the world's largest supplies of cinchona for Quinine	**Banlung**
➢ The Balkan of East	**S.E. Asia**
➢ The official language of Indonesia	**Bhasa Indonesia**
➢ The home of green revolution	**Philippines**
➢ The largest Peninsula of the world	**Arabian Peninsula**
➢ The two countries of Asia which are also partly in Europe	**Turkey and Russia**
➢ The key to Black Sea	**Strait of Bosporus**
➢ The Paris of East	**Beirut**
➢ The Island of Pearl	**Bahrain**
➢ The land of five Seas	**Saudi Arabia**
➢ Countries having control over the strait of Bab-el-Mandeb	**Yemen and Djibouti**
➢ Countries having control over the strait of Hormuz	**Oman and Iran**

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➢ The largest Salty desert of the world situated in the Northern Iran	**Dasht-i-Kavir**
➢ The countries forming Golden crescent, the region of illict opium cultivation	**Pakistan, Afghanistan & Iran**
➢ Most famous of shore oil well of Burnei	**Ampa**
➢ The island country of the Persian gulf	**Behrain**
➢ The cultural capital of Iran	**Shiraz**
➢ The Land of Seven Hills	**Jordan**
➢ The Land of Rivers and Distributaries	**Bangladesh**
➢ The country of Canals	**Pakistan**
➢ World's largest non-capital city	**Shanghai**
➢ The steel capital of China	**Anshan**
➢ The Detroit of Japan	**Nagoya**
➢ The longest river of Asia	**Chang Jiang**
➢ The life line of Myanmar	**Irrawaddy**
➢ The island which is known as the Rice Bowl of Philippines	**Luzon**
➢ "The land of thunder dragon"	**Bhutan**
➢ The largest dam of Pakistan which is located on the Jhelum river	**Mangla Dam**
➢ The longest river of Sri Lanka	**Mahaweli Ganga**
➢ The only active volcano of philippines	**Mount Mayan**
➢ The three cities of Pakistan known for growing fruits	**Chaman city, Quetta and Kalat**
➢ The twin ancient towns of Pakistan where river of the Indus Valley Civilisation have been excavated	**Harappa & Mohenjodaro**
➢ The only hydroelectric project of Bhutan with the help of India	**Chukha Project**
➢ The famous tin and tungsten mines of Myanmar	**Tanintharyi**
➢ The place where pearls are found in Myanmar	**Gulf of Martaban**
➢ The coldest place in the Northern Hemisphere	**Verkhoyansk (Russia)**
➢ The Strait that separates Hokkaido and Honshuislands of Japan	**Tsugaru strait**
➢ The Manchester of Japan	**Osaka**
➢ The tough and fearless people, Kirghiez are also known as	**Tartar**

➢ The famous variety of orange found in Israel	**Jaffa**
➢ The discontinguous city of Russia	**Kaliningrad**
➢ The contribution of Japan in the total fishing haul of the world	**15%**
➢ The island on which the cities of Tokyo and Yokohama are located	**Honshu**
➢ The biggest trading partner of Japan	**USA**
➢ The tropical cyclone biting the southern coast of Japan frequently	**Typhoons**
➢ The two important oil fields of Japan	**Nigata, Akita**
➢ The southern island groups of Japan	**Kerma Island**
➢ The roof of the Korean Peninsula	**Korma Highlands**
➢ The deepest fresh water lake of the world	**Lake Baikal**
➢ The Sick Man of Europe	**Turkey (Asia Minor)**
➢ The Switzerland of Middle East	**Lebanon**

FACTS TO REMEMBER – EUROPE

➢ The biggest and the richest coal producing area of Europe	**Ruhr**
➢ Besides Ruhr, the other two important coal fields of Germany	**Saar, Saxony**
➢ The Iron ore in Germany is mainly found in	**Bavaria**
➢ The country of Europe having maximum coniferous trees	**Sweden**
➢ The canal which Joins Baltic Sea with North Sea	**Kiel canal**
➢ The city of Russia on the bank of the Angara river having world's tallest hydel power scheme	**Brotsk**
➢ The Bay of Biscay separates	**France and Spain**
➢ The key to the Mediterranean	**Strait of Gibralter**
➢ The Bosporus Strait separates	**Istanbul and Anatolia Peninsula**
➢ The longest river of Russia	**Ob-Irtysh**
➢ The Manchester of Italy	**Milan**
➢ The Detroit of Italy	**Turin**
➢ The most important fishing ground of UK	**Dogger Bank**
➢ A large mountain mass with one or two summits	**Massif**

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➢ A narrow gate between the Vosges and the Jura through which the river Rhine passes	**Burgundy Gate**
➢ The longers river of Europe	**Volga**
➢ The three CIS countries which are known as Baltic States	**Estonia, Lithuania, Latvia**
➢ Big embankments built along the sea front to protect the land from the sea	**Dykes**
➢ The land which is reclaimed from the sea by making dykes	**Polders**
➢ The city of five ports	**Moscow**
➢ The second largest country in Europe, next only to Russia	**France**
➢ More than 90% of iron ore of France comes from	**Lorraine field**
➢ The silk industry of France is located in	**The Rhone valley**
➢ The White City of North	**Helsinki (Finland)**
➢ The city known as "the key to the Baltic"	**Copenhagen**
➢ The only fibre crop of Europe which is used for making Linen	**Flax**
➢ The highest peak of the Alps	**Mt. Blanc (7807 m)**
➢ The highest peak of Europe	**Mt. Elbrus (5633 m)**
➢ The mountain forming the boundary between France and Spain	**Pyrenees**
➢ The mountain lying in the eastern France which separates it from Switzerland	**Jura**
➢ The mountain forming the boundary between France and Germany	**Vosges**
➢ The mountain which separates France from Italy	**Alps**
➢ The Ruhr is a small right bank tributary of	**Rhine**
➢ Two important ancient cities of Germany situated along the river Elbe	**Leipzig, Dresden**
➢ The city of Germany which is the centre for art and culture	**Munich**
➢ The major ice-free port along the Arctic coast	**Murmansk**

MAJOR CROPS, GEOGRAPHICAL CONDITIONS NECESSARY FOR CULTIVATION, LEADING PRODUCER/ EXPORTERS ETC.

S.No.	Crop	Climatic Conditions (°C), Temperature, R-Rainfall (cms)	Soils	Other Factors	Leading Producer Countries/ Regions	Exporting Countries	Production in India
					First country is in most cases First in production (export)		
	Food Crops						
1.	Wheat	Cool and moderately moist during growing period and warm dry and shiny during harvesting period, T : mild 13 to 19, R : moderate 25 to 75; with irrigation in areas having R less than 25.	—Sandy loams and black —Requires manuring every alternate year.	Level land facilitates use of machines	—Cool Temperate Grassland Region is the world's greatest producing region **Reasons** —Fertile soil —Sparsely populated and, therefore, large and abundant holdings —Suitable climate —Former USSR, USA, China, India, Canada, Australia, Argentina	USA, Canada Australia, Argentina	—The alluvial plains of Sutlej—Ganga basin comprising Punjab, Haryana and Western Uttar Pradesh —Black soil region of Gujarat, Maharashtra, Madhya Pradesh and Andhra Pradesh —Varieties : Kalyana, Shera, Moti

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2. Rice	—Hot and moist —Flooding in early period of growth T : average 27, R : 100-150	—Loams with high silt and clay content as these prevent rain water from seeping to under ground. —Constant use of fertilisers and manure.	—Level land because of flooding requirements. Therefore, alluvial soils of river valleys and deltas most suitable —Cheap labour. Therefore densely populated	—Wheat most important crop in Australia in terms of area, production and exports Tropical Monsoon Region is the principal producing region along with Equatorial Lowland Region —China, India, Indonesia, Japan Thailand —In Japan, principal crop	USA, Former USSR, Sudan, Egypt	—India second largest producer but still an importer. —West Bengal largest producer. Bihar, Orissa, Assam, Coastal plains, Punjab, Haryana. Production low because —crop dependent upon rainfall UP, Bihar, Punjab
3. Maize	Humid subtropical T : 20 to 24 in summer 8 to 14 in autumn	Well-drained deep loam		USA, China, In USA, maize is used as an animal feed.		
4. Barley	—Similar to wheat T : mild 13 to 19 R : moderate 75 to 100 —Grows in wide range of climate : hot,	Rich fertile		Former USSR, USA, Canada, China West European countries		UP, Bihar

5. Millets.	Hot and semi-arid climate T : 24 to 29 R : 50 to 75	Can grow in poor sandy soils		China, India, Former USSR		Tamil Nadu, Maharashtra, Rajasthan, Gujarat, Uttar Pradesh
Industrial Crops 6. Cotton	Warm moderately moist dry summer days in the later part. T : 21 (average) R : 60-110 (moderate)	Grown on variety of soils; light sandy, loams, heavy clay, bottom sands, yield increasing in that order	—Sea breeze improves quality —Manuring after a fixed number of years —Use of insecticides and pesticides to check disease —Cheap labour	USA, Former USSR, China, India	USA, Former USSR, Sudan, Egypt	—India has largest acreage under cotton cultivation in the world, but she is fourth largest producer. —Important growing areas : Black Cotton belt of Deccan consisting of Plateau of Malwa, Southern and north eastern Gujarat, almost whole of Maharashtra, northern Andhra Pradesh, north eastern and south eastern Karnataka, Central Tamil Nadu Sujata II is best quality cotton grown. India exports short staple cotton and imports long staple.

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7. Jute	Hot and moist T : 24-27 R : 200 well distributed over the growing period	—Well-drained loamy and clayee —Delta and flood plains are best since soil fertility is recouped every year by natural process	—Abundant supply of water for soaking, washing —Cheap labour —Cheap transport	India and Bangladesh hold virtual monopoly. Mymensingh area in Bangladesh alone produces 70 per cent of raw jute production of the country.	Bangladesh (exporter of raw wool), Thailand, Nepal India imports raw jute from Bangladesh but is largest exporter of jute manufactures	—West Bengal (50 per cent of total output); Assam, Bihar, Orissa
8. Rubber	—Hot and humid T : 24-27 R : 175-250; well distributed throughout the year	Deep well-drained loamy	—Cheap labour	Wild rubber : Brazil and some other S. American countries Plantation rubber : SE Asian countries, Sri Lanka, India, Myanmar, SE Asian region possesss virtual monopoly Malaysia, Indonesia, Thailand	Malaysia, Indonesia, Thailand, Sri Lankan Rubber exports account for 20-50 per cent of export earnings of first three countries	Southern States: Kerala (90 per cent of total production), Tamil Nadu, Karnataka
9. Cotton seed				USA, Former USSR, China, India, Egypt.		
10. Coconut Palm	—Hot wet T : 24 R : over 200	Flourishes in coastal belts of tropical countries		Philippines, Indonesia, Singapore		
11. Groundnut	—High Temperature			India, China, USA		Maharashtra, Gujarat, A.P.

	—Moderate rainfall					Karnataka, Tamil Nadu, Madhya Pradesh, Uttar Pradesh
12. Sesame	Tropical and sub-tropical			India, China Myanmar, Pak.		
13. Linseed	Warm summers, high humidity, moderate rainfall well distributed over the growing period	Moist; loamy or sandy		Canada, Argentina, USA	USA, Canada export seed while India exports linseed oil	
14. Soyabean				USA and China hold virtual monopoly	USA, China	
15. Castor Plant				India, Brazil	India, Brazil	
16. Tea	—Warm and humid throughout the year T : 27 average) R : Heavy, about 200 cm. coming in frequent showers	Fertile well drained soil rich in organic matter and iron	—Cheap labour —Chemical fertilisers and green manure	—Virtual monopoly of Monsoon Region —India, China, Sri Lanka	—India China, Sri Lanka —Tea accounts for more than 50 per cent of export earnings of Sri Lanka	NE India and S. India NE India : Assam Valley Surma Valley, Darjeeling, Terai, Tripura S. India : Tamil Nadu, Kerala, Darjeeling produces the best quality tea.
17. Coffee	—Warm to hot and moist T : 21 to 27 R : 125 to 250, well distributed throughout the growing period	—Fertile, well drained soil, rich in iron and potash —Terra Roxa soil is ideal	Cheap labour	Brazil, Colombia (S. America); Ivory Coast (Africa)	Brazil, Colombia	—Southern India —Karnataka, on Nilgiri Hills in Tamil Nadu, on Cardamom Hills in Kerala

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FAMOUS PLACES/STRUCTURES AND THEIR LOCATION

Place/ Structure	Location	Importance
Abadan	Iran	World's biggest oil refinery
Angkor Vat	Kampuchea	a ruined city with specimens of Indian art and culture and Hindu complex devoted to Lord Vishnu
Babylon	Baghdad (Iraq)	Ancient centre of art, science and culture, remains of biblical tower/hanging gardens found here
Bangkok	Thailand	Known as 'Venice of the East', largest city in Thailand and capital
Basra	Iraq	Principal port on the bank of the river Shatt-el-Arab near the Persian Gulf
Bethlehem	Israel	Birth place of Jesus Christ
Boddam	Near Diego Garcia	A military base being developed by the US as a station for nuclear sub-marines and ships
Diego Garcia	Indian Ocean	An important American military base in the Indian Ocean
Herat	Afghanistan	Ancient trade centre, carpet and silk products manufacturing
Harappa	Pakistan	Ruins of ancient India, site of the Indus Valley Civilisation
Hiroshima	Japan	Industrial town was known as 'Venice of Japan', ruined by the first atom bomb dropped by USA in the Second World War on August 6, 1945, also a seaport
Haifa	Israel	Chief seaport
Jeddah	Saudi Arabia	Chief seaport on Red Sea, ancient city
Jerusalem	Israel	Jesus Christ was crucified here, also called 'Holy City'
Khandhar	Afghanistan	Trading centre
Kandy	Sri Lanka	Temple of Tooth (Buddha's Tooth)
Karachi	Pakistan	Chief seaport
Kirkuk	Iraq	Oilfields

Lop Nor	China	Site of the Chinese nuclear test explosion
Madina	Saudi Arabia	Place of pilgrimage for Muslims, birth place of Prophet Mohammed, second capital city
Mohenjodaro	Pakistan	Historical site of Indus Valley civilisation
Murree	Pakistan	Chief hill station
Nagasaki	Japan	An atom bomb was dropped here on August 9, 1945 during Second World War, seaport
Nazareth	Israel	Holy place of Christians associated with the life of Christ
Quetta	Pakistan	Hill station, commands the entrance to the Bolan Pass
Shatt-al-Arab	Iraq	One of the world's ancient waterways, witnessed early human settlements
Shanghai	China	Largest and most populous city of China
Tashkent	Uzbekistan	Venue of talks between Prime Minister Lal Bahadur Shastri and President Ayub Khan on Indo-Pak problem
Tokyo	Japan	World's second most populous city, capital city
Armero	Columbia	Also called 'White City of Columbia', more than 20,000 people killed in volcanic eruption
Barranacas	Mexico	World's first urban settlement to be exclusively powered by solar energy
Belize	Central America	Formerly British Honduras which became independent on September 21, 1981, 156th member of the UNO
Buenos Aires	Argentina	Largest city in the southern hemisphre, famous for dairy products
Chicago	USA	Important trading city, meat packing is the chief industry
Cape Kennedy	USA	Missile launching centre and HO of NASA, named after John F Kennedy US Senate

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Capitol	Washington	US Senate
Detroit	USA	HO of biggest car manufacturing company, Ford Motor
Gettysburg	USA	Historical town, site of the American civil war
Havana	Cuba	Cigar manufacturing, also capital town
Honolulu	Hawaii Islands	Tourist resort, capital city
Hollywood	USA	Film industry
Kansas	USA	Chief livestock trading centre
Los Angeles	USA	Largest city of USA, film industry
Miami Beach	USA	Centre of world beauty contests
Montreal	Canada	Large trading centre
New York	USA	Leading commercial and financial centre of the world, located on the Hudson river, houses the second largest building of the world–Empire State Building, has the Statue of Liberty
New Oreleans	USA	Cotton market
Quebec city	Canada	Seaport
San Francisco	USA	Seaport, industrial centre, meat packing, automobiles
Sao Paulo	Brazil	Second largest city of Brazil, coffee growing
Sudbury	Canada	World's biggest source of nickel
Toronto	Canada	Largest city of Canada
Washington DC	USA	White House (Official residence of the President), DC denotes District Columbia
Vancouver	British Columbia (Canada)	Seaport
Yellow Stone National Park	USA	Oldest and largest national park with about 3000 geysers and hot springs
Al-Aqsa Mosque	Jerusalem	Islam's third holiest place
Angkor Vat	Cambodia	A Hindu temple complex (Lord Vishnu's) built by the Khmer King Suryavarman II in the period 1113-1150. It is considered the largest religious structure.

Kaaba	Mecca	Inner shrine of the great Mosque of Mecca
Kremlin	Moscow	A large fortified citadel, the Secretariat of the former Soviet Government
Malacanang Palace	Manila	Presidential palace of Ferdinand Marcos, President of the Philippines who ruled for more than 20 years
Mao Mausoleum	Beijing	Built from material brought from every province of China
Pentagon	Washington	A five-sided building, houses the ministry of defence of the USA
Wall Street	New York	Stock Exchange of New York
White House	Washington	Official residence of the President of USA since 1800 AD and constructed in1792. President John Adam was the first US President to occupy it.
Broadway	USA	Broadest street in the world
C N Tower	Toronto	World's tallest free standing structure, 553.33 m high
Aswan	Egypt	A tourist resort, world's biggest Aswan Dam (13 km.)
Benghazi	Libya	Chief town and port on the Gulf of Sidra in Mediterranean sea
Durban	South Africa	Associated with political activities of Gandhiji
Entebbe	Africa	Commercial centre
Johannesburg	South Africa	Gold mines
Kimberley	South Africa	Diamond mining
Al Asnam	Algeria	World's greatest earthquake when 80% city was destroyed
Alexandria	Egypt	Seaport, city founded by Alexander the Great
Zanzibar	Tanzania	Produces cloves
Barcelona	Spain	Chief port and a commercial centre, venue of the 1992 Olympics
Bergen	Norway	Biggest city of Norway and seaport
Cologne	Germany	Industrial centre, 'Eau-de-Cologne is after its name

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Dover	England	Sea port on the Strait of Dover
Dunkirk	France	A French port on the English Channel near the Belgiam border
Edinburgh	Scotland	Important educational centre
Epsom	London	Famous Racecourse
Essen	Germany	Coal mining, iron and steel industries
Geneva	Switzerland	European HQ of the UN, former seat of the League of Nations, capital town
Genoa	Italy	Seaport in Mediterranean Sea
Gibraltar	Spain	A famous British colony
Glasgow	Scotland	Biggest ship building centre, seaport
Greenwich	London	Observatory, the time in all countries is calculated on the basis of Greenwich Mean time
Goteborg	Sweden	Seaport of Gota connected to the Baltic Sea by a canal
Hauge, the	Netherlands	Seat of UNO Internatonal Court of Justice
Hamburg	Germany	Chief seaport
Istanbul	Turkey	Seaport, formerly called 'Constantinople'
Kew Gardens	London	Botanical gardens
Leningrad	Russia	Seaport, second largest city of Russia. In World War II it was seiged by Germany, also an industrial town
Leipzig	Germany	Industrial town
Liverpool	UK	Seaport, exporter of milk
London	UK	Seaport, capital city
Vatican City	Italy	The Residence of the Pope, smallest independent State in the world 0.44 sq km, population-1000
Waterloo	Belgium	Battle of Waterloo was fought here between the British and her allies and the French forces in which Napolean was defeated in 1815
Wimbledon	London	Famous for its tennis tournaments
Zurich	Switzerland	University of Switzerland

Aberdeen	England	Industrial city, seaport, famous as the 'Granite City'
Antwerp	Belgium	Seaport, diamond cutting, ship building, oil and sugar
Baku	Russia	Oil centre on the Caspian Sea
Baikonur	Kazakastan	Russian Rocket launch station
Milan	Italy	Second largest city of Italy
Moscow	Russia	Largest city of Russia-capital
Munich	Germany	Beer manufacturing, venue of 1972 Olympics
Olympia	Greece	Birth place of Olympic Games
Pisa	Italy	Leaning tower which is one of the wonders of the world
Rome	Italy	Centre of Roman civilisation and culture, historical buildings, capital city
Rotterddam	Netherlands	Ship building, iron and steel industries
Elba	Mediterranean sea	An island in the Mediterrean where Napolean was exiled in 1814-15
Stratford-on-Avon	England	Birthplace of William Shakespeare
Ulster	Ireland	Where struggle between Catholic and Protestant Christians took place
Red Square	Kremlin, Moscow	An open ground attached to the Kremlin and used for processions & demonstrations
White Hall	London	The seat of British Government offices, the former official residence of the Queen of England
Big Ben	London	A huge clock on the tower of the British Parliament installed in the year 1859
Brandenburg Gate	Berlin	Main gate between the erstwhile east and west Berlin
Bridge of Sighs	Venice (Italy)	A bridge on which condemned prisoners had to pass over before being executed
Buckingham Palace	London	Palace of the British Monarch since Queen Victoria's accession in 1837

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10, Downing Street	England	Official residence of the Prime Minister of England
Elysee Palace	France	Official residence of President of France
Escurial	Spain	One of the largest palaces in Spain

MISCELLANEOUS INFORMATION (WORLD GEOGRAPHY)

SOBRIQUETS

Big Game Country	:	African Savanna
Blue Mountains	:	Nilgiri Hills
Britain of the South	:	New Zealand
City of Dreaming Spires	:	Oxford
City of Palaces	:	Kolkata
City of Seven Hills	:	Rome
City of the Golden Gate	:	San Francisco
City of the Golden Temple	:	Amritsar
Cockpit of Europe	:	Belgium
City of Skyscrapers	:	New York
Emerald Island	:	Ireland
Eternal City	:	Rome
Garden of England	:	Kent
Garden City of India	:	Bangalore
Gate of Tears	:	Bab-el-Mandab
Gift of Nile	:	Egypt
Granite City	:	Aberdeen
Hermit Kingdom	:	North Korea
Herring Pond	:	Atlantic Ocean
Holy Land	:	Palestine
Clove Bowl of the World	:	Zanzibar
Island of Pearls	:	Bahrain
Key to Mediterranean	:	Gibraltar
Land of Seven Seas	:	Arabia
Land of Golden Fleece	:	Australia
Land of Garden Pagoda	:	Myanmar
Land of Kangaroo	:	Australia
Land of Lilies	:	Canada
Land of Maple	:	Canada
Land of Morning Calm	:	Koreas
Land of Midnight Sun	:	Norway
Land of Rising Sun	:	Japan
Land of Thousand Lakes	:	Finland
Land of Thunderbolt	:	Bhutan

Land of White Elephants	:	Thailand
Lighthouse of Mediterranian	:	Stromboli
Pearl of Antilles	:	Cuba
Playground of Europe	:	Switzerland
Port of Five Seas	:	Moscow
Quaker City	:	Philadelphia
Queen of the Adriatic	:	Venice.
Queen of the Arabian Sea	:	Cochin
Roof of the World	:	Pamirs
Pink City	:	Jaipur
Ruhr of East	:	Damodar Valley
Sick Man of Europe	:	Turkey
Singapore of Future	:	Pinang
Sorrow of Bengal	:	River Damodar
Sorrow of China	:	River Hwang Ho
Spice Garden of India	:	Kerala
Sugar Bowl of the World	:	Cuba
Venice of North	:	Stockholm
White City	:	Belgrade
White Man's Grave	:	Guinea Coast
Windy City	:	Chicago
World's Breadbasket	:	American Prairies

GEOGRAPHICAL DISCOVERIES

Place	Discoverer	Nationality	Year
America	Christopher Columbus	Italy	1492
Brazil	Petro Alvarez cafrol	Portuguese	1500
Hawaii Islands	Captain James Cook	England	1778
Island of Tasmania and New foundland	John Cabot	England	1497
New Zealand	Abel Janszoon Tasman	Holland	1642
North Pole	Robert Peary	U.S.A.	1909
Planetary Motion	Kepler	German	1600
Sea Route to India (via Cape of Good Hope)	Vasco da Gama	Portuguese	1498
South Pole	R. Amundsen	Norway	1911
Solar System	Corpernicus	Poland	1540
Suez Canal	Designed by French Engineer Fardinand de Lesseps	French	1869

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PRINCIPAL MOUNTAIN PEAKS

Name	Country	Range
Mt. Everest	Nepal-Tibet	Himalayas
K2 (Godwin Austin)	India	Karakoram
Kanchenjunga	Nepal-India	Himalayas
Lhotse	Nepal-China	Himalayas
Makalu	Tibet-Nepal	Himalayas
Dhaulagiri	Nepal	Himalayas
Nanga Parvat	India	Himalayas
Nanda Devi	India	Himalayas
McKinley	Alaska	Rockies
Mt Logan	Canada	Rockies
Mt Whitney	USA	Rockies
Mt Elbruz	Russia	Caucasus
Mont Blanc	France	Alps
Toubkal	Morocco	Atlas
Mt Kosciusko	Australia	Australian Alps

GREAT DESERTS

Name		Country/Region
Sahara (Libyan, Nubian)	:	N Africa
Australian (Gibson, Simpson, Victorian, Great Sandy)	:	Australia
Arabian (Rub'al Khali, An-Nafud)	:	Arabia
Dast-e-Lut (Barren Desert)	:	Iran
Dast-e-Kavir (Salt Desert)	:	Iran
Desierto de Sechura	:	Peru
Atacama	:	N Chile
Patagonia	:	Argentina
Kalahari	:	Botswana
Namib	:	Namibia
Thar	:	NW India
Negev	:	Israel
Ordos	:	China
Takla Makan	:	China
Gobi	:	Mongolia, China
Kara Kum	:	Turkmenistan
Kyzyl Kum	:	Kazakhstan, Uzbekistan
Mohave	:	S California, N America
Sonoran	:	N America, Mexico

POLITICAL BOUNDARIES

R. Rio Grande	:	Mexico & USA
R. Amur	:	China & Russia
R. Limpopo	:	S Africa & Botswana and S Africa & Zimbabwe
R. Zambezi	:	Zambia & Zimbabwe
R. Orange	:	S. Africa & Namibia
R. Mekong	:	Cambodia & Thailand, Myanmar
R. Salween	:	Myanmar & Thailand
R. Danube	:	Romania & Bulgaria, Yugoslavia
R. Uruguay	:	Uruguay & Brazil
R. Parana	:	Paraguay & Argentina, Brazil
R. Oder	:	Germany & Poland
Durand Line	:	Afghanistan & Pakistan
Hindenberg Line	:	Germany & Poland (After 1st World War)
MacMohan Line	:	India & China
Maginot Line	:	France & Germany
Oder Niesse Line	:	Poland & Germany (Presently)
Radcliffe Line	:	India & Pakistan
38th Parallel	:	North & South Korea
49th Parallel	:	USA & Canada
16th Parallel	:	Namibia & Angola
17th Parallel	:	North & South Vietnam (Before unification)

IMPORTANT STRAITS

Name		Links
Bab-el-Mandeb	:	Red Sea and Arabian Sea
Bering	:	Arctic Ocean and Bering Sea
Bosporous	:	Black Sea and Sea of Marmora
Dardanelles	:	Sea of Marmora and Aegean Sea
Dover	:	North Sea and the Atlantic Ocean
Florida	:	Gulf of Mexico and Atlantic Ocean
Gibraltar	:	Mediterranean Sea and Atlantic Ocean
Magellan	:	South Pacific and South Atlantic Ocean
Malacca	:	Java Sea and Bay of Bengal
Palk	:	Bay of Bengal and Palk Bay
Tartar Strait	:	Sea of Japan and Sakhalinsky (Sea of Okhotsia)

PRINCIPAL WATERFALLS

Name		Location
Angel	:	Venezuela
Tugela	:	South Africa
Yosemite	:	California
Ostra Mardolafoss	:	Norway
Cuqenam	:	Venezuela

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Sutherland	:	New Zealand
Ribbon	:	California
Grey Kamarang	:	Guyana
Northern Mardals	:	Norway
Fossen		
Buyoma falls	:	Zaire
Victoria Falls	:	Zimbabwe
Niagra	:	USA/Canada

LOCAL WINDS

Names	Nature	Region
Fohn	Warm	Alps
Chinook (Snow eater)	Warm	Rockies
Kalbaisakhi	Warm	North India
Berg	Warm	S Africa
Zonda	Warm	Andes
Loo	Warm	Indian subcontinent
Santa Ana	Warm	Coastal Southern California
Southerly Burster	Cold	New South Wales
Khamsin	Warm	Egypt
Harmattan	Warm	Guinea Coast
Mistral	Cold	S E France

OCEANS

Ocean	Water area (%)	Deepest point	Depth (m)
Pacific	46	Mariana Trench	11,034
Atlantic	23	Puerto Rico Trench	9,200
Indian	20	Java Trench	7,450
Arctic	4	Eurasian Basin	5,122

SHIFTING-CULTIVATION

Country		Name of shifting cultivation
India	:	Jhum
Malaysia	:	Ladang
Myanmar	:	Taungya
Thailand	:	Tamrai
Sri Lanka	:	Chena
Philippines	:	Caingin
Indonesia	:	Humah

AREAWISE TEN BIG AND SMALL COUNTRIES

TEN BIG COUNTRIES

S. No.	Country	Sq. km (Total Portion)	Area (Thousand sq. km)
1.	Russia (Europe-Asia)	17,075,400	16889
2.	Canada (N. America)	99,70,610	9221
3.	China (Asia)	95,74,000	9327
4.	U.S.A. (N. America)	96,29,091	9159
5.	Brazil (S. America)	85,47,404	8457
6.	Australia (S. Pacific)	76,82,300	7682
7.	India (Asia)	32,87,263	2973
8.	Argentina (S. America)	27,76,654	2737
9.	Kazakhstan (Europe-Asia)	27,24,900	2671
10.	Sudan (Africa)	25,05,815	2505

TEN SMALL COUNTRIES

S. No.	Country	Area (Sq. km)
1.	Vatican City (Europe)	0.44
2.	Monaco (Europe)	1.95
3.	Nauru (Southern Pacific)	21.10
4.	Tuvalu	26.00
5.	San Marino (Europe)	61.00
6.	Liechtenstein (Europe)	160.00
7.	Marshall Island (Central Pacific)	181.00
8.	St. Kitts and Nevis (Eastern Caribbean)	269.00
9.	Seychelles (Indian Ocean)	308.00
10.	Grenada (Eastern Caribbean Sea)	

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POPULATIONWISE TEN BIG AND SMALL COUNTRIES

TEN BIG COUNTRIES

S. No.	Country	Population (In crore)
1.	China (Asia)	127.6
2.	India (Asia)	102.7
3.	U.S.A. (North America)	28.142
4.	Indonesia	21.256
5.	Brazil (South America)	16.92
6.	Pakistan (Asia)	15.601
7.	Russia (Europe-Asia)	14.62
8.	Japan (Asia)	12.731
9.	Bangladesh (Asia)	12.713
10.	Nigeria (Africa)	10.8

TEN SMALL COUNTRIES

S. No.	Country	Population
1.	Vatican City (Europe)	1000
2.	Naura (Southern Pacific)	11,000
3.	Juvalu (Southern Pacific)	11,000
4.	Palau (Western Pacific)	18,000
5.	San Marino (Europe)	27,000
6.	Monaco (Europe)	32,000
7.	Liechstein (Europe)	33,000
8.	St. Kitts and Nevis (Eastern Caribbean)	45,000
9.	Marshall Island (Central Pacific)	52,000
10.	Andora (Europe)	66,000

COUNTRY, CAPITAL, CURRENCY

Country	Capital	Currency	Language	Religion
Afghanistan	Kabul	Afghani	Pakhto (Pusthu), Dari, Persian	Islam
Algeria	Algiers	Dinar	Arabic & French	Islam
Angola	Luanda	Kwanza	Portuguese, Bantu	Tribal & Christianity
Argentina	Buenos Aire	Peso	Spanish	Christianity
Australia	Canberra	Australian Dollar	English	Christianity
Austria	Vienna	Euro	German	Christianity
Azerbaijan	Baku	Manat	Azeri, Turkish, Russian	Islam
Bahrain	Manama	Bahrain Dinar	Arabic & English	Islam
Bangladesh	Dhaka	Taka	Bengali & Chakmamagh	Islam & Hinduism Christianity
Belgium	Brussels	Euro	Dutch, French & German	
Belarus	Minsk	Belarus Ruble (Zaichik)	Belorunian, Russian	Christianity
Bhutan	Thimphu	Ngultrum	Dzongkha & Nepali	Buddhism & Hinduism
Botswana	Gaborone	Pula	English & Setswana	Christianity
Brazil	Brasilia	Real (BRC)	Portuguese & English	Christianity
Brunei	Bander Seri Begawan	Dollar	Brunei Chinese & English	Malay, Islam
Bulgaria	Sofia	Lev	Bulgarian, Turkish	Christianity & Atheism
Cambodia	Phnompenh	Riel	Khmer &	Theravada & Buddhism
Canada	Ottawa	Dollar	French English & French	Christianity
Chile	Santiago	Peso	Spanish	Christianity
China	Beijing	Yuan	Chinese (Mandarin) Mongol	Confucianism Taoism & Buddhism
Colombia	Bogota	Peso	Spanish	Christianity
Congo (Belglum)	Brazzaville	Franc CFA	French & Lingala	Tribal & Christianity
Cuba	Havana	Peso	Spanish	Christianity
Cyprus	Nicosia	Cyprus Pound	Greek & Turkish	Christianity & Islam
Denmark	Copenha-gen	Danish Krone	Danish Krone	Lutheranism
Ecuador	Quito	Sucre	Spanish & Shuaar, quechna	Christianity

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Egypt	Cairo	Pound	Arabic, English	Islam & Christianity
Guinea	Conakry	CFA	Fang	
Ethiopia	Addis Ababa	Birr	Amharic, Gallinga	Christianity & Islam
Fiji	Suva	Dollar	English & Figian	Christianity Islam & Hinduism
Finland	Helsinki	Euro	Finnish & Swedish	Litheranism
France	Paris	Euro	French	Christianity
Germany	Berlin	Euro	German	Christianity
Ghana	Accra	Cedi	English (Official Language) and eight major national languages	Christianity
Greece	Athens	Euro	Greek	Christianity
Guatemala	Guatemala City	Quetzal	Spanish, Indian dialects	Christianity
Guinea	Bissau	Franc (CFA)	Portuguese	Islam
Guyana	George Town	Guyana Dollar	English Amerindian dialects	Christianity Islam & Hinduism
Hong Kong	Victoria	Hongkong Dollar	English & Cantonese	& Buddhism Confucianism
Hungary	Budapest	Forint	Hungarian	Christianity
Iceland	Reykjavik	Krona	Icelandic	Christianity
Senegal	Dakar	CFA Franc	French	Islam
Seribia and Montenego	Belgrade	Dinar	Serbo-croatian	Christianity & Islam
South Africa	Cape Town & Pretoria	Rand	Afrikaans & English	Christianity, Hindusism, & Islam
Spain	Madrid	Euro	Spanish	Christianity
Sri Lanka	Colombo	Sri Lankan Rupee	Sinhala, Tamil & English	Buddism & Hinduism
Sudan	Khartoum	Sundan's Pound	Arabic, English & Tribal dialects	Islam & Christianity
South Sudan	Juba	Pound	English	—

Suriname	Parmaribo	Suriname Guilder	Dutch, English & Surinamese	Islam & Hinduism Christianity
Swaziland	Mbabane	Lilangeni	English & Swazi	Christianity & Tribal
Sweden	Stockholm	Krone	Swedish	Lutheranism
Switzerland	Berne	Swiss France	German, Frenc Italian	Christianity
Syria	Damascus	Syrian Pound	Arabic	Islam
Taiwan	Taipei	New New Taiwan	Mandarin Chinese	Buddhism, Taoism & Confucianism
Tanzania	Dodoma	Dollar Tanzanian Shilling	Kiswahili & English	Christianity & Islam
Thailand	Bangkok	Bath	Thai, Chinese & English	Buddhism
Togo	Lome	CFA Franc	French (official) & Tribal	Christianity, Tribal & Islam
Trinidad & Tabago	Port-of-Spain	Trinidad Tobago Dollar	English	Christianity & Hinduism
Tunisia	Tunis	Tunisian Dinar	Arabic (official) & French	Islam
Turkey	Ankara	Turkish Lira	Turkish	Islam
Turkmenistan	Ashkhabad	Manat	Turkmen & Russian	Islam
Tuvalu	Funafuti	Australian Dollar	Tuvaluan & English	Christianity
U.A.E.	Abu Dhabi	Dirham	Arabic	Islam
Uganda	Kampala	Uganda Shilling	English & Luganda	Christianity & Islam
Ukraine	Kiev	Karbova-nets	Ukrainian	Christianity & Islam
United Kingdom	London	Pound Sterling	English, Welsh & Scots	Christianity
United States of America	Washington (D. C.)	U.S. Dollar	English	Christianity

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Uzbekistan	Tashkent	Soum	Uzbek & Russian	Islam
Venezuela	Caracas	Bolivar	Spanish	Christianity
Vietnam	Hanoi	Dong	Vietnamese	Buddhism & Taoism
Yemen (N)	Sana's	Rial	Arabic	Islam
Zaire	Kinshasa	Zaire	French	Christianity
			English & Swahili	
Zambia	Lusaka	Kwacha	Bantu & English	Christianity & Islam
Zimbabwe	Harare	Dollar	English & Shona	Tribal & Christianity

PARLIAMENTS OF DIFFERENT COUNTRIES

- Afghanistan : *Shora*
- Andorra : *General Council*
- Albania : *People's Assembly*
- Azerbaijan : *Melli Majlis*
- Algeria : *National Popular Assembly*
- Angola : *National Popular Assembly*
- Argentina : *National Congress*
- Australia : *Federal Parliament*
- Austria : *National Assembly*
- Bahamas : *General Assembly*
- Bahrain : *Consultative Council*
- Bangladesh : *Jatiya Sangshad*
- Belize : *National Assembly*
- Bhutan : *Tsogdu*
- Bolivia : *National Congress*
- Brazil : *National Congress*
- Brunei : *National Assembly*
- Botswana : *National Assembly*
- Britain : *Parliament (House of Commons & House of Lords)*
- Bulgaria : *National Assembly*
- Cambodia : *National Assembly*
- Cango Democratic : *Republic of National Legislative Council*
- Colombia : *Congress*
- Canada : *House of Commons and Senate*
- China : *National People's Congress*
- Chile : *Chamber of Deputies and Senate*
- Comoros : *Legislative Council and Senate*
- Costa Rica : *Legislative Council and Senate*
- Crotia : *Sabor*
- Cuba : *National Assembly of People's Power*
- Czech Republic : *Chamber of Deputies and Senate*

- Denmark : *Folketing*
- Dominica : *House of Assembly*
- Ecuador : *National Congress*
- El Salvador : *Legislative Assembly*
- East Timor : *Constituent Assembly*
- Ethiopia : *Federal Council and House of Representative*
- Egypt : *People's Assembly*
- Fiji Islands : *Senate & House of Representative*
- France : *National Assembly*
- Finland : *Eduskusta (Parliament)*
- Germany : *Lower House and Upper House*
- Guyana : *National Assembly*
- Greece : *Chamber of Deputies*
- Hungry : *National Assembly*
- Iceland : *Althing*
- India : *Sansad*
- Indonesia : *People's Consultative Assembly*
- Iran : *Majlis*
- Iraq : *National Assembly*
- Israel : *Knesset*
- Italy : *Chamber of Deputies and Senate*
- Japan : *Diet*
- Jordon : *National Assembly*
- Korea (North) : *Supreme People's Assembly*
- Korea (South) : *National Assembly*
- Kuwait : *National Assembly*
- Laos : *People's Supreme Assembly*
- Labanon : *National Assembly*
- Lesotho : *National Assembly and Senate*
- Lithuania : *Seimas*
- Luxembourg : *Chamber of Deputies*
- Libya : *General People's Congress*
- Malaysia : *Dewan Rakyat and Dewan Negara*
- Maldives : *Majlis*
- Madagascar : *National People's Assembly*
- Mongolia : *The Great Khural*
- Mozambique : *National Assembly*
- Myanmar : *People's Assembly*
- Nepal : *Rashtriya Panchayat*
- Netherlands : *The Staten General*
- New Zealand : *Parliament (House of Representatives)*
- Oman : *Manarchy*
- Pakistan : *National Assembly & Senate*
- Paraguay : *Senate & Chamber of Deputies*
- Philippines : *The Congress*
- Papua New Guinea : *National Parliament*

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- Poland : *Sejm*
- Romania : *Great National Assembly*
- Russia : *Duma & Federal Council*
- Senegal : *National Assembly*
- Seychelles : *People's Assembly*
- South Africa Republic : *House of Assembly*
- Spain : *Cortes Generales*
- Sweden : *Riksdag*
- Saudi Arabia : *Majlis Al-Shura*
- Sudan : *Majlis Watani*
- Switzerland : *Federal Assembly*
- Syria : *People's Council*
- Turkey : *Grand National Assembly*
- USA : *Congress*
- Vietnam : *National Assembly*
- Venezuela : *National Congress*
- Yugoslavia : *Federal Assembly*
- Zambia : *National Assembly*

PRINCIPAL LAKES OF THE WORLD

Name	Length (sq. km.)	Country
Caspian Sea (Largest)	3,86,400	Russia-Iran
Superior	82,100	USA-Canada
Victoria	69,485	Kenya-Uganda
Aral	66,457	Russia
Hudson	59,600	USA-Canada
Michigan	57,800	USA
Tanganyika	32,900	Tanzania-Zambia
Baikal	31,500	Russia
Erie	25,745	USA-Canada
Winnipeg	24,341	Canada
Malawi	23,310	Malawi Mozambique
Ontario	19,529	USA-Canada
Chad	15,540	Nigeria-Chad
Eyre (Salt)	9,324	Australia
Rudolf	9,065	Kenya
Titica	9,065	Peru-Bolivia
Athabasca	8,081	Canada
Nicaragua	7,697	Nicaragua
Reindeer	6,389	Canada
Kuko	5,957	China
Torrens	5,775	Australia
Victoria Nyanza	26,640	East Africa
Nyasa	30,044	Africa

GEOGRAPHY (INDIA)

THE LOCATIONAL SETTING

- Geographically India is so vast that it is often described as a 'sub -continent, part of the Asian continent and yet looking like a continent in itself.
- With an area of 32,87,263 sq km India is seventh largest country in the world after, Russia, Canada, China, USA, Brazil and Australia.
- India holds a position in the eastern part of northern hemishere over the globe. The mainland extends from 8°4' 28" N to 37° 17' 53" N latitudes and from 68°7' 53" E to 97°24'77" east longitude.
- Both latitudinal and longitudinal extent of the country are approximately same and is about 30°. The North-South extent of 30° measures 3,214km while East-West extent also of almost 30° measures 2,933 km., which is about 1/10th of circumference of the Earth.
- The latitudinal extend is carried further down by Andaman and Nicobar island to about 6°14'N latitude, where the southern most point of Indian sovereignty (land), the Indira Point is located.

PHYSIOGRAPHIC DIVISIONS OF INDIA

- Physiographically India can be broadly divided into :
  (i) The Himalyan Mountain Chain
  (ii) The North Indian Plain
  (iii) The Peninsular Plateau

THE HIMALAYAN MOUNTAIN CHAIN

- The Himalayan Mountain chain consists of a series of parallel mountain ranges with bold relief and are characterised by highly rugged topography.
- Himalayas are the youngest and the loftiest of the fold mountain systems in the world. The central axis extending form Indus gorge to Brahmaputra gorge is about 2400km.
- These mountains were formed as result of the convergence of Angaraland and Gondwanaland. The Tethys sea sediments in between them were folded due to compression to take the form of the mighty Himalayas.
- The Himalayas do not comprise a single range but a series of three ranges running more or less parallel to one another. They are Great Himalayas, Middle Himalayas and the Shiwaliks.
- The Great Himalayan mountain range boasts of the tallest heads of the world, most of which remain under perpetual snow.
- In Greater Himalayas, the snow line is at lower elevation of the southern slopes than on the northern slopes because the southern slopes are steeper and received more rainfall.
- The middle Himalayas lies between the Shiwalik in the South and the Great Himalayas in the North.

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- The important ranges included are the **Pir-Panjal, Dhaula Dhar, the Mussorie Range, the Nag Tiba and the Mahabharat Lekh.**
- The Shiwaliks comprises the outer most range of the Himalayas. Overlooking the great plains, this chain of hills runs for a distance of about 2400km from the Potwar plateau to the Brahmaputra valley.
- The width of the Shiwaliks varies from 50 km in Himachal Pradesh to less then 15km in Arunachal Pradesh. The altitude varies from 600m to 1500m.

PRINCIPAL PEAKS OF HIMALAYA

Peak	Height (Mtrs)	Location
1. Mt. Everest	8848	Nepal-Tibet
2. Mt.K2	8611	India
3. Kanchenjunga	8597	Nepal-India
4. Dhaulagiri	8172	Nepal
5. Nanga Parbat	8126	India
6. Annapurna	8078	Nepal
7. Gasherbrum	8068	India
8. Nanda Devi	7817	India
9. Mt. Kamet	7756	India
10. Gurla Mandhata	7728	Tibet

MOUNTAIN PASSES OF INDIA

HIMALAYAN PASSES

Benihal pass	:	between Doda and Anantnag (Jawahar Tuneel). J&K
Shipkila	:	River Satluj enters India from Tibet, Himachal Pradesh
Bara Lacha La	:	between Kyelang and Leh, Himachal Pradesh
Rohtang pass	:	between Kullu and Kyelang, Himachal Pradesh
Bomdila pass	:	between Tezpur and Tawang, Arunachal Pradesh

HIMALAYAN PASSES BETWEEN INDIA-CHINA

Shipkila	:	Himachal Pradesh
Thaga La and Niti La	:	Uttaranchal
Lipu Lekh La	:	Tri-juction, India-Nepal-China, Uttarachal
Jelep La	:	Between India and China (Gangtok-Lhasa Road) Sikkim
Nathu La	:	Between India and China (Entry to Chumbi Valley) Sikkim

TRANS HIMALAYAN PASSES

Karakoram pass and Aghil pass	:	Jammu & Kashmir.

PASSES IN WESTERN GHATS

Palghat	:	between Palakhad and Coimbotore
Shenkota	:	between Kollam and Madurai
Thalghat	:	between Mumbai and Pune
Bhorghat	:	between Mumbai and Nasik

IMPORTANT PEAKS OF INDIA

Highest peak of Himalayas in India	:	Kanchenjunga
Highest mountain peak in India	:	K2 or Godwin Austen
Highest peak of Aravalis	:	Gurushikhar
Highest peak of Western Ghats	:	Anaimudi
Highest peak of Nilgiri	:	Dodabeta
Highest peak of Eastern Ghats	:	Mahendragiri
Highest peak of Rajmahal hills	:	Parasnath
Highest peak of Andaman & Nicobar	:	Saddle peak

THE NORTH INDIAN PLAIN

- The Great North Indian plain lies to the north of the peninsula and to the south of the Himalayas.
- The plain extends for 3200 km between the mouths of the Ganga and the Indus, all along the foot of the moutains, with a width varying from 150 to 300 km.
- The plain is narrowest in Assam with its width varying between 90 and 100 km.
- It is 160 km wide near the Rajmahal hills and 280 km near Allahabad.
- The plains were formed as a result of the filling of depression lying between the peninsula and the Himalayas by the depositional work of the Himalayan and peninsular rivers.
- It is crroneous to characterise the plains as an area of monotonous relief having little variety in its geomorphological features.
- Generally the plain is recognised as consisting of four divisions each characterised by important differences in surface relief. These divisions are : (i) Bhabar (ii) Tarai (iii) Bhangar and (iv) Khadar.
- The Bhabar is a narrow belt of 8-16 km wide running east-west direction along foothills of Shiwaliks. the Himalyan rivers deposits their sediments creating alluvial fans along the foot hills. The fans consisting of gravel and unsorted sediments merge together to form the Bhabar belt.
- The Bhabar zone is studded with pebbles and it consists of porous beds. The porosity is so high that all streams lose themselves in Bhabar.

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- The **Terai** is marshy tract south of the Bhabar marked by reemergence of underground streams of the Bhabar belt. These streams convert large areas along the rivers into marshy lands of excessive dampness.
- The **Bhangar** refers to the upland formed by deposition of older alluvium in river beds. It is alluvial terrace above the flood clains, often impregnated with calcareous concentration known as Kankar.
- The **Khadar** is composed of newer alluvium and forms the flood plains along the river banks. It is a lowland formed by deposition of detritus of new alluvium in the river beds during floods every year.
- The Great Indian Plains of North India can be divided into the following four major regions.
  (i) The Rajasthan or Western Plains
  (ii) The Punjab-Haryana Plains
  (iii) The Ganga Plains
  (iv) The Brahmaputra Plains
- **The Rajasthan Plain :** The plain consisting of Thar or Marusthali,& the arid plain of Rajasthan. Luni is the only river flowing through this desert region. North of the Luni basin, there is a large area of inland drainage . Eastern Thar Desert has several saline lakes such as Sambhar, Didwana, Degana, Sargol, Khatu etc. Sambhar is the largest salt lake in India.
- **The Punjab Haryana plain :** This part of the plain is formed as a result of deposits brought by five rivers (Satluj, Ravi, Chenab, Jhelum & Beas) and Known as Punjab. It is primarily made up of Doabs (interfluves) -the land Between two rivers.
- The important Doabs in this plain are :-
  1. Bist -Jalandhar Doab-between Beas and Satluj.
  2. Bari Doab between the Beas and Ravi.
  3. Rechna Doab between the Ravi and the Chenab.
  4. Chaj Doab between Chenab and the Jhelum.
  5. Sindsagar Doab between the Jhelum, Chenab and the Indus.
- **Ganga plain :** The plain stretches between Punjab- Haryana plain to the Sundarbans Delta region. The Ganga along with Yamuna, Gomti, Ghaghara, Gandak and Kosi has deposited large quantities of alluvium to build this fertile and densely populated region.
- The important doabs in this plain are :
  (i) Ganga-Yamuna Doab
  (ii) Ganga-Ghaghra Doab
  (iii) Ghaghra-Gandak
  (iv) Gandak-Kosi Doab (Mithila Plain)
- The Ganga plain is further divided into, Upper Ganga plain, Middle Ganga plain, and the Lower Ganga plain.
- **The Brahmaputra plain :** It is an aggradational plain built up by, depositional work of Brahmaputra and its tributaries. It is

girdled by Purvanchal hills, Patkai Bum, Naga hills in the east, Garo-Khasi-Jaintia, Mikir hills and Meghalaya plateau in the south.

THE PENINSULAR PLATEAU

- The peninsular plateau forms a triangle with its concave base lying between the Ridge at Delhi and the Rajmahal Hills and the apex formed by Kanyakumari.
- The outlying projections of the Peninsular plateau are seen in the Aravalis, Rajmahal Hills and the Shillong Plateau.
- The general slope of the plateau is from west to east with the exception of Narmada-Tapi rift which slapes westwards.
- The peninsular plateau is an ancient tabular block composed mostly of Archean gheisses and sheists.
- The Indian plateau is a region of great geomorphological complexity. Some of the prominent Plateaus are :
- **The Malwa Plateau :** It extends north of Vindhyan hills, bounded by Aravalis in the west and Bundelkhand in the east. This Plateau is composed of extensive lava flow and is covered with black soils.
- **The Chotanagpur Plateau :** It is well-known for the mineral wealth. It covers the States of Jharkhand, Southern Bihar, Western parts of West Bengal and Northern parts of Orissa.
- This plateau is composed mainly of Gondwana rocks with patches of Archean granites and gheises and Deccan Lavas.
- The highest general elevations of about 1100m is in the mid-western portion known as the **Pat lands** high-level laterite plateau.
- Rivers like Damodar, the Subarnrekha, the North Koel, South Koel and the Barakar have developed extensive drainage basins.
- The Mehgalaya Plateau which is also known as the Shillong plateau covers the State of Meghalaya. The plateau is separated from the Rajmahal hills by a wide streach of alluvial plain called the Garo-Rajmahal Gap.
- The Garo, Khasi and Jaintia hills are located south of the Plateau.
- Deccan Plateau is a triangular plateau, bounded by Satpura and the Vindhya ranges in north west, the Mahadev and Maikal in the north, the Western Ghats in the west and the Eastern Ghats in east.
- The plateau surface, made up of flat lava floors, generally slopes to the east and south-east.
- The Deccan Plateau is divided into a number of well-defined physical units such as the Vidarbha plain, upper Godawari basin and the Bhima Basin.
- **The Coastal Plains:** The length of the coastline of mainland of India is 6500 kms, from Rann of Kuchch to Ganga-Brahmaputra delta. The Arabian Sea coastal plain is a narrow when compared to the east coastal palin. The East coastal plain is 80 -100 km

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wide and has a thicker layer of alluvium particularly in deltaic regions. The West coastal plain are confined to a narrow belt of about 10-25 km stretching between Arabian Sea and Western Ghats.

CLIMATE

- The climate of India can be broadly discribed as Tropical Monsoon Climate.
- Derived from the Arabic word 'Mausam' monsoon implies a seasonal reversal in the wind direction through the year.
- The monsoon regime emphasises the unity of India with the rest of south-east Asia region.
- The meteorologists usually recognise the following four seasons:-
  (i) Hot weather season,
  (ii) Cold wether season,
  (iii) South-West Monsoon season, and
  (iv) The Season of retreating Monsoon.
- Summer is India's hottest season. Summer season starts in March with day times temperatures exceeding 30° C. Coastal India as well as the southern states of Tamil Nadu and Kerala experience high humidity. By May, most of interior India experience very high temperature (40° C).
- Warm land surface creates large area of low pressure over north western India. This creates an onshore wind bringing the moisture laden maritime air from Indian Ocean to the land.
- **Southwest Monsoons:** The southwest monsoons supplies over 80 per cent of India's annual rainfall. It consists of two arms, the *Bay of Bengal* arm, and the *Arabian Sea* arm. Both arms are attracted to the low pressure area over the Thar desert in Rajasthan.
- The monsson makes its presence felt by the end of May. It starts around the 29th May, hitting the Andaman and Nicobar Islands in the Bay of Bengal. It strikes the mainland of Kerala on June 1. By 9th June, it hits Mumbai and Delhi by 29th June. By first week of July, the entire country experiences rain. Predictably, Southern India receives more rainfall than Northern India.
- The Bay of Bengal branch moves in the northwest direction whereas the Arabian Sea arm moves in the northeast direction.
- During this season, cyclones occur, causing widespread devastation to coastal regions. Cherapunji and Mosinram in Meghalaya, the world's wettest place, receive rainfall above 300cms annually.
- The monsoons start, withdrawing by the last week of August. By mid September, it has withdrawn from Mumbai and by October, the southwest monsoons have completely withdrawn from India.
- **Northeast Monsoons:** After the withdrawal of the monsoons, the northeast monsoons begin by November. Supplying 20 per cent of India's rainfall it doesn't cover the entire country but only the States of Tamil Nadu, West Bengal, Arunachal Pradesh, Karnataka, Kerala and Meghalaya.

- Cold mountain air travelling along the Brahmaputra river brings rain to the northeast region of India. This picks up moisture over the Bay of Bengal resulting in heavy rain in southern India.

DRAINAGE

- India has been adorned, with hundreds of large and small rivers, by the nature.
- The threefold physiographic division has an important bearing on the drainage of Indian Sub-continent.
- On the basis of their origin the river system of India can be classified into two categories:-
  (i) The Himalayan rivers
  (ii) The Peninsular rivers.

The Himalayan River System

- It is constituted by the Indus, the Ganga, the Brahmaputra and their tributaries.
- These rivers originate from the lofty Himalayan ranges and are named as the Himalayan rivers.
- These rivers have large basins and catchment areas.
- The total basin area of the Indus, the Ganga and the Brahmaputra is 11.78, 8.61 and 5.8 lakh square kilometres respectively.
- The Himalayan rivers flow through deep I-shaped valleys called gorges. These gorges have been carved out by down cutting carried on side by side with the uplift of the Himalayas. These are examples of antecedent drainage.
- The Himalayan rivers are perennial in nature, i.e., the water flows throughout the year in these rivers.
- These rivers receive water both from the monsoons and snowmelt. The perennial nature of these rivers makes them useful for irrigation.
- These rivers flow across the young fold mountains and are still in a youthful stage.
- The upper reaches of the Himalayan rivers are highly tortuous. When they enter the plains, there is a sudden reduction in the speed of flow of water. Under these circumstances these rivers form meanders and often shift their beds.
- The Himalayan rivers form big deltas at their mouths. The Ganga-Brahmaputra delta is the largest in the world.

The Peninsular River System

- It is constituted by Mahanadi, Godawari, Krishna, Cauvery, Narmada, Tapi and their tributaries.
- These rivers originate in the Peninsular plateau and are named as the Peninsular rivers.
- These rivers have small basins and catchment areas. The Godavari has the largest basin area of 3.12 lakh square kilometres which is less than one-third of the basin area of the Indus.

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- The Peninsular rivers flow in comparatively shallow valleys.
- These are more or less completely graded valley. The rivers have little erosional activities to perform. These are examples of consequent drainage.
- The Peninsular rivers receive water only from rainfall and water flows in these rivers in rainy season only. Therefore, these rivers are seasonal or non-perennial. The seasonal nature of these rivers is not much useful for irrigation.
- These rivers have been flowing in one of the oldest plateaus of the world and have reached maturity.
- The hard rock surfaces and non-alluvial character of the plateau permits little scope for the formation of meanders. As such, the rivers of the Peninsular Plateau follow more or less straight course.
- Some of the Penisular rivers, such as Narmada and Tapi form estuaries. Other rivers such as Mahanadi, Godavari, Krishna and Cauvery form deltas. Several small streams originating from the Westerm Ghats and flowing towards the west enter the Arabian Sea without forming any delta.

RIVERS OF INDIA

River	Total length (km)	Area Draind (km2)
Indus and its Tributaries		
Indus	2,880 709km in India	3,21,290
Jhelum	400 in India	28,490
Chenab	1,800 in India	26,750
Ravi	725	14,442
Beas	460	20,303
Sutlej	1,050 in India	24,087
Ganga and its Tributaries		
Ganga (comprised of two head streams)	2,526	86,1404
Yamuna	1,300	35,9000
Ram Ganga	596	32,412
Ghaghara	1,080	12,7950
Gandak	425 (in India)	9,540 (in India)
Burhi Gandak	320	10,150
Kosi	730 (in India)	11,600
Damodar	541	22,000
Gomti	940	30,437

Brahmaputra and its Tributaries		
Brahmputra	885 (in India)	
West Flowing Peninsular Rivers		
Narmada	1,312	98,796
Tapi	724	64,145
Luni	482	37,250
Sabramati	300	21,674
East Flowing Peninsular Rivers		
Mahanadi	860	1,41,600
Brahmani	800	39,033
Subarnarekka	395	19,300
Godavari	1,465	3,12,812
Manjra	724	30,821
Penganga	676	23,888
Wardha	483	24,087
Wainganga	462	61,093
Indravati	531	41,663
Sabari	418	20,427
Krishna	1,400	2,58,948
Bhima	867	69,144
Tungbhadra		69,562
Cauvery	800	87,900

IMPORTANT PLACES ON RIVER BANKS

Place	State	River
Agra	Uttar Pradesh	Yamuna
Ahmedabad	Gujarat	Sabarmati
Allahabad	Uttar Pradesh	Confluence of Ganga Yamuna & Saraswati
Alwaye	Kerala	Periyar
Ayodhya	Uttar Pradesh	Saryu
Badrinath	Uttaranchal	Alaknanda
Bhagalpur	Bihar	Ganga
Buxar	Bihar	Ganga
Kolkata	West Bengal	Hooghly
Cuttack	Orissa	Mahanadi
Delhi	Delhi	Yamuna
Dibrugarh	Assam	Brahmaputra
Ferozepur	Punjab	Sutlej
Guwahati	Assam	Brahmaputra
Hardwar	Uttaranchal	Ganga
Howrah	West Bengal	Hooghly
Hyderabad	Andhra Pradesh	Musi

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Jabalpur	Madhya Pradesh	Narmada
Kanpur	Uttar Pradesh	Ganga
Ludhiana	Punjab	Sutlej
Mathura	Uttar Pradesh	Yamuna
Moradabad	Uttar Pradesh	Ramganga
Munger	Bihar	Ganga
Nasik	Maharashtra	Godavari
Patna	Bihar	Ganga
Srinagar	Jammu & Kashmir	Jhelum
Surat	Gujarat	Tapti
Tiruchirapalli	Tamil Nadu	Cauvery
Vijayawada	Andhra Pradesh	Krishna
Varanasi	Uttar Pradesh	Ganga
Sekobabad	Assam	Brahmaputra
Srirangaptanam (River Island)	Karnataka	Kaveri
Kurnool	Karnataka	Tungabhadra

LAKES OF INDIA

Lake		State
Wular Lake	:	Jammu & Kashmir
Lonar	:	Maharashtra
Kolleru	:	Andhra Pradesh
Loktak	:	Manipur
Dal Lake	:	Jammu & Kashmir
Nani Tal	:	Uttaranchal
Salt Lake	:	Kolkota
Chilka	:	Orissa
Pulicut	:	Andhra Pradesh
Vembanad Kayal	:	Kerala
Ashtamudi	:	Kerala
Bhim Tal	:	Uttaranchal
Gohna	:	Uttaranchal
Sambhar	:	Rajasthan
Sukhna	:	Chandigarh
Parashuram Kund	:	Arunachal Pradesh
Pongong Tso	:	Jammu & Kashmir
Tso Morari	:	Jammu & Kashmir
Nakki Lake	:	Rajasthan
Pushkar Lake	:	Rajasthan
Udaipur Lake	:	Rajasthan
Upper & Lower Lake	:	Bhopal, MP
Nizam Sagar	:	Hyderabad

NATURAL VEGETATION AND WILDLIFE

MAJOR INDIAN FOREST TYPES

(1) Tropical Evergreen Forest

- **Region :** Areas having 200-300 cm or more annual rainfall such as windward side of Western Ghats, North-eastern hills of India, Andaman and Nicobar Islands.
- **Important trees :** Rosewood, shisham, ebony, mahogany, etc.

(2) Tropical Monsoon Forests

- **Region :** Areas having annual rainfall between 100-200 cm (in Orissa, Madhya Pradesh, Chhattisgarh, Jharkhand, Tamil Nadu and Karnataka).
- **Important trees :** Sal, teak, sandalwood, myrobalan, bamboo, rosewood, ebony, shisham, etc.

(3) Tidal or Littoral Forests

- **Region :** Areas of West Bengal, Orissa and Andhra Pradesh having annual rainfall above 200cm (deltaic regions).
- **Important trees :** Sundari

(4) Montane Forests

- **Region :** Eastern and Western Himalayas and Nilgiri regions of Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Kerala and Tamil Nadu.
- **Important trees :** The type of trees depends on the height of mountain: sal (lower Shiwalik range); chir (higher range); and pine, cedar, fir, spruce,(1,600-3,300m).

(5) Thor Forests

- **Region:** Areas of Rajashtan, Punjab and Gujarat having annual rainfall between 25 to 80cm.
- **Important trees :** Khajuri, khair, kikar and babul.

MANGROVES

- Mangroves are salt tolerant forest eco-system found mainly in the tropical and sub-torpical inter-tidal regoins of the world.
- They are reservoirs of a large number of plant and animal species associated together over a long revolution period and exhibiting remarkable capacity of salt tolerance.
- They stabilise the shoreline and act as a bulwark against encroachments by the sea.
- Mangroves occur all along the Indian coastline in sheltered estuary, tidal creeks, backwaters, salt marshes and mud flats covering a total area of 6,740 sq.km. which is about seven per cent of the world's total mangrove area.

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MANGROVES IN INDIA

State	Mangrove
West Bengal	Sunderbans
Orissa	Mahanadi, Bhitarakanika
Andhra Pradesh	Godavari,Krishna
Tamil Nadu	Pichavaram, Muthupet, Point Calimere
Gujarat	Gulf of Kutchha, Gulf of Khambat
Goa	Goa
Karnataka	Coondapur
Maharashtra	Achra/Ratnagiri
Kerala	Vembanad
Others	
Andama & Nicobar Island	Andaman islands & Nicobar islands

WETLANDS

- According to Ramsar convention,wetlands are areas of marshes, fens, peatlands, fresh brackish or saline, including areas of marine water, the depth of which at low tide does not exceed six metres.
- India has a great wealth of wetland eco-system distributed in different geographical regions from cold arid zone of Ladakh to wet humid climate of Imphal; warm arid zone of Rajasthan to wet and humid zone of southern peninsula.
- Most of the wetlands in India are directly or indirectly linked with major river systems such as Ganga, Brahmaputra, Narmada, Tapti, Godavari, Krishna, Cauveri etc.
- India is a signatory to the Convention on Wetlands of international importance especially as waterfowl habitat. (Ramsar Convention) and six Indian wetlands have been designated under this convention.
- The National Committee on Wetlands, Mangroves and Coral Reefs has identified 22 wetlands for conservation and management on priority basis.

WETLANDS IN INDIA

Name of Wetland	State	Name of Wetland	State
Bhoj	Madhya Pradesh	Harike	Punjab
Kanjli	Punjab	Ropar	Punjab
Wular	Jammu & Kashmir	Tso Morari	Jammu & Kashmir
Pichola	Rajasthan	Sambhar	Rajasthan
Chilka	Orissa	Ujini	Maharashtra
Kodungallur	Kerala	Vembanad	Kerala
Asthamudi	Kerala	Sasthamkotta	Kerala
Kolleru	Andhra Pradesh	Loktak	Manipur
Sukhna	Chandigarh	Kabar	Bihar
Renuka and Pong dam (combined)	Himachal Pradesh	Nalsarovar	Gujarat

WILD LIFE

BIOSPHERE RESERVES OF INDIA

Biosphere Reserve	Location (State)
Nilgiri	Part of Wynad, Nagarhole, Bandipur, Mudumalai, Nilambur, Silent Valley and Siruvani hills (Tamil Nadu, Kerala and Karnataka)
Nanda Devi	Part of Chamoli, Pithoragarh and Bageshwar districts (Uttaranchal)
Nokrek	Garo hills (Meghalaya)
Manas	Parts of Kokrajhar, Bongaigaon, Barpeta Nalbari, Kamrup and Darang district (Assam)
Sundarbans	Delta of Ganges and Brahmaputra river system (W.B.)
Gulf of Mannar	Indian part of Gulf of Mannar between India and Sri Lanka (Tamil Nadu)
Great Nicobar	Southern part most Islands of Andaman and Nicobar
Similipal	Parts of Mayurbhanj district (Orissa)
Dibru-Daikhowa	Parts of Dibrugarh and Tinsukia districts (Assam)
Dihang-Dibang	Parts of Siang and Debang valley (Arunachal Pradesh)
Pachmarhi	Parts of Hoshangabad, Betual and Chhindwara districts (M.P.)
Kanchenjunga	Kanchenjunga National Park and surrounded partk area (Sikkim)
Chilka Lake	Chilka Lagoon located south of the Mahanadi's delta.

NATIONAL PARKS

State/U.T.	National Parks
Andhra Pradesh	1. Sri Venkateswara National Park; 2. Mrugavani National Park; 3. Mahaver Harina ranasthali; 4. Karu Brahmanada Reddy.
Aurnachal Pradesh	1. Namdaph National Park; 2. Mouling National Park
Assam	1. Dibru-Saikhowa National Park; 2. Manas; 3. Kaziranga; 4. Orang; 5. Nameri
Andaman and Nicobor Islands	1. Saddle Peak National Park; 2. South Button Island;

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3. Rani Jhansi Marine;
4. Mount Herriett;
5. Mahatma Gandhi Marine;
6. Campbell Bay;
7. Galathea.

Bihar : Valmiki National Park
Goa : Mollem National Park
Haryana : Sultanpur National Park
Jharkhand : Betla National Park
Manipur : Keibul Lamjao National Park
Mizoram : Murlen National Park
Nagaland : Intanki National Park
Sikkim : Kanchenjunga National Park
Uttar Pradesh : Dudhwa National Park
West Bengal :
1. Buxa National Park;
2. Gorumara National Park;
3. Neora Valley National Park;
4. Singwila National Park;
5. Sunderbans National Park;

Jammu & Kashmir :
1. Salim Ali National Park;
2. Dechigam National park;
3. Hemis National Park;
4. Kishtwar National Park;

Madhya Pradesh :
1. Bandhavgarh National Park;
2. Fossil National Park;
3. Kanha National Park;
4. Mandhav National Park;
5. Panna National Park;
6. Pench National Park;
7. Sanjay National Park;
8. Satpura National Park;
9. Van Vihar National Park.

Maharashtra :
1. Gugamal National Park;
2. Namegaon National Park;
3. Pench National Park;
4. Sanjay Gandhi National Park;
5. Tadoba National Park

Karnataka :
1. Anshi National Park;
2. Bandipur National Park;
3. Bannerghata National Park;
4. Kudremukh National Park;
5. Nagarhole National Park.

Uttaranchal :
1. Corbett National Park;
2. Gangotri National Park;

3. Govind National Park;
4. Nanda Devi National Park;
5. Rajaji National Park;
6. Valley of flower National Park

Tamil Nadu :
1. Guindy National Park;
2. Gulf of Mannar Marine National Park;
3. Indira Gandhi (Annamalai) National Park;
4. Mudumalai National Park;
5. Muturthi National Park.

Rajasthan :
1. Desert National Park;
2. Deoladeo Ghana National Park;
3. Ranthambore National Park;
4. Sariska National Park.

Himachal Paradesh :
1. Great Himalayan National Park;
2. Pin Valley.

Meghalaya :
1. Balphakram National Park;
2. Nokrek Pidge National Park.

Kerala :
1. Eravikulam National Park;
2. Perigar National Park;
3. Silent Valley National Park.

Orissa :
1. Bhitarkanika National Park.
2. Simlipal National Park.

Gujarat :
1. Bansda National Park;
2. Gir National Park;
3. Marine (Gulf of Kutchha) National Park;
4. Black Buck National Park.

Chhattisgarh :
1. Indravati;
2. Kangaerghati National Park;
3. Sanjay National Park.

- **National Park :** A reserved area meant for preserving its natural vegetation, wildlife and natural beauty.
- **Sanctury :** A reserved area meant for preservation and development of endangered species.
- **Biosphere :** Multipurpose protected areas to preserve genetic diversity in representative ecosystems.
- **Project Tiger :** Launched on 1st April, 1973, with twin objectives of ensuring maintenance of a viable population of tiger in India and preserving the areas of such biological importance as national heritage.
- **Project Elephant :** Launched in 1992 for conservation of elephants. This ensures the habit preservation and tackling the problems of poaching and illegal ivory trade.

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SOILS IN INDIA

- Soil is a mixture of many solid, liquid and gaseous substances. It forms the top most layer of earth's crust.
- In India there is a vast variety in the soil cover due to differences in terrain and climatic conditions.
- The densely-populated deltaic tract of West Bengal and the coastal plain of Kerala have rich alluvial soils and support flourishing agriculture.
- The shallow and coarse grained soils of Telengana and the dry regions of Rajasthan do not provide a base for developed agriculture.
- The process of soil formation is known as Pedogenesis.
- The process of soil formation depends upon factors like Parent material, Relief, Climate and Natural Vegetation.

MAJOR SOIL TYPES OF INDIA

- All India Soil Survey Committee has divided the Indian soils into eight major groups. They are (1) Alluvial soils, (2) Black soils, (3) Red soils, (4) Laterite and Lateritic soils, (5) Forest and Mountain soils, (6) Arid and Desert soils, (7) Saline and Alkaline soils and, (8) Peaty and Marshy-soils.

SOME IMPORTANT SOIL TYPES

(1) Alluvial Soils

- These soils are generally confined to the river basins and coastal plains.
- These soils are very fertile soils.
- These soils contribute significantly to the development of agriculture in India.
- The alluvial soils are fine-grained both in the areas of new alluvium (Khadar) as will as the old alluvium (Bangar).
- These soils vary from sandy loam to clay in texture.
- They are generally rich in potash but poor in phosphorus.
- The soils of North India are the examples of alluvial soils.

(2) Black Soils

- The black soils are concentrated over the Deccan lava tract.
- The black soils are generally clayey, deep and impermeable.
- Chemically the black soils consist of lime, iron, magnesium and alumina.
- The black soil lack in phosphorus, nitrogen and organic matter.
- Black soil is very retentive of moisture. It swells greatly and becomes sticky when wet in rainy season.
- Black soils of uplands are of low fertility but they are darker, deeper and richer in the valleys.
- Some of the major crops grown on the black soils are cotton, wheat, jowar, linseed, virginia tobacco, castor, sunflower and millets.

- These soils are mainly found in Maharashtra, Western Madhya Pradesh, parts of Karnataka, Andhra Pradesh, Gujarat and Tamil Nadu.

(3) Red Soils

- The reddish colour of the soil is due to the presence of iron in crystalline and metamorphic rocks.
- The physical properties of these soils vary from region to region.
- Red soils are generally shallow and their pH value ranges from 6.6 to 8.0.
- Red soils are poorer in quality as compared to Alluvial soils.
- These soils are spread on almost the whole of Tamil Nadu, parts of Karnataka, south-east of Maharashtra, eastern parts of Andhra Pradesh, Madhya Pradesh, Orissa and Chhotanagpur.
- By and large, the red soils are poor in lime, magnesia, phosphates, nitrogen and humus, but are fairly rich in potash.
- In their chemical composition they are mainly siliceous and luminous, with free quartz as sand, the alkali content is fair, some parts being quite rich in potassium.
- On the uplands, the red soils are thin, poor and gravelly, sandy or stony and porous, but in the lower areas they are rich, deep dark and fertile.

(4) Laterite Soils

- The laterite soils are formed due to the alternations of wet and dry season which leads to the leaching away of the siliceous matter of the rocks.
- The soils in the higher areas are generally more acidic than in low lying areas.
- The main development of laterite soil has taken place in the higher areas of the plateau.
- The laterite soils are commonly found in Karnataka, Kerala, Tamil Nadu, Maharashtra and Madhya Pradesh.
- The laterite soils are poor in lime and magnesia and deficient in Nitrogen.

AGRICULTURE IN INDIA

Crop Classification : Indian crops can be divided into following categories :

1. **Food Crops :** Rice, Wheat, Maize, Millets-Jowar, Bajra, Ragi, Pulses-Gram, Tur (Arhar).
2. **Cash Crops :** Cotton, Jute, Sugarcane, Tobacco, Oilseeds, Groundnut, Linseed, Sesamum, Castorseed, Rapeseed, Mustard etc.
3. **Plantation Crops :** Tea, Coffee, Spices, Cardamum, Chillies, Ginger, Turmeric, Coconut, Arecanut and Rubber.
4. **Horticulture :** Fruits-Apple, Peach, Pear, Aprecot, Almond, Strawberry, Walnut, Mangao, Banana, Citrus Fruits and Vegetables.

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CROPPING SEASON

1. Kharif Crops

- These are sown (in June or early July) with the commencement of south-west monsoon and are harvested by the end of monsoon or autumn (September/October).
- The major kharif crops are rice, jowar, maize, cotton, groudnut, jute, hemp, tobacco, bajra, sugarcane, pulses, forage grasses, green vegetables, chillies, gourd, lady's finger etc.

2. Rabi Crops

- These crops, grown in winter, require relatively cool climate during growth and warm climate during germination of their seeds and maturation. Therefore, sowing in done is November and crops are harvested in April-May.
- The major rabi corps are wheat, gram, and oilseeds like mustard and rape seed.

3. Zaid Crops

- Besides these two dominant crops, a brief cropping season has been lately introduced in India mainly in irrigated areas where early-maturing crops, called zaid crops, are grown between March and June.
- The chief zaid crops are urad, moong, melons, water melons, cucumber, tuber vegetables etc.

LARGEST PRODUCERS OF MAJOR CROPS/ AGRICULTURAL PRODUCTS

Crops/Products	State
Rice	West Bengal
Wheat	Uttar Pradesh
Maize	Madhya Pradesh
Sugarcane	Uttar Pradesh
Cotton	Maharashtra
Pulses	Madhya Pradesh
Groundnut	Gujarat
Potato	Uttar Pradesh
Onion	Maharashtra
Soyabean	Madhya Pradesh
Sunflower	Karnataka
Tea	Assam
Coffee	Karnataka
Rubber	Kerala
Pepper	Kerala
Chillies	Andhra Pradesh
Coconut	Kerala

IMPORTANT CROPS AND THEIR PRODUCING AREAS

- **Rice :** W. Bengal, Assam, Bihar, Orissa, Tamil Nadu, A.P., U.P., Maharashtra, Karnataka, Chhattisgarh and Punjab.
- **Wheat :** Uttar Pradesh, Punjab, Haryana, Bihar, Madhya Pradesh, Rajasthan, Maharashtra, Gujarat.
- **Bajra :** Tamil Nadu, Karnataka, Rajasthan, Madhya Pradesh, U.P., Haryana, and Andhra Pradesh.
- **Jowar :** Tamil Nadu, Karnataka, Madhya Pradesh, Gujarat, Rajasthan, U.P., Andhra Pradesh, Haryana, and Maharashtra.
- **Millets :** Maharashtra, Karnataka, Madhya Pradesh, Tamil Nadu, Gujarat, Haryana and the dry areas of Andhra Pradesh.
- **Maize :** Bihar, U.P., Punjab, Rajasthan, Maharashtra and Gujarat.
- **Pulses :** Punjab, Haryana, Rajashtan, Andhar Pradesh, M.P., U.P., Orissa, Maharashtra and Karnataka.
- **Sugarcane :** U.P., Punjab, Haryaya, Tamil Nadu, Bihar, Bengal, Rajashtan and A.P.
- **Oilseeds :** Bihar, Orissa, U.P., Madhya Pradesh, Maharashtra, Gujarat, Andhra Pradesh and Punjab.
- **Cotton :** Maharashtra, Gujarat, Madhya Pradesh, Punjab, Tamil Nadu, Uttar Pradesh, W. Bengal, Andhra Pradesh and Karnataka.
- **Jute :** Assam, West Bengal, Bihar and Orissa.
- **Tobacco :** Andhra Pradesh, Gujarat, Tamil Nadu, Bihar, Karnataka, West Bengal, U.P. and Haryana.
- **Tea :** Assam, W. Bengal, Meghalaya, Arunachla Pradesh, U.P., Himachal Pradesh, Tamil Nadu.
- **Coffee :** Karnataka, Tamil Nadu and Kerala.
- **Coconut :** Kerala, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Gujarat, Orissa and West Bengal.
- **Rubber :** Kerala, Tamil Nadu and Karnataka. 95 per cent of the total output of rubber is produced in Kerala.
- **Spices (Pepper) :** Kerala, Tamil Nadu and Karnataka.

MAJOR INDUSTRIES AND ITS CENTRES

- **Cotton Textiles :** Mumbai, Sholapur, Nagpur, in Maharashtra; Ahmedabad, Surat, Vadodara in Gujarat and Indore in M.P.; Chennai, Madurai and Coimbatore in Tamil Nadu; Kanpur in U.P. and Kolkata in West Bengal.
- **Jute Textiles :** West Bengal, Bihar, Andhra Pradesh, U.P. and M.P.
- **Silk Textiles :** Assam, Karnataka, Jharkhand, Jammu & Kashmir, Orissa, U.P., M.P., W. Bengal, Bihar, Maharashtra and Punjab.
- **Woollen Textiles :** The chief centres of woollen textiles are Punjab, U.P., Maharashtra, Madhya Pradesh, Karnataka, West Bengal.
- **Sugar Industry :** U.P., Bihar and some centres are there in Maharashtra, Andhra Pradesh, West Bengal and Punjab.
- **Cement Industry :** M.P., Rajasthan, Jharkhand, Karnataka, Andhra Pradesh, Tamil Nadu, Gujarat, U.P. and Orissa have some factories also.

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- **Paper Industry :** West Bengal, Maharashtra, U.P., Bihar, Orissa, Punjab, Karnataka, Kerala, Andhra Pradesh and Gujarat.
- **Iron and Steel Industry :** Jamshedpur, Bokaro (Jharkhand), Bhilai (Chhattisgarh), Durgapur, Hirapur, Kulti, Burnpur (West Bengal), Rourkela (Orissa), Bhadrawati (Karnataka) and Neyveli (Tamil Nadu).
- **Leather Industry :** Chennai, Agra, Kolkata, Delhi, Kanpur, Mumbai.
- **Aluminium :** Alwaye (Kerala), Hirakund (Orissa), Muri (Jharkhand), Renukoot (U.P.), Bailur (W. Bengal), Koyna Mettur (Tamil Nadu) and Orissa.
- **Matches :** Bareilly, Kolkata, Chennai, Gwalior and Hyderabad.
- **Photo Film Industry :** Octacamund (Tamil Nadu).
- **Glass :** Ferozabad, Shikohabad, Naini, Haorah, Bangalore, Bahjoi, and Belgaon.
- **Chemical Industry :** Delhi, Pimpri, Pune, Kolkata, Mumbai, Chennai, Rishikesh, Bangalore and Amritsar.
- **Rubber-Goods Industry :** Kolkata, Chennai, Delhi, Bangalore, Mumbai, Hyderabad, Ballabhgarh.
- **Locomotive Industry :** Chittaranjan (West Bengal), Varanasi in U.P., Perambur (Tamil Nadu).
- **Automobile Industry :** Mumbai, Kolkata, Chennai, and Jamshedpur.
- **Antibiotic Industry :** Rishikesh, Pimpri and Delhi.
- **Aircraft Manufacturing Industry :** Bangalore, Kanpur, Nasik, Koraput and Hyderabad.
- **Fertilisers Industry :** Durgapur, Kanpur, Foolpur (Uttar Pradesh), Haldia, Namrup, Rourkela, Vadodara, Barauni, Vishakhapatnam, Gorakhpur, etc.
- **Plastic Industry :** Mumbai, Kolkata, Amritsar, Kanpur, Hyderabad and Coimbatore.
- **Petro-Chemical Industry :** Vadodara and Mumbai Bongaigoan, Assam.

TOWNS ASSOCIATED WITH INDUSTRIES

- **Agra :** Stoneware, leather, carpets and marbles.
- **Ahmedabad :** Cooton-textiles.
- **Aligarh :** Cutlery, locks and dairy-industries.
- **Ambala :** Scientific goods.
- **Amritsar :** Cloth-printing, carpets, woollen goods, shawls.
- **Bangalore :** Watches, telephone, aircraft industry.
- **Bareilly :** Rubber factory, match factory, wood work.
- **Bhagalpur :** Silk.
- **Chennai :** Integral coach factory, leather, cigarette, cotton.
- **Mumbai :** Chemicals, oil refineries, fertilisers, film industry, woollen goods, cotton manufacturing.
- **Chittaranjan :** Electrical locomotives.

- **Churk :** Cement.
- **Cochin :** Coffee, coconut, oil, ship-building.
- **Dalmianagar :** Cement.
- **Darjeeling :** Tea, orange.
- **Delhi :** Textiles, chemicals, electronics, sewing machines.
- **Dhariwal :** Woollen goods.
- **Ferozabad :** Glass-bangles.
- **Hardwar :** Heavy electricals.
- **Jamshedpur :** Iron and steel works, train coaches locomotives.
- **Jalandhar :** Sports articles and surgical goods.
- **Jaipur :** Ivory work, brass work, jewellery, pottery, cloth painting.
- **Kolkata :** Iron and steel, jute, paper, pottery.
- **Kanpur :** Leather, cotton, aircraft factories, woollen mills, soap, iron, flour mills.
- **Kolar :** Gold-fields.
- **Lucknow :** Embroidery, gold, silver, lac work.
- **Ludhiana :** Hosiery, cycle.
- **Mirzapur :** Carpet, pottery, stoneware and brass.
- **Moradabad :** Brassware, cutlery, enamel industry.
- **Karnataka :** Sandalwood oil, ivory work, silk goods.
- **Renukoot :** Hindustan Aluminium Works.
- **Saharanpur :** Paper mill.
- **Srinagar :** H.M.T. factory, wood-work, embroidery, paper machine, woolen shawls.
- **Surat :** Cotton textiles.
- **Tarapur :** Atomic power plant.
- **Titagarh :** Paper and jute.
- **Trombay :** Oil refineries, atomic-reactors.
- **Varanasi :** Diesel-locomotives, brass-wares, lac bangles.
- **Vishakhapatnam :** Ship-bulding.

HUMAN GEOGRAPHY

- The present day population of the Indian Sub-continent is supposed to have affinity to the following racial groups :
  1. The Negrito
  2. The Proto-Australoids
  3. The Mongoloids
  4. The Mediterraneans
  5. The Brachycephalic
  6. The Nordies

TRIBES OF INDIA

Name		State/Union Territory
Kol	:	Madhya Pradesh
Muriyas	:	Madhya Pradesh
Birhor	:	Jharkhand

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Santhal	:	Jharkhand, W.B., Orissa
Oraon	:	Jharkhand, Orissa
Ho	:	Jharkhand
Munda	:	Jharkhand
Khond	:	Orissa
Gaddis	:	Himachal Pradesh
Jaintia	:	Meghalaya
Garo	:	Meghalaya
Khasi	:	Meghalaya, Assam
Bodos	:	Assam
Mikir	:	Assam
Abhor	:	Assam
Angame Nagas	:	Assam
Khasa	:	Uttar Pradesh
Tharu	:	Uttar Pradesh
Bhotia	:	Uttar Pradesh
Gaori	:	Maharashtra
Warli	:	Maharashtra
Mina	:	Rajashtan
Lushai	:	Tripura
Rabari	:	Gujarat
Nagas	:	Nagaland
Kuki	:	Manipur
Apatamis	:	Arunachal Pradesh
Lepcha	:	Sikkim
Gujjar	:	Jammu & Kashmir
Great Andamanese	:	Andaman Nicobar
Jarawas	:	Andaman Nicobar
Onges	:	Andaman Nicobar
Nicobaries	:	Nicobar
Sentenelese	:	Andaman Nicobar
Shompens	:	Andaman Nicobar
Tod	:	Tamil Nadu
Kota	:	Tamil Nadu
Kadar	:	Tamil Nadu
Badaga	:	Tamil Nadu
Paliyan	:	Tamil Nadu
Irula	:	Kerela
Uralis	:	Kerela
Chenchu	:	Andhra Pradesh
Baiga	:	Madhya Pradesh
Gond	:	Madhya Pradesh, Jharkhand, Orissa, Andhra Pradesh
Bhil	:	Madhya Pradesh, Rajashtan, Gujarat

INDIA AT 60 YEARS

As India has recently completed sixty glorious years of Independence, it's the time to press the rewind button and let's see how India has evolved as a nation in the last six decades. The journey from 1947 to 2007 has been full of remarkable success stories as well as several failures. Let's take a look at some of the most defining moments that have occurred in that last sixty years and which have shaped and reshaped the contours of the country.

Independence and Partition : On 3rd June 1947, Viscount Lord Louis Mountbatten, the last British Governor-General of India, announced the partitioning of the British Indian Empire into a secular India and a Muslim Pakistan. On 14 August 1947, Pakistan was declared a separate nation. At midnight, on 15 August 1947, India became an independent nation. Violent clashes between Hindus, Muslims, and Sikhs followed. Prime Minister Nehru and Deputy Prime Minister Sardar Vallabhbhai Patel invited Lord Mountbatten to continue as Governor General of India.

Mahatma Gandhi Is Assassinated : On January 30, 1948, Mahatma Gandhi was shot and killed while having his public walk on the grounds of the Birla Bhavan (Birla House) in New Delhi. The assassin, Nathuram Godse, was a Hindu radical with links to the extremist Hindu organisation, who held Gandhi responsible for weakening India by insisting upon a payment to Pakistan.

India Becomes Republic : The Constituent Assembly adopted the Constitution of India, drafted by a committee headed by B. R. Ambedkar, on November 26, 1949. India became a federal, democratic republic after its Constitution came into effect on January 26, 1950. Rajendra Prasad became the first President of India.

Indo-China War (1962) : In 1962, India and China fought the Sino-Indian War; the Chinese occupied a part of Kashmir and Himalayan border regions in Arunachal Pradesh. It dealt a blow to Jawahar Lal Nehru's invincibility who died as a sad leader two years later. China still holds on to part of Kashmir and even today the border dispute continues to frazzle India-China relations.

White Revolution : This was one event which transformed the lives of the millions of people. Aimed towards creating a nationwide milk grid, Operation Flood, as a rural development programme was started by India's National Dairy Development Board (NDDB) in 1970. It resulted in making India one of the largest producer of milk and milk products, and hence is also called the White Revolution of India.

Green Revolution : The introduction of high-yielding varieties of Indian seeds after 1965 and the increased use of fertilizers and irrigation are known collectively as the Indian Green Revolution, which provided the increase in production needed to make India self-sufficient in food grains.

Indira Gandhi Becomes Prime Minister : Indira Gandhi (19 November 1917 – 31 October 1984) was the first woman to become Prime Minister of India. As prime minister, Gandhi tried to improvethe image of India on international foras.

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Indo-Pak War (1971) : The Indo-Pakistani War of 1971 was a major conflict between India and Pakistan. The war is closely associated with Bangladesh Liberation War. The war ended in a crushing defeat for the Pakistani military in just a fortnight.

India's First Nuclear Test : The Smiling Buddha was the first nuclear test explosion by India on May 18, 1974 at Pokhran. It was also the first confirmed nuclear test by a nation outside the permanent five members of the United Nations Security Council.

Emergency declared : June 26, 1975 was the date on which internal emergency was declared in India. Since then this event always remained significant in the country's political history as, for the first time since independence, it ushered in a short period of authoritarian rule.

India Wins World Cup (1983) : The greatest surprise of all in 1983 World cup was when India under the captaincy of Kapil Dev, beat West Indies in the final at Lord's.

Indira Gandhi Is Assassinated : On October 31, 1984, Indira Gandhi's Sikh bodyguards assassinated her. They did so to avenge the storming of the Golden Temple in Amritsar.

Babri Mosque Is Demolished : Ever since the demolition of Babri Masjid at Ayodhya on December 6,1992, the politics of the day has become a ritual of the political representatives to exploit the issue with an eye on their vote bank.

Beauty Crowns : 1994 was the year when beauty of Indian girls was acknowledged throughout the world. That Rita Faria was the first Indian to win the Miss World crown 28 years ago was forgotten in the near hysteria that gripped the country in 1994 because of Shusmita Sen and Aishwarya Rai.

Avul Pakir Jainulabdeen Abdul Kalam (born October 15, 1931, Tamil Nadu, usually referred to as Dr. A.P.J. Abdul Kalam) was the twelfth President of India, serving from 2002 to 2007.

Amartya Kumar Sen (born 3 November 1933), is an Indian economist, philosopher, and a winner of the Bank of Sweden Prize in Economic Sciences (Nobel Prize for Economics) in 1998.

Ellatuvalapil Sreedharan popularly known as 'Metro Man' of India, is from Perungode in Palaghat district of Kerala. He was a classmate of T. N. Seshan, the former Chief Election Commissioner of India in school. He later studied at the Victoria College in Palghat and then graduated as an engineer from the Government Engineering College, Kakinada (now JNTU).

Homi Bhabha is one of the pioneers in the field of science in modern India. His role in the history of science in free India is of great significance. He is the architect of nuclear science in India.

Sir Chandrasekhara Venkata Raman (7 November 1888 – 21 November 1970), physicist, was awarded the 1930 Nobel Prize in Physics for his work on the scattering of light and for the discovery of the Raman effect, which is named after him. He was knighted in 1929 and awarded the Bharat Ratna in 1954. Raman was also awarded the Lenin Peace Prize (1957).

Monkombu Sambasivan Swaminathan is an agriculture scientist, born August 7, 1925, in Kumbakonam, Tamilnadu. He is known as "Father of the Green Revolution" in India, for his leadership and success in introducing and further developing high yielding varieties of wheat in India.

Vikram Ambalal Sarabhai (August 12, 1919 – December 31, 1971) was a world renowned physicist. He is considered to be the Father of the Indian space programme.

Amitabh Bachchan (born October 11, 1942) is one of the most prominent figures in the Indian film industry. He is the biggest star to have come out of Indian cinema, and was voted the Star of Millennium in the century ending BBC 1999 millennium survey.

Maqbool Fida Husain (born September 17, 1915, Pandharpur) popularly known as M F Husain, is one of India's best known artists. According to Forbes magazine, he has been called the "Picasso of India".

Satyajit Ray (May 2, 1921–April 23, 1992) could be regarded as one of the finest filmmakers India has ever produced. Ray directed thirty-seven films, including feature films, documentaries and shorts. Ray's first film, Pather Panchali, won eleven international prizes, including Best Human Document at Cannes.

Viswanathan Anand (born December 11, 1969) is a chess grandmaster and became FIDE world champion on September 29, 2007. Anand is one of only four players in history to break the 2800 mark on the FIDE rating list.

Mother Teresa (born Agnes Gonxha Bojaxhiu, August 27, 1910 – September 5, 1997), was a Roman Catholic nun who founded the Missionaries of Charity and won the Nobel Peace Prize in 1979 for her humanitarian work.

Pilavullakandi Thekkeparambil Usha (b. June 27, 1964), popularly known as PT Usha, regarded as queen of Indian track and field, P.T. Usha has been associated with Indian athletics since 1979. She was also nicknamed Payyoli Express. During the 1985 Asian Track & Field Meet at Jakarta (Indonesia), Usha secured 5 gold medals.

Kalpana Chawla (7 March 1962 – 1 February 2003), was an Indian-born American astronaut and space shuttle mission specialist. She was one of seven crewmembers lost aboard Space Shuttle Columbia during mission STS-107 when the shuttle disintegrated upon reentry into the Earth's atmosphere.

Sunita Williams (born September 19, 1965 in Euclid, Ohio) is a United States Naval officer and a NASA astronaut. She holds three records for female space travelers: longest spaceflight (195 days), number of space walks (four), and total time spent on spacewalks (29 hours and 17 minutes).

Pratibha Patil (born December 19, 1934) is the 13th and current President of India. She is the first woman and first Maharashtrian to hold this post. She was sworn in as President of India on July 25, 2007 by the Chief Justice of India K. G. Balakrishnan.

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STATES OF INDIA

LARGEST INDIAN STATES : AREA-WISE

Rank	States	Area (Sq. km)	Rank	States	Area (Sq. km)
1	Rajasthan	3,42,239	15	Jharkhand	79,714
2	Madhya Pradesh	3,08,245	16	Assam	78,438
3	Maharashtra	3,07,577	17	Himachal Pradesh	55,673
4	Andhra Pradesh	2,75,069	18	Uttarakhand	53,483
5	Uttar Pradesh	2,40,928	19	Punjab	50,362
6	Jammu & Kashmir	2,22,236	20	Haryana	44,212
7	Gujarat	1,96,024	21	Kerala	38,863
8	Karnataka	1,91,791	22	Meghalya	22,429
9	Orissa	1,55,707	23	Manipur	22,327
10	Chhattisgarh	1,35,191	24	Mizoram	21,087
11	Tamil Nadu	1,30,058	25	Nagaland	16,579
12	Bihar	94,163	26	Tripura	10,486
13	West Bengal	88,752	27	Sikkim	7,096
14	Arunachal Pradesh	83,743	28	Goa	3,702

LARGEST UNION TERRITORIES : AREA-WISE

Rank	States	Area (Sq. km)	Rank	States	Area (Sq. km)
1	Andaman & Nicobar Islands	8,248	5	Chandigarh	114
2	Delhi	1,483	6	Daman & Diu	112
3	Dadra & Nagar Haveli	491	7	Lakshadweep	32
4	Pondicherry	480			

LARGEST INDIAN STATES (Population-Wise) : 2011

Rank	States	Persons	Rank	States	Persons
1	Uttar Pradesh	19,95,81,477	15	Punjab	2,77,04,236
2	Maharashtra	11,23,72,972	16	Chhattisgarh	2,55,40,196
3	Bihar	10,38,04,637	17	Haryana	2,53,53,081
4	West Bengal	9,13,47,736	18	Jammu & Kashmir	1,25,48,926
5	Andhra Pradesh	8,46,65,533	19	Uttarakhand	1,01,16,752
6	Madhya Pradesh	7,25,97,565	20	Himachal Pradesh	68,56,509
7	Tamil Nadu	7,21,38,958	21	Tripura	36,71,032
8	Rajasthan	6,86,21,012	22	Manipur	27,21,756
9	Karnataka	6,11,30,704	23	Meghalaya	29,64,007
10	Gujarat	6,03,83,628	24	Nagaland	19,80,602
11	Orissa	4,19,47,358	25	Goa	14,57,723
12	Kerala	3,33,87,677	26	Arunachal Pradesh	13,82,611
13	Jharkhand	3,29,66,238	27	Mizoram	10,91,014
14	Assam	3,11,69,272	28	Sikkim	6,07,688

LARGEST UNION TERRITORIES (Population-Wise) : 2011

Rank	States	Persons	Rank	States	Persons
1	Delhi	1,67,53,235	5	Dadra & Nagar Haveli	3,42,853
2	Puducherry	12,44,464	6	Daman & Diu	2,42,911
3	Chandigarh	10,54,686	7	Lakshadweep	64,429
4	Andaman & Nicobar Islands	3,79,944			

SOME INDIAN STATES

CHHATTISGARH

Area — 135,191.00 Sq. km
Capital — Raipur
Language — Hindi
Districts — 18
Population — 2,55,40,196 (Males–1,28,27,915—Females–1,27,12,281)
Density — 189 persons per square kilometer
Literacy — 71.04% (Males–81.45% and Females – 60.59%)
Sex Ratio — 991
High Court seat — Bilaspur
Lok Sabha seats — 11
Rajya Sabha seats — 5
Vidhan Sabha seats — 90
Festivals — Pola, Nawakhai, Dussehra, Deepawali, Holi, Govardhan Pooja are celebrated.
Tourist Centres — Chitrakota falls, Tirathgarh falls, Kangerghat National Park, Kailash caves, Kutumbsar caves, Khutaghat waterfalls, Didneswari temple of Mallahar, Udanti sanctuary.

SOME IMPORTANT FACTS

- Chhattisgarh came into being on 1 November 2000 as the 26th State of the Union.
- In ancient times the region was known as Dakshin Kaushal.
- The region mentioned several times in epics like Ramayana and Mahabharata.
- Between 6th and 12th centuries Sarabhpuriyas, Panduvanshi, Somvanshi, Kalchuri and Nagvanshi rulers dominated the region.
- Kalchuris ruled in Chhattisgarh from 980 to 1791 A.D.
- The city of Raipur gained prominence during the British regime.
- Chhattisgarh is bounded by southern Jharkhand and Orissa in the east, Madhya Pradesh and Maharashtra in the West, U.P. and Western Jharkhand in the North and Andhra Pradesh in the South.
- Areawise Chhattisgarh is the 9th largest state.
- Populationwise Chhattisgarh is the 16th State of the Nation.

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- Agriculture and allied activities account for nearly 80 percent of the work force in the State.
- Around 4800 thousand hectares is the gross cropped area, which constitutes about 35 percent of the total geographical area.
- Rice is the predominant crop of the state.
- Important crops of the Chhattisgarh are Maize, Wheat, Niger, Groundnut, Pulses.
- About 45 percent of the total geographical area is under forest.
- Chhattisgarh has 3 National Parks and 10 wild life sanctuaries.
- Chhattisgarh is producing approximately 20 percent of steel in the country.
- There are approximately 130 steel-re-rolling mills, a number of Mini steel plants and large number of agro-based and food processing units in the state.
- Chhattisgarh has huge coal reserves (more than 80 percent of India).
- NTPC is installing a new power generation unit in Bilaspur.
- Chhattisgarh government has enacted — special law "Chhattisgarh Investment Promotion Act, 2002".
- CHOICE and BHUIYAN are e-governance programmes of Chhattisgarh government.
- A variety of minerals are available in Chhattisgarh.
- Large deposits of coal, iron ore, limestone, Bauxite, Dolomite and Tin ore are located in several parts of the State.
- Twenty percent of the country's steel and cement is produced in the state.
- The Government of Chhattisgarh has constituted a mineral development fund.
- Major completed Irrigation Projects are Kodar, Tandula and Pairy.
- Hasdev, Mahanadi Reservoir Project, Sondhur and Jonk are major projects under construction.
- Around 93 percent of the inhabited villages of Chhattisgarh have been electrified.
- The total length of roads in the state is 35,388.54 km.
- The length of the National Highways are 1,827.30 km, State Highways are 3611 km.
- Raipur, Bilaspur, Durg, Raigarh and Korba are important railway stations.
- Total Railway route length is 1,053 km.
- New railway zone in Bilaspur has started functioning from 1 April, 2003.

UNIVERSITIES IN CHHATTISGARH

- Guru Ghasidas University, Bilaspur.
- Indira Kala Sangeet Vishwavidyalaya, Rajanandgaon.
- Pandit Ravishankar Shukla University Raipur.
- Indira Gandhi Krishi Vishwavidyalaya, Raipur.

GUJARAT

Area	— 1,96,024 Sq, km
Capital	— Gandhinagar
Language	— Gujarati
Districts	— 26
Population	— 6,03,83,628 (Males–3,14,82,282—Females–2,89,01,346)
Density	— 308 persons per square kilometer
Sex Ratio	— 918 Females per thousand Males
Literacy	— 79.31% (Males – 87.23% and Females – 70.73%)
High Court seat	— Ahmedabad
Airports	— Ahmedabad has got the status of an international airport. Other airports are Vadodara, Bhavnagar, Bhuj, Surat, Kandla, Keshod, Jamnagar, Porbandar and Rajkot.
Ports	— Out of 40 ports Kandla occupies a leading position in the country. Kandla Free Trade Zone is also constituted.
Festivals	— Madhavrai fair (the marriage by elopement of Lord Krishna and Rukmini) Ambaji fair, Tarnetar fair (honour of Lord Shiva) are celebrated. Other festivals are Dangidarbar, Shamlaji fair, Bhavnath fair etc.
Tourist Spots	— Lion sanctuary of Gir Forest, Wild Ass sanctuary in Kachchh, bird sanctuary at Nalsarovar, the sacred temples of Dwaraka and Somanath, Jain temples at Palitana, Udwada, the oldest place of the fire temple of Parsees, the 11th century sun temples at Modhera, Beautiful beaches like Ahmedpur-Mandvi, Chorwad, Ubharat and Tithal, Porabandar—birth place of Mahatma Gandhi. Siddhpur Ghumli, Vadnagar, Dabhoi, Patan, Lothal, etc. are places of tourist attractions.

FACTS TO REMEMBER

- Gujarat was an important centre during the period of Harappan civilization.
- Several urban sites like Dholavira, Lothal, Rangpur, Surkotda were present during the Harappan civilization.
- A dockyard has been excavated from Lothal.
- Rangpur is marked by the absence of mothergoddess figurines during the Harappan phase.
- Lothal has yielded persian gulf seals.

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- It is believed that Lord Krishna settled on the west coast of Saurastra which later came to be known as Dwarka.
- Various dynasties like Mauryas, Guptas, Pratiharas ruled Gujarat during the Ancient period.
- Gujarat made remarkable progress under the reign of Chalukyas (Solankis).
- Gujarat remained an important part of the Mughal Empire.
- Before Independence, the present territories of Gujarat used to be in two parts, the British and the Princely Territories.
- The present state of Gujarat came into being on May, 1960.
- Gujarat is bounded by the Arabian Sea on the west, Pakistan and Rajasthan in the north and north-east respectively, Madhya Pradesh in the south-east and Maharashtra in the south.
- Gujarat is the main producer of tobacco, cotton and groundnut in the country.
- Ahmedabad Airport has got the status of an International Airport.
- Vadodra, Bhawnagar, Bhuj, Surat, Jamnagar, Rajkot, Kandla are other major airports in Gujarat.
- Gujarat has 40 ports of which Kandla is a major one.
- 'Tarnetar fair' is held at village Tarnetar in the honour of Lord Shiva.
- Lion sanctuary is in Gir Forest and wild ass sanctuary is in Kachchh area.

UNIVERSITIES IN GUJARAT

- Gujarat Vidyapeeth, Ahmedabad.
- MS University of Baroda, Vadodara.
- Nirma University of Science & Technology, Ahmedabad.
- North Gujarat University, Patan.
- Sardar Patel University, Vallabh Vidyanagar.
- Sardar Vallabhbhai National Institute of Technology, Surat.
- Saurashtra University, Rajkot.
- South Gujarat University, Surat.
- Bhavnagar University, Bhavnagar.
- Dharmsingh Desai Institute of Technology, Nadiad.
- Dr. Babasaheb Ambedkar Open University, Ahmedabad.
- Gujarat Agricultural University, Banaskantha.
- Gujarat Ayurved University, Jamnagar.
- Gujarat University, Ahmedabad.

UTTARAKHAND

Area	— 53,483 Sq, km
Capital	— Dehra Dun (Provisional)
Language	— Hindi, Garhwali, Kumaoni
Districts	— 13
Population	— 1,01,16,752 (Males–51,54,178—Females–49,62,574)
Density	— 189
Literacy	— 79.63% (Males — 88.33 and Females 70.70)
Sex Ratio	— 963 Females per thousand Males
Legislative Assembly Members	— 70
Lok Sabha Members	— 5
Rajya Sabha Members	— 3
Total Land	— 55 lakh hectare
Total Forest Cover	— 12.5%
High Court	— Nainital
District with highest Population	— Hardwar
District with least Population	— Rudra Prayag
Tourist Centres	— Gangotri, Yamunotri, Kedarnath, Badrinath, Nainital, Mussorie, Corbett National Park

FACTS TO REMEMBER

- Uttarakhand is mentioned in the Ancient Hindu scriptures as Kedarnath, Manaskhand and Himvant.
- Uttarakhand is often called as the land of the God (Dev Bhoomi) because of its various holy places and abundant shrines.
- The hilly regions of Uttarakhand have various popular tourist locations.
- The present state of Uttarakhand was earlier a part of the United Province of Agra and Awadh which came into existence in 1902.
- In 1935 the name of the state was shortened to the United Province.
- In January 1950, the United Province was renamed as Uttar Pradesh.
- On 9th November 2000, Uttaranchal came into being as the 27th State of India.
- On 1st January, 2007 Uttaranchal changed into Uttarakhand.
- Uttarakhand has international boundaries with China (Tibet) in the north and Nepal in the east.
- On its Northwest lies Himachal Pradesh while on the South is Uttar Pradesh.
- About 90 percent population in Uttarakhand depends on agriculture.
- The total cultivated area in the state is 7,84,117 hectares.
- The state is rich in mineral deposits like limestone, marble, rock phosphate, dolomite, magnesite, gypsum etc.
- There are 191 heavy industries, 17,534 small scale industries and 54,047 handicraft units in the state.
- Agricultural land under irrigation is 5,51,054 hectares.

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- Out of 15, 667 villages 12, 973 villages have been electrified.
- The total length of metalled roads in Uttarakhand is 19,543 km.
- The main railway stations are Dehradun, Hardwar, Roorkee, Kashipur, Udhamsingh Nagar, Haldwani, Ramnagar and Kathgodam.
- There are air strips at Jolly Grant (Dehradun) and Pantnagar (Udhamsingh Nagar).
- Pawan Hans Ltd. had recently started helicopter service from Rudraprayag to Kedarnath for pilgrims.
- Importance places of pilgrimage are Gangotri, Yamunotri, Badrinath, Kedarnath, Hardwar, Rishikesh, Hemkund Sahib etc.
- The World famous valley of Flowers, Pindari glacier, Roop Kund, hill stations like Mussorie, Nainital, Bhimtal, Ranikhet are important places of tourist interest.

FAIRS/FESTIVALS

Fairs/Festivals	Place
Kumbh Mela/Ardha Kumbh Mela	Hardwar
Devidhura Mela	Champawat
Purnagiri Mela	Champawat
Nanda Devi Mela	Almora
Gauchar Mela	Chamoli
Baisakhi	Uttarkashi
Magha Mela	Uttarkashi
Uttarayani Mela	Bageshwar
Vishnu Mela	Jaunsar Vavar
Peerane Kaliyar	Roorkee

UNIVERSITIES IN UTTARAKHAND

- Indian Institute of Technology, Roorkee
- Kumaun University, Nainital
- Dev Sanskrit Vishwavidyalaya, Gayatri Kunj, Hardwar
- Forest Research Institute, Dehradun
- Govind Ballabh Pant University of Agriculture and Technology, Pantnagar
- Gurukula Kangri Vishwavidyalaya, Hardwar
- Hemwati Nandan Bahuguna Garhwal University, Garhwal

IMPORTANT INSTITUTES IN UTTARAKHAND

- Indian Institute of Petroleum — Dehradun
- Central Building Research Institute — Roorkee
- Structural Engineering Research Institute — Roorkee
- Pant College of Technology — Pantnagar
- Indian Military Academy — Dehradun
- Lal Bahadur Shastri National Academy of Administration—Mussoorie
- Hindustan Anti-Biotics Limited–Rishikesh (Hardwar)
- Bharat Heavy Electricals-Ranipur (Hardwar)

- Drugs composite Research Unit-Ranikhet (Almora)
- The forest survey of India-(Dehradun)
- G.B.Pant Institute of Himalayan Environment and Development-(Almora)
- The Indian Council of Forestry. Research and Education-(Dehradun)
- Wildlife Institute of India–(Dehradun)

National Parks

National Parks	Location	Year of Establishment	Area (sq.km)
Carbett National Park	Nainital	1936	521
Rajaji National Park	Dehradun	–	820
Gangotri National Park	Uttarkashi	–	2390
Nanda Devi National Park	Chamoli	1982	630
Govind National Park	Uttarkashi	–	472
Valley of Flowers National Park	Chamoli	1982	87

RAJASTHAN

Area — 3,42,239 sq.km.
Capital— Jaipur
Language — Hindi and Rajasthani
Districts — 33
High Court — Jodhpur (Bench at Jaipur)
Population — 6,86,21,012 (Males – 3,56,20,086, Females – 3,30,00,926)
Density— 201 persons per sq km.
Sex Ratio — 926 females per thousand males
Literacy— 67.06% (Males – 80.51% and Females – 52.66%)

FACTS TO REMEMBER

- Rajasthan is the largest state in India area wise.
- Prior to Independence it was known as Rajputana.
- Pre-historic cultural remains have come to light at various sites in Rajasthan.
- Rajasthan was an Important centre of the Indus valley civilization.
- In the Medieval period states like Mewar, Marwar, Bundi, Kota, Alwar, Bharatpur emerged.
- Rajputs had very close relationship with Mughal rulers.
- In 1562, Jodha Bai, daughter of Bharamal of Amber married to Akbar.
- The house of Mewar was ruled by the proud Sisodiyas.
- Rana Pratap ascended the throne of Mewar in 1572.
- The Rajputs were given high Mansab during the Mughal period.

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- Raja Sawai Jai Singh established several scientific observatories (Jantar-Mantar).
- In 1958, the present state of Rajasthan formally came into being.
- Principal crops are rice, barley, jowar, millet, gram, wheat, cotton, tobacco.
- Rajasthan has rich deposits of zinc concentrates, emerald, gypsum, asbestos, feldspar and mica.
- The First Export Promotion Industrial Park of the country has been established and made operational at Sitapura (Jaipur).
- Jodhpur, Jaipur, Bikaner, Kota, Sawai Madhopur and Bharatpur are main rail junctions.
- Regular air services connect Jaipur, Jodhpur and Udaipur with Delhi and Mumbai.
- District having highest literacy — Kota (77.48%)
- District having lowest literacy — Jalore (55.58%)
- District having maximum population — Jaipur (6663971)
- District having minimum population — Jaisalmer (672008)
- District having highest Density — Jaipur (598)
- District having lowest Density — Jaisalmer (17)
- Highest female literacy is in Kota — (66.32%)
- Lowest females literacy is in Jalore — (38.73%)
- Highest male literacy is in Jhunjhunu — (87.88%)
- Lowest male literacy is in Pratapgarh — (70.13%)
- Mewar, Marwar and Kishangarh are important schools of Painting.

UNIVERSITIES IN RAJASTHAN

- University of Bikaner, Bikaner
- University of Kota, Kota
- University of Rajasthan, Jaipur
- Agriculture University, Udaipur
- Rajasthan Vidyapeeth, Udaipur
- Kota Open University, Kota
- Maharana Pratap University of Agricutlure & Technology, Udaipur
- Maharshi Dayanand Saraswati University, Ajmer
- Malviya National Institute of Technology, Jaipur
- Mohanlal Sukhadia University, Udaipur
- National Law University, Jodhpur
- Rajasthan Agricultural University, Bikaner
- Rajasthan Ayurveda University, Jodhpur
- Rajasthan Sanskrit University, Jaipur
- Banasthali Vidhyapith, Banasthali
- Birla Institute of Technology & Science, Pilani
- Institute of Advanced Studies in Educaitonal, Sardarshahr
- Jai Naraian Vyas University, Jodhpur
- Jain Vishva Bharati Institute, Ladnun

BIHAR

Area — 94,163 sq.km.
Capital— Patna
Language — Hindi
Districts — 38
Population — 103,804,637 (Males – 54,185,347, Females – 49,619,290)
Density— 1102 persons per sq km.
Sex Ratio — 916 females per thousand males
Literacy— 63.82% (Males – 73.39% and Females – 53.33%)
High Court — Patna
Festivals : Holi, Ramnavami, Dussehra, Buddha Jayanti, Idd, Muharram,
Tourists Centres : Bodh Gaya, Nalanda, Patna, Pawapuri, Rajgir, Sasaram, Vaishali, Vikramshila

FACTS TO REMEMBER

- Bihar finds mention in the Vedas, Puranas, Epics etc.
- Bihar is the land of great religious personalities like Buddha and 24 jain Tirthankars.
- The city of Pataliputra (Patna) was founded by Udayin.
- Pataliputra remained the epicentre of political developments under the Mauryas, Post-Mauryan dynasties and the Guptas.
- The first Muslim conqueror of Bihar was Mohammad-Bin Bakhtiar Khalji.
- During the 1857 revolt Bihar was an important centre of revolutionary activities.
- Kunwar Singh was an important leader from Bihar during the 1857 revolt.
- Bihar is bounded on the north by Nepal, on the east by West Bengal, on West by Uttar Pradesh and on the South by Jharkhand.
- Important rivers flowing in Bihar includes, Ganga, Sone, Poonpoon, Falgue, Durgawati, Kosi, Gandak, Ghagra etc.
- Bihar has a total geographical area of about 93.60 lakh hectare, out of which only 56.03 lakh hectare is the net cultivated area.
- Principal food crops are Paddy, Wheat, maize and Pulses.
- Main crash crops are sugarcane, Potato, tobacco, oilseeds, onion, chillies, jute.
- Bihar has notified forest area of 6,764.14 sq km.
- There is an international airport at Patna, besides landing, grounds in all major districts of the state.
- Important places of Tourist interest are Rajgir, Nalanda, Vaishali, Pawapuri, Bodh Gaya, Vikramshila, Madhubani.

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UNIVERSITIES IN BIHAR

- Magadh University, Bodh Gaya
- Nalanda Open University, Patna
- Patna University, Patna
- Rajendra Agricultural University, Samastipur
- Tilka Manjhi Bhagalpur University, Bhagalpur
- Veer Kunwar Singh Universiry, Arrah
- Babasaheb Bhimrao Ambedkar University, Muzaffarupur
- Bhupendra Narayan Mandal University, Madhepura
- Bihar Yoga Bharati, Munger
- Jai Prakash Vishwavidyalaya, Chhapra
- Kameshwar Singh Darbhanga Sanskrit University, Darbhanga
- Lalit Narayan Mithila University, Darbhanga

Industries in Bihar

Industries	Location
Railway Wagon Plant	Muzaffarpur, Mokamah
Oil refinery	Barauni
Fertilizer Plant	Barauni Amjhor
Cotton Spinning Mills	Siwan, Pandual, Bhagalpur, Mokamah, Gaya
Distilleries	Gopal Ganj, Bhagalpur, Riga
Finished Leather Industry	West Champaran, Muzaffarpur, Barauni
Jute Mills	Katihar, Samastipur
Medicine Manufacturing Unit	Hajipur
Food Processing Units	Aurangabad, Patna

WEST BENGAL

Area — 88,752 sq.km.

Capital — Kolkata

Language — Bengali

Districts — 19

Population — 9,13,47,736 (Males – 4,69,27,389, Females – 4,44,20,347)

Density— 1029 persons per sq km.

Sex Ratio — 947 females per thousand males

Literacy— 77.08% (Males – 82.67% and Females – 71.16%)

River — Bhagirathi and tributaries like Mayurakshi, Damodar, Rupnarayan

High Court — Kolkata

Airports — Dumdum is an international airport, Balurghat, Coochbehar, Malda, Bagdogra, Panagarh, Behala, Barrackpore and Kalaikunda are other airfields

Ports — Most important port is Kolkata besides Haldia

Festivals — Most important festival is Durga Puja, Kali Puja or Diwali comes next.

Tourists Spots — Sagar Island and Sunderbans, Bandel, Tarakeswar, Kolkata, Digha, Kamarpukar and Godiara, Shantiniketan and Bakreshwar, Durgapur, Mukutmanipur and Vishnupur, Ayodhya Hills, Murshidabad, Gour and Pandua, Darjeeling, Mirik, Kalimpong, Sandakfu and Falut and Kurseong, Jaldapara and Dooers are important tourist centres.

FACTS TO REMEMBER

- West Bengal has a long and glorious history going back to the Pre-historic period.
- At the time of Alexander's invasion a powerful kingdom called Gangaridai ruled here.
- Gopala founded the Pala dynasty in Bengal.
- After the Mughals, history of modern Bengal begins with the advent of European and English trading companies.
- Bengal became an independent vice-royalty under Murshid Quli Khan.
- During the British period Bengal was an important administrative centre.
- Lord Curzon divided Bengal in 1905.
- Bengal remained an important centre of various strands of Indian Freedom struggle.
- West Bengal is connected with countries like Bangladesh in the east and Nepal in the West. Bhutan lies in the north-east.
- On the west are the states of Bihar, Jharkhand, while in the south lies Orissa.
- Agriculture is the most important occupation of people in Bengal.
- West Bengal Industrial Infrastructure Development Corporation (WBIIDC) is entrusted with the development of the infrastructure in the state.
- Important Industrial estates are, the Gem and Jewellery Park 'Manikanchan', and the toy park in Salt Lake.
- The two major irrigation projects under implementation in the state are the Teesta Barrage Projects and the Subarnarekha Barrage Project.
- Howrah, Asansol, Sealdah, Bandal, Bardhaman, Kharagpur and New Jalpaiguri are the main Railway junctions.

UNIVERSITIES IN WEST BENGAL

- Indian Institute of Technology Kharagpur, Kharagpur
- Indian Statistical Institute Kolkata
- Jadavpur University, Calcutta
- National Institute of Technology, Durgapur
- Netaji Subhash Open University, Calcutta
- Vidyasagar University, Midnapore
- Vishva Bharti Shantiniketan
- West Bengal University of Animal and Fishery Sciences, Kolkata

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- West Bengal University of Technology, Kolkata
- West Bengal National University of Juridicial Sciences, Calcutta
- Rabindra Bharati University, Calcutta
- The University of Burdwan, Burdwan
- University of Calcutta, Calcutta
- University of Kalyani, Kalyani
- University of North Bengal, Raja Rammohanpur
- Uttar Banga Krishi Vishwavidyalaya, CoochBihar
- Bengal Engineering College, Howrah
- Bidhan Chandra Krishi Vishwavidyalaya, Nadia

JHARKHAND

Area — 79,714 sq.km.
Capital— Ranchi
Language — Hindi
Districts — 24
Population — 3,29,66,238 (Males – 1,69,31,688, Females – 1,60,34,550)
Density— 414 persons per sq km.
Sex Ratio — 947 females per thousand males
Literacy— 67.63%, (Males – 78.45% and Females – 56.21%)
High Court — Ranchi
Lok Sabha Members — 14
Rajya Sabha Members — 6
Vidhan Sabha Members — 81
Industries —TISCO, TELCO, Hindalco, ACC Cement etc.
Important Minerals — Coal, Iron ore, Limestone, Copper Ore, Bauxite, Payrite, Kayanite, Fine clay, Quartz, Dolomite, graphite.

FACTS AT A GLANCE

- Jharkhand came into being on 15 November 2000 as the 28th State of the Union.
- In 13th century Raja Jai Singh Deo of Orissa declared himself the ruler of Jharkhand.
- In post-Independence period the Jharkhand Mukti Morcha launched agitation for a separate state.
- Jharkhand Area Autonomous council was established in 1995.
- Jharkhand is bounded by West Bengal in the east, U.P. and Chattisgarth in the West, Bihar in the North and Orissa in the South.
- Jharkhand has an area of 79,714 sq.km. of which 18,423 sq. km is forest land.
- The total cultivated land in Jharkhand is only 38 lakh hectares.
- Agriculture and allied activities are the major source of Jharkhand's economy.
- Damodar, Maurakshi, Barakar, Sankh, Kharkai and Ajay are major water resources in the state.

- The net irrigated area is 1.57 lakh hectares.
- The net irrigated area is 8 percent of the net sown area.
- The installed capacity of power in Jharkhand is 2,590 MW.
- The state is richest in the country in terms of its minerals resources.
- The total length of roads in the state is 4,311 km.
- The total length of National Highways is 1500km and State highways is 2,711 km.
- Ranchi, Bokaro, Giridih, Deoghar, Hazaribagh, Daltonganj and Noamundi have air strips.
- Famous Temples of Jharkhand are, Jharkhand Dham, Lagnta Baba Temple, Bindhvashini Temple.

Wildlife Sanctuary

Tourist	Location
Udhava Bird Sanctuary	Sahibganj
Chachro Crocodile Breeding Centre	Koderma
Jawaharlal Nehru Zoological Garden	Bokaro
Dalma Wildlife Sanctuary	Jamshedpur
Tata steel Zoological Park	Jamshedpur
Palkota Wildlife Sanctuary	Gumla
Bhagwan Birsa Zoological Gardens	Ranchi
Birsa Deer Sanctuary	Kalmati Ranchi
Betla National Park	Palamau

Industries

Industries	Location
Tata Iron Steel Company (TISCO)	Jamshedpur
Timken India Limited	Jamshedpur
Bharat Cooking Limited	Dhanbad
Khilari Cement Factory	Palamu
Indian Aluminium	Muri
ACC Cement	Chaibansa
Central Coalfield Limited	Ranchi
Uranium Corporation (I) Limited	Jadugora
Hindustan Copper Limited	Mussabani
Tin Plate Company of India Limited	Jamshedpur
Indian Explosive Limited	Gomia
Hindalco Bauxite	Lohardaga

UNIVERSITIES IN JHARKHAND

- Siddhu Kanhu University, Dumka
- Birla Institute of Technology, Ranchi
- Birsa Agricultural University, Kanke Ranchi
- Indian School of Mines, Dhanbad

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- National Institute of Technology, Jamshedpur
- Ranchi University, Ranchi
- Vinoba Bhave University, Hazaribag

RESEARCH INSTITUTES IN JHARKHAND

1. Indian School of Mines
2. Xavier Labour Relations Institute
3. Central Mining Research Institute
4. National Metallurgical Laborartory
5. Tribal Research Institute

HARYANA

Area— 44,212 sq.km.
Capital — Chandigarh
Language — Hindi
Districts — 21
Population — 2,53,53,081 (Males – 1,35,05,130, Females – 1,18,47,951)
Density— 573 persons per sq km.
Sex Ratio — 877 females per thousand males
Literacy— 76.64% (Males – 85.38%, Females – 66.77%)
High Court — Chandigarh
State Day — 1 November
Lok Sabha Members — 10
Rajya Sabha Members — 5
Vidhan Sabha Members — 90

FACTS TO REMEMBER

- Haryana was the home of the legendary Bharat dynasty.
- The battle of Mahabharat was fought at Kurukshetra, situated in Haryana.
- Hemu from Rewari emerged as an important warrior in the Medieval period.
- Rao Tula Ram of Rewari took active part in 1857 war of Independence.
- Several territories of Haryana were handed over to the rulers of Punjab Princely states by the Britishers.
- With the reorganisation of Punjab on 1 Nov, 1966, Haryana was made into a full fledged state.
- The state is bounded by U.P. in the east, Punjab in the west, HImachal in the north and Rajasthan in South.
- More than 75% population is engaged in agricultural activities.
- Rice, Wheat, Jowar, Bajra, maize, sugarcane, cotton are the major crops.

- Gurgaon region is ranked at number 3 in the country in software exports.
- Haryana has more than 1230 large and medium and 80,000 small scale units in the state.
- New Industrial Estates are being developed at Karnal, Panipat, Kundli, Rai, Barhi.
- Four Food parks are located at Narwana (Jind), Saha (Ambala), Rai (Sonipat) and Dabwali (Sirsa).
- Haryana became the first state to achieve 100% rural electrification in 1970.
- In Haryana all villages stand connected with metalled roads.
- Ambala, Panipat and Jakhal are important railway stations.
- The length of road in the state is 31,010 km.
- There is a railway workshop at Jagadhari.
- There are civil aerodromes at Pinjore, Karnal, Hisar, Bhiwani and Narnaul.
- Haryana has a network of 46 tourist complexes in the state.
- The Suraj Kund craft mela of International fame is held every year in the month of February.
- The legislature consists of only one house, the Legislative Assembly.
- Per capital availability of milk is 579 grams against the Indian average of 180 grams.
- The Indian Army has 11.2% of its soldiers from Haryana.
- Cosmonaut Kalpana Chawla was born in Haryana.

UNIVERSITIES IN HARYANA

- National Dairy Research Institute, Karnal
- National Institute of Technology, Kurukshetra
- Chaudhary Devi Lal University, Sirsa
- Guru Jambeshwar University, Hissar
- Kurukshetra University, Kurukshetra
- Maharshi Dayanand University, Rohtak
- National Brain Research Centre, Gurgaon
- Ch. Charan Singh Haryana Agricultural University, Hissar

MADHYA PRADESH

Area — 3,08,000 sq.km.
Capital— Bhopal
Language — Hindi
Districts — 50
Population — 72,597,565 (Males – 37,612,920, Females – 34,984,645)
Density— 236 persons per sq km.
Sex Ratio — 930 females per thousand males
Literacy— 70.6% (Males – 80.5% and Females – 60.0%)

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High Court — Jabalpur (Benches at Gwalior and Indore)
Lok Sabha Members — 29
Rajya Sabha Members — 11
Vidhan Sabha Members — 230

FACTS AT A GLANCE

- Madhya Pradesh is the second largest state in the country.
- During the Ancient Period Ashoka was the Prince of Ujjain.
- A major portion of present Madhya Pradesh was part of the Gupta Empire during the ancient period.
- The Muslims came into central India in the beginning of 11th century.
- Mohammad Ghori incorporated some parts of central India into his ruling territory of Delhi.
- Central part was also part of the Mughal empire.
- After the decline of Marathas central India got divided into several small states.
- Queen Ahilyabai Holkar of Indore, the Gond Maharani Kamalapati and Queen Durgawati were important women rulers.
- Madhya Pradesh came into being on 1 November 1956.
- It was reorganised on 1 November 2000 to create a new Chhatisgarh state.
- Madhya Pradesh is bounded by U.P. in north, Chhattisgarh in east, Maharashtra in South, Gujarat and Rajasthan in West.
- Agriculture is the main stay of Madhya Pradesh's economy.
- Around 75% of the total population lives in rural areas.
- About 49% area of the State is cultivable.
- Madhya Pradesh is producing optical fibre for telecommunication needs.
- A large number of automobile industries have been set up at Pithampur near Indore.
- The Government of India is setting up a Special Economic Zone (SEZ) at Indore.
- Madhya Pradesh produces 21 types of Minerals.
- Madhya Pradesh is famous for its traditional handicrafts and handloom cloths manufactures in Chanderi and Maheshwar.
- Madhya Pradesh is rich in low-grade coal suitable for power generation.
- The total length of roads in the state is 67,600 km.
- The length of national highways in the state is 3,700 km.
- The divisional railways headquarters are at Bhopal, Ratlam and Jabalpur.
- There are airports at Bhopal, Gwalior, Indore and Khajuraho.
- Maheshwar, Omkareshwar, Ujjain, Chitrakoot and Amarkantak are major centres of pilgrimages.

- Erotic temples of Khajuraho are famous all over the world.
- Pachmarhi, Dhuandhar Fall, Kanha National Park, Bandhavgarh National Park are famous tourist spots.
- Gwalior, Mandu, Datia, Chanderi, Jabalpur, Orchha, Sanchi, Vidisha, Bhimbetika, Indore are famous for their historical monuments.

Public Sector Industries	Location
Bharat Heavy Electrical Ltd.	Bhopal
Security Paper Mill	Hoshangabad
Bank Note Press	Dewas
Newsprint Factory	Nepanagar
Alkaliod Factory	Neemuch
Art Festivals	**Centre**
Tansen Music Festival	Gwalior
Utad Allauddin Khan Music Festival	Maihar
Kalidas Samaroh	Ujjain
Festival of Dances	Khajuraho

UNIVERSITY OF MADHYA PRADESH

- Awadhesh Pratap Singh University, Rewa
- Barkatullah Vishwavidyalaya, Bhopal
- Bundelkhand University, Jhansi
- Devi Ahilya Vishwavidyalaya, Indore
- Dr. Harisingh Gour Vishwavidyalaya Sagar
- Indian Institute of Information Technology and Management, Gwalior
- Jawaharlal Nehru Krishi Vishwavidayalaya, Jabalpur
- Jiwaji University, Gwalior
- Lakshmibai National Institute of Physical Education, Gwalior
- Madhya Pradesh Bhoj (Open) University, Bhopal
- Maharishi Mahesh Yogi Vedic Vishwavidyalaya, Jabalpur
- Mahatma Gandhi Chitrakoot Gramoday Vishwavidyalaya, Chitrakoot
- Makhanlal Chaturvedi Rashtriya Patrakarita Vishwavidyalaya, Bhopal
- Maulana Azad National Institute of Technology, Bhopal
- National Law Institute University, Bhopal
- Rajiv Gandhi Proudyogiki Vishwavidyalaya Bhopal
- Rani Durgavati Vishwavidyalaya, Jabalpur
- Vikram University, Ujjain
- Indian Institute of Forest Management, Bhopal

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MAHARASHTRA

Area — 3,07,713 sq.km.
Capital— Mumbai
Language — Marathi
Districts — 35
Population — 11,23,72,972 (Males – 5,83,61,397, Females – 5,40,11,575)
Density— 365 persons per sq km.
Sex Ratio — 925 females per thousand males
Literacy— 82.91% (Males – 89.82% and Females – 75.48%)

Important Crops : rice, jowar, bajra, wheat, tur, mung, urad, gram and other pulses

High Court — Mumbai (Benches at Nagpur, Panaji and Aurangabad)

Ports : The major ports are Mumbai and Jawaharlal Nehru (Nhava Shava)

Airports : The major airports are Mumbai, Pune, Aurangabad, Nasik and Nagpur.

Festivals : Ganesh Chaturthi is the main festival of the state.

Tourist Spots : Ajanta, Ellora, Elephanta, Kanheri and Karla Caves; religious places at Nasik Shirdi, Pandharpur, Nanded, Trimbakeshwar, Aundhananath Tuljapur, Ganpatipule, Bhimashankar, Harihareshwar and Shegon; Mahablaeshwar, Matheran and Panchagani, Jawahar, Malshejghat, Amboli, Chikhaldara, Panhala hills stations are some of the important tourist spots.

IMPORTANT FACTS

- The Satavahanas (230 B.C. – 225 A.D0 established their rule over Maharashtra during the ancient period.
- The Satavahanas promoted literary and artistic activities during their rule.
- The Satavahanas were followed by the Vakatakas.
- Some of the Ajanta caves and fresco paintings reached the high level mark during the period of Vakatakas.
- Subsequently, Kalachuris, the Chalukyas, the Rashtrakutas and the Yadavas ruled over Maharashtra.
- A new sense of Nationalism evolved in Maharashtra under Marathas particularly Shivaji.
- The Peshwas established the Maratha supremacy from the Deccan Plateau to Attock in Punjab.
- The administrative evolution of the state of Maharashtra is the outcome of the linguistic reorganisation of the states of India effected on 1 May 1960.
- The dominant physical trait of Maharashtra is its Plateau character.
- Arabian sea guards the western boundary of Maharashtra, while Gujarat and M.P. are on the northern side.
- Chhattisgarh covers the eastern boundary of the state. Karnataka and Andhra Pradesh are on its Southern side.
- About 65% of the total workers in the state depend on agriculture and allied activities.

- Maharasthra is a major producer of oilseeds.
- Groundnut, sunflower, soyabean are major oil seed crops.
- Important cash crops of Maharashtra are cotton, Sugarcane, turmeric and Vegetables.
- Maharashtra has an area of 12.90 lakh hectares under various fruit crops like mango, banana, orange, grapes, cashewnut etc.
- Mumbai is the centrepoint of India's financial and commercial markets.
- Industrial sector occupies a prominent position in the economy of Maharashtra.

UNIVERSITIES IN MAHARASHTRA

- Narsee Monjee Institute of Management Studies, Mumbai.
- North Maharashtra University, Jalgaon.
- Padmashree Dr. D.Y. Patil Vidyapeeth, Vidyanagar, Navi Mumbai.
- Pravara Institute of Medical Sciences, Ahmednagar.
- Shivaji University, Vidyanagar, Kolhapur.
- SNDT Women's University, Mumbai.
- Swami Ramanand Teerth Marathwada University, Nanded.
- Symbiosis International Education Centre, Pune.
- Tata Institute of Fundamental Research, Homi Bhaba Road, Mumbai.
- Tata Institute of Social Sciences, Sion Trombay Road, Mumbai.
- Tilak Maharshtra Vidyapeeth, Gultekdi, Pune.
- University of Mumbai, Fort Mumbai.
- University of Pune, Pune.
- Visvesvaraya National Institute of Technology, Nagpur.
- Yashwantrao Chavan Maharashtra Open University, Nasik.
- Amravati University, Amaravati-444602 Bharati Vidyapeet, Pune.
- Central Institute of Fisheries Education, Versova, Mumbai.
- Deccan College Post Graduate and Research Institute, Pune.
- Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- Dr. Babasaheb Ambedkar Technological University, Lonere.
- Dr. D.Y. Patil Vidyapeeth, Pimpri, Pune.
- Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Krishi Nagar, Akola.
- Gokhale Institute of Politics & Economics, Pune.
- Indian Institute of Technology Bombay, Powai, Mumbai.
- Indira Gandhi Institute of Development Research, Mumbai.
- Institute of Armament Technology, Girinagar, Pune.
- International Institute For Population Sciences, Deonar, Mumbai.
- Kavikulguru Kalida Sanskrit Vishwavidyalaya, Ramtek.
- Konkan Krishi Vidyapeeth, Dapoli.
- Maharashtra Animal & Fishery Sciences University, Seminar Hills, Nagpur.
- Maharashtra University of Health Sciences, Nashik.
- Mahatma Phule Krishi Vidyapeeth, Parbhani.
- Nagpur University, Ravindra Nath Tagore Marg, Nagpur.

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HIMACHAL PRADESH

Area — 55,673 sq.km.
Capital— Shimla
Languages — Hindi and Pahari
Districts — 12
Population — 68,56,509 (Males – 34,73,892, Females – 33,82,617)
Density — 123 persons per sq km.
Sex Ratio — 974 females per thousand males
Literacy— 83.78% (Males – 90.83% and Females – 76.60%)
High Court — Shimla
State Day — 15 April
Rivers — Chenab, Ravi, Beas, Sutlej, Yamuna
— only one House i.e. Vidhan Sabha
Vidhan Sabha Members — 68
Lok Sabha Members — 4
Rajya Sabha Members — 3
Crops — Wheat, Maize, Paddy, Apples, Potatoes, Ginger and Stone Fruits.
Total Road Length — 21,935 km.
Airports — Bhuntar (Kullu Valley), Jubbarhatti (Shimla) and Gaggal (Kangra)
Schools — 10,650 Primary Schools, 1,680 Middle Schools, 990 High Schools, 530 Senior Secondary Schools.
Colleges — 37 colleges, 3 Universities and 2 Medical Colleges.
Tourist Centres — Shimla, Dalhousie, Dharmasala, Kulu, Solan, Chail, Kufri, Kasauli, Temples at Bhima Kali, Sarahan, Hakkoti, Jwalajee, Chamunda Devi, Chintpurni, Renuka and Rewalsar Deot Siddh and Naina Devi; tourist complexes at Shimla.

SOME IMPORTANT FACTS

- During the ancient period the natuies of Himachal Pradesh were called as 'Dasas'.
- During the period of Mahabharata Audumabaras, Trigartas, and Kulindas were the famous ruling houses.
- Guptas and later the Vardhana rulers established their control.
- Mahmud Ghazni attacked in 11th centuary
- Tughlaqs in 14th c and Mughals in 16th c established their political control.
- In early 19th c Maharaja Ranjit Singh established control over Kangra.
- During the British rule it came under their political and administrative control.
- Himachal Pradesh was originally formed as a centrally administered territory on April 15, 1948 by the integration of some 30 odd Punjab hill states.

- Himachal Pradesh was declared a state on January 25, 1971.
- Agriculture and horticulture are the mainstay of Himachal's economy as 71 percent of people are engaged in these activities.
- Irrigated area forms 26 percent of the net sown area.
- There are 194 medium and large scale industries and about 29,208 small scale industries.
- Khajjair in Chamba district has earned the name 'Mini Switzerland' because of the striking similarity in landscape.
- The total area under fruit cultivation is 2.23 lakh hectares.
- At present seven hydroelectric projects with aggregate capacity of 321.5 PWD are under execution.
- The State Government has undertaken a WASH project for irrigation as well as for drinking water supply.
- Rs. 2.85 crore Biotechnology Park is being established in District Solan.
- The State Government official website is "http://himachal.nic.in".

UNIVERSITIES IN HIMACHAL PRADESH

1. Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishwavidyalaya, Palampur.
2. Dr. Y.S. Parmar University of Horticulture & Forestry, Nauni.
3. Himachal Pradesh University, Summer Hills, Simla.
4. Jaypee University of Information Technology, Waknaghat, Solan.
5. National Institute of Technology, Hamirpur.

PUNJAB

Area — 50,362 sq.km.
Capital— Chandigarh
Language — Punjabi
Districts — 20
Population — 2,77,04,236 (Males – 1,46,34,819; Females – 1,30,69,417)
Density— 550 persons per sq km.
Sex Ratio — 893 females per thousand males
Literacy— 76.68% (Males – 81.48% and Females – 71.34%)
High Court — Chandigarh
Legislature — Unicameral, only Legislative Assembly.
Rivers — Indus, Jhelum, Chenab, Ravi, Beas, Sutlej.
Airports — There are airports at Amritsar, Bhatinda, Chandigarh and Ludhiana.
Festivals — Baisakhi, Hola Mohalla, Basant, Maghi Mela etc. are important festivals.

FACTS TO REMEMBER

- Situated in the North-western corner of the country. Punjab is bound on the west by Pakistan, on the north by Jammu & Kashmir.

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on the north-east by Himachal Pradesh and on the south by Haryana and Rajasthan.

- Ancient Punjab formed part of the vast Indo-Iranian region. In later years it saw the rise and fall of the Mauryas, Bactrians, Greeks, Sakas, Kushanas and Guptas.
- During the 15th and 16th centuries Sikhism emerged as an important socio-religious movement.
- Punjab reached its high water mark during the reign of Maharaja Ranjit Singh.
- Punjab was annexed to the British Empire in 1849.
- Eight Princely states of East Punjab were grouped together to form a single state called PEPSU — Patiala and the east Punjab states Union — with Patiala as its capital.
- PEPSU states was merged with Punjab in 1956. Later in 1966, Haryana was carved out of Punjab.
- The word 'Punjab' is made up of two Persian words 'Panj' and 'Aab'. Panj means five and Aab means water.
- Road length in Punjab is 48,543 km and length of railway route is 3726.06 km.
- There is a domestic airport at Chandigarh and an International Airport at Rajasansi (Amritsar).
- Chandigarh was designed by Le Carbusier.
- Punjab produces 21 percent of wheat, 10 percent Rice and 12 percent of Cotton in the country.
- In Punjab per hectare consumption of fertilizer is 177 km as compared to 90 kg at National Level. It is highest in India.
- Punjab's contribution is highest in the procurement of foodgrains for the central pool.
- Per capita availability of eggs in Punjab is 90 as compared to 22 at National level.
- There are 203 lakh small scale industrial units in the state in addition to 620 large and medium units.
- Punjab has the least population (5.84%) below powerty line.
- Punjab has terminated the agreement of 1981 for sharing the waters of the Sutlej, Beas and Ravi.

UNIVERSITIES IN PUNJAB

- Guru Nanak Dev University, Amritsar.
- National Institute of Pharmaceutical Education & Research, Mohali.
- Punjab Agricultural University, Ludhiana.
- Punjab Technical University,
- Dr. B.R. Ambedkar Regional College Campus, Jalandhar.
- Punjabi University, Patiala.
- Thapar Institute of Engineering & Technology, Patiala.
- Baba Farid University of Health Sciences, Faridkot.
- Dr. B.R. Ambedkar National Institute of Technology, Jalandhar.

DELHI

Area — 1,483 sq.km.
Capital — Delhi
Districts — 9
Language — Hindi, Punjabi, Urdu, English
Population — 1,67,53,235 (Males – 89,76,410; Females – 77,76,825)
Density — 11,297 persons per sq km.
Sex Ratio — 866 females per thousand males
Literacy — 86.34% (Males – 91.03% and Females – 80.93%)
High Court — Delhi

Transport — There are Bus Terminals at ISBT (Kashmere Gate), Sarai Kale Khan, the third at Anand Vihar (Under construction). Three important railway stations—Delhi Junction, New Delhi Railway Station and Nizamuddin Railway Station. on Dec. 24, 2002, the first section of Delhi Metro was inaugrated.

Airports — There are three major airports—Indira Gandhi International Airport (International Flights), Palam Airport (National Air Services) and Safdarjung Airport (Training purpose).

Festivals — All major festivals and some tourist festivals like International Kite Flying Festival, Garden Tourism and Mango Festival are celebrated.

FACTS TO REMEMBER

- The city of Delhi was founded by a Rajput Chieftain of the Tomar Clan in 11th C A.D.
- Delhi remained an important political, administrative and cultural centre during the Sultanats period and Mughal period.
- The capital of British India was transferred from Calcutta to Delhi in 1912.
- A new city, New Delhi was laid out by the side of the old city, old Delhi, by the British Indian Government.
- Delhi became a Union Territory on November 1, 1956.
- In December 1991 Delhi got a legislative assembly comprising 70 Seats along with a seven member council of ministers head by the Chief Minister.
- The territory is made up of three census towns, Delhi, New Delhi and Delhi Cantt and 214 villages.
- It is represented by 7 members in the Lok Sabha and 3 members in the Rajya Sabha.

Location : It is located in the northern part of the country. It is surrounded by Haryana on all sides except east where Uttar Pradesh touches it.

Climate : The climate of the territory is influenced by its inland position with the desert of Rajasthan to the west and south-east and

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Gangetic plains of Uttar Pradesh to the east. Extreme dryness with an intensely hot summer and cold winter are the characteristics of the climate.

Agriculture : Principal food crops are wheat, gram, rice, maize, bajra and jowar. Cash crops are sugarcane, mustard, tobacco and chillies. Emphasis is now on vegetable and fruit crops, dairy and poultry farming.

Industry : It is the largest commercial centre and largest centre of small industries. Paints and varnishes; drugs and chemicals, steel castings, television sets, radios, transistors, electrical appliances, scientific instruments, readymade garments and vegetable oil are the prominent industries. Some of the other industries are leather and rubber goods, pottery, textiles and tanning. Gold and silver, embroidery, brass and copperwire are some of the cottage industries.

Tourist Centres : Since Delhi has been the capital of India for centuries, it is full of rich monuments. Both the Delhis preserve centres of trourist interest some of which are Rashtrapati Bhawan, Mughal Gardens, Parliament Buildings, Chandni Chouk, Red Fort, Jama Masjid, Raibat, Raj Ghat, Shantivana, Vijaya Ghat, Purana Kila (Indraprastham), Humayun's Tomb, Lodi Tomb, Qutb Minar, Haus Khas, Safdarjung's Tombs, Jantar Mantar and India Gate.

The Zoological Garden, Kashmiri Gate, Birla Mandir, Vigyan Bhawan, National Museum, Connaught Circus, Buddha Jayanti Park, Rabindra Rangsala and Nehru Memorial Museum are other attractions. An expressway around the capital is to be built. A national law university is being set up in Delhi. A state-of-the-art National Ayurvedic Hospital is another project.

UNIVERSITIES IN DELHI

- All India Institute of Medical Sciences, New Delhi Pin:110029.
- Guru Govind Singh Indraprastha Vishwavidyalaya, Delhi Pin: 110006.
- University of Delhi, Delhi Pin: 110007.
- Indian Agriculture Research Institute, New Delhi Pin: 110012.
- Indian Institute of Technology Push, New Delhi Pin: 110016.
- Indira Gandhi National Open University, New Delhi Pin: 110068.
- Jamia Hamdard, New Delhi Pin: 110062.
- Jamia Millia Islamia, New Delhi Pin: 110025.
- Jawaharlal Nehru University, New Delhi Pin: 110067.
- National Museum Institute of History of Art, Conservation & Museology, New Delhi Pin: 110011.
- School of Planning & Architecture, New Delhi Pin: 110002.
- Shri Lal Bahadur Shastri Rashtriya Sankrit Vidyapeeta, New Delhi Pin: 110016.
- TERI School of Advanced Studies, New Delhi Pin: 110003.

UTTAR PRADESH

Area — 2,40,928 sq.km.
Capital — Lucknow
Language — Hindi and Urdu
Districts — 72
Population — 19,95,81,477 (Males – 10,45,96,415; Females – 9,49,85,062)
Density— 828 persons per sq km.
Sex Ratio — 908 females per thousand males
Literacy— 69.72% (Males – 79.24% and Females – 59.26%)
Legislative Assembly — 403 members
Legislative Council — 99 members
Lok Sabha — 80 members
Rajya Sabha — 31 members
High Court — Allahabad (Bench at Lucknow)
State Day — 1 November, 1956

Railways — Main Junction of the northern network is Lucknow, Agra, Kanpur, Allahbad, Mughalsarai, Varanasi, Tundla, Gorakhpur, Gonda, Faizabad, Bareilly and Sitapur are other important railway junctions.

Tourist Centres — Sravasti, Sarnath, Kushinagar, Sankisa, Kaushambi, Varanasi, Prayag Naimisharanya, Taj Mahal, Ayodhya, Lucknow and Mathura are important tourist centres.

FACTS TO REMEMBER

- Uttar Pradesh has a very glorious past and it is recognized in the Vedic Age as Madhya Desha.
- Many great sages of the Vedic times like Gautam, Bharadwaja, Yagnavalkya, Vashishtha, Valmiki and Vishwamitra flourished in this state.
- Two great epics of India, Ramayan and Mahabharat, appear to have been inspired by Uttar Pradesh.
- In the sixth century B.C. Jainism and Buddhism flourished here.
- Buddha preached his first sermon at Sarnath and breathed his last at Kushinagar.
- Ayodhya, Prayag, Varanasi and Mathura were reputed centres of learning.
- In Mathura emerged an important school of art.
- During the early Medieval period Kanauj became the centre of political importance.
- During the medieval period Uttar Pradesh was an important centre for the development of Bhakti.
- Ramanand and his Muslim disciples Kabir, Tulsidas, Surdas and many other intellectuals contributes to the growth of Hindi and other languages.
- The British combined Agra and Awadh into one province and called it United Provinces of Agra and Awadh.

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- The name was shortened to the United Provinces in 1935 and January 1950 the United Province was renamed as Uttar Pradesh.
- The state is bounded by Uttaranchal and Himachal Pradesh in the north, Haryana in the west, Madhya Pradesh in the South and Bihar in the east.
- A software Technology Park has been set up in Kanpur while five more software parks are proposed to be set up.
- There are airports at Lucknow, Kanpur, Varanasi, Allahabad, Agra, Jhansi, Bareilly, Hindon, Gorakhpur, Sarsawa and Fursatganj.
- Prominent pilgrimage centres of Uttar Pradesh are Varanasi, Ayodhya, Chitrakoot, Prayag, Mathura, Vrindavan, Dargah of Shaikh Salim Chishti, Sarnath etc.

Fairs/Festivals

Fairs/Festivals	Place
Kumbh Mela	Allahabad
Ardh Kumbh Mela	Allahabad
Magh Mela	Allahabad
Jhoola fair	Mathura, Vrindavan
Cattle Fair	Bateswar (Agra)
Dusshera Mela	Agra–Mathura
Devi Mela	Barabanki
Ayodhya Mela	Faizabad
Lathmar Holi	Barsana (Mathura)
Kailas Mela	Agra
Navratra Mela	Agra

UNIVERSITIES IN UTTAR PRADESH

- Indian Institute of Technology, Kanpur
- Indian Veterinary Research Institute, Izatnagar Bareilly
- Jagadguru, Rambhadracharya Handicapped University, Chitrakoot Dham, Lucknow
- M.J.P. Rohilkhand University, Bareilly
- Mahatma Gandhi Kashi Vidyapeeth, Varanasi
- Motilal Nehru National Institute of Technology, Allahabad
- Aligarh Muslim University, Aligarh
- Allahabad Agricultural Institute, Allahabad
- Babasaheb Bhimrao Ambedkar University, Lucknow
- Banaras Hindu University, Varanasi
- Bhatkhande Music Institute, Lucknow
- Central Institute of Higher Tibetan Studies, Sarnath, Varanasi
- University of Lucknow, Lucknow
- Uttar Pradesh Technical University, Lucknow
- V.B.S. Purvanchal University, Jaunpur
- Bundelkhand University, Jhansi

- Chaudhary Charan Singh University, Meerut
- Chandra Shekhar Azad University of Agriculture and Technology, Kanpur
- Chhatrapati Shahu Ji Maharaj Medical University, Kanpur
- Chhatrapati Shahu Ji Maharaj University, Kanpur
- Dayalbagh Educational Institute, Agra
- Deendayal Upadhyaya Gorakhpur University, Gorakhpur
- Dr. Bhim Rao Ambedkar University, Agra
- Dr. Ram Manohar Lohia Avadh University, Faizabad
- Indian Institutte of Information Technology, Allahabad
- Narendra Dev University of Agriculture and Technology, Faizabad
- Sampurnanand Sanskrit Vishwavidyalaya, Varanasi
- Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow
- Sardar Vallabha Bhai Patel University of Agriculture and Technology, Meerut
- University of Allahabad, Allahabad

Other Important Institutes

Institute	Location
Birbal Sahni Institute of Paleobotny	Lucknow
Hindustan Aeronautics Limited	Kanpur
Diesel Locomotive Works	Varanasi
Hindustan Aeronautics Limited	Lucknow
Bharat Electronics Limited	Ghaziabad
National Sugar Research Institute	Kanpur
Central Indian Medicinal Plants organisation	Lucknow
National Botanical Gardens	Lucknow
Central Drug Research Institute	Lucknow
Institute of Social Studies	Lucknow
Indian Telephone Industries	Allahabad and Rai Bareli

National Highways Passing through Uttar Pradesh

National Highway Number	Passing Through	Area covered in Uttar Pradesh
2	Delhi–Mathura–Agra–Kanpur–Allahabad–Varanasi–Kolkata	770
3	Agra–Gwalior–Indore–Nasik–Mumbai	26
7	Varanasi–Mangwana–Rewa–Kanyakumari	128
11	Agra–Jaipur–Bikaner	51
24	Delhi–Bareilly–Lucknow	430
25	Lucknow–Kanpur–Jhansi–Shivpuri	237
26	Jhansi–Lakhnadev	128
27	Allahabad–Mangwana	43
28	Barauni–Muzaffarpur–Pipra–Gorakhpur–Lucknow	259
29	Gorakhpur–Ghazipur–Varanasi	196
56	Lucknow–Varanasi	285

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INDIAN ECONOMY

- Indian Economy is characterised as an underdeveloped economy
- The United Nations define an underdeveloped country as one which has real per capita income lower than per capita income of the USA, Canada, Australia and Western Europe.
- Indian economy is characterised with the predominance of the agricultural sector.
- Seventy to eighty per cent of the country's population seeks employment in agriculture.
- Also, mass of the people spend major portion of their incomes on food and necessities, and thus food grains remain the principle wage good.
- Demographic and technological parametres also characterise Indian economy as an underdeveloped economy.

STRUCTURE AND CHARACTERISTICS OF INDIAN ECONOMY

- Indian Economy is a mixed economy.
- Economic Planning in India has been adopted and practised within the framework of 'mixed economy'.
- A mixed economy is characterised by social ownership of the means of production, alongside private ownership.
- It was only after Independence, that mixed economy was adopted as an instrument of economic development.
- The various official documents, declarations and resolutions, like the Constitution, the Five Year Plans, and the Industrial Policy Resolutions, contained ideas on mixed economy.

POPULATION (CENSUS-2001)

CENSUS 2011

- Total Population of India — 121.01 crore
- Sex Ratio (females per thousand males) — 940
- Density — 382 persons per sq. km.
- Crude Birth Rate (2009) — 22.5
- Crude Death Rate (2009) — 7.3
- Infant Mortality Rate (2006) — 57 per thousand live births
- Maternal Morality Rate — 407 per lakh live births
- Literacy rate of the country — 74.04 per cent. (Male — 82.14 per cent, Female — 65.46 per cent)
- State with highest literacy — Kerala (93.91%)

- State with lowest literacy — Bihar (63.82%)
- State with highest female literacy — Kerala (91.98%)
- State with lowest female literacy — Rajasthan (52.66%)
- State having highest decadal growth — Meghalaya (27.82%)
- State having highest Population — Uttar Pradesh (19.95 crore)
- State having lowest Population — Sikkim (6.07 lakh)
- State with highest Population Density — Bihar (1,102)
- State with lowest Population Density — Arunachal Pradesh (17)
- State having highest Sex Ratio — Kerala (1084)
- State having lowest Sex Ratio — Haryana (877)

Religious Community (2001)	Percentage
Hindu	80.50
Muslim	13.40
Christian	2.33
Sikh	1.84
Buddhist	0.80
Jain	0.40

- India accounts for a meagre 2.4 per cent of the world surface area of 135.79 million sq km.
- India supports 17.5 per cent of the World Population.
- Life Expectancy at Birth — 63.5 years, Male — 62.6 years, Female — 64.2 years
- First census was undertaken in 1872 but a systematic programme of Population Census started in 1881.
- Highest Death Rate among states is in Orissa — 98 per thousand.
- Lowest Death Rate among states is in Kerala — 16 per thousand
- Decadal growth rate in Population — 17.64 per cent
- State having lowest population decadal growth rate — Nagaland (–0.47%)
- Four cities having highest population in India are Mumbai, Kolkata, Delhi and Chennai respectively. (Census-2001)
- Andhra Pradesh was the first state to prepare a population policy.
- Highest Scheduled Caste population is in Uttar Pradesh.
- Highest Scheduled Tribe Population is in Madhya Pradesh.
- Lowest Scheduled Caste Population is in Nagaland.
- Lowest Scheduled Tribe Population is in Punjab.
- The National Population Stablisation Fund was renamed as Jansankhya Sthirikaran Kosh in June 2003

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CENSUS-2011 : AT A GLANCE

State-Wise Distribution of Indian population, Decadal Growth, Sex Ratio, Population Density and Literacy

State/ Union Territories	India/ State/ Union	Total Population			Sex Ratio (Females per 1000 males)	Population Density (persons per sq. km)	Decadal Growth (%)	Literacy Rate		
		Persons	Males	Females				Persons	Males	Females
	India	1,21,01,93,422	62,37,24,248	58,64,69,174	940	382	17.64	74.04	82.14	65.46
01	Jammu & Kashmir	1,25,48,926	66,65,561	58,83,365	883	124	23.71	68.74	78.26	58.01
02	Himachal Pradesh	68,56,509	34,73,892	33,82,617	974	123	12.81	83.78	90.83	76.60
03	Punjab	2,77.04,236	1,46,34,819	1,30,69,417	893	550	13.73	76.68	81.48	71.34
04	Chandigarh	10,54,686	5,80,282	4,74,404	818	9,252	17.10	86.43	90.54	81.38
05	Uttarakhand	1,01,16,752	51.54,178	49,62,574	963	189	19.17	79.63	88.33	70.70
06	Haryana	2,53,53,081	1,35,05,130	1,18,47,951	877	573	19.90	76.64	85.38	66.77
07	NCT Delhi	1,67,53,235	89,76,410	77,76,825	866	11,297	20.96	86.34	91.03	80.93
08	Rajasthan	6,86,21,012	3,56,20,086	3,30,00,926	926	201	21.44	67.06	80.51	52.66
09	Uttar Pradesh	19,95,81,477	10,45,96,415	9,49,85,062	908	828	20.09	69.72	79.24	52.26
10	Bihar	10,38,04,637	5,41,85,347	4,96,19,290	916	1,102	25.07	63.82	73.39	53.33
11	Sikkim	6,07,688	3,21,661	2,86,027	889	86	12.36	82.20	87.29	76.43
12	Arunachal Pradesh	13,82,611	7,20,232	6,62,379	920	17	25.92	66.95	73.69	59.57
13	Nagaland	19,80,602	10,25,707	9,54,895	931	119	-0.47	80.11	83.29	76.69
14	Manipur	27,21,756	13,69,764	13,51,992	987	122	18.65	79.85	86.49	73.17
15	Mizoram	10,91,014	5,52,339	5,38,675	975	52	22.78	91.58	93.72	89.40

16	Tripura	36,71,032	18,71,867	17,99,165	961	350	14.75	87.75	92.18	83.15
17	Meghalaya	29,64,007	14,92,668	14,71,339	986	132	27.82	75.48	77.17	73.78
18	Assam	3,11,69,272	1,59,54,927	1,52,14,345	954	397	16.93	73.18	78.81	67.27
19	West Bengal	9,13,47,736	4,69,27,389	4,44,20,347	947	1,029	13.93	77.08	82.67	71.16
20	Jharkhand	3,29,66,238	1,69,31,688	1,60,34,550	947	414	22.34	67.63	78.45	56.21
21	Orissa	4,19,47,358	2,12,01,678	2,07,45,680	978	269	13.97	73.45	82.40	64.36
22	Chattisgarh	2,55,40,196	1,28,27,915	1,27,12,281	991	189	22.59	71.04	81.45	60.59
23	Madhya Pradesh	7,25,97,565	3,76,12,920	3,49,84,645	930	236	20.30	70.63	80.53	60.02
24	Gujarat	6,03,83,628	3,14,82,282	2,89,01,346	918	308	19.17	79.31	87.23	70.73
25	Daman & Diu	2,42,911	1,50,100	92,811	618	2,169	53.54	87.07	91.48	79.59
26	Dadra And Nagar Haveli	3,42,853	1,93,178	1,49,675	775	698	55.30	77.65	86.46	65.93
27	Maharashtra	11,23,72,972	5,83,61,397	5,40,11,575	925	365	15.99	82.91	89.82	75.48
28	Andhra Pradesh	8,46,65,533	4,25,09,881	4,21,55,652	992	308	11.10	67.66	75.56	59.74
29	Karnataka	6,11,30,704	3,10,57,742	3,00,72,962	968	319	15.67	75.60	82.85	68.13
30	Goa	14,57,723	7,40,711	7,17,012	968	394	8.17	87.40	92.81	81.84
31	Lakshadweep	64,429	33,106	31,323	946	2,013	6.23	92.28	96.11	88.52
32	Kerala	3,33,87,677	1,60,21,290	1,73,66,387	1,084	859	4.86	93.91	96.02	91.98
33	Tamil Nadu	7,21,38,958	3,61,58,871	3,59,80,087	995	555	15.60	80.33	86.81	73.86
34	Puducherry	12,44,464	6,10,485	6,33,979	1,038	2,598	27.72	86.55	92.12	81.22
35	Andaman and Nicobar Islands	3,79,944	2,02,330	1,77,614	878	46	6.68	86.27	90.11	81.84

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POPULATION POLICY 2000

- The objective of the policy is to bring qualitative improvement in the lives of the people through social and economic development.
- This policy has three man objectives —
- The immediate objective is to meet the needs of contraception, health, infrastructure, health personnel and to provide integrated service delivery for basic reproductive and health child care.
- The medium term objective is to reduce the total fertility rates to the replacement level by 2010.
- The long term objective is to achieve a stable population by 2045.

GOALS OF THE NATIONAL POPULATION POLICY 2000

1. Reduce maternal mortality ratio to below 100 per one lakh live births.
2. Reduce IMR to below 30 per one thousand live births.
3. Achieve universal immunisation of children against all vaccine preventable diseases.
4. Achieve universal access to information/counselling and services for fertility regulations and contraception with a wide basket of choices.
5. Promote delayed marriages for givers; not earlier than age 18 and preferably aftyer 20 years of age.
6. Prevention and control of communicable diseases.
7. Making school education compulsory and to reduce dropouts.

NATIONAL RURAL HEALTH MISSION (NRHM)

- NCMP mandates health care as one of the seven thrust areas, wherein it is proposed to increase the expenditure in health sector as a proportion of GDP from 0.9 per cent to 2-3 per cent over the next five years. Accordingly, NRHM has been launched on April 12,2005 for a period of 7 years (2005-2012). NRHM includes the second phase of Reproductive and Child Health (RCH) Programme. The RCH Programme Phase-II has been launched with effect from April 1, 2005 for a period of 5 years.

NATIONAL RURAL HEALTH MISSION (NRHM) AND FAMILY WELFARE

VISION OF NRHM

- To be implemented throughout the country with special focus on 18 States with weak public health indicators and/or weak infrastructure.
- To improve the availability of and access to quality health care.
- To build synergy between health and determinants of good health like nutrition, sanitation, hygiene and safe drinking water.
- To mainstream the Indian Systems of Medicines to facilitate comprehensive health care.
- To increase the absorptive capacity of the health delivery system to enable it to handle increased allocations.

- To involve the community over the planning process.
- Upgradation of infrastructure.
- Capacity building.
- Increasing the fund allocation for health sector.

TARGET OUTCOME

- IMR to be reduced to 30/1000 live births by 2012.
- MMR to be reduced to 100/100,000 live births by 2012.
- TFR reduced to 2.1 by 2012.
- Malaria mortality to be reduced by 50 per cent by 2010 and 60 per cent by 2012.
- Elimination of Kala Azar mortality by 2010.
- Filaria to be reduced by 70 per cent by 2010, 80 per cent by 2012 and eliminated by 2015.
- Dengue mortality to be reduced by 50 per cent by 2010 and sustaining it at that level till 2012.
- Cataract operations increasing to 46 lakh per annum.
- Leprosy prevalence rate to be reduced from 1.8 per 10,000 in 2005 to less than 1 per 10,000 thereafter.
- TB DOTS series-maintain 85 per cent cure rate through entire Mission period.

TENTH FIVE YEAR PLAN AND POPULATION FEATURES

- Reduction of Infant Morality Rate (IMR) to 45 per 1000 live births by 2007 and to 28 by 2012.
- Reduction of Maternal Morality Rate (MMR) to 2 per 1000 live births by 2007 and to 1 by 2012.
- Reduction in the decadal rate of population growth between 2001 and 2011 by 16.2 per cent.

POVERTY AND UNEMPLOYMENT

- Poverty is a social phenomenon in which a section of society is unable to fulfill even its basic necessities of life.
- The poor are those who live below the poverty line.
- The poverty line is defined in terms of per capita household expenditure.
- The official method to estimate poverty is the Head Count Ratio. It is calculated by dividing the number of people below the poverty line by the total population.

TYPES OF POVERTY

1. Absolute Poverty :

- When the level of the income of people of a country is so low that they cannot meet even their basic minimum requirements, it is called absolute poverty.
- On the basis of this definition, nearly 26.1 per cent of total population fall below the poverty line.

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2. Relative Poverty

- When we compare the income of different people we find that some people poor than others. It is called relative poverty.
- According to an estimate the highest 10 per cent people of the country receive 25 per cent share of the country's total income while the bottom 10 per cent people get only 4 per cent of the total income
- It is important to note here that proportion of population below poverty line has declined while the absolute number of the poor has increased over the years.
- The number of the poor in Andhrta Pradesh, Bihar, Karnataka, MP, Orissa, Rajasthan, Tamil Nadu, UP and West Bengal is relatively high
- More than one-third of their population lies below poverty line
- As against this, the states of Punjab, Haryana, Himachal Pradesh, J&K here much less numbers of poor. It is around 10 per cent of their population.

Poverty Ratio of Important States

States	1999-2000	2007 (Projected)
1. Orissa	47.15	41.04
2. Bihar	42.60	43.18
3. M.P.	37.43	29.52
4. Sikkim	36.55	—
5. U.P.	31.15	24.67
6. Maharashtra	25.02	16.18
7. Tamil Nadu	21.12	6.61
8. Karnataka	20.04	7.65

Causes of Poverty

- Rapid growth of population.
- Low level of economic development.
- Low productivity in agriculture and industry.
- Widespread inequality in the distribution of Income and Assets.
- Problem of large scale unemployment and underemployment.
- Laws of inheritance.
- Political factors and state policy.

UNEMPLOYMENT

- Unemployment is a situation in which those who are willing to work fail to get a job and therefore do not have a regular source of income.
- The extent of unemployment in India is generally measured on the basis of three different concepts used by the National Sample Survey Organisation (NSSO). These are :

(i) *Usual Status Unemployment* : It refers to number of persons who remain unemployed for a major part of the year.

Various Development and Employment Programme in India : At a Glance

Programme/Plan /Institution	Year of beginning	Objective
Community Development Programme (CDP)	1952	Over all development of rural area with people's participation
Intensive Agriculture Development Programme (IADP)	1960-61	To provide High yeild fertilizer inputs to the farmers
Intensive Agriculture Area Programme (IAAP)	1964-65	To develop the special harvests
Credit Authorisation Scheme (CAS)	Nov. 1965	A Scheme of Qualitative Credit Control of Reserve Bank
High Yielding Variety Programme (HYVP)	1966-67	To increase productivity of foodgrains by adopting latest Varieties of inputs for crops
Indian Tourism Development Corporation (ITDC)	Oct. 1966	To arrange for the construction of Hotels and Guest houses at various places of the country
Green Revolution	1966-67	To increase the foodgrains specially wheat production
Nationalisation of 14 Banks	July 1969	To provide loans for agriculture rural development and other priority sectors
Rural Electrification Corporation	July 1969	Electrification in rural areas
Housing and Urban Development Corporation	April 1970	Loans for the development of housing and provision of resources for technical assistance
Scheme of Discriminatory Interest Rate	April 1972	To provide loan to the weaker sections of the society at a concessional interest rate of 4%
Employment Guarantee Scheme of Maharashtra	1972-73	To assist the economically weaker sections of the rural society
Accelerated Rural Water Supply Programme (ARWSP)	1972-73	For providing drinking to the villages
Drought-Prone Area Programme (DPAP)	1973	To try an expedient for protection from drought by achieving environmental balance and by developing the ground water
Crash Scheme for Rural Employment (CSRE)	1972-73	For rural employment
Marginal Farmer and Agriculture Labour Agency (MFALA)	1974-74	For technical and financial assistance to marginal and small farmers and agricultural labour
Small Farmer Development Agency (SFDA)	1974-75	For technical and financial assistance to small farmers

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Command Area Development Programme (CADP)	1974-75	To ensure better and rapid utilisation of irrigation capacities of medium and large projects
Twenty Point Programme (TPP)	1975	Poverty eradication and raising the standard of living
National Institution of Rural Development	1977	Trainning, investigation and advi -sory organisation for rural de-velopment
Desert Development Programme (DDP)	1977-78	For controlling the desert expan-sion and maintaining environ-mental balance
Food for Work Programme	1977-78	Providing foodgrains to labour for the works of development
Antyodaya Yojana	1977-78	To make the poorest families of the village economically indepen-dent (only in Rajasthan State)
Training Rural Youth for Self-Employment (TRYSEM)	Aug. 15, 1979	Programme of training rural youth for self-employment
Integrated Rural Development Programme (IRDP)	Oct.2 , 1980	All-round development of the rural poor through a programme of asset endowment for self-employment
National Rural Employment Programme (NREP)	1980	To provide profitable employ-ment opoortunities to the rural poor
Development of Women and Children in Rural Areas (DWCRA)	Sep. 1982	To provide suitable opportunies of self-employment to the women belonging to the rural families who are living below the poverty line.
Rural Landless Employment Guarantee Programme (RLEGP)	Aug.15, 1983	For providing employment to landless farmers and labourers
Self-Employment to the Educated Unemployed Youth (SEEUY)	1983-84	To provide financial and techni -cal assistance for selfemploy -ment
Farmer Agriculture Service Centre's (FASC's)	1983-84	To popularise the use of improv -ed agricultural instruments and took kits
National Fund for Rural Development (NFRD)	Feb. 1984	To grant 100% tax rebate to don -ors and also to provide finan-cial assistance for rural devel-opment projects
Industrial Reconstruction Bank of India	March 1985	To provide financial assistance to sick and closed industrial units for their reconstruction
Comprehensive Crop Insurance Scheme	April 1, 1985	For insurance of agricultural crops

Council for Advancement of People's Action and Rural Technology (CAPART)	Sep. 1 1986	To provide assistance for rural prosperity
Self-Employment Programme for the Urban Poor (SEPUP)	Sep. 1986	To provide self-employment to urban poor through provision of subsidy and bank credit
Service Area Account (SAA)	Feb. 1988	A new credit policy for rural are -as
Formation of Securities and Exchange Board of India (SEBI)	April 1988	To safeguard the interest of inve -stors in capital market and to regulate share market
Tourism Finance Corporation of India (TFCI)	1989	To arrange the finance for the schemes related to tourism
Jawahar Rozgar Yojana	April 1989	For providing employment to rural unemployed
Nehru Rozgar Yojana	Oct. 1989	For providing employment to urben unemployed
Agriculture and Rural Debt Relief Scheme (ARDRS)	1990	For providing employment to urban unemployed
Scheme of Urban Micro Enterprises (SUME)	1990	To assist the urban poor people for small enterprise
Scheme of Urban Wage Employment (SUWE)	1990	To provide wages employment after arranging the basic facili-ties for poor people in the ur-ban areas where population is less than one lakh
Scheme of Housing and Shelter Upgradation (SHASU)	1990	To provide employment by the means of shelter upgradation in the urban areas where popula-tion is between 1 to 20 lakhs
National Housing Bank Voluntary Deposit Scheme	1991	To utilise black money for cons-tructing low cost housing for the poor
National Renewal Fund (NRF)	Feb. 1992	To protect the interest of the employees of Public Sector
Supply of Improved Toolkits to Rural Artisans	July 1992	To supply modern toolkits to the rural craftsmen except the weavers, tailors, embroiders and tobacco labourers who are liv-ing below the poverty line
Employment Assurance Scheme (EAS)	Oct. 2, 1993	To provide employment of a least 100 days in a year in villages
Members of Parliament Local Area Development Scheme (MPLADS)	Dec.23, 1993	To sanction Rs. 1 crore per year to every Member of Parliament for various development works in their respective areas through DM of the district

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Scheme of Infrastructural Development in Mega Cities (SIDMC)	1993-94	To provide capital through special institutions for water supply, seewage, drainage, urban transportation, land development and improvement of slum projects undertaken in Mumbai, Kolkata, Bangalore, Chennai and Hyderabad
Scheme of Integrated Development Small and Medium Towns	Sixth Five Year Plan	To provide resources and create employment in small and medium towns for prohibiting the migration of population from rural areas to big cities
District Rural Development Agency (DRDA)	1993	To provide financial assistance for rural development
Mahila Samridhi Yojana	2 Oct., 1993	To encourage the rural women to deposit in Post Office Saving Account
Child Labour Eradication Scheme	Aug. 15, 1994	To shift child labour from hazardous industries to schools
Prime Minister's Integrated Urban Poverty Eradication Programme (PMIUPEP)	Nov. 18, 1995	To attack urban poverty in an integrated manner in 345 town having population between 50,000 to 1 lakh
Group Life Insurance Scheme in Rural Areas	1995-96	To provide insurance facilities to rural people on low premium
National Social Assistance Programme	1995	To assist people living below the poverty line
Ganga Kalyan Yojana	1997-98	To provide financial assistance to farmers for exploring and developing ground and surface water resources
Kasturba Gandhi Education Scheme	Aug. 15, 1997	To establish girls schools in districts having low female literacy rate
Swarna Jayanti Shahari Rozgar Yojana (SJSRY)	Dec. 1997	To provide gainful employment to urban unemployed and under employed poor through self-employment or wage employment
Bhagya Shree Bal Kalyan Policy	Oct. 19, 1998	To uplift the girls conditions
Rajrajeshwari Mahila Kalyan Yojana	Oct. 19, 1998	To provide insurance protection of women
Annapurna Yojana	March 1999	To provide 10 kg. foodgrains to senior citizens (who did not get pension)
Swarna Jayanti Gram Swarozgar Yojana	April 1999	For eliminating Rural poverty and unemployment and promoting self-employment
Samagra Awas Yojana	1999-2000	For providing shelter sanitation and drinking water

Jawahar Gram Samridhi Yojana (JGSY)	April 1999	Creation of demand driven community village infrastructure
Jan Shree Bima Yojana	Aug. 10, 2000	Providing Insurance Security to people living poverty line
Pradhan Mantri Gramodaya Yojana	2000	To fulfil basic requirements in rural areas
Antyodaya Anna Yojana	Dec. 25 2000	To provide food security to poor
Ashraya Bima Yojana	June 2001	To provide compensation to labourers who have lost their employment
Pradhan Mantri Gram Sadak Yojana (PMGSY)	Dec. 25, 2000	To line all villages with Pacca
Khetihar Mazdoor Bima Yojana	2001-02	Insurance of Landless Agricultural workers
Shiksha Sahyog Yojana	2001-02	Education of Children Below Poverty Line
Sampurna Gramin Rojgar Yojana	Sept. 25, 2001	Providing employment and foot security
Jai Prakash Narain Rojgar Gurantee Yojana	2002-03 Budget	Employment Gurantee in most poor distts.
Valmiki Ambedkar Awas Yojana (VAMBAY)	Dec. 2, 2001	Constructing Slum houses in urban areas
National Slum Development Programme	Aug. 1996	Development of Urban Slums
Social Security Pilot Scheme	Jan. 23, 2004	Scheme for labours of unorganised sector for providing family pension, insurance and medical
Vande Matram Scheme	Feb. 9, 2004	Major initiative in public-private partnership during pregnancy check-up
National Food for Work Programme	Nov. 14, 2004	Programme to intensify the generation of supplementary wage employment
Janani Suraksha Yojana	Apr. 12 2005	Providing care to expectant mothers
Bharat Nirman Programme	Dec. 16, 2005	Development of Rural Infrastructure including six components : Irrigation, Water Supply, Housing, Road, Telephone and Electricity
National Rural Employment Scheme	Feb. 2, 2006	To provide 100 days wage employment in rural areas
Rastriya Swasthya Bima Yojana	Oct. 1, 2007	Health insurance to all workers in unorganised area below poverty line
Aam Aadmi Bima Yojana	2007	Insurance cover to the head of the family of rural landless households in the country
Rajiv Awas Yojana	2009	To Make India slum free in 5 years

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(ii) *Weekly Status Unemployment* : – It refers to number of persons who remain unemployed for a major part of a week i.e., they did not find even an hour of work.

(iii) *Daily Status Unemployment* : It refers to the number of persons who remain unemployed during a day or some days during the survey week.

CAUSES OF UNEMPLOYMENT

- Low rate of growth of the economy.
- Low productivity in the agricultural sector.
- Defective educational system.
- Maladjustments between demand and supply of educated workers.
- Failure to prevent migration of labour force from rural to urban areas.

TYPES OF UNEMPLOYMENT

(i) Frictional unemployment
(ii) Structural unemployment
(iii) Seasonal unemployment
(iv) Cyclical unemployment
(v) Technological unemployment

NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME

After the notification of the National Rural Employment Guarantee Act on September 7,2005, a new scheme named "National Rural Employment Guarantee Scheme (NREGS)" has been launched on February 2, 2006. The on-going programmes of Sampoorna Grameen Rozgar Yojana (SGRY) and National Food for Work Programme (NFFWP) are being subsumed within the NREGS in the 200 districts identified in the initial stage. All the districts in the country will be covered under the scheme within five years. The features of the scheme are :

- State Government to provide at least 100 days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work.
- Until such time as a wage rate is fixed by the Central Government, the minimum wage for agricultural labourers shall be applicable for the scheme.
- An applicant not provided employment within fifteen days, to be entitled to a daily unemployment allowance as specified by the State Government subject to its economic capacity, provided such rate is not less than a quarter of the wage rate for the first thirty days during the financial year and not less than a half of the wage rate for the remaining period of the financial year.
- Central Employment Guarantee Council to be constituted to discharge various functions and duties assigned to the Council. Every State Government to also constitute a State Council for the purpose.

- Panchayat at the district level to constitute a Standing Committee of its members to supervise, monitor and oversee the implementation of the Scheme within the district.
- For every Block, State Governments to appoint a Programme Officer for implementint the Scheme.
- Gram Panchayat to be responsible for identification of the projects as per the recommendations of the Gram Sabha and for executing and supervising such works.
- Central Government to establish a National Employment Guarantee Fund. State Governments to establish State Employment Guarantee Funds for implementation of the Scheme.
- The Scheme to be self-selecting inthe sense that those among the poor who need work at the minimum wage would report for work under the scheme.

Which scheme merged with which?

- National Food for Work program was merged with NREGA
- Sampoorna Grameen Rojgar Yojna merged with NREGA
- Intesified Jawhar Rozgar Yojna 1993 was merged with Employment Assurance Scheme 1996 which was later merged with Sampoorna grameen Rozgar Yojna 2001.
- IRDP, TRYSEM, DWCRA, Million Wells Scheme, SITRA & Ganga kalian Yojna merged with Swaran jayanti Gram Swarojgar Yojna.
- Rural Landless Employment Guarantee programme merged with Jawahar Rojgar Yojna which was replaced by Jawahar Gram Samridhi Yojna (1999) and Jawahar Gram Samridhi Yojna was merged with Sampoorna grameen Rojgar Yojna (2001)

NATIONAL INCOME

- National Income is the net output of commodities and services flowing during the year from the country's productive system into the hands of the ultimate consumers.
- National Income is an expression in monetary terms of the current achievements of the national economy.
- It is used as a measure of economic growth and reflects the productive power of an economy.
- It is expressed by the symbol 'Y' which implies Yearly income.
- It is calculated by the Central Statistical Organisation (CSO).
- National Income at constnat price is called real National Income.
- The base year for calculating National Income at constant price is 1993-94.
- The term per capita income means total National Income divided by total population of a country.
- The first estimate of National Income was prepared by Dadabhai Naoroji for the year 1867-68.
- The first scientific estimate was made by Prof. V.K. R.V. Rao for the year 1931-32.
- The first official estimates of national income for the Indian union were prepared by Ministry of Commerce in the year 1948-49.
- The Central Statistical Organisation (CSO), Department of Statistics is entrusted with the work of estimating the National Income of India.

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CONCEPTS OF NATIONAL INCOME

- *GNP (Gross National Product)* : GNP refers to the money value of total output or production of final goods and services produced by the country during a given period of time, generally one year. In India accounting year is 1st april to 31st March.
  GNP = GDP + X - M
  X = Exports
  M = Imports
  If X = M
  GDP = Gross Domestic Product
  then GNP = GDP in a closed economy
  X = M = 0
  then also GNP = GDP
- *GDP (Gross Domestic Product)* : GDP is the total money value of all final goods and services produced within the geographical boundaries of the country during a given year.
  GDP = GNP - (X-M)
- *NNP (Net National Product)* : NNP is obtained by substracting depreciation value from GNP.
  NNP = GNP – Depreciation
- When NNP is obtained at factor cost, it is known as National Income
- *National Income (NI)* : National Income is calculated by subtracting the net indirect taxes from NNP at market price.
  ^{NNP}(Factor Cost) N.I.= ^{NNP}(Market Price) – Indirect Tax + Subsidies.

METHODS OF MEASURING NATIONAL INCOME

1. **Product Method** : In this method net value of final goods and services produced in a country during a year is obtained and the this value is called total final product.
2. **Income Method** : A total of net incomes earned by working people in different sectors and commercial enterprises is obtained.
3. **Consumption Method** : This method is generally not used for establishing national income.

- In India a combination of production and income method is used for calculating the National Income.

ECONOMIC PLANNING

- Sir M. Visheshvraya wrote a book named 'Planned Economy for India' in the year 1934.
- In 1938, the Indian National Congress, under the leadership of Pt. Jawaharlal Nehru, made a National Planning Committee.
- 'The Bombay Plan' was presented in January 1944.
- 'The Bombay Plan' was drawn up by leading businessmen including J.R.D. Tata, G.D. Birla, P. Thakurdas, Shri Ram and Kasturbhai Lalbhai.
- Mr. Shrimanna Narayan constructed the 'Gandhian Plan' in 1944. It was inspired by the economic views of Mahatma Gandhi.
- M.N. Roy introduced a 'Peoples Plan' in 1945.
- In 1950, Jaiprakash Narayan published a plan called 'Sarvodaya Plan'.

PLANNING COMMISSION

- The Planning Commission came into existence in 1950.
- Planning Commission is a non-statutory and extra-constitutional body.
- It works as an advisory body of the Government of India.

The duties assigned to the Planning Commission are as follows :

- to make an assessment of the material, capital and human resources of the country and to formulate plan for its most effective and balanced utilization;
- to determine national priorities of development and the stages in which the plan should be carried out;
- to indicate the factors which tend to retard economic development; and determine the conditions which, in view of the current socio-political situation should be established for the successful execution of the plan;
- to determine the nature of machinery required for the implementation of each stage of the plan;
- to apprise from time to time, the progress achieved and to make recommendation about necessary changes in the prevailing economic conditions, policies, measures and development programmes etc.

FIVE YEAR PLANS

1ST FIVE YEAR PLAN (1951-1956)

- Agricultural sector was accorded the highest priority.
- Emphasis was also laid on developing the basic infrastructure for rapid industrial expansion in future.
- Community Development Projects was initiated.
- The plan achieved huge success mainly due to good harvests.
- The Per Capital Income growth was 1.8 per cent.
- ICOR was 2.95 per cent.

2ND FIVE YEAR PLAN (1956-1961)

- The main objective was rapid Industrialisation with the help of Public Sector.
- It was based on Mahalanobis Model.
- It also aimed at increasing National Income and reducing unemployment.
- It was based on socialist pattern of society and reduction in inequalities of income was one of its main objectives.

3RD FIVE YEAR PLAN (1961-1966)

- This plan aimed to make India a "self reliant" and self-governing economy."

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- The annual growth rate was only 2.5 per cent against the target of 5.0 per cent per annum.
- Chinese aggression (1962), Indo-Pak conflict (1965) and poor monsoons, all played crucial role in the failure of the Third Plan.

ANNUAL PLANNING (1966-1969)

- Due to the failure of Third Plan, the Government declared a 'Plan Holiday'.
- Three Annual Plans were prepared in the intervening time period.

4TH FIVE YEAR PLAN (1969-1974)

- The prime objective of the Plan was *'growth with stability'*.
- The annual growth rate was only 3.8 per cent which was much lower than the target of 5.7 per cent.
- During the planning period prices increased sharply.
- The Indo-Pak war (1971) and the problems of Bangaldeshi refugees also had negative impact on the economy.

5TH FIVE YEAR PLAN (1974-1979)

- Its objective was *'removal of poverty'* and attainment of *'self-reliance.'*
- The plan aimed at 5.5 per cent growth rate.
- This plan followed the path of exports promotion and import substitution.
- The Janta Party Government terminated this plan one year prior to its schedule.
- The National Income during the period increased at the rate of 5.3 per cent.

THE ROLLING PLAN (1978-1980)

- It was started by the Janta Party Government.
- Every year the performance of the plan would be assessed.
- It is a form of continuous planning.

6TH FIVE YEAR PLAN (1980-1985)

- The prime objective of the plan was *'removal of poverty'*.
- It aimed towards qualitative improvement of the living standard of the poor through the Minimum Needs Programme.
- Economy made widespread development.
- The targeted growth rate was 5.2 per cent per annum.
- The achieved growth rate was 5.3 per cent per annum.

7TH FIVE YEAR PLAN (1985-1990)

- The basic objective of plan was *'growth, modernisation, self-reliance and social justice'*.
- Against the target of 5 per cent growth rate, the actual growth rate of National Income was 5.9 per cent.
- Overall the plan performance was satisfactory.

8TH FIVE YEAR PLAN (1992-1997)

- Due to severe economic problems the plan could be started in 1992.
- It aimed at achieving *'Human Development in various aspects'*.
- The plan introduced Indicative Planning.
- Greater role was accorded to the Private Sector.
- More emphasis was laid on manufacturing activities.

9TH FIVE YEAR PLAN (1997-2002)

- The objective of this plan was *"Growth with Social Justice and Equity"*.
- It aimed towards ensuring food and nutritional security for all.
- To contain the growth of population.
- To provide safe drinking water, primary health care facilities and universal primary education.

10TH FIVE YEAR PLAN (2002-2007)

- It was approved by the National Development Council on 21 December, 2002.
- The tenth Five Year Plan has fixed the target of achieving 8 per cent average annual growth for the period 2002-2007.

MONITORBALE TARGETS FOR THE TENTH PLAN AND BEYOND

- Reduction of poverty ratio by 5 percentage points by 2007 and by 15 percentage points by 2012;
- Decadal Population Growth to reduce from 21.3 per cent in 1991-2001 to 16.2 per cent in 2001-2011;
- Providing gainful high quality employment to the addition to the labour force over the Tenth Plan period;
- All children in school by 2003; all children to complete 5 years of schooling by 2007;
- Reduction in the decadal rate of population growth between 2001 and 2011 to 16.2 per cent;
- Increase in literacy rate to 75 per cent within the plan period;
- Reduction of infant mortality rate (IMR) to 45 per 1000 live births by 2007 and to 28 by 2012;
- Reduction of maternal mortality ratio (MMR) to 2 per 1000 live births by 2007 and to 1 by 2012;
- Increase in forest and tree cover to 25 per cent by 2007 and 33 per cent by 2012;
- All villages to have sustained access to potable drinking water within the Plan Period; and
- Cleaning of major polluted rivers by 2007 and other notified stretches by 2012;

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11TH FIVE YEAR PLAN (2007-2012)

- The year 2007-08 marks the beginning of the Eleventh plan.
- The declared objective in "Faster and More inclusive growth".
- The approach paper to 11th plan proposes to create 70 million new work opportunities.
- Among the other objectives of the plan are growth of a perent in the agriculture sector and accelerate GDP grwoth from 8% to 10%.

BUDGET : SOME CONCEPTS

WHAT IS BUDGET

- The Budget is a statement of the estimated receipts and expenditure of the Government of India for the following financial year i.e. from 1 April to 30 March.
- It also states proposals of taxation and other ways and means of raising the receipts and meeting the expenditures.

WHY BUDGET ?

- The Constitution of India provides that no tax shall be levied or collected except by authority of Parliament and no expenditure can be made without the sanction of the Parliament.
- The Constitution has provided that the President shall, in respect of every financial year, cause to be laid before both the Houses, the Annual Financial Statement.
- Budget is a Government Bill and is classified as a Money Bill.
- It is presented in the Lok Sabha on the recommendation of the President.
- It is presented by the Finance Minister.

REVENUE BUDGET

- Revenue Budget consists of the revenue receipts both tax revenue and non-tax revenue and the expenditure met out of the revenue receipts.
- Tax revenue consists of receipts from a variety of direct and indirect taxes.
- Non–tax revenue consists of items such as interest income from the loans made to State and Union territories, Departmental Undertakings such as Railways, Post and Telegraph, dividend income from public enterprises, fees and user charges for public services etc.

CAPITAL BUDGET

- Capital Budget comprises capital receipts and capital expenditures of the Government. It covers those items which are concerned with acquiring and disposal of capital assets.
- Capital receipts are those receipts of the Government which create liability or reduce financial assets.
- While those expenditures of the Goverment which lead to the creation of physical or financial assets or reduction in recurring financial liability constitutes the capital expenditure.

CURRENT EXPENDITURE

- The expenditure on revenue account is divided into two categories– development expenditure and non-development expenditure.
- Development expenditure comprises expenditure on social services such as education, health and economic services like irrigation, export promotion, transport and communication etc.
- Non–development expenditure includes defence expenditure, administrative expenditure, interest on national debt, subsidies, pensions etc.

FINANCE BILL

- The proposals for taxation to raise revenue are presented in the form of Finance Bill.

VOTE ON ACCOUNT

- It empowers the Lok Sabha to make any grant in advance for a part of any financial year, pending the completion of the Budgetary process.

APPROPRIATION BILL

- It is a bill incorporating all the demands for grants voted by the Lok Sabha, along with the expenditures charged on the Consolidated Fund.
- It is introduced in the Lok Sabha.

BUDGETARY DEFICIT

- It is the excess of public expenditure over public revenue i.e. Total Expenditure – Total Receipts

ZERO–BASE BUDGETING

- It is a naval technique to guard against wastage in public expenditure.
- It is based on the philosophical premise of reviewing and evaluating each and every item of expenditure assuming that the expenditure at the time of review is zero.

CUT MOTIONS

These are a part of the budgetary process which seek to reduce the amount of grant. These are moved in the Lok Sabha only. They are classified into three categories :

(i) **Policy Cut** : A policy cut motion implies that the mover disapproves of the policy underlying the demand. Its forms of expression is that the amount of the demand to reduced to Re. 1."

(ii) **Ecomony Cut** ; This means reduction in amount of the expenditure. It clearly states the amount to be reduced and its form of expression is "that the amount of the demand be reduced by Rs.... (a specified amount)."

(iii) **Token Cut** : It is introduced where the object of the motion is to ventilate a specific grievance within the sphere of the responsibility of the Government of India. Its form of expression is "that the amount of the demand be reduced by Rupee 100."

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AGRICULTURE

IMPORTANCE OF AGRICULTURE

- Agriculture provides livelihood to more than 70 per cent of the labour force.
- Its share in the National Income is around 25 per cent.
- Rate of growth of agriculture has a direct impact on poverty eradication.
- Agriculture contributes around 18 to 20 per cent to the total exports.
- It is an important source of raw-material for a large number of industries.
- Agricultural growth is an important factor in containing inflation.
- It is the main support to Tertiary Sector.
- The total food-grain production in 2002-2003 was 174 million tonnes.

LAND REFORMS

- At the time of Independence, there were three types of land tenure systems prevailing in the country viz., the *Zamindari system*, the *Mahalwari system* and the *Ryotwari system*.
- The period from First Five Year Plan to Third Five Year Plan concentrated on land reforms and institutional changes.
- The steps took include abolition of Zamindari and tenancy reforms for bringing about rapid agricultural growth.
- The aims and objectives associated with land reforms include :
  i. Abolition of Intermediaries,
  ii. Security of Rent,
  iii. Ownership rights for Tenants,
  iv. Redistribution of land,
  v. Consolidation of holdings,
  vi. Cooperative farming,

GREEN REVOLUTION

- It refers to the major increase in agricultural productivity due to the introduction of High Yield Variety of Seeds (HYVS) together with new techniques.
- Green Revolution led to a significant increase in the production of both Wheat and Rice.
- The credit for ushering in the era of Green Revolution goes to Dr. Norman Borlang and Dr. M.S. Swaminathan.
- Dr. William Gande gave the term Green Revolution.
- The New Agricultural strategy of Green Revolution was based on a 'Package Programme'.
- The production of wheat increased from 10.4 million tonnes in 1965 to 70.5 million tonnes in 1998-1999.

- The production of rice increased from 30.6 million tonnes in 1965-1966 to 86.0 million tonnes in 1998-1999.
- Green Revolution initiated the process of modernisation of Indian Agriculture.
- Its negative aspect was that Green Revolution remained confined to wheat and rice only. It did not cover pulses.
- The fruit of Green Revolution did not reach to each and every region of the country.
- Increase in food production has taken place only in Punjab, Haryana, Maharashtra, Tamil Nadu and Western Uttar Pradesh.
- The new technology remained out of reach of the small and marginal farmers.
- The new technology has widened income inequality.
- Dr. M.S. Swaminathan is now advocating *'Evergeeen Revolution'* based on biotechnology for the growth of agricultural sector.

Various Revolutions

Revolution	Commodity
Green	Wheat, rice
Yellow	Oilseeds
Golden	Horticulture
Rainbow	Agriculture
White	Milk
Blue	Fish
Pink	Lobster (Fish)
Black	Petroleum Products
Brown	Fertilisers
Grey	Wool

AGRICULTURE PRICE POLICY

- The commission on agricultural costs and prices provide expert advice to the government on price policy.
- The Food Corporation of India (FCI) has been the Government's operational arm for entering the market to guarantee price support to farmers.
- **Minimum Support Price (MSP) :** MSP is the price which is announced by the Government to purchase the crop from the farmers directly if crop prices become lower than MSP.
- The main objectives behind MSPs are :
- To prevent fall in price,
- To protect the interest of farmers.
- **Procurement Prices :** Procurement prices are fixed at a higher levels as compared to the MSP and are meant essentially for the

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purchase of quantities needed by the Government for maintaining the PDS and for building the buffer stocks.

- **Issue Prices :** It indicates the prices at which the Government supplies food grains through fair price shops and national depots.

AGRICULTURAL CREDIT

- Credit requirements of the Indian farmers can be classified into three types viz, short term, medium term and long term.
- Short term loans are provided for a period of less than 15 months.
- Medium term loans are provided for a period of 15 months to 5 years.
- Long term loans are provided for a period of more than 5 years.
- There are two principal sources for obtaining credit by the farmers viz., Non–Institutional sources and Institutional sources.
- Non-Institutional sources includes, money lenders, landlords etc.
- Institutional sources includes commercial banks, cooperative banks and regional rural banks.
- The NABARD is the apex refinancing institution for all the institutional sources.
- The Kisan Credit Card scheme was introduced in 1998-1999.
- The total credit flow to agriculture in the Ninth Plan (1997-2002) amounted to Rs. 2,29,956 crore.
- In the Tenth Plan (2002-2007) the total credit flow to agriculture is projected at Rs. 7,36,570.

NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT (NABARD)

- NABARD was established on July 12, 1982.
- It was established with a paid up capital of Rs. 100 crore having 50:50 contribution of Indian Government and RBI.
- NABARD is the apex institution providing finance for agriculture and rural development.
- NABARD (Amendment) Act 2001 raised the authorised capital of NABARD from Rs. 500 crore to Rs. 2000 crore.
- NABARD provides refinance facilities to various such financial institutions which provide loans to promote productive activities in rural areas.
- NABARD obtains funds from Government of India, World Bank and other agencies.

AGRICULTURAL INSURANCE

- National Agricultural Insurance Scheme (NAIS) was introduced in the country from Rabi 1999-2000.
- It is also known as Rashtiya Krishi Bima Yojana.
- NAIS has replaced the earlier Comprehensive Crop Insurance Scheme (CCIS).

- Agriculture Income Insurance Scheme was introduced in Rabi 2003-2004 in 20 districts of 13 states.
- Farm Income Insurance Scheme was implemented on a pilot basis during Rabi 2003-2004 in 18 selected districts of 12 states.
- NAIS will be withdrawn for the crops covered under FIIS but would continue to be applicable for other crops.

INDUSTRY

- The first Industrial Policy in the Post Independence period, was declared on April 6, 1948 by Mr. Shyama Prasad Mukherjee.
- This policy clearly divided the industrial sectors into private and public sectors.
- This policy laid the foundation for mixed and controlled economy in India.
- The 1948 Industrial Policy was replaced by a New Industrial Policy Resolution declared on April 30, 1956.
- The Fundamental Policy Resolution of 1956 set the overall tone of Government's approach towards industrial development for the following three decades right upto 1991.
- The concentraion of this policy was the Nehru Mahalnobis model adopted in the second Five Year plan launched in 1956.
- The 1956 Policy classified all industries in the country into three schedules viz., Schedule A, Schedule B, Schedule C industries.
- The Schedule A included 17 key industries like defence, iron and steel etc, and would remain exclusively in the public sector.
- The Schedule B included 12 industries, such as fertilisers aluminium, drugs, cement in which both public and private sector can take part.
- The Scheule C contained all the remaining industries and these industries were left open to the private sector.
- The three principal legislations which guided the course of industrial development up to the end of 1980 were the IRDA Act, 1951, MRTP Act 1969 and the FERA 1973.
- A landmark change in the industrial policy was introduced by the New Industrial Policy–1991.
- The 1991 policy made major changes in policies relating to industrial licensing, foreign investment, import of technology, government ownership of industry etc.
- The process of deregulation which began with the 1991 industrial policy has been continuously going on year after year.
- FERA was amended in 1993 and in 1999. It was named as FEMA effective from June 1, 2000.
- The New Economic Policy (1991) also initiated Public Sector Reforms in India.

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LIST OF MAHARATNA, NAVRATNA AND MINIRATNA

Maharatna

- Indian Oil Corporation Limited
- NTPC Limited
- Oil & Natural Gas Corporation Limited
- Steel Authority of India Limited
- Coal India Limited

Navratna

- Bharat Electronics Limited
- Bharat Heavy Electricals Limited
- Bharat Petroleum Corporation Limited
- GAIL (India) Limited
- Hindustan Aeronautics Limited
- Hindustan Petroleum Corporation Limited
- Mahanagar Telephone Nigam Limited
- National Aluminium Company Limited
- NMDC Limited
- Oil India Limited
- Power Finance Corporation Limited
- Power Grid Corporation of India Limited
- Rashtriya Ispat Nigam Limited
- Rural Electrification Corporation Limited
- Shipping Corporation of India Limited
- Neyveli Lignite Corporation Limited

Miniratna Category - I

- Airports Authority of India
- Balmer Lawrie & Co. Limited
- Bharat Dynamics Limited
- BEML Limited
- Bharat Sanchar Nigam Limited
- Bridge & Roof Company (India) Limited
- Central Warehousing Corporation
- Central Coalfields Limited
- Chennai Petroleum Corporation Limited
- Cochin Shipyard Limited
- Container Corporation of India Limited
- Dredging Corporation of India Limited
- Engineers India Limited
- Ennore Ports Limited
- Garden Reach Shipbuilders & Engineers Limited
- Goa Shipyard Limited
- Hindustan Copper Limited
- Hindustan Latex Limited
- Hindustan Newsprint Limited
- Hindustan Paper Corporation Limited
- Housing & Urban Development Corporation Limited
- India Tourism Development Corporation Limited

- Indian Railway Catering & Tourism Corporation Limited
- IRCON International Limited
- Kudremukh Iron Ore Company Limited
- Mazagaon Docks Limited
- Mahanadi Coalfields Limited
- Manganese Ore India Limited
- Mangalore Refinery & Petrochemicals Limited
- Mishra Dhatu Nigam Limited
- MMTC Limited
- MSTC Limited
- National Fertilizers Limited
- National Seeds Corporation
- Neyveli Lignite Corporation
- NHPC Limited
- Northern Coalfields Limited
- Numaligarh Refinery Limited
- Rashtriya Chemicals & Fertilizers Limited
- RITES Limited
- Satluj Jal Vidyut Nigam Limited
- Security Printing and Minting Corporation of India Limited
- South Eastern Coalfields Limited
- State Trading Corporation of India Limited
- Tehri Hydro Development Corporation Limited
- Telecommunications Consultants (India) Limited
- Western Coalfields Limited
- Water & Power Consultancy (India) Limited

INDUSTRIAL SICKNESS

- Sickness is one of the major problems faced by Indian industrial sector.
- Industrial units belonging to all key industries have been afflicted by sickness.
- Following the recommendations of Tiwari Committee (1981) the Sick Industrial Companies (Special Provision) Act was enacted in 1985.
- Exteranl factors responsible for sickness are government policy, shortage of power, transport, rawmaterial, change in technology, market recession etc.
- Internal factors for sickness are mismanagement, excessive overheads, wrong divided policy etc.
- Industrial Reconstruction Corporation of India was set up in 1971. It was renamed as Industrial Investment Bank of India in 1999.
- The Board for Industrial and Financial Restructuring (BIFR) was set up in 1987.
- Onkar Goswami committee on industrial sickness and corporate restructuring was set up in 1993.
- Justice Eradi Parel recommended to replace the BIFR by a National Company Law Tribunal,
- For ensuring easier exit of the sick units the Government had proposed to introduce a policy called 'EXIT POLICY' in 1992.

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- The EXIT Policy could not be implemented by the Government due to strong opposition from the trade unions.
- The operation tool of the EXIT Policy was the National Renewal Fund (NRF), set up in February, 1992.

COMPETITION POLICY

- The Government enacted a competition law called the MRTP Act in 1969.
- However, this Act was not directed towards promoting competition in the market.
- The Government appointed a committee on Competition Policy and Law under Mr. S.S. Raghvan in October 1999.
- The Committee advocated that the MRTP Act should give way to the Indian Competition Act.
- The Competition Act has been enacted and published in the gazette of India on 14 January, 2003 for bringing competition in the market.

INDUSTRIAL FINANCE

- Financial requirements of Indian industries can be differentiated into three types i.e., long term, medium term and short term finances.
- Long term and medium term finances are required to purchase permanent assets like land, machinery, building etc.
- Short term finances are required to fulfill the requirements of raw materials and meeting daily expenses.
- Major sources of finances are shares and debentures, deposits from public, credit from banks and industrial finance institutions.

MAJOR INDUSTRIAL FINANCE INSTITUTIONS

(1.) INDUSTRIAL DEVELOPMENT BANK OF INDIA (IDBI) :

- Industrial Development Bank of India (IDBI) was established under Industrial Development Bank of India Act 1964.
- It is principal financial institution for providing credit and other facilities for developing industries and assisting development institution.
- Till 1976, IDBI was a subsidiary bank of RBI.
- In 1976 it was separated from RBI and the ownership was transferred to Government of India.

(2) SMALL INDUSTRIES DEVELOPMENT BANK OF INDIA (SIDBI)

- Small Industries Development Bank of India (SIDBI) was established as wholly owned subsidiary of IDBI under the Small Industries Development Bank of India Act, 1989 as the principal financial institution for promotion, financing and development of industries in the small scale sector.
- SIDBI also co-ordinates the activities of agencies which provide finances to small enterprises. SIDBI started its operations from April 2, 1990. Its head-quarter is situated at Lucknow.

(3) INDUSTRIAL FINANCE CORPORATION OF INDIA LTD. (IFCI)

- Industrial Finance Corporation of India Ltd. was established in 1948 under a special Act on the recommendations of Central Banking Enquiry Committee.
- The basic aim of IFCI is to arrange medium and long term credit for various industrial enterprises of the country.
- Initially the authorised capital of the corporation was Rs. 10 crore which was divided in equities of Rs. 5000 each. Later on this authorised capital was increased upto Rs. 20 crore.
- Since July 1, 1993 this corporation has been converted into a company and it has been given the status of a Ltd. company with the name Industrial Finance Corporation of India Ltd.

(4) INDUSTRIAL CREDIT AND INVESTMENT CORPORATION OF INDIA BANK (ICICI BANK)

- ICICI was established in 1955 as public limited company under Indian Company Act for developing medium and small industries of private sector.
- Initially its equity capital was owned by companies, institutions and individuals but at present its equity capital has been owned by public sector institutions like—Banks, LIC, GIC and its associate companies.

FOREIGN TRADE AND BALANCE OF PAYMENTS

- India's share in total world trade is 0.8 per cent.
- In 1950 India's share in total world trade was 1.80 per cent.
- India had favourable balance of trade in 1972-1973 and 1976-1977.
- The most important export item in 1960-1961 was jute which contributed 21 per cent of total export earnings.
- The country faced serious Balance of Payments problem on current account since 1951 which developed into a payment crisis in 1990-1991.
- Two factors have contributed to the worsening of the BOP serious (i) large imbalances, (ii) Loss of confidence.
- Since 1951 the composition of India's foreign trade has undergone siginificant structural changes.
- In 1951 more than two-third of India's exports consisted of traditional goods like tea, jute, cotton, spices etc. Now there share has been reduced to 20 per cent.
- Non-traditional goods consisting of a large number of manufactured goods now account for more than three-fourths of exports.
- In 1951 India was a major importer of foods articles and consumer goods.
- Today items like gold, silver, chemicals, pearls, precious account for nearly one-third of India's imports.
- Petroleum products account for nearly 35 per cent of India's imports.

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SPECIAL ECONOMIC ZONES (SEZ)

- The SEZ scheme was introduced in the EXIM Policy announced on 31 March, 2000.
- It aimed at providing an internationally competitive and hassle-free environment for exports.
- The SEZ will have infrastructure facilities of international standards in export production.
- The SEZ can be set up in the public, private, joint sector or by the State Governments.
- In SEZ no license is required for import.
- Exemption from custom duties on import of capital goods, raw materials etc., from the domestic market.

FOREIGN TRADE POLICY (2009-2014)

- The Union Minister for Commerce and Industry Anand Sharma unveiled the five year Foreign Trade Policy on August 27, 2009 in a bid to boost exports and save jobs in export-oriented industries.
- The Minister has set an ambitious target of $200 billion worth exports for the next fiscal, a feat the country failed to achieve in 2008-09 due to a slump in global demand.
- While exports for the April-June 2009 quarter contracted by nearly 30 per cent, Mr. Sharma set a growth target of 15 per cent for 2009-10.
- The new Foreign Trade Policy, coming in the backdrop of a 30 per cent contraction in exports in the last 10 months, seeks to identify 26 new markets for trade that would be eligible for sops. These include 16 in Latin America and 10 in Asia and Oceania.
- The new policy has sought to give special focus to help the gems and jewellery sector, one of the worst hit, by allowing duty drawback on exports.
- The handloom and handicrafts sector would be helped under the Market Development Scheme, while the government also announced the continuation of the DEPB scheme till December 2010.
- As the existing export markets are reeling under recession, the Government has decided to expand its Focus Markets Scheme (FMS). It has included 26 markets — 16 in Latin Amercia and 10 in Africa and CIS countries — in the list of FMS.
- The policy has also increased the Support extended to exporters from 2.5 per cent to 3 per cent of the value of the exports if they cater to these markets, which include South Africa, Nigeria, Tanzania and Brazil.

Export Development Centres	
Tripur	Hosiery and Weaving
Panipat	Handloom and Textiles
Bhagalpur	Weaving
Moradabad	Brass Ware Handicraft
Ludhiana	Hosiery
Surat	Gem and Gewellery
Alleppi	Coconut and Coir
Meerut, Jalandhar	Sport goods
Ranipat (Amboor)	Leather
Agra	Leather shoes
Batala	Machine equipment
Nagpur	Hand-made equipments
Vizag	Fish and fish products
Aligarh	Brass locks
Khurja	Clay Pots
Selam	Hand-made items
Sivakashi	Match boxes
Ambala	Scientific equipments
Rajkot	Engine Pumps
Wap (Ankleshwar)	Chemical
Jamnagar	Brass spare parts

LIST OF OPERATIONAL SEZ OF INDIA

Exports from SEZs established by Central Government

No.	Name ofthe SEZ	Location	Type
1	Kandla Special Economic Zone	Kandla, Gujarat	Multi product
2	SEEPZ Special Economic Zone	Mumbai, Maharashtra	Electronics and Gems and Jewellery
3	Noida Special Economic Zone	Uttar Pradesh	Multi product
4	MEPZ Special Economic Zone	Chennai, Tamil Nadu	Multi product
5	Cochin Special Economic Zone	Cochin, Kerala	Multi product
6	Falta Special Economic Zone	Falta, West Bengal	Multi product
7	Visakhapatnam SEZ	Vishakhapatnam, Andhra Pradesh	Multi product

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Exports from State Government/Private Special Economic Zones established prior to SEZ Act.

No.	Name of the SEZ	Location	Type
1	Surat Special Economic Zone	Surat, Gujarat	Multi product
2	Manikanchan SEZ, W. Bengal	Kolkatta, West Bengal	Gems and Jewellery
3.	Jaipur SEZ	Jaipur, Rajasthan	Gems and Jewellery
4.	Indore SEZ	Sector-3, Pithampur Distt. Dhar (MP)	Multi product
5.	Jodhpur SEZ	Jodhpur, Rajasthan	Handicrafts
6.	Salt Lake Electronic City - WIPRO, West Bengal	Kolkatta, West Bengal	Software development and ITES
7.	Mahindra City SEZ (IT), T. Nadu	Tamil Nadu	IT/Hardware and Bio-informatics
8.	Mahindra City SEZ (Auto ancillary), T. Nadu	Tamil Nadu	Auto
9.	Mahindra City SEZ (Textiles), Tamil Nadu	Tamil Nadu	Apparel and fashion accessories
10.	Nokia SEZ	Sriperumbudur, Tamil Nadu	Telecom equipments/ R&D services
11.	Moradabad SEZ	Moradabad, UP	Handicrafts
12.	Surat Apparel Park	Surat, Gujarat	Apparel

MONEY AND BANKING

MONEY MARKET

- A money market may be defined as the market for lending and borrowing of short term funds.
- Broadly the Indian Money Market is divided into two parts, (i) The Organised Sector (ii) The Unorganised Sector.

- The asset money market deals in money.
- There are three main components of the organised sector of the money market are :
  - (i) Inter-bank call money market
  - (ii) Bill market
  - (iii) Bank loan market
- The unorganised money market is largely made up of indigenous bankers and moneylenders.
- It is unorganised because the activities of its parts are not systematically coordinated by the RBI.

RESERVE BANK OF INDIA (RBI)

- RBI is the central bank of the country.
- RBI was established in 1935.
- RBI was nationalised on January 1, 1949.
- The head office of RBI is in Mumbai.
- At present D. Subba Rao is the Governor of RBI.
- RBI has the sole right to issue currency notes of various denominations except 'one rupee note.'
- RBI maintains gold and foreign exchange reserves of Rs. 200 crore, of which atleast Rs. 115 crore should be in gold.
- RBI act as the Banker, Agent and Adviser to the Government.
- RBI provides short-term credit to the Government to meet any shortfalls in its reciepts over its disbursement.
- RBI is also charged with the responsibility of managing the public debt.
- As Bankers Bank, RBI holds a part of the cash reserves of the banks, lend them funds for short periods and provides them with centralised clearing and cheap and quick remittance facilities.
- RBI enjoys extensive powers of supervision, regulation and control over commercial and co-operative banks.
- RBI acts an the custodian of the country's foreign exchange reserves.
- RBI acts as the agent of the Government in respect of India's membership of the International Monetary Fund (IMF).
- RBI acts as the source of all monetary and banking data, which are essential for the formulation and evaluation of economic policies.
- Marketg Stabilisation Scheme (MSS) for monetary management was introduced in 2004 by RBI.

RESERVE BANK OF INDIA (RBI) CELEBRATING 75 YEARS

- **1935 :** Operations begin on April 1
- **1949 :** Nationalisation of the Reserve Bank; Banking Regulation Act enacted
- **1950 :** India embarks on planned economic development. The Reserve Bank becomes active agent and participant

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- **1966 :** Cooperative banks come under RBI regulation
- **1969 :** Nationalisation of 14 major commercial banks (six more were nationalised in 1980)
- **1973 :** RBI strengthens exchange controls by amending Foreign Exchange Regulation Act (FERA)
- **1974 :** Introduction of priority sector lending targets
- **1975 :** Regional Rural Banks set up
- **1985 :** Financial market reforms begin with Sukhamoy Chakravarty and Vaghul Committee Reports
- **1991 :** India faces balance of payment crisis; pledges gold to shore up reserves. Rupee devalued
- **1993 :** Exchange rate becomes market determined
- **1994 :** Board for Financial Supervision set up
- **1997 :** Ad hoc treasury bills phased out ending automatic monetisation
- Regulation of Non-Banking Finance Companies strengthened
- **1998 :** Multiple indicator approach for monetary policy adopted
- **2000 :** Foreign Exchange Management Act replaces FERA
- **2002 :** Clearing Corporation of India Limited (CCIL) commences clearing and settlement in government securities
- **2003:** Fiscal Responsibility and Budget Management Act enacted
- **2004 :** Transition to a full-fledged daily liquidity adjustment facility (LAF) completed. Market Stabilisation Scheme (MSS) introduced to sterilise capital flows
- Real Time Gross Settlement System commences
- **2005 :** Focus on financial inclusion and increasing the outreach of the banking sector
- **2006 :** RBI empowered to regulate money, forex, G-sec and gold related securities market
- **2007 :** RBI empowered to regulate Payment System
- **2008-09 :** Pro-active efforts to minimise impacts of global financial crisis

Nationalisation of Banks	
Bank/s	**Years**
Reserve Bank of India	1949
State Bank of India	1955
14 Banks Nationalised	July 19, 1969
6 Banks Nationalised	April 15, 1980

PUBLIC FINANCE

- Two important components of public finance are public revenue and public expenditure.
- The income of the Government through all its sources is called as Public Revenue.
- The expenditure incurred by the Government on various activities is called as Public Expenditure.
- Fiscal Policy is that part of Government policy which is concerned with raising revenue through taxation and deciding on the level and method of expenditure.

TAX

- Tax is a compulsory contribution from a person to the Government. It is necessary for the development of the country.
- Direct Taxes are levied directly on individuals or firms.
- Indirect Taxes are levied on goods and services e.g., excise duty, sales tax.

TAXATION

- Tax revenue as a percentage of National Income was 7.4 per cent in 1951 and increased to 16 per cent at the end of the Ninth Plan.
- Since 1991, there has been a progressive increase in the share of direct taxes in total taxation revenue.
- The share of direct taxes has increased from 19.1 per cent in 1990-1991 to 43.03 per cent in 2005-2006.
- The Central Government levies four main taxes viz., Personal Income Tax, Corporate Tax, Custom Duties and Union Excise Duties.
- In India the tax-base is narrow for both direct and indirect taxes.
- The 1997-1998 Budget introduced Presumptive Taxation.
- MAT (Minimum Alternate Tax) was introduced in 1996-1997.
- Value Added Tax (VAT) is the tax levied on the value added at various stages.
- VAT has been introduced in the country on April 1, 2005.
- The Government has constituted a seven-member Expert Group for smooth implementation of Value Added Tax (VAT).
- A modified version of VAT was first introduced in 1986 called the MODVAT (Modified Value Added Tax).
- In the year 2000-2001, CENVAT (Centralised Value Added Tax) was introduced.
- 'SARAL' is a simple one page tax-payer friendly income tax return form.
- In 2008-09 Budget introduce commodity Transaction Tax.

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VAT

- VAT means Value Added Tax. It is a multi-point tax, on value addition at different stages of sale, with the provisions for granting set-off (credit) of the tax paid at earlier stage.
- This ensures that same commodity does not get taxed again and there is no cascading effect.
- Value added means difference between selling price and purchasing price.

HISTORY OF VAT

- VAT was first introduced in France in 1885 and gradually it reaches to other countries also. It has been levied in almost all developed or developing countries in one or other way. It is mandatory for all the countries of the European Union to levy VAT.
- As far as, Asia is concerned, it was first introduced in South Korea in 1987. After that it was levied in Japan in 1989, Pakistan in 1990, Bangladesh in 1991, China in 1994 and Sri Lanka in 1995.
- Other countries in which VAT is levied are Indonesia, Mangolia, Philippines, Singapore, Taiwan and Thailand.
- In India L.K. Jha Committee was set up in 1976 to look into the indirect tax structure and Committee suggested for VAT, so that reform in indirect tax can be implemented. Though the Committee had the apprehensions regarding implementation of VAT at that time, and keeping this in view MANVAT (Manufacturing Value Added Tax) was introduced. But it was not possible to implement as more than 70% of manufacturing was done in unorganised sector. In 1986, during V.P. Singh regime, suggestion for MODVAT (Modified Value Added Tax) came. It was suggested to introduce it in Limited Manufacturing Sector. In 1991, Chellaiah Committee also suggested for implementation of VAT.
- VAT was first introduced in Haryana.

EXPENDITURE

- All public expenditure is classified into :

(i) Non-Plan Expenditure

- Non-plan expenditure of the Central Government is divided into Revenue Expenditure and Capital Expenditure.
  - Under revenue expenditure, we include; interest payments, defence revenue expenditure, major subsidies (food, fertilisers and export promotion), interest and other subsidies, debt relief to farmers, postal deficit, police, pensions, other general services (organs of state, tax collection, external affairs, etc.), social services (education, health, broadcasting, etc.), economic services (agriculture, industry, power, transport, communications, science and technology, etc.) and grants to States and Union territories and grants to foreign governments.
- Capital non-plan expenditure includes such items as : Defence capital expenditure, loans to public enterprises, loans to States and Union territories and and loans to foreign governments.

(ii) Plan Expenditure

- The second major item of Central Government expenditure is Plan expenditure. This is to finance :
- Central Plans, such as five year plans, other social empowerment programmes.

DEFICIT FINANCING

- When the Government faced with excess expenditure over its receipts from all sources, meets the resulting deficit either by issuing fresh currency or by borrowing from the Central Bank. It is known as Deficit Financing.

TYPES OF DEFICITS

REVENUE DEFICIT

Revenue Deficit = Revenue Expenditure – Revenue Receipts

- Current revenue expenditure of the Central Government is composed of Plan and Non-Plan expenditure, and current revenue receipts include net tax revenue and non-tax revenue of the Central Government.
- Thus,

Revenue Deficit = Revenue Expenditure – Revenue Receipts = (Non-Plan expenditure+Plan expenditure) – (tax revenue+non-tax revenue)

BUDGET DEFICIT

Budget Deficit = Total Expenditure–Total Receipts

- The total expenditure of the Central Government always exceeded its total revenue which is known as Budget Deficit or Overall Budgetary Deficit.

FISCAL DEFICIT

- In simple terms, *Fiscal Deficit is budgetary deficit plus market borrowings and other liabilities of the Government of India.*

Fiscal deficit = Total Expenditure–Total receipts+Market Borrowing

- In recent years the Finance Ministry has introduced one more concept of deficit known as 'primary deficit'.

PRIMARY DEFICIT = FISCAL DEFICIT – INTEREST PAYMENT

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DEVELOPMENT AND WELFARE PROGRAMMES IN INDIA

- Swarna Jayanti Gram Swarojgar Yojana (SGSY) was launched on April 1, 1999.
- The cost sharing basis of SGSY is 75:25.
- Sampoorna Grameen Rojgar Yojana (SGRY) was launched in September 2001.
- The cost sharing basis of SGRY is 87.5:12.5.
- Pradhan Mantri Gramodaya Yojana was launched in 2000-2001.
- Pradhan Mantri Gram Sadak Yojana (PMGSY) was launched on 25th December, 2000.
- The source for funding of PMGSY is the diesel cess, 50 per cent of which is earmarked for PMGSY.
- Swarna Jayanti Shahri Rozgar Yojana was launched in December, 1997.
- The cost sharing basis of the scheme is 75:25.
- The Indira Awaas Yojana (IAY) was launched in 1996.
- Under IAY minimum 60 per cent of the Funds are to be allocated to SCs/STs.
- Samagra Awaas Yojana was launched in 1999-2000.
- Food for work programme was launched in February 2001.
- Antyodya Anna Yojana was launched in the year 2000.
- Annapurna Scheme was launched in 1999-2000.
- Annapurna is 100 per cent centrally sponsored scheme.
- Jai Prakash Rojgar Guarantee Yojana was launced in 2002.
- This Yojana guarantees a minimum of 100 days employment.
- Valmiki Ambedkar Awaas Yojana (VAMBAY) was launched in 2001.
- Nirmal Bharat Abhiyan is a component of the scheme providing community Toilets.
- Varishtha Bima Pension Yojana was started in 2003.
- Krishi Shramik Surksha Yojana was started in 2001.
- Janshree Bima Yojana was started in 2000.
- Raj Rajeshwari Mahila Kalyana Yojana was started in 1998.
- Bhagyashree Child Welfare scheme was launched in 1998.
- Kasturba Gandhi Education scheme was launched in 1997.
- Vande Mataram scheme was started in February 2004.

SWAYAMSIDHA

- Formation of **self help groups (SHGs);** access to *micro credit* and promoting micro-enterprises.

SWAYAM SHAKTI

- Centrally sponsored scheme since 1998.
- Aims at enhancing women's *access to reasources* for better quality of life through the use of drudgery and time reduction devices, health, literacy and imparting skills for confidence enhancement and income generating activities.

STEP

- Support to **training and employment programme** for women (STEP); seeks to provide updated skills and new knowledge to poor asset less women in eight **traditional sectors** of employment.

namely agriculture, animal husbandry, dairying, fisheries, handlooms, handicrafts, Khadi and village industry and sericulture.

SWALAMBAN

- To provide **training and skills** to women to facilitate them to obtain employment or self employment on a sustainable basis. Generally, the training fields are **computer programming**, medical transcription, handicrafts, secretarial practices etc.

SWADHAR

- Scheme launched in 2001-2002 by the Central Government to provide holistic and integrated services to women in difficult circumstances such as destitute widow deserted by their families, women prisoner released from jail, women survivor of natural disasters, trafficked women/girls rescued or run away from brothels etc.
- Scheme includes provision of food, clothing, shelter, health care, and legal support, social and economic rehabilitation etc.

RASHTRIYA MAHILA KOSH (RMK)

- Also known as **'National Credit Fund for Women'**, set up in 1993.
- It aims to facilitate credit support or micro-finance to poor women to start income generating activity such as in dairy, agriculture, shopkeeping, vending and handicrafts.
- **Panchdhara Yojana :** Madhya Pradesh Government's Scheme was launched on 1 November, 1991 for rural and tribal women which includes following five Schemes :
  - (i) *Vatsalya Yojana* : For health care and facilities at the time of delivery of a child.
  - (ii) *Gramya Yojana* : For providing working capital to rural women for small trade.
  - (iii) *Aayushmati* Yojana : Govt. subsidy is provided for medical treatment to the poorest women.
  - (iv) *Social Security Pension Scheme* : For orphan widows.
  - (v) *Kalpavraksha Scheme* : For providing employment to SC/ST women in tribal areas.
- **Apni Beti Apna Dhan Yojana :** Haryana Government's Scheme was launched on 2 October, 1994 under which an investment of Rs. 2500 is made by the Government in Indira Vikas Patra for newly born female child in SC/ST families which becomes Rs. 25000 after 18 years and given to the concerned girl.
- **Kunwar Bainu Mamerun Scheme :** Gujarat Govt.'s Scheme was launched in 1995 in which an assistance of Rs. 5000 is provided to families having annual income of less than Rs. 7500 at the time of their daughter's marriage.
- **Kamdhenu Yojana :** Maharashtra Government's Scheme provides the financial opportunities of self-employment to disabled, divorced women.
- **Girl Child Protection Scheme :** Andhra Pradesh Government's Scheme aims at protecting the interest of girl child in the society.

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TRANSPORT AND COMMUNICATION

RAILWAYS

- Indian Railways are the biggest national undertaking.
- The first Indian railway train rolled on its 34 km track from Bombay (Mumbai) to Thane on April 16, 1853.
- Indian Railway System is largest railway system in Asia and second in the world (First America).
- The number of stations, at present, is 6909.
- The total length of Indian railways is 64,015 km.
- At present, Indian railways have 7,910 engines, 42,441 passengers compartments, 5822 other compartments for other passenger trains and 2,22,397 goods compartments.
- About 28 per cent of the railways routes have been electrified.
- At present, Indian railways have 44 steam engines, 4,801 diesel engines and 3065 electric engines.
- Railway finance is separate since 1924-1925 from the general revenue.
- The only oldest running engine is *Fairy Queen*.
- The first electric train rolled on from Mumbai to Kurla on 3rd February, 1925.
- Kolkata Metro Rail is the first under ground rail.
- The longest railway platform of the world is Kharagpur. Its length is 2,733 feet.
- The longest tunnel of Indian railways on Konkan Railways is 6.5 km long.
- Indian Railway Board was established in 1905.
- Indian Railways have three gauges – Broad gauge, metre gauge and narrow gauge.
- At present, there are 19 Railway Recruitment Boards.
- In railways, there are A.C., first class and second class. Third class was removed in 1974.
- Computer reservation facility covering the 95 per cent of the passenger population, is available at over 300 locations in the country.
- Nehru Setu is the longest railway bridge built on river Sone.
- Delhi Metro Railways started on 24th December, 2002.
- The longest railway journey which takes 66 hours from Jammu Tavi to Kanyakumari (3,751 km).
- Recently, National Rail Vikas Yojana (NRVY) was launched to increase the speed, to enhance quadilateral network connecting all metros (superfast + double line) and to connect the ports.
- Konkan Railway is run by a separate corporation and it runs from Mangalore to Roha (40 km south of Mumbai).

- Four States involved in this network are Maharashtra, Goa, Karnataka and Kerala.
- It does not passes through Kerala.
- 51 per cent of the shares of Konkan railway is with Indian Railways.
- It has the fastest of tracks in India.
- Total length is 760 km.
- 10 per cent of the line passes through tunnels.
- Longest tunnel is near Ratnagiri in Karbude 6.5 km.
- Rail density is maximum in North Indian Plains because of its levelled surface and very high density of population.
- Railway density in hills and plateaus are quite low.
- East coast has more railway lines than West coast.
- Rail route per 1000 sq. km is maximum in Punjab (42 kms.), then West Bengal, Haryana, Bihar, UP.
- Indian average rail route density is 18.6 km/1000 sq. km.
- Chhatrapati Shivaji Terminus, Mumbai first Indian railway station appear in World Heritage Site.

Railway Tracks

Gauge	Route Km	Running Track Km	Total Track km
Broad Gauge (1,676 mm)	45,622	64,461	87,889
Metre Gauge (1,000 mm)	14,364	14,859	17,848
Narrow Gauge (762mm & 610mm)	3,136	3,172	3,484
Total	**63,140**	**82,492**	**1,09,221**

Railway Manufacturing units

Sl. No.	Name	Location	Estd.in	Item Manufactured
1.	Chittranjan Locomotive works	Chittranjan	1950	Originally manufactured steam engines, now electric and diesel engines
2.	Diesel Locomotive works	Varanasi	1964	Diesel engines and electric shunters
3.	Integral Coach Factory	Perambur	1955	B.G. M.G. Coaches, A.C. Coaches
4.	Whell and Axle Plant	Yalavhanka	1983	Wheels of Axles
5.	Diesel Component works	Patiala		Components of diesel engines
6.	Rail Coach Factory	Kapurthala	1988	Rail Coaches.

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Railway Zones

Sl. No.	Name	Date Established	Headquarters	Divisions
1	Central	1951, November 5	Mumbai	Mumbai, Bhusawal, Pune, Solapur, Nagpur
2.	East Central	2002, October 1	Hajipur	Danapur, Dhanbad, Mughalsarai, Samastipur, Sonpur
3.	East Coast	2003, April 1	Bhubaneswar	Khurda Road, Sambalpur, Visakhapatnam
4.	Eastern	1952, April	Kolkata	Howrah, Sealdah, Asansol, Malda
5.	North Central	2003, April 1	Allahabad	Allahabad, Agra, Jhansi
6.	North Eastern	1952	Gorakhpur	Izzatnagar, Lucknow, Varanasi
7.	North Western	2002, October 1	Jaipur	Jaipur, Ajmer, Bikaner, Jodhpur
8.	Northeast Frontier	1958, 15th Jan	Guwahati	Alipurduar, Katihar, Rangia, Lumding, Tinsukia
9.	Northern	1952, April 14	Delhi	Delhi, Ambala, Firozpur, Lucknow, Moradabad
10.	South Central	1966, October 2	Secunderabad	Secunderabad, Hyderabad, Guntakal, Guntur, Nanded, Vijayawada
11.	South East Central	2003, April 1	Bilaspur	Bilaspur, Raipur, Nagpur
12.	South Eastern	1955	Kolkata	Adra, Chakradharpur, Kharagpur, Ranchi
13.	South Western	2003, April 1	Hubli	Hubli, Bangalore, Mysore
14.	Southern	1951, April 14	Chennai	Chennai, Tiruchirappalli, Madurai, Palakkad, Salem, Trivandrum (Thiruvananthapuram)
15.	West Central	2003, April 1	Jabalpur	Jabalpur, Bhopal, Kota
16.	Western	1951, November 5	Mumbai	Mumbai Central, Ratlam, Ahmedabad, Rajkot, Bhavnagar, Vadodara

ROAD TRANSPORT

- The road network in India is one of the largest in the world.
- The total length of roads, at present is 33.4 lakhs.
- The total length of metalled road excluding roads constructed under Jawahar Rozgar Yojana is 13,94,061 km and unmetalled roads is 10,71,816 km.
- The Central Government owns the responsibility of 57,737 km long national highways.
- Border Road Organisation was established in 1960.
- Though the national highways do not constitute even 2 per cent of the total road length of the country, they bear about 40 per cent of the traffic.
- Maharashtra has the highest length of roads (3,61,893 km) whereas the lowest length of road has Lakshadweep (1 km).
- National Highways Development Project has been launched to link the four corners of the country by four or six lanes in a network. The four major cities — Kolkata, Delhi, Chennai and Mumbai will be linked by 5,882 km long roads in golden quadrilateral.

CLASSIFICATION OF ROADS

NATIONAL HIGHWAYS

- It is constructed and maintained by CPWD (Central Public Works Department).
- They are for inter-state and strategic movement and connect the state capitals.
- They carry nearly 40 per cent of the road traffic in India.
- Total Length is 70,548 km.

STATE HIGHWAYS

- Constructed and maitained by State governments.
- They join the state capital with district headquarters.
- Total length is 1,30,000 km.

DISTRICT HIGHWAYS

- Construction and maintenance fall under the purview of Zila Parishads.
- They join district headquarters with Tehsils and Blocks.
- Total length is 6,50,528 km.

VILLAGE ROADS

- Responsibility of village Panchayats.
- Connects the villages with neighbouring towns.
- Total length is 14,55,896 km.

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PORTS

- India has 7,516 km long coast line.
- Shipping Corporation of India is the biggest shipping line of the country having the longest number of vessels.
- India has the largest merchant shipping fleet among the developing countries and ranks 17th in the world in shipping tonnage.
- As on 31 July, 2005 the net operative tonnage consisted of 707 ships totalling 82.9 lakh Gross Registered Tonnage (GRT).
- There were 122 shipping companies which were operative in the country till 1st April, 2001.
- The public sector company, The Shipping Corporation of India Limited has established on 2nd October, 1961.
- There are 12 major ports in the country apart from about 187 minor ports. Major ports are under Central Government and others are maintained by State Governments.

SOME IMPORTANT PORTS OF INDIA

CHENNAI

- Artificial harbour.
- Located on the east coast.
- It handles petroleum products, mineral oil and iron ore.
- Oldest port in India.
- Lesser depth of water and tropical cyclones makes it impossible sometimes.

VISAKHAPATNAM

- Eastern coast along Andhra Pradesh.
- Naturally deep water and protected.
- Export of crude oil, petroleum products, iron ore.
- It is the deepest land locked and protected port.

PARADEEP

- On Orissa coast.
- It has capacity of handling 6.05 million tonnes.

KOLKATA

- Riverine.
- Inland location on Hoogali River.
- Goods from South-East Asia, Australia and New Zealand imported.
- Tidal Port.
- Suffers problem of silting.

HALDIA

- On Hoogly.
- Crude petroleum for oil refinery.
- For larger ships.
- To release congestion on Kolkata.

KANDLA

- Tidal port.
- Located at the eastern end of Rann of Kutch.
- Export of crude oil, fertiliser, salt, foodgrain, cotton, cement.
- It was created out of compulsion since Karachi port went to Pakistan after partition

MORMUGAO

- Off the cost of Goa natural port.
- Iron ore export from Goa.
- It occupies 5th position in handling the traffic.

NEW MANGALORE

- Off the coast of Karnataka.
- Export of iron ore from Kudremukh mines.
- It handles the import of fertiliser, edible oil, petroleum products.

KOCHI

- Natural harbour.
- Backwaters of Kerala Coast.
- Export of tea, coffee, spices, cashew, etc.
- Sheltered backwater bay.
- Import of petroleum for Kochi refinery.

TUTICORIN

- At the coast of Tamil Nadu.
- It handles coal, foodgrain, edible oil, sugar and petro products.
- Only recently developed.

MUMBAI

- Natural harbour.
- Located on the West Coast.
- Import of Mineral Oil from South-West Asia.
- Foreign Trade with Western countries and East African countries.
- Biggest port in India.
- Another port Nhava Sheva is developed to relieve the Mumbai port. It is also called Jawaharlal Nehru Port.

NATIONAL WATERWAYS

- **National Waterway 1 :** Allahabad — Haldia stretch (1620kms) of the Ganga-Bhagirathi— Hooghly river system in October 1986 as National waterway No. 1 (Nw-1).
- **National Waterway 2 :** Sadiya — Dhubri stretch (891 kms) of the Brahmaputra river in September 1988 as National waterway No. 2 (Nw-2).

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- **National Waterway 3 :** Kollm — Kottapuram stretch (168 kms) of the west coast canal along with Champakara canal (14 kms) and Udyogmandal canal (23 kms) in February 1993 as National waterway No. 3 (Nw-3).
- **National Waterway 4 :** Kakinada — Puducherry stretch at canals andthe Kaluvelly Tank, Bhadrachalam - Rajahmundry stretch of River Godavari and Wazirabad- Vijayawada stretch of River Krishna. Its established in November 2004. (NW-4)
- **National Waterway 5 (623 km) :** Talcher — Dhamra stretch of river Brahmani, Geonkhali - Charbatia stretch of East Costal Canal, Charbatia-Dhamra stretch of Matai river and Mangalgadi-Paradip stretch of Mahanadi delta rivers. Its established in November 2008.
- **National Waterway 6 (121 km) :** Lakhipur to Bhanga of river Barak. (Proposed)

COMMUNICATION SYSTEM

POSTAL SERVICES

- One Indian Postal network is the largest postal network in the world with approx. 1,54,551 post offices.
- on an average a post-office serves an area of 21.5 sq. km. and a population of 6000.

Fact File

First Postal Service Started	:	1837
First Postal Stamp issued	:	1852 in Karachi (provincial)
First all-India Postal Stamp issued	:	1854
Establishment of Postal Department	:	1854
Money-order Service Started	:	1880
Post Office Saving Bank Started	:	1882
Airmail Service Started	:	1911
Speed-Post Introduced	:	August 01, 1986
Post-shoppee Introduced	:	August 1994
e-Post Introduced	:	August 02, 2001
Gramin Sanchar Sewak Scheme (GSS)	:	24 December, 2002

TELECOMMUNICATION

- Almost all the Indian cities and towns have access to telephone network along with more than 50 per cent villages.
- A Telecommunication research centre was set-up in 1955-56.
- The teledensity in Indian is 18 per 100 population as on February 2007.
- Luxemberg has highest mobile density in The world and Hong Kong comes next.

Facts-File

First telegraph line	:	1851, between Calcutta and Diamond Harbour
First telephone Exchange	:	1881 in Calcutta
First automatic Exchange	:	1913 in Shimla
First International telephone line	:	1870, between London and Mumbai

International Financial Organisations : At a Glance

Organisation	Year of establishment	Headquarter	No. of Member states
International Monetary Fund (IMF)	1945	Washington D.C.	186
World Bank	1945	Washington D.C.	186
World Trade Organisation (WTO)	1995	Geneva	153
Asian Development Bank (ADB)	1966	Manila	67
Association of South East Asian Nations (ASEAN)	1967	Jakarata	10
North American Free Trade Agreeement (NAFTA)	1992	—	3
Asia-Pacific Economic Cooperation (APEC)	1989	—	21
South Asian Association for Regional Cooperation (SAARC)	1985	Kathmandu	8
South Asian Preferential Trade Agreement (SAPTA)	1995	—	7
Organisation of Petroleum Exporting Countries (OPEC)	1960	Vienna	12
G-8	1975	Australia	8
G-15	1989	—	19
G-77	1964	Geneva	130
Organisation for Economic Co-operation and Development (OECD)	1961 (Renamed)	—	30
Asian Clearing Union (ACU)	1975	Paris	8
Asia Europe Meeting (ASEM)	1996	Tehran (Iran)	45
Food and Agricultural Organisation (FAO)	1945	—	175
United Nations Organisation (UNO)	1945	Quebec (Canada)	193
		New York	

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WORLD TRADE ORGANISATION (WTO)

IMPORTANT FACTS

- The Uruguay round of GATT game birth to WTO.
- WTO was officially constituted on January 1, 1995.
- WTO's ministerial conference is the highest authority of policy making.
- Mr. Renatto Rugaro is the present Director-General of WTO.
- The present strength of WTO membership is 150.
- The ministerial conference has to meet at least every two years.
- So far five ministerial conferences have been held.
- The first ministerial conference was held from 9-13 December 1996 in Singapore.
- The second conference was held from 18-20 May, 1998 at Geneva.
- The third conference was held from November 30 to December 3, 1999 in Seatal (USA).
- The fourth conference was held from 9-14 December, 2001, at Doha (Qatar).
- The fifth ministerial conference was held on 10-14 September, 2003 at Cancun (Mexico).
- The issues relating to Trade and Investment, Trade and Competition, Transparency in Government procurement, and Trade Facilitation, are called as Singapore Issues.
- Amber box constitutes all forms of domestic support deemd to be trade distorting.
- Blue Box subsidies are less trade distarting because they set limits on production through Quotas.
- Green Box subsidies are generally considered to be non-distorting in terms of production and trade.
- The fifth ministerial conference at Cancum remained a failure.
- The sixth ministerial conference is proposed on 13-18 December, 2005 at Hong Kong (China).

WTO Ministerial Conference

Conference	Year	Place
First	9-13 December, 1996	Singapore
Second	18-20 May, 1998	Geneva
Third	30 November - 3 December, 1999	Seatal (USA)
Fourth	9-14 November, 2001	Doha (Qatar)
Fifth	10-14 September, 2003	Cancun (Mexico)
Sixth	13-18 December, 2005	Hong Kong (China)

IMPORTANT COMMITTEES

Committee/Commission	Area
Lakdawala Committee	Poverty
M.S. Ahluwalia Committee	Employment opportunities
Subimal Dutt Committee (1969)	Licensing System
Hazari Committee (1967)	Licensing System
R.H. Patil Commission (2001)	Disinvestment
S.S. Kohli Committee	Small Scale Industries
Abid Hussain Committee (1984)	Small Scale Industries
Onkar Goswami Committee (1993)	Industrial Sickness
S.S. Raghvan Committee (1999)	Competition Policy
Chelliah Committee (1991)	Tax Reforms
Geethi Krishnan Commission (2000)	Expenditure Reforms
Narsimhan Committee (1991)	Banking Sector
Verma Committee	Banking Sector
Kumar Mangalam Birla Committee	Corporate Governance
Montek Singh Ahluwalia Committee	Power Sector
Swaminathan Committee	Population
M.J. Ferwani Committee	Stock Exchange
C. Rangrajan Committee	Balance of Payment
Hanumnata Rao Committee	Fertilisers
Mahajan Committee	Sugar Industry
R. V. Gupta Committee	Agriculture Credit
Narsimhan Committee (1998)	Banking Reforms
Khan Working Group	Development of Finance Institutions
S.L. Kapoor Committee	Credit and Flow Problems of SSIs
Dave Committee (2000)	Pension scheme for Unorganised sector
Mashelkar Committee (January 2002)	Auto Fuel Policy
S.N. Verma Committee (1999)	Restructuring the Commercial Banks
Bhurelal Committee	Increase in Motor Vehicle Tax
Sapta Rishi Committee (July 2002)	Development of Domestic Tea Industry
Abhijit Sen Committee (July 2002)	Long Term Food Policy
Kelkar Committee	Tax Structure Reforms
Goiporia Committee	Consumer Service Importance
Malhotra Committee	Improving Insurance Centre
Tarapur Committee	Full convertibility in capital account
Rakesh Mohan Committee	Infrastructure
Chandrashekhar Committee	Transfer of Shares
J.J. Irani Committee	Company Law Reforms

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Pay Commissions

Pay Commission	Chairman	Appointment	Report
First Pay Commission	S. Varadachariar	1946	1947
Second Pay Commission	Jaganath Das	1957	1959
Third Pay Commission	Raghubir Dayal	1970	1973
Fourth Pay Commission	P.N. Singhal	1983	1986
Fifth Pay Commission	S.R. Pandian	1994	1997
Sixth Pay Commission	B.N. Srikrishna	2006	2008

Main Share Price Index of the World

MUMBAI	DOLEX
	SENSEX
	S & PCNX
	NIFTY FIFTY
New York	DOW JONES
Tokyo	NIKKEI
Frankfurt	MID DAX
Hong Kong	HANG SENG
Singapore	SIMEX
	STRAITS TIMES

Establishment Years of Major Financial Institutions in India

Imperial Bank of India	1921
Reserve Bank of India	April 1, 1935
Industrial Finance Corporation of India	1948
ICICI	January 1955
State Bank of India	July 1, 1955
Unit Trust of India	February 1, 1964
IDBI	July 1964
NABARD	July 12, 1982
IRBI	March 20, 1985
SIDBI	1990
EXIM Bank	January 1, 1982
National Housing Bank	July 1988
Life Insurance Corporation (LIC)	September 1956
General Insurance Corporation (GIC)	November 1972
Regional Rural Banks	October 2, 1975
Risk Capital and Technoloty Finance Corportation Ltd.	March 1975
Technology Development & Information Co. of India Ltd.	1989
Infrastructure Leasing & Finance Services Ltd.	1988
Housing Development Finance Corporation Ltd. (HDFC)	1977

RBI GOVERNORS

1. Sir Osborne Smith
2. Sir J.B. Taylor
3. Dr. C.D. Deshmukh
4. Sir. Benegal Rama Rau
5. K.G. Ambegaokar
6. H.V.R. Iengar
7. P.C. Bhattacharyya
8. L.K. Jha
9. B.N. Adarkar
10. S.Jagannathan
11. N.C. Sen Gupta
12. K.R. Puri
13. M. Narasimham
14. Dr. I.G. Patel
15. Dr. Manmohan Singh
16. A. Ghosh
17. R.N. Malhotra
18. S. Venkitaramanan
19. C. Rangarajan
20. Bimal Jalan
21. Y.V. Reddy
22. Mr. Duvvuri Subba Rao

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IMPORTANT TERMINOLOGY

- **Ad-Valorem Tax :** A tax based on the value of a transaction. It is normally a given percentage of price at the retail, wholesale or manufacturing stage and is a common form of sales tax.
- **Absolute Poverty :** A situation where a population is able to meet only its bare subsistence essentials of foods, clothing, and shelter.
- **Administered Prices :** Prices which are set by a single decision taking body, e.g. a government agency rather than being determined by the free play of market forces.
- **Asian Development Bank :** It was founded in 1966. It aimed at to further development and investment in Asia, to help prepare and co-ordinate development and provide technical aid. It has twenty regional members and thirteen non-regional members. The bank is having its headquarters in the Philippines.
- **Andean Group :** A common market formed by Bolivia, Colombia, Ecuador, Peru and Venezuela in an effort to promote economic integration, co-ordinate industrial development, regulate foreign investment and maintain a common external tariff among the member countries.

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- **Appreciation :** A rise in the value of an asset or currency. Its opposite is depreciation.
- **Average Cost :** It is the cost per unit of output, where the cost of all inputs is included. If X is output and TC is total cost than average cost may be written as AC = TC/X.
- **Black Market :** A situation in which there is illegal selling of foods at prices above a legal maximum set by the government.
- **Budget Deficit :** When the expenditure of the Government exceeds the revenue, the balance between the two is the budget deficit.
- **Buffer Stocks :** Stocks of commodities held to moderate the commodities price fluctuations.
- **Balanced Budget :** A budget in which current income exactly equals current expenditure.
- **Balance of Payments :** The relation between the payments of all kinds made from one country to the rest of the world and its receipts from all other countries.
- **Balance of Trade :** The relationship between the value of a country's imports and its exports.
- **Bandwagon Effect :** The effect whereby as the price of a good falls demand by some sections or individuals in the community expand. Other individuals or sections expand their demand also.
- **Base Period :** A point in time used as a reference point for comparison with some later period.
- **Boom :** The expansionary phase of the trade cycle.
- **Bearer Cheque :** It is a cheque that is payable to a person whosoever presents it to the banker.
- **Bill of Exchange :** It means the drawer makes an unconditional undertaking to pay to the drawee a sum of money at a given date. Usually three months ahead.
- **Birth Rate :** The average number of live births occurring in a year for every 1000 populations.
- **Black Economy :** That part of a country's economic activity which is not recorded in the national income accounts, although it does involve in the production of goods and services.
- **Backward Linkage :** The relationship between an industry or firm and the suppliers of its inputs. A change in the output of the industry will get transmitted backwards to the supplier of its inputs by changing it's demand for inputs.
- **Backwash Effects :** These are considered to operate where the economic growth in one region of an economy possesses adverse effects on the growth of other regions.
- **Bank Rate :** The Rate of interest payable by commercial banks on the loans or rediscounts from the central bank.

- **Brain Drain :** The migration of educated and skilled labour from poor to richer countries.
- **Bullion :** Precious metal such as gold or silver which are held in bulk in the form of ingots or bars.
- **Bear :** A person who expects prices to fall and sells secutiries hoping to make a profit by subsequently repurchasing at a lower prices.
- **Bid :** The price at which someone is prepared to buy shares.
- **Brokerage :** Changes made by a broker for acting as a agent in the buying and selling of shares.
- **Bull :** –A person who buys secutiries in the expectation that prices will rise and so give him an opportunity to resell on a profit.
- **Cash Reserve Ratio :** Under this method of credit control, commercial banks have to keep with RBI a percentage of reserves against their deposits.
- **Call Money :** It is a loan that is made for a very short period of a few days only or for duration of a week. It carries a low rate of interest.
- **Capital Account :** Portion of a country's balance of payments table that shows the volume of a private foreign investment and public grants and loans that flow into out of a country over a given period.
- **Capital Accumulation :** It is increase in a country's stock of real capital (i.e. net investment in fixed assets).
- **Capitalism :** Economic system featuring private property in means of production, commodity production and profit as the guiding motivating force of production.
- **Capital Market :** Places where long-term titles to capital assets such as bonds, debentures, shares and mortgages are bought and sold.
- **Capital-output ratio :** A ratio that shows the units of capital required to produce a unit of output over a given period of time.
- **Cartel :** An organisation of producers agreeing to limit the output of their product in an effort to raise prices and profits.
- **Cash Crops :** Crops produced entirely for the market (e.g., coffee, tea, cocoa, cotton, rubber, pyrethrum, jute, wheat).
- **Cheap Money :** Refers to a phase in which loans have been available at low rates of interest or a policy which creates this situation.
- **Commercial Banks :** Financial institutions that create credit; accept deposit and give loans and perform other financial functions. They create credit by creating deposits on the basis of their cash reserves.
- **Capital Budget :** It comprises capital receipt and payments and also incorporates transactions in the Public Account.

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- **Capital Expenditure :** It consists of payments for acquisition of assets like land, buildings, machinery, equipments as also investments in shares etc., and loans and advances granted by the Government.
- **Capital Receipt :** These are loans raised by the government from the public, which are called market loans, borrowings by the government from the Reserve Bank of India and other parties.
- **Comparative Cost Method :** Refers to a method of comparing the profitability of alternative projects. The method takes into consideration the initial cost of alternative projects only, it is possible to use this method only where the output and lift of each competing schemes is the same.
- **Consumer Good :** A commodity bought by house-holds for use of consumption.
- **Consumerism :** A widespread movement which is concerned with the quality and safety of consumer goods, with harmful advertising and the conduct of business in a manner harmful to the consumer.
- **Cost Push Inflation :** A situation of general rise in prices in which costs increase faster than productivity or efficiency.
- **Creeping Inflation :** Slow and persistent rise in general level of prices over a long period.
- **Current Account Balance :** The difference between (a) exports of goods and services plus inflows of unrequited official and private transfers, and (b) imports of goods and services plus unrequited transfers to the rest of the world.
- **Cyclical Unemployment :** Unemployment in industrial market economies resulting from down showing of economic activity on account of deficient demand (insufficient to ensure Keynesian full employment).
- **Consolidated Fund :** It is made up of all revenues received by the government loans raised by it, and also receipts from recovery of loans granted by it.
- **Contingency Fund :** This fund is placed at the disposal of the President to meet any unforseen expenditure where the Parliament's approval cannot be obtained due to time factor. It was created by an Act of Parliament in 1950.
- **Dividend :** Distribution of a part of a company's net profit to share holders as a reward for investing in the company. Usually expressed as a percentage of par value or as per cents per share.
- **Dear Money :** Refers to phases when interest rates have been high compared with their historical average values.
- **Demography :** The study of information in figures about the population of an area or country.

- **Decentralised Planning :** Regionalised or sectoral planning as opposed to planning at the centre.
- **Deflation :** (a) Decline in the general price level of goods and services leading to rise in the value of purchasing power of money. (b) A method of statistical conversion of a series of data to compensate for the general rise in prices.
- **Demand Deposit :** A deposit with bank which can be withdrawn immediately by the deposition also called cheque-book money.
- **Demand Pull Inflation :** A state of rising prices brought about by increase in aggregate demand in the face of short supply.
- **Domestic Income :** Income generated by the factors of production within the country from its own resources is called domestic income.
- **Dependency burden :** That proportion of the total population of a country falling in the ages of 0 to 15 and 64+, which is considered economically unproductive and therefore not counted in the labour force.
- **Depression :** A phase of the business cycle in which economic activity is at a low ebb and there is unemployment/ under employment of resources; prices, profits, consumption and rate of capital investment are also at a low level.
- **Devaluation :** Official reduction in the foreign value of domestic currency. For example, if the official rate of exchange between rupee and dollars is rupees 7 = 1$ and the government reduces the value of rupee by making Rs. 10 = 1$, this will be devaluation. It is done to encourage the country's exports and discourage imports.
- **Dependency Ratio :** The number of people of non-working age in an economy related to those who are of working age.
- **Direct Tax :** Tax that cannot be shifted, the burden of direct tax is borne by the person on whom it is initially fixed. Examples: personal income tax, social security tax paid by employees, death tax, wealth tax, etc.
- **Disguised Unemployment (under-employment) :** (a) A situation in less developed countries where people are apparently employed but are actually unemployed or under-employed; for example, in agriculture in India, (b) A situation in developed countries in which the employed resources are being employed in uses less efficient than normal; for example, a doctor may be employed as a cab driver or as a compounder.
- **Disinvestment :** Reduction in the total stock of capital goods on account of failure to provide for depreciation.
- **Demands for Grants :** It is a statement of estimates of expenditure from the consolidate fund and is required to be voted by the Lok Sabha.

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- **Expenditure Budget :** It contains expenditure estimates made for a scheme or programme under both the revenue and capital heads.
- **Dumping :** It is a special type of price discrimination in which a monopoly firm charges a higher price at home and a lower price at abroad.
- **Disposable Income :** It means the actual income which can be spent on consumption by individuals and families.
- **Debentures :** Debenture is a written instrument acknowledging a debt.
- **Demand :** The quantity of a commodity which an individual is willing to buy at a given price.
- **Elasticity of Demand :** It express the degree of correlation between demand and price.
- **Engel's Law :** It is a relationship between the family's income and expenditure on different items. According to the Law, when a family's income increases the percentage of its income spent on food decreases.
- **Estate Duty :** A tax payable on a person's property at his death and before it passes into the hands of others.
- **Export Promotion :** Purposeful development efforts to expand the volume of a country's exports through export incentives and other means in order to generate more foreign exchange and improve the current account of its balance of payments.
- **Fiat Money :** Money which the State declares to be legal tender, although its content value may be little or nothing. Most of fiat money has been notes, although token money may also be included in the term.
- **Fiscal Drag :** The effect of inflation upon effective tax rates or sometimes the effect of growth in nominal gross domestic product on tax revenue. In other words, fiscal drag is directly related to inflation and tax rates.
- **Finance Bill :** This contains the government's proposals for levy of new taxes, modification of the existing tax structure beyond the period approved by parliament.
- **Fiscal Deficit :** It is the difference between the revenue receipts plus certain non-debt capital receipts and total expenditure including loans.
- **Financial Intermediary :** Business institutions that act as middle men between lenders and borrowers. Example : commercial banks, mutual savings banks, saving and loan associations, insurance companies.
- **Fiscal Policy :** Government's expenditure and tax policy, an important means of moderating the upswings and downswings of the business cycle.

- **Fixed Exchange Rate :** The exchange value of a national currency is fixed in relation to another (usually the U.S. dollar), not free to fluctuate on the international money market.
- **Flexible Exchange Rate :** The exchange value of national currency is free to move up and down in response to shifts in demand and supply arising from international trading.
- **Floating Debt :** Refers to that part of the National Debt which involves short term borrowing, it consists of Ways and Means Advances (q.v) and Treasury Bills.
- **Floating Exchange Rate :** Refers to a market situation in which the exchange rate between currencies has been free to change from day–to–day in response to supply and demand, the opposite to fixed parity.
- **Full Employment :** A situation in which the economy's resources are being used fully; zero deflationary unemployment, i.e. a situation in which all those who want to work at the current rate of wages are, in fact, employed.
- **Gilt–edged :** Refers to a high–grade bond issued by a company which has demonstrated its ability to earn a comfordable profit over a period and pay its bondholders their interest without interruption.
- **Gini Coefficient :** It measures the income inequality ranging from zero (perfect equality) to one (perfect inequality). It is graphically measured by dividing the area between the perfect equality line and the Lorenz curve by the total area lying to the right of the equality line in a Lorenz diagram. The higher the value of the coefficient, the higher the inequality of income distribution and the lower it is the more equitable the distribution of income.
- **Giffen Paradox :** It holds that for a commodity the demand is strengthened with a rise in price and weakened with a fall in price.
- **Green Money :** Refers to a set of special exchange rates which are used to convert common farm prices into national currencies in the European Economic Community.
- **Green Revolution :** The revolution in grain production associated with the scientific discovery of new hybrid seed varieties of wheat, rice, and corn which have resulted in high farm yields in many LDCs.
- **Gross Domestic Investment :** Consists of the outlays for additions to the fixed assets of both the private and public sector. plus the net value of inventory changes.
- **Gross Domestic Product (G.D.P) :** A measure of the total flow of goods and services produced by the economy over a specified time period, normally a year. It is obtained by valuing outputs of goods and services at market prices and then aggregating.

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- **Gross National Income :** Gross National Product from the income side; consists of national income at factor costs – wages + rent + interest + profits + indirect taxes and capital consumption.
- **Gross National Product :** Aggregate value of all final goods and services at market prices produced in an economy during the period of one year.
- **Good hart's law :** This law states that any measure of the money supply which is officially controlled promptly loses its meaning.
- **Giffen Goods :** Those goods whose demand tends to fall as their price falls.
- **Hard Currency :** Means a currency which is having a continuing high level of demand relative to supply in the market for foreign exchange.
- **Hot Money :** Refers to money which gets transferred rapidly from one financial centre to another to take advantage of differences in short term interest rates or to escape the financial penalties of devaluation.
- **Hyper Inflation :** A situation in which general prices are rising sharply with no or little increase in output, also called runaway or galloping inflation.
- **Import Duty :** It can be described as a tax on imports and is imposed on an-ad-valorem basis.
- **IDA :** International Development Association is an international body set up in 1960 to assist the World Bank (IBRD) in its efforts to promote economic development of the underdeveloped countries by providing additional capital on a low interest basis especially to the poorest of the poor developing countries.
- **IFC :** International Finance Corporation is an international financial institution that was set up in 1956 to supplement the efforts of the World Bank in providing development capital to private enterprises for the underdeveloped countries.
- **ILO :** International Labour Organisation is one of the United Nations functional organisation based in Geneva whose central task is to look into problems of world manpower supply, its training, utilisation, domestic and international distribution etc.
- **IMF :** International Monetary Fund is an autonomous international financial institution that originated from the Bretton Woods Conference of 1944. Its main purpose is to regulate the international monetary exchange system which also originated from that conference but has since been modified.
- **Import Substitution :** A deliberate effort to replace major consumer imports by promoting the emergence and expansion of domestic industries such as textiles, shoes, household appliances. It requires the imposition of protective tariff and physical quotas to get the new industry started.

- **Income Per Capita :** Total GNP of a country divided by the total population. Per capita income is often used as an economic indicator of the levels of living and development.
- **Incremental Capital-Output Ratio (ICOR) :** The amount of capital needed to raise output by one unit.
- **Indirect Taxes :** Taxes levied on goods purchased by the consumer (and exported by the producer) for which the tax-payer's liabilities varies in proportion to the quantity of particular goods purchased or sold.
- **Infant Mortality :** The deaths among children between birth and one year of age. The infant mortality rate measures the number of these deaths per 1,000 live births.
- **Inflation :** Rise in the general or average price of goods and services; consequently, a decline in the value of money-doubling of the general price level means halving the value of money.
- **Invisibles :** It represents services in a current account of the foreign trade of a country. They exclude physical goods in foreign trade.
- **Isoquant :** It is the locus of all technically efficient methods of producing a given level of output.
- **Investment :** That part of national income of expenditure devoted to the production of capital goods over a given period of time. "Gross" investment refers to the total expenditure on new capital goods, while "net" investment refers to the additional capital goods produced in excess of those that wear out and need to be replaced.
- **Labour-intensive Technique :** Method of production that uses proportionately more labour relative to other factors of production.
- **Liquidity :** It refers to the assets which can be converted into cash money easily.
- **Laffer Curve :** A curve depicting relationship between total tax revenue and corresponding tax rates.
- **Laissez-faire :** The principle of non-intervention of government in economic affairs.
- **Life Expectancy at Birth :** Indicates the number of years newborn children would live if subject to the mortality risks prevailing for the cross-section of population at the time of their birth.
- **Lorenz Curve :** A graph depicting the variance of the size distribution of income from perfect equality.
- **Micro-economics :** That branch of economics which studies the particular aspects of an economy. It is the study of the particular, of individuals, households, firms, prices, wages or incomes.
- **Monetised Deficit :** It indicates the level of support extended by the Reserve Bank of India to the governments borrowing programme.

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- **Maturity :** Means the date on which a loan or bond or debenture becomes due and is to be paid-off.
- **MNC :** It implies Multi-national Company i.e., a large scale company having its production base in several countries and the bulk of the production is produced in the outside nations.
- **Mixed Economy :** An economy in which both the State and the private sector co-exist; decisions on what, how and for whom are made partially by the market and partially by the State or any other public authority; many consider it essentially a transitory form.
- **Monetary Policy :** Policy through which the Reserve Bank of India expands or contracts the money supply, or makes credit cheap or dear.
- **Money Market :** Money market can be defined as comprising the financial institutions that deal in short-term securities and loans.
- **Money Supply :** Sum of total currency in circulation plus commercial bank demand deposits (M1) plus sometimes savings bank time deposits (M2).
- **Mutual Fund :** Type of investment operated by an investment company that raises money from shareholders and invests it in a portfolio of stocks, bonds, or other securities. These funds offer investors the advantages of diversification and professional management.
- **NASDAQ** (National Association of Securities Dealers Automated Quotations) : Owned and operated by the NASD, NASDAQ is the computerised network that provides price quotations for securities traded over the counter as well as many listed securities.
- **New Economics** : Economics thought, founded by John Maynard Keynes (1883-1946) in the thirties; also called Keynesian thought or Keynesianism.
- **Non-Plan Expenditure :** It includes both revenue and capital expenditure on interest payments, the entire defence expenditure, subsidies, postal deficit, police, pensions, economic services, loans to public enterprises and loan as well as grants to State Governments, Union Territory Governments and Foreign Governments.
- **OECD :** Organisation for Economic Co-operation and Development is an organisation of 20 countries from the Western World including all of those in Europe and North America. Its major objectives is to assist the economic growth of its member nations by promoting co-operation and technical analysis of national and international economic trends.
- **OPEC :** Organisation of Petroleum Exporting Countries is an organisation consisting of the 13 major oil exporting countries of the Third World that acts as a "cartel" or oligopoly to promote their joint national interests. Members include Saudi Arabia, Nigeria, Algeria, Venezuela, Libya, Kuwait, United Arab Emirates, Iran, Iraq, Ecuador, Qatar, Gabon and Indonesia.

- **Open Market Operations :** Purchase and sale of Government securities by the Central Bank. Purchases have an expansionary effect, while sales have a contractionist effect.
- **Optional Money :** It is non-legal tender money but, it is generally accepted by the people as a medium of exchange.
- **Oligopoly :** It is a situation, that emerges when a few sellers of a product are found in the market.
- **Opportunity Cost :** It refers to the forgone value of resources in their next best alternative use.
- **Primary Deposits :** People deposit their cash with the banks. Such passively created deposits are known as Primary deposits.
- **Public Finance :** Public finance is the investigation into the nature and principles of public expenditure and public revenue.
- **Primary deficit :** It measures the fiscal deficit after excluding internal payments. It is an indicator of the real state of Government finances.
- **Primary data :** It refers to the data collected for the first time by the investigator. It provides original and first hand information.
- **Proportional Tax :** A proportional tax is one which, whatever the size of the income, the same rate or percentage is charged.
- **Portfolio :** Investors holding of securities of various types.
- **Preference shares :** Rank above ordinary shares for claims an assets, earnings and dividends but rank below creditors and debenture holders. These shares usually have a fixed dividend rate.
- **Premium :** The amount by which a security is quoted or issued above its value. The opposite to 'discount'.
- **Payroll Tax :** A tax levied on employer's wage bills.
- **Positional Goods :** Goods that are necessarily scarce and whose security cannot be reduced by increased productivity; for example, gold.
- **Purchasing Power Parity :** An exchange between two countries such that the same basket of goods and services could be bought in each country if the cost were converted at that exchange rate.
- **Progressive Income Tax :** A tax whose rate increases with increasing personal incomes i.e,. where the proportion of personal income paid by a rich person in taxes is higher than that paid by a poorer person. A progressive tax strucutre therefore tends to improve income distribution.
- **Promissory Note :** A promise to pay by one person to another (I.O.U.) a given sum of money by a given date.
- **Revenue Budget :** It consist of the revenue receipt of the Government and the expenditure met from these revenues. It has two components, revenue receipts and revenue expenditure.

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- **Revenue Deficit :** It refers to the excess of revenue expenditure over revenue receipt.
- **Revenue Expenditure :** It is meant for the normal running of Government Departments and various services, interest charges on debt incurrent by the Government and subsidies.
- **Revenue Receipt :** It includes proceeds of taxes and other duties levied by the Centre, interest and dividend on investments made by the Government and fees and other receipt for services rendered by the Government.
- **Real Income :** Real income is income expressed in terms of a general level of prices of a particular year taken as base.
- **Running Inflation :** When price rises rapidly, at a rate of around 10 per cent per annum, it is called running inflation.
- **Soft Currency :** A currency which is having a falling exchange rate due to continuing balance of payments deficits. Such a currency would not be held by other countries as part of their exchange reserves.
- **Soft Loan :** A loan bearing either no rate of interest or an interest rate which is below the true cost of the capital lent.
- **Special Drawing Rights (SDRs) :** An international reserve currency system which was created by the International Monetary Fund in October, 1969. It provides for a new type of money (known as paper gold) to serve the agreement of the free world nations as the first international legal tender.
- **Strategic Sale :** It refers to the transfer of the management control of a public sector unit to a private party with the sale of a chunk of its equity.
- **Structural Unemployment :** Unemployment in an economy due to the fundamental change in technology, markets or other development priorities.
- **Sunrise Industries :** Industries in the forefront of development and which may become large industries in the future e.g. industries engaged in high technology, biotechnology and solar energy.
- **SEAQ :** Stock Exchange Automated Quotation.
- **Shadow Price :** It is the opporunity cost to a society of engaging in some economic activity. It is a concept applied to situations where actual prices cannot be charged or where actual prices charged to not reflect the real sacrifice made when some activity is pursued. For example, price of crackers is a shadow price.
- **Social Capital :** The total stock of society's productive assets is called social capital.
- **Takeover :** When a company's share of 51 per cent is taken away by another company (or acquired) it is called takeover, whereas **merger** is the fusion of two or more separate companies into one. Takeover is a forceful process, whereas, merger is a voluntary process.

- **Total revenue :** It refers to the total money receipts of a firm from the sale of a certain given quantity of output.
- **Tariff :** It is a duty or tax which is charged by a country on its imports from other countries, a customs duty.
- **Tariff (*ad valorem*) :** A fixed percentage tax (e.g. 30%) on the value of an imported commodity levied at the point of entry into the importing country.
- **Tax :** A compulsory payment to Government against which there is no quid *pro quo*.
- **Tax Avoidance :** Loopholes in tax laws used by tax payers to avoid taxes. Contrasted with tax evasion.
- **Tax Break :** A situation which is providing some relief from tax, in whole or part.
- **Tax Evasion :** Illegal escape from tax payment; black market incomes result from tax evasion.
- **Tax Incidence :** Ultimate burden of tax.
- **Tax Shifting :** Refers to the phenomenon whereby those on whom taxes are leveid are able to pass the burden either partly or fully on to others.
- **Time Deposits :** It refers to an interest bearing deposit over a fixed period of time.
- **Trotting Inflation :** When prices rise moderatetly and the annual inflation rate is a single digit, it refers to trotting inflation.
- **Tertiary Sector :** The services and commerce portion of an economy. Examples of services include repair and maintenance or capital goods, haircuts, public administration, medical care, transport and communications, teaching.
- **Tight Money :** It refers to the tightness of the money market–the comparative scarcity of the loanable funds and a consequently the high rate of interest that tends to prevail.
- **Trading off :** Something in order to get more of something else – e.g. sacrificing consumption now for consumption later by devoting some present resources to investment.
- **Transfer earnings :** The price which is necessary to retain a given unit of a factor in a certain industry may be called its transfer earnings.
- **Transfer Payment :** Payment made by one sector of the economy to another without any returns. Examples: Unemployment and social security payments, relief payments and charity, etc.
- **Transfer Pricing :** An accounting procedure usually designed to lower total taxes paid by multi–national corporations (MNCs) in which intra-corporate sales and purchases of goods and services are artificially invoiced so that profits accrue to those branch office located in low tax countries while offices in high tax countries show little or no taxable profits.
- **Treasury Bills :** Marketable financial bill of the Central Government.

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- **Underlying Inflation :** The rate at which prices are rising in the economy, once the impact of erratic effects on price measurements has been removed.
- **UNCTAD :** United Nations Conference on Trade and Development, a body of the United Nations whose primary objective is to promote intenational trade and commerce with a principle focus on trade and balance of payments problems of developing nations. Its first Secretary General was Raul Prebisch of Latin America.
- **Under-development :** An economic situation in which there are persistent low level of living in conjunction with the following characteristics; absolute poverty, low per capita incomes, low rates of economic growth, low consumption levels, poor health services, high death rates, vulnerability and dependence on foreign economies, and limited freedom to choose between variables that satisfy human wants.
- **Underemployment :** A situation in which persons are working less, either daily, weekly, monthly, or seasonally than they would like to work.
- **Underutilisation of Labour :** Operation of labour force at levels below their capacity or potential output.
- **Union :** Organisation of workers for advancing their social and economic interests.
- **Unit Cost :** The average total cost per unit of output of any economic good or service.
- **Utility :** It is defined as a want satisfying power of a commodity.
- **Variable costs :** Costs incurred on variable factors like raw materials.
- **Value Added Tax (V.A.T.) :** A value added tax is a tax levied on the values that is added to goods and services turned out by the producers at each stages of production and distribution.
- **Welfare State :** Refers to a nation that provides minimum standards in respect of education, health, housing, pensions and other social benefits etc. When the individual means of certain sections of the population may be inadequate to provide these standards.
- **Ways and Means Advance :** It refers to the advance of money by the Central Bank to the Government to meet short term expenditure needs.
- **Zero-Based Budgeting :** The practice of justifying the utility in cost benefit terms of each Government expenditure on projects. Otherwise in the next year's budget it would not get the budgetary provision. This form of financial planning is with an object to ensure that is every rupee that is spent is result oriented.
- **Zero Growth :** Zero growth in the economy occurs when the economic growth is static and shows on rise at all.

GENERAL SCIENCE

INTRODUCTION

Science is the systematic study of the nature and behaviour of the material. It is through a scientific approach only that we can analyze and understand the world with a rational perspective. The Nature of which we are an important part, is a complex phenomenon. It is only after having the basic knowledge of science subjects like Physics, Chemistry and Biology that we can understand our environment, our surrounding and even our own existence. General science make us aware of the various laws governing the Nature and help us in understanding the way the entire globe works. However, General science is a very broad term and it includes a variety of scientific disciplines associated with the study of their specific areas.

VARIOUS SCIENTIFIC DISCIPLINES

- **Acarology :** Branch of zoology dealing with ticks and mites.
- **Acoustics :** The study of sound (or the science of sound).
- **Aerodynamics :** The branch of mechanics that deals with the motion of air and other gases; the study of the motion and control of solid bodies like aircraft, missiles in air.
- **Aeronautics :** The science or art of flight.
- **Aerostatics :** The branch of statics that deals with gases in equilibrium and with gases and bodies in them.
- **Aetiology :** The science of causation.
- **Agrobiology :** The science of plant life and plant nutrition.
- **Agrology :** Soil science dealing with production of crops.
- **Agronomy :** The science of soil management and production of field crops.
- **Agrostology :** The study of grasses.
- **Alchemy :** Chemistry in ancient times.
- **Anatomy :** The science dealing with the structure of animals, plants or human body.
- **Anaesthesiology :** Branch of medicine dealing with administration of anaesthetics and the patient's condition while under anaesthesia.
- **Anthropology :** The Science that deals with the origin and physical and cultural development of mankind.
- **Arboriculture :** Cultivation of trees and vegetables.
- **Archaeology :** The study of antiquities.
- **Astrochemistry :** Science relating to composition and reaction of substances found in celestial objects.
- **Astrogeology :** Dealing with structure and formation of rocks and minerals found in other planets.

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- **Astrology :** The ancient art of predicting the course of human destinies with the help of indications deduced from the position and movement of the heavenly bodies.
- **Astronautics :** The science of space travel.
- **Astronomy :** The study of the heavenly bodies.
- **Astrophysics :** The branch of astronomy concerned with the physical nature of heavenly bodies.
- **Bacteriology :** The study of bacteria.
- **Biochemistry :** The study of chemical processes of living things.
- **Biology :** Science dealing with study of living things.
- **Biometry :** The application of mathematics to the study of living things.
- **Bionics :** The study of functions, characteristics and phenomena observed in the living world and the application of this knowledge to the world of machines.
- **Bionomics :** The study of the relation of an organism to its environment.
- **Bionomy :** The science of the laws of life.
- **Biophysics :** The physics of vital processes (living things).
- **Botany :** The study of plants.
- **Cardiology :** A branch of medicine dealing with the heart.
- **Carpology :** The study of fruits and seeds.
- **Cetology :** Dealing with the study of aquatic mammals.
- **Chemistry :** The study of elements and their laws of combination and behaviour.
- **Chemotherapy :** The treatment of disease of using chemical substances.
- **Cherology :** Study of geographical areas and distribution of plants/animals.
- **Chronobiology :** The study of duration of life.
- **Chronology :** The science of arranging time in periods ascertaining the dates and historical order of past .....
- **Conchology :** The branch of zoology dealing with the cells of molluscs.
- **Cosmogony :** The science of the nature of heavenly bodies.
- **Cosmography :** The science that describes and maps the chain features of the universe.
- **Cosmology :** The science of the nature, origin and story of the universe.
- **Craniology :** The study of skulls.
- **Criminology :** The study of crime and criminals.
- **Cryptography :** The study of secret writings.
- **Crystallography :** The study of structure, forms and properties of crystals.
- **Cryogenics :** The science dealing with the production, control and application of very low temperatures.

- **Cytochemistry :** The branch of cytology dealing with chemistry of cells.
- **Cytogenetics :** The branch of biology dealing with the body of heredity from the point of view of cytology and genetics.
- **Cytology :** The study of cells, especially their formation, structure and functions.
- **Cytology :** The study of cells, especially their formation, structure and functions.
- **Cytopathology :** The study of cells in diseases.
- **Dactylography :** The study of fingerprints for the purchase or identification.
- **Dactylology :** The study of fingerprints.
- **Dandrology :** Science dealing with study of trees.
- **Dietetics :** Science dealing with study of diet and nutrition.
- **Ecology :** The study of the relation of animals and ants to their surroundings, animate and inanimate.
- **Econometrics :** The application of mathematics in testing economic theories.
- **Economics :** The science dealing with the production, distribution and consumption of goods and services.
- **Embryology :** The study of development of embryos.
- **Endocrinology :** The study of endocrine glands and air secretions.
- **Entomology :** The study of insects.
- **Epidemiology :** The branch of medicine dealing with communicable diseases.
- **Epigraphy :** The study of inscriptions.
- **Epistemology :** Study of the nature of knowledge.
- **Eschatology :** Study of death and destiny.
- **Ethnography :** A branch of anthropology dealing with scientific description of individual cultures.
- **Ethnology :** A branch of anthropology that deals with origin; distribution and distinguishing characteristics of races of mankind.
- **Ethology :** The study of animal behaviour.
- **Eugenics :** The study of the production of better offering by the careful selection of parents.
- **Exobiology :** Branch of biology relating to the search study of extraterrestrial living organisms.
- **Genecology :** The study of genetical composition of plant population in relation to their habitat.
- **Genesiology :** The science of generation.
- **Genetics :** The branch of biology dealing with the phenomena of heredity and the laws governing it.
- **Geobiology :** The biology of terrestrial life.
- **Geobotany :** The branch of botany dealing with all aspects of relations between plants and the earth's surface.
- **Geochemistry :** The study of the chemical composition of the earth's crust and the changes which take place within it.

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- **Geology :** The science that deals with the physical history of the earth.
- **Geomedicine :** The branch of medicine dealing with the influence of climate and environmental conditions on health.
- **Geomorphology :** The study of the characteristics, origin and development of landforms.
- **Geophysics :** The physics of the earth.
- **Geriatrics :** Branch of medicine relating to diagnosis and treatment of diseases afflicting the elderly.
- **Geriodontics :** Dealing with dental problems of the elderly people.
- **Gerontology :** The study of old age, its diseases, etc.
- **Gynaecology :** Dealing with female diseases of the reproductive system.
- **Haemetology :** Relating to study of blood and blood disorders.
- **Hepatology :** Branch of medicine relating to study of liver and its diseases.
- **Histology :** The study of tissues.
- **Horticulture :** The cultivation of flowers, fruits, vegetables and ornamental plants.
- **Hydrodynamics :** The mathematical study of the forces, energy and pressure of liquid in motion.
- **Hydrography :** The science of water measurements of the earth with special reference to their use for navigation.
- **Hydrology :** The study of water with reference to its occurrence and properties in the hydrosphere and atmospheres.
- **Hydropathy :** The treatment of disease by the internal and external use of water.
- **Hydroponics :** The cultivation of plants by placing the roots in liquid nutrient solutions rather than in soil.
- **Hydrostatics :** The mathematical study of forces and pressures in liquids.
- **Hygiene :** Science of health and its preservation.
- **Hypnology :** Study of sleep.
- **Ichthyology :** Study of fishes.
- **Immunology :** Branch of medicine relating to the immune system in the body.
- **Lalopathology :** Branch of medicine relating to study of speech disorders.
- **Lithology :** Study of characteristics of rocks.
- **Malacology :** Branch of zoology concerned with study of mollusks of shell-bearing organisms.
- **Metallography :** Study of the crystalline structures of metals and alloys.
- **Meteorology :** Science of the atmosphere and its phenomena.
- **Metrology :** Scientific study of weights and measures, bacteria, molds and pathogenic protozoa.
- **Minerology :** Study of distribution, identification and properties of minerals.

PHYSICS

Physics is the branch of science which is concerned with the study of matter and energy and their inter–relationship. Numerous developments have taken place in the realm of Physics, from the earlier stages of classical physics to the emergence physics based on quantum theory. Classical physics included topics like optics, mechanics, electricity, magnetism, acoustics. In the twentieth century quantum physics has made much headway and it includes topics like atomic, nuclear, particle etc.

Some SI Derived Units

Quantity	Name of Unit	Symbol
Area	square meter	m^2
Volume	Cubic meter	m^3
Frequency	hertz	Hz
Mass density (density)	kilogram per cubic meter	kg/m^3
Speed, velocity	meter per second	m/s
Angular velocity	radian per second	rad/s
Acceleration	meter per second per second	m/s^2
Angular acceleration	radian per second per second	rad/s^2
Force	newton	N, $kg.m/s^2$
Pressure	pascal	Pa, N/m2,
Work, energy, quantity of heat	joule	J, N.m
Power	watt	W, J/s
Quantity of electric charge	coulomb	C, A.s
Potential difference, electromotive force	volt	V, W/A
Electric field strength	volt per meter (or newton per coulomb)	V/m, N/C
Electric resistance	ohm	Ω, V/A
Capacitance	farad	F, A.s/V
Magnetic flux	weber	Wb, V.s
Inductance	henry	H, V.s/A
Magnetic flux density	tesla	T, Wb/m^2
Magnetic field strength	ampere per meter	A/m
Entropy	joule per kelvin	J/K
Specific heat	joule per kilogram kelvin	J/(kg. K)
Thermal conductivity	watt per meter kelvin	W/(m.K)
Radiant intensity	watt per steradian	W/sr
Plane angle	radian	rad
Solid angle	steradian	sr

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MECHANICS

MOTION

- Motion is change of position of a body with time.
- Two types of Motion are, Linear Motion and Rotatory Motion.
- **Scalar quantities :** Those physical quantities which are completely described by a magnitude (size) alone, are known as scalar quantities, e.g. length or distance, mass, time, area, volume, work, power, energy, temperature, speed, pressure, charge and potential.
- **Vector quantities :** Those physical which are completely described only if their magnitudes as well as directions are known, are called vector quantities, e.g. displacement, velocity, acceleration, force, weight, moment, momentum and electric field.

DISTANCE

- The distance traveled by a body is the actual length of the path covered by a moving body irrespective of the direction in which the body travels.
- It is a scalar quantity having magnitude only.

DISPLACEMENT

- When a body moves from one position to another, the shortest distance between the initial position and final position of the body alongwith direction is known as its displacement.
- Vector quantity have magnitude as well as direction.

SPEED

- Speed is the scalar form of velocity. It is defined as the distance traveled in one second. If the body covers a distance d in time t then speed $V = d/t$.

VARIABLE SPEED

- If the body covers unequal distance in equal interval of time, then it is said to be moving with a variable speed.
- Acceleration is always present if the speed of the body is variable.

UNIFORM SPEED

- The speed of the body is uniform if it covers equal distance in equal interval of time.
- Acceleration may or may not be there in the motion if the body is moving in uniform speed e.g. a body moving in uniform circular motion has uniform speed but variable velocity therefore acceleration is present in the circular motion.

AVERAGE SPEED

- If a body has travelled 'S_1' and 'S_2' distance with 'V_1' and 'V_2' velocities, then,

$$\text{Average speed} = \frac{S_1 + S_2}{\frac{S_1}{V_1} + \frac{S_2}{V_2}}$$

VELOCITY

- The rate of change of displacement is called velocity.
- $V = \frac{s}{t}$
- It is a vector quantity.
- Velocity may be positive and negative.

UNIFORM VELOCITY

- When a body covers equal displacement in equal interval of time the velocity is said to be uniform.
- Acceleration is absent if the body moves with uniform velocity.

VARIABLE VELOCITY

- When a body covers unequal displacement in equal intervals of time then it is said to have variable velocity.
- Acceleration is necessarily present in this motion.
- In this case either direction of velocity or magnitude or both change with respect to time e.g. speed is constant in uniform circular motion but velocity is variable.

AVERAGE VELOCITY

1. Average velocity is zero if the body returns to starting point in the given time interval.
2. If the body covers first half distance with velocity v_1 and next half with velocity v_2 then the average velocity $= \frac{2v_1v_2}{v_1 + v_2}$
3. If a body travels with uniform velocity v_1 for time t_1 and with uniform velocity v_2 for time t_2, then average velocity is

$$\frac{v_1t_1 + v_2t_2}{t_1 + t_2}$$

- A body whose velocity falls with the passage of time is said to be undergoing deceleration or retardation. A retardation may be treated as a negative acceleration.
- The acceleration of a moving body is the rate of change of its velocity, i.e.,

$a = \frac{(v - u)}{t}$; where 'a' is the acceleration, 'u' is the initial velocity which becomes 'v' in 't' second.

ACCELERATION

- Time rate of change in velocity is known as acceleration.
- It is a vector quantity.
- Negative acceleration is known as retardation. It indicates that the velocity of the object is decreasing with respect to time.

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VARIABLE ACCELERATION

- If the velocity of the body changes in different amounts during the same time intervals, then the acceleration of the body is known as variable acceleration.
- Acceleration is variable if either its direction or magnitude or both changes with respect to time, e.g. acceleration in uniform circular motion.

UNIFORM ACCELERATION

- If the velocity of the body changes by same amounts in same time intervals of time, then the acceleration of the body is known as uniform acceleration, e.g. acceleration due to gravity.

EQUATIONS OF MOTION

(i) $v = u + at$, (ii) $s = ut + \frac{1}{2}at^2$, (iii) $v^2 = u^2 + 2as$;

Where initial velocity = u
Final velocity = v
Elapsed time = t
Acceleration = a
Distance covered = s

- The acceleration caused by the earth's attraction is known as the acceleration due to gravity and it is identified by the symbol 'g'. Mean value of 'g' is 9.8 m/s^2.
- It the body travels downwards, then 'g' is positive. However, if the body is projected vertically upwards, then 'g' is negative.

LAWS OF MOTION

- **Newton's First Law of Motion :** Every body continues to be in a state of rest or of uniform motion, unless compelled by an external force to change that state. The first law can be called law of **Inertia**.
- **Newton's Second Law of Motion :** The rate of change of momentum is directly proportional to the applied force and takes place in the direction in which the force acts. The second law can be termed as the **law of acceleration**.
- **Newton's Third Law of Motion :** For every action, there is an equal and opposite reaction.

FORCE AND INERTIA

- A force is that pull or push which changes or tends to change the state of motion of a body.
- The tendency of a body to remain in the state it is, either stationary or moving, is called its inertia.
- The more the mass of the objects, the greater is their inertia.
- The force (F) which causes an acceleration (a) in a moving object of mass (m) is given by F = ma
- The SI unit of force is Newton.
- To every action there is always an equal and opposite reaction and action-reaction forces act on different bodies.

MOMENTUM

- The force which a body possesses, due to the combined effect of its mass and velocity is called momentum.
- The greater the mass and velocity of an object, the larger is its momentum.
- For example, cars are heavy and fast. Thus, they have enough momentum to crumple steel and break down brick walls when they crash to a halt.
- According to the law of conservation of momentum, in a colliding system, the total momentum remains conserved.
- When a force of very large magnitude is applied on a body for a very short interval of time, then collective effect of force and time is called **impulse.**

GRAVITY

- Gravity is the force which pulls all bodies towards the centre of the earth, keeps the planet revolving round the sun in definite paths and is responsible for the weight of all objects.
- A falling body accelerates under the influence of gravity.
- Different masses, fall to the ground together, because acceleration due to gravity is same for all objects.
- Every particle in the universe attracts every other particle with a force F which depends on the masses 'm_1' and 'm_2' of the interacting particles and on their separation 'r'. Greater the masses and smaller the separation, greater is the force of attraction. It is called Gravitational Force.
- Gravity is a special form of Gravitational Force, in which the interacting bodies are the earth and any other object.
- The value of acceleration due to gravity, i.e., 'g' decreases with height and depth.
- The radius of the earth is slightly more at the equator than at the poles. So, 'g' is less at the equator than at the poles. So artificial satellites are launched from the places near or on the equator.

MASS AND WEIGHT

- Mass is measure of the atoms contained in an object, and the number of atoms in the object remains constant. So, mass is an intrinsic, unchanging property of matter.
- The force with which a body is attracted towards earth is called weight.
  W = mg; where 'W' is the weight and 'm' is the mass.
- Mass is measured with the help of physical balance, while a spring balance measures the weight of an object.

FRICTION

- Friction is a kind of force that opposes relative motion.
- It comes into existence at the common boundary of two bodies in contact with one another, when one of them either moves or tends to move relative to the other.

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- Force of friction does not depend on the area of contact.
- Frictional force increases with weight.
- On rough surfaces, frictional force is more than that on the smooth surfaces.
- Less force is needed to maintain motion than to initiate it i.e., Kinetic friction < Static friction.
- Kinetic friction does not depend on the speed, when the speed is not large.
- The vehicles are provided with wheels and their axles are supported with ball bearings, because the rolling friction is much less than the sliding friction.
- Friction is necessary for the operation of belts, pulleys, clutches and brakes. Nails and screws remain firmly fixed in which they are driven because of friction.
- For motion in a fluid, the frictional forces that oppose the motion are called **drag forces.**
- The drag forces depend on area, shape and the velocity of the moving body. For faster motion, the drag force may be assumed to be proportional to the square of the velocity.

TYPES OF FRICTION

- **Static Friction :** Frictional force arises on account of the contact of two surfaces. If the surfaces remain at rest, there is static friction.
- Static friction acts as a resistance to the commencement of relative motion between the two surfaces.
- **Dynamic Friction :** Friction that exists during the relative slipping of one surface over another is called dynamic or kinetic friction.
- Dynamic friction is less than the Static Friction.
- **Rolling Friction :** When a body rolls over a surface the frictional force that develops is known as rolling friction.

WORK, POWER AND ENERGY

- **Work** is said to be done only, when a force or its component causes displacement in its own direction.
- In SI system, unit of work is called **Joule.**
- $W = F \times d$; where 'W' is the work done, 'F' is the force and 'd' is the displacement.
- Rate of doing work is called **power.** Power (P) can be defined as the product of force (f) and velocity (v).
  $P = fv$
- In SI system, absolute unit of power is called **Joules/second** or **Watt.**
- The capacity of a body to do work is called **energy.**
- Energy is the total amount of work done by a body, therefore, its unit is the same as that of work.

- Conveniently, energy is divided into (i) potential energy and (ii) kinetic energy.
- When a body does work by virtue of its motion, it is said to have kinetic energy. If 'm' is the mass of the body, moving with an initial velocity v, then its Kinetic Energy (KE) is given by

$$KE = \frac{1}{2}mv^2$$

- A fast moving electron, running water, blowing wind; a speeding car; a shooting arrow etc., have kinetic energy.
- Electric energy, radiant heat, light energy, mechanical energy can be regarded as kinetic energy.
- If a body does work by virtue of its position or configuration, it is said to have potential energy.
- If a body of mass 'm' be raised vertically through a height 'h' against the acceleration due to gravity 'g', then its Potential Energy (PE) is PE = mgh.
- When a body is on the surface of earth, then the potential energy between the system of body, and the earth is zero.
- When the body moves vertically upward, the height of the body from ground increases, and hence potential energy between the system of the earth and the body increases.
- When a body falls towards the earth, the height of the body from ground decreases. Thus the potential energy between the system of the earth and the body decreases.
- When, the spring of watch is wounded, its configuration changes. Thus, it possess potential energy. On unwinding, the potential energy moves hands of watch, by being converted into kinetic energy.
- Similarly, a stretched bow and arrow system, a cocked-up spring of an air gun, a stretched catapult, water stored high up in the dams, a stone lying on the top of the roof etc., posses potential energy.
- Magnetic energy, chemical energy, nuclear energy, energy of static electricity are the forms of potential energy.
- **Law of conservation of energy** states that the energy can neither be created, nor can be destroyed, It may be transformed from one form to another form, but total energy of the system remains constant.
- The phenomenon of transformation of energy from useful form to useless forms, is known as **dissipation of energy.**

INTERCONVERSION OF ENERGY

- When hands are rubbed, the mechanical energy due to friction changes to heat energy.
- When two stones are struck, the mechanical energy changes to heat and light energy.
- When a knife is rubbed, against grinding stone the mechanical energy changes to heat, light and sound energy.

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- When brakes are applied, the mechanical energy changes to heat energy at the point where brakes rub against moving wheel.
- When an arrow is stretched in a bow, the mechanical energy changes to potential energy. On releasing string, the potential energy changes to kinetic energy of arrow.
- The water stored in dams has potential energy. When this water is released, it changes to kinetic energy of flowing water. The kinetic energy of flowing water turns blades of turbine and changes to mechanical energy. The mechanical energy of turbine drives dynamo and changes to electric energy.
- When a torch is switched on, the chemical energy changes to electric energy. The electric energy on flowing through filament of bulb changes to heat and light energy.
- The electric energy in an electromagnet changes to magnetic energy.
- The electric energy flowing through an electric motor or fan changes to mechanical energy. It partly changes to heat energy.
- The sound energy in a microphone changes to electric energy.
- The electric energy changes to sound energy while flowing through speaker.
- In an electric heater, electric oven, electric geyser etc.; the electric energy changes into heat energy.
- In steam engine, the heat energy of steam changes to mechanical energy.
- In an electric generator, the mechanical energy changes to electric energy.
- In photo voltaic cell, the light energy changes to electric energy.
- In Television, the electric energy changes to sound and light energy.
- When fuels are burnt the chemical energy of fuels changes to heat energy.
- In matches, due to friction, the chemical energy changes to heat and light energy.
- When a cracker is exploded, the chemical energy changes to heat, light and sound energy.
- During photosynthesis, the light energy changes to chemical energy.
- During charging of battery, the electric energy changes to chemical energy.
- During respiration, the chemical energy of food changes to heat energy. It is the heat energy which keeps our bodies warm. It is the heat energy which changes to mechanical energy when we do perform locomotion.
- During nuclear fusion or fission, it is the nuclear energy, which ultimately changes to heat and light energy.
- During the pumping up of water into an overhead tank by an electric motor pump, the electric energy changes to kinetic energy of water. The kinetic energy of water, then changes to potential energy of the stored water.

FLUID PRESSURE

- **Pressure** is defined as the thrust acting per unit area of the surface of contact i.e., P = F/A
  Where 'P' is the pressure, 'F' is the thrust and 'A' is the area over which the thrust is acting.
- The SI unit of pressure is known as **pascal.**

FACTS TO REMEMBER

- On the surface of moon there is no atmospheric pressure and hence lemonade cannot be pushed up the straw.
- **Barometer** is used for the measurement of pressure.
- Why mercury is used in barometers ?
  (i) With mercury, practically no vapours are produced.
  (ii) Mercury does not wet or stick with glass.
  (iii) It is shining and opaque, so readings can be easily taken.
- A **gradual fall** in the atmospheric pressure indicates a steady increase in the atmospheric water vapour, and rain may occur.
- A **steady rise** in the atmospheric pressure shows a gradual fall in the atmospheric water vapour and indicates a fair weather.
- A sudden fall in atmospheric pressure predicts a storm.
- The boiling point of a liquid increases with the increase in pressure on its surface.
- On higher altitudes, the pressure of atmosphere is less. Thus, water starts boiling below 100°C. As the cooking temperature of rice, pulses, meat etc, is slightly above 100°C, therefore, they do not cook well on hills.
- Density of brine is more than that of fresh water. Thus, upthrust experienced by the floating ice in brine is more than upthrust due to fresh water. Hence, the volume of ice above brine is more as compared to that in fresh water.
- Ships are hollow from within, thus have fairly large volume. Thus, they are able to displace more weight of water than their own weight and hence float on the surface of water.
- The weight of hydrogen filled ballon as well as its fabric is less than the weight of air displaced by it. Thus, a net upthrust act on the balloon and hence it rises upward.
- Floatation and swimming in sea water is easier than in fresh water, because density of sea water is more than fresh water. Thus, for the same volume, the sea water provides greater upthrust as compared to the fresh water.
- The density of human body is slightly less than the density of water and it should have floated on water, but the density of human head is very large and hence, on the whole, density of human body becomes more than that of water. Thus, if we jump in deep water, we are liable to be drown.
- Human corpse always float on the surface of water, but the head stays within water. The reason being when the dead body decays,

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its volume increases. Thus, it becomes lighter than water and floats up. However, head being heavy cannot displace water more than its own weight, and hence remains under water.

- **Hydrometer** is used for measuring the densities of liquds directly.
- **Lactometer** is used to measure the purity of milk, if it is adul terated with water.
- **Archimedes' Principle :** When a body is immersed in a liquid fully or partially, it suffers an upthrust.
- The upthrust is equal to the weight of liquid displaced by the im mersed part of it.
- The result of the upthrust is an apparent loss of weight of the body in the liquid.

HEAT AND THERMODYNAMICS

- Heat is a form of energy that flows from one body to another due to temperature difference between them. It is the combined en ergy of all molecules moving inside a body.
- Temperature is only a measure of how fast these molecules are moving. The faster the molecules in a body vibrate, the hotter it is.
- The flow of heat from one body to another continues until both the sides are at the same temperature. The two bodies are then said in **'Thermal Equilibrium'.**
- In general, matter (whether solid, liquid or gas) expands when heated and contracts when cooled.
- Black or dark bodies absorb heat while white or bright, shiny sur faces reflect away the heat.
- Kelvin is the SI unit of temperature. In it, temperature is expressed in kelvin and not in degree kelvin. If T is the temperature on the kelvin scale and 0°C is the temperature on the celsius scale, then $T = 273.15 + 0$
- It the temperature of a hot body on the celsius scale and farenheit scale are 0°C and 0_F°F respectively, then the relation between the two is $\frac{0}{100} = \frac{^0F - 32}{180}$.
- At–40°, both the celsius and farenheit scales give same redding

TRANSMISSION OF HEAT

- The process of net energy transfer through a substance without movement of the substance itself is called conduction.
- The process of transfer of heat energy within the heated medium by the movement of the substance itself is known as convection
- The process of transfer of heat from one body to another without requiring any medium is called radiation.
- Heat energy from the sun is transmitted to earth by radiation.
- Very poor conductors, such as glass, are called insulators.

MAGNETISM

- Magnetism is the branch of physics concerned with magnetic phe nomenon.
- Magnetism is caused by the way atoms are arranged in materials.
- Materials can be divided broadly into three categories.
  - (i) Diamagnetic Substances
  - (ii) Paramagnetic Substances
  - (iii) Ferromagnetic Substances
- Diamagnetic substances are those substances which are repelled by a magnet. *e.g.* copper, lead, gold, zinc, tin, water, air, antimony.
- Para magnetic substances are attracted by a magnet very feebly, e.g., Aluminium, Chromium, Oxygen, Platinum.
- Ferromagnetic substances are attracted by magnets and can also be magnetised. *e.g.* Iron, Cobalt, Nickel, Gandolineum.
- Ferromagnetic substances behave just like paramagnetic materi als but the effect is much more intense.

ELECTROMAGNETIC INDUCTION

- It is a process in which an electromotive force (EMF) is set up in an electrical circuit by changing magnetic flux limbed with the circuit. If the circuit is closed, an electric current will flow.
- The magnitude of the EMF is proportional to the rate of change of flux. The direction of induced EMF is such that it opposes the change of flux which produces it.
- The law of induction was given by Faraday and the direction of induced EMF is given by Lenz's law.

SOME IMPORTANT FACTS ABOUT MAGNETISM

- The regions of strongest magnetisation near the ends of a mag net are called **poles** of the magnet.
- The distance between the two poles of a magnet is known as the **Effective length** of the magnet.
- An imaginary the bisecting the effective length of the magnet, at right angles to it, is called the **magnetic equator** of the magnet.
- Iron can be easily magnetised even by weak magnetic fields whereas steel needs strong magnetic fields.
- The induced magnetism acquired by iron is temporary, whereas the induced magnetism acquired by steel is more or less perma nent i.e., steel has greater retentivity and it has higher coercivity i.e., resistance to lose magnetism than iron.
- Magnetic materials which retain magnetism for considerable time are known as **hard materials** and those which lose magnetism easily are called **soft materials.**
- Iron is an example of a soft material while steel is a hard mate rial.
- A vertical plane passing through the magnetic axis of a freely sus pended magnet at rest is called the **magnetic meridian** of that place.

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- A vertical plane passing through the north-south direction at a place is known as the **geographical meridian** of that place.
- The angle between the magnetic meridian and the geographical meridian is known as the **Angle of declination**.
- The angle which the magnetic field due to the earth, makes with the horizontal at a place is known as **angle of dip** of that place.
- Angle of dip at places lying on the so-called magnetic equator is zero.
- The magnetism of the Earth is caused by the link between magnetism and electricity. The rapid spinning of the Earth creates electric currents in the molten core, which are responsible for the magnetic field around the earth.
- Repulsion, and not attraction, is the sure test for polarity of a magnet.
- Certain types of iron, which once magnetised retain their magnetism, are called **permanent magnets**.
- An insulated copper wire wounded on some cylindrical card board or plastic tube, such that its length is greater than its diameter and it behaves like a magnet when current is made to flow through it is called **solenoid**.
- A solenoid which has an iron core is called an **electromagnet**. Electromagnet is a temporary magent.
- Electromagnets are used :
  (i) in electrical appliances, such as electric bell, electric fan, electric relay, electric motor, electric generator etc, and
  (ii) for magnetic separation and for lifting heavy ferromagnetic loads.
- Rough handling, heating and hammering, demagnetising with other magnet and by using alternating current are some of the methods of **demagnetisation** of permanent magnet.
- Galvanometer is an instrument used for :
  (i) detecting the flow of current in an electric circuit,
  (ii) finding the direction of flow of current,
  (iii) measuring the strength of current,
  (iv) making measuring devices, such as voltmeter and ammeter.

BASIC ELECTRONICS

- The electrons, revolving in the outermost orbit of metals, which are weakly held by nucleus are called **free electrons**.
- The electrons emitted from the surface of metal, when heat energy is supplied to metal are called **Thermions**.
- Emission of electron from any metallic surface caused by heating is known as **Thermoionic Emission**.
- The minimum heat energy required to make a metal emit an electron (thermion) from its surface is called **threshold energy** or **work function**.

- Rate of emission of light electrons is directly proportional to intensity of falling radiation. The minimum frequency of radiation that required for emission of electrons is known as '**Threshold frequency**'.
- A good thermion emitter must have low work function and high melting point, e.g., tungsten, alkali metal oxides.
- A thermion emitter, which gets heated on the passage of electric current, and when its temperature become more than threshold temperature, it starts emitting electrons, is called **directly heated thermion emitter**, e.g., tungsten.
- A material, which itself does not get heated up on the passage of electric current, but when heated by some other source emits thermions is called **indirectly heated thermion emitter**, e.g., alkali metal oxides.
- An electronic device, which allows the electron to flow only in one particular direction is called **diode valve**.
- Diodes are used as half and full wave rectifiers.
- In 1904, Sir J.A. Fleming, an English physicist, invented first vaccum diode, called the Fleming's valve.
- This electronic device allows the electron to flow only in one direction.
- It is used as a rectifier i.e., it can convert AC into DC.
- Instead of obeying Ohm's law it works on Chield-Langumer law.
- Substance having number of valance or free electrons between conductor and insulator is called **semiconductor**. It is in-between conductor and insulators, e.g., Ge, Si, C, etc.

FACTS TO REMEMBER

- Germanium (Ge) and Silicon (Si)are pure (intrinsic) semiconductors.
- Integrated Circuit (IC) chips are made of Silicon.
- Einstein has described **photo electric effect**. Einstein photo electric equation :

$$\frac{1}{2}mv^2 = h\,(V - Vo)$$

- Good absorbers are good emitters.

ATOMIC AND NUCLEAR PHYSICS

- Rutherford first invented the nucleus.
- X rays are produced when high speed electrons are falling on tungsten.
- Radioactivity was discovered by 'Henry Becquerel.'
- α particles are doubly ionized helium atoms or helium nuclei.
- γ rays are electromagnetic radiation of very high energy thus its frequency is very low.
- γ rays are emitted with both α and β particles.

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- An element becomes radioactive when
  (i) its atomic number exceeds 82, and
  (ii) there is an imbalance of protons and neutrons as compared to normal stable atoms.
- The process by which a heavy radioactive nuclei is broken into light nuclei by the bombardment of slow neutron, so as to liberate energy and more neutrons than used for bombardment is called **nuclear fission**.
- **Chain reaction** is the phenomenon in which neutrons liberated during fission process lead to further fission of atoms, releasing a large amount of energy.
- If the fission process is carried out under controlled conditions, i.e., the neutron formed during fission are absorbed by the control rods made up of graphite and boron, then the energy so released can be utilised in producing steam which can be further used in running electric turbines.
- The process of combining lighter nuclei (atomic weight less than 20) into heavier nuclei is called **nuclear fusion**.
- To fuse hydrogen atoms, the minimum temperature required is 1000,000°C. It is for this particular high temperature, the fusion reaction are sometimes called **thermo-nuclear reaction**.
- The principle of nuclear fusion is used in Hydrogen bomb.
- Geiger counter is used for measuring radioactivity.
- The radiation which is omnipresent every where on the earth because of radioactive substances and cosmic ray particles are called **background radiation**.
- Radioactive property of carbon is used in carbon-14 dating to determine the age of fossils.
- **Half life :** It is the time after which the amount of radioactive element becomes half of the initial.

ELECTRICITY

- Electricity is the phenomenon associated with stationary or moving electrons, ions or other charged particles.
- The electricity produced by friction is called frictional electricity.
- If the charges in a body do not move, then the frictional electricity is known as static electricity.
- The electricity that travels along wires is called current electricity.
- An electric current is defined as an electric charge in motion. The unit of curent is **ampere** and it is measured with the help of instrument known as **ammeter.**
- The opposition or obstruction offered by a conductor to the passage of drifting electrons is called electric resistance. It's unit ohm.
- Resistance of conductor is directly proportional to its length.
- Resistance of conductor is inversely proportional to its area cross-section.

- Resistance of conductor depends upon the nature of conductor.
- Resistance of pure metals increases with the rise in temperature.
- Resistance of alloy, such as German silver, Constantan, Eureka manganin hardly changes with rise in temperature.
- Resistance of ionic compounds, carbon, vulcanised rubber decreases with rise in temperature.
- The resistance offered by the electrolyte of a cell is called internal resistance.
- Internal resistance of cell is inversely proportional to area of electrodes in contract with electrolyte.
- Internal resistance of cells directly proportional to distance between the electrodes of cell.
- Electric energy = Electric power × time in seconds. However, in commercial unit of energy, the time is kept in hour.
- Electric power (P) = Electric Current (I) × Electric potential (V)
  $P = V.I.$

FACTS TO REMEMBER

- Fuse is a safety device in an electrical circuit.
- It is the weakest point in an electrical circuit,which melts and breaks the electric circuit, when the circuit gets :
  (i) overloaded due to large withdraw of current,
  (ii) due to short-circuiting in the electric circuit,
  (iii) due to fluctuations of current in power supply system.
- Fuse wire has a low melting point, and high resistance.
- Earthing protects the user and the appliance from electric shock and burn out respectively.
- Household distribution of electricity is done in parallel, so that :
  (i) if there is short-circuit or overloading in one particular circuit, then only the fuse of that circuit will melt, but the power supply to other circuits is not affected.
  (ii) As the resistance due to appliances goes on increasing, the overall resistance of circuit decreases. Thus, more current flows in the various circuits depending upon the resistance of appliances. Hence, each appliance receives optimum amount of current, while potential difference at the ends of each appliance remains the same.
- Switches are always placed in live wire, so that an appliance is completely cut off from live wire in off position. Thus, a user will not receive any accidental shock.
- According to new international convention for colour coding of electric wires, **brown is for live wire**, **light blue for neutral wire** and **green or yellow for earth wire.**
- Nichrome and Manganin are the common alloys used for making heating elements of electric appliances, because they have good resistivity, high melting point, low thermal expansion and do not get oxidised till 1000°C.

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- In most of the cases, nichrome is used as heating element, e.g., in electric iron, electric heater, geyser etc.
- The heating element of heater becomes red hot, but not the connecting wires, because the resistance of connecting wires is extremely small as compared to the element. So, the heat produced in connecting coils is much less compared to that produced in element.
- The filament of electric bulb is made up of tungsten.
- The bulb is filled with a mixture of nitrogen and argon gases at very low pressure.

FARADAY'S LAW OF ELECTROLYSIS

1. During electrolysis, amount of the mass deposited on the electrode is directly proportional to the amount of electricity passes through it.
   $M \propto Q$
   $M = ZIT$
   where, M = amount of mass deposited
   Q = charge
   I = current
   T = time
   Z = electrochemical equivalent of element (ECE)
2. During electrolysis, the amount of different elements deposited from the same current is proportional to their electrochemical equivalent.

DIRECT CURRENT AND ALTERNATIVE CURRENT

- Direct Current or DC is that whose magnitude remains constant as a function of time. An Alternative Current or AC is that which varies in magnitude continuously and whose direction varies periodically.

ELECTRIC MOTOR

- When a current carrying rectangular conductor is placed in a magnetic field at right angles to it, the forces acting on the two parallel lengths will be equal and opposite thus constituting a couple. The conductor therefore rotate. This is the principle of electric motor. (The EM doesn't work on the principle of electro-magnetic induction)

DYNAMO

- It works on the reverse principle of the motor, i.e. Electro-magnetic induction.

TRANSFORMER

- Transformer is an electric device, by which the e.m.f. of an alternating current can be increased or decreased as per need of a particular situation. The relation between the o/p voltage and i/p voltage is

$$\frac{\text{Voltage in secondary}}{\text{Voltage in primary}} = \frac{\text{number of turns in secondary}}{\text{number of turns in primary}}$$

The current ratio is in the inverse proportion in the case of step-down transformer

$$\frac{\text{Current in secondary}}{\text{Current in primary}} = \frac{\text{number of turns in primary}}{\text{number of turns in secondary}}$$

COULUMB'S LAW

- Force of attraction or repulsion between two point charges is directly proportional to the product of thier magnitude of charges and inversely proportional to the square of the distance between them and acting in the direction of the line joining the points. In SI system

$$F = 9\times10^9 \frac{q_1 \times q_2}{r^2}$$

INTENSITY OF ELECTRIC FIELD

- The force experienced by a point charge of 1 coulumb in any electric field is called the intensity of the electric field the point. It is a vector quantity and its unit is
  Unit – N/C (NC^{-1})

$$F = 9\times10^9 \frac{q_1}{r^2} N/C$$

ELECTRIC POTENTIAL (V)

- It is defined as the amount of work done (W) in bringing a charge (qo) from infinity to any electric field.

$$V = \frac{W}{q_o} \text{ volt}$$

POTENTIAL DIFFERENCE

- The amount of work required in moving a charge of 1 Coulumb from a point to the another is called the potential difference between those points.

EFFECT OF TEMPERATURE UPON RESISTANCE

- In case of pure metal the resistance increases with increase in temperature and vice-versa. It is given by the relation $R_t = R_o (1+\alpha t$ (α = coefficient of thermal resistance)

ELECTRIC POWER

- The rate of loss of electric power in any electric circuit is calle the power (W)
- Power = current × voltage
- W = V × A
- Watt = volt × ampere

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OHM'S LAW

- The amount of electric current passes through any conductor is directly proportional to the potential difference between its both ends i.e. V = IR, (Unit = Ohm)
- Ice has the highest specific latent heat. So, compared to other matter, it requires higher amount of energy for melting. That's why;
  (i) Water bodies in cold countries do not freeze suddenly,
  (ii) Snow melts slowly on the mountains in the summers, due to which, there are no flash floods, and the rivers contain water for whole year,
  (iii) Soft drinks are cooled by ice rather than iced cold water.
- Boiling point of a liquid rises with presence of dissolved impurities.
- The phenomenon due to which, a liquid changes into its vapour state at any temperature, without the aid of any external source of heat is called evaporation. Evaporation is basically the internal property of liquid.

OPTICS

- Light is the physical cause which produces sensation of sight and makes the surrounding objects visible to us.
- Bodies which themselves emit light are called luminous objects. The luminous objects are usually hot. However, cold luminous objects also exist. The sun and the stars are examples of hot luminous objects, whereas, the light emitting diodes used in digital instruments are examples of cold luminous objects.
- Objects which do not emit light themselves are called non-luminous objects. They become visible to us only when the light reflected (or scattered) by them is able to enter our eyes.
- In a pin-hole camera, the image is always at focus, real, inverted and usually smaller than the object.
- If the size of the pin-hole is increased, the image becomes blurred.
- When the object is moved towards the pin-hole camera, the size of the image and its luminosity increases.
- When the screen is moved towards the pin-hole camera, the size of the image decreases but its luminosity increases.
- Reflection is the phenomenon whereby light, on striking a surface is thrown back into the same medium.
- An opaque body absorbs some of the light that falls on it and reflects the remaining light.
- A transparent body like glass or water transmits almost all the light through it and does not reflect any light.
- A smooth shining surface like a mirror reflects away almost all the light that falls on it.
- When rays shooting from a point object, after reflection or refraction, appear to converse at a second point, the second point is known as the real image of the first. A real image can be received on a screen as it is actually formed by the intersection of rays.

- When rays shooting from a point object, aften reflection or refraction, appear to diverge from a second point, the second point is said to be the virtual image of the first. A virtual image has no existence. Hence, it cannot be received on the screen.

MIRRORS

- The image formed by a plane mirror is erect, laterally inverted and virtual. Also, it has the same size as the object and is as far behind the mirror as the object is in front of it.
- A polished surface is visible only from that direction in which it reflects the light.
- In reflection from irregular surfaces, the object can be seen from all directions.
- A man can see the whole of his body in a mirror, the size of which is half of his own height.
- The minimum size of a plane mirror required to be fixed on the wall of a room so that an observer at the centre of the room can see the full image of the wall behind him is one-third the height of the wall behind the observer.
- A set of two parallel mirrors, therefore, produces theoretically an infinite number of images. However, in practice only a limited number of images are observed, since each successive image is fainter than the preceeding one.
- The total number of images formed by two plane mirrors inclined at right angles is 3.
- The portion of the mirror from where reflection actually takes place is known as Aperture.
- In a concave mirror, the image is always real except when the object is within the focal length. In the latter case, the image is virtual.
- In a convex mirror, irrespective of the position of the object, the image is always behind the mirror. It is always virtual and the image distance from the mirror is always less than the object's distance.
- The image formed by a concave mirror might be an enlarged or diminished one depending upon the position of the object. But in a convex mirror, the image is always a diminished one.
- A concave mirror is used as shaving mirror, Doctor's reflector, reflectors of search light, telescope etc.
- A convex mirror or a diverging mirror is used as driving mirror and street lamp reflector.

FACTS TO REMEMBER

- The phenomenon, due to which a ray of light deviates from its original path, while traveling from one optical medium to another optical medium is called Refraction.
- When a ray of light travels from optically rarer medium to optically denser medium, it always bends towards normal, drawn at the point of incidence.

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- When a ray of light travels from optically denser medium (glass or water) to optically rarer medium (air or vaccum), it always bends away from the normal, drawn at the point of incidence.
- When an incident ray strikes at right angles at the point of incidence, it suffers no refraction.
- The perpendicular shift in the path of incident ray,while emerging out from an optical slab is called lateral displacement.
- Because of **refraction** :
  (i) A stick appears bent and short when immersed obliquely in water. It also appears magnified because image is formed close to the eye.
  (ii) The bottom of a beaker filled with water appears raised. Swimming pool appears shallow when filled with water.
  (iii) Stars twinkle and appear higher in horizon than their actual positon.
  (iv) The Sun appears bigger during sunset or sunrise. Also, refraction is responsible for twilight and helps in increasing the length of the day.
- The phenomenon due to which a ray of light, while traveling from optically denser medium to optically rarer medium, gets reflected into the same medium at the surface of separation, is called total internal reflection.
- For total internal reflection :
  (i) rays of light must travel form optically denser medium to optically raer medium,
  (ii) the angle of incidence in optically denser medium, must be greater than critical angle.
- Angle of incidence in a denser medium for which angle of refraction in rarer medium is 90° is called Critical Angle.
- Sparkling of diamonds and formation of mirage take place due to total internal reflection.

LENSES

- A convex lens always forms real and inverted images, except it forms a virtual and erect image, when object is between optical centre and principal focus.
- A convex lens can be used as :
  (i) burning glass,
  (ii) objective lens for telescopes,
  (iii) erecting lens,
  (iv) objective lens for photogaphic camera,
  (v) objective lens for cinema projector,
  (vi) objective lens for search light,
  (vii) as a simple microscope and,
  (viii) for correcting long sightedness,
- A concave lens always forms virtual, erect and diminished image.

- A concave lens can be used as :
  (i) eye lens for Gellelio telescope, and
  (ii) correcting short sightedness.
- The power of lens is the measure of convergence or divergence produced by it and is measured in diopeters (D).
- If 'f' is the focal length in metres and 'p' is the power, then $p = \frac{1}{f}$
- The power of convex lens is considered positive and is denoted as +D.
- The power of concave lens is considered negative and is denoted as –D.
- If two or more than two lenses of power P_1, P_2 etc., are placed in contact with each other, then power 'P' of the combination is :
  $P = P_1 + P_2 + ...$ algebraic sum

FUNCTIONING OF THE CAMERA

- A photographic camera has different f-numbers marked on a ring. The f-numebr is adjusted according to intensity of light.
- In dim light f-number is kept higher and in bright light f-number is decreased so that film may not get over-exposed. The diaphragm helps in controlling the amount of light entering in camera.
- A shutter of variable speed is fixed behind the diaphragrm of the photographic camera to control the exposure time of film.
- The time of exposure is directly proportional to the square of f-number.
- The shutter is so constructed that automatically closes after a certain required time-interval.

HUMAN EYE

- In human eye, cornea, acts as window to the world, i.e., allows the light to enter the eye.
- In human eye, choroids darkens the eye from inside and hence prevents any internal reflection.
- The function of retina is to receive the optical image of an object and then convert it into optical pulses which are finally sent to brain through optic nerve.
- Yellow spot in the eye is responsible for forming an extremely clear image. When we want to examine an object very minutely, the image of object is brought to focus at this point.
- Crystalline lens of the eye focuses images of objects at different distances clearly on the retina.
- Ciliary muscles alter the focal length of crystalline lens, so that images of objects at various distances are clearly focused on retina.
- Iris of the eye controls the amount of light entering into the eye. It acts like the adjustable diaphragm of the camera.
- Eye-lids of human eye act as the shutter in front of camera to restrict light.

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LIGHT AND COLOUR

- The electromagnetic radiations which can excite our retina have wave length between 8000Å (Angstron Unit) to 4000Å.
- In a wave-band 'VIBGYOR' wavelength go on increasing from vio. let towards red.
- Colour is a sensation produced in the brain due to the excitation of retina, by an electromagnetc wave, of some particular wave length.
- A light, which is a mixture of several colours is called polychromatic light. White light is a polychromatic light and has all the seven wave-bands present in it.
- The phenomenon due to which a polychromatic light splits into component colours, when passed through a prism, is called Dispersion.
- The angle through which light of a particular wave length can deviate, while passing through prism, is called refrangility.
- The refrangility for red light is least, whereas that of the violet light is maximum.
- As the velocity of light is least in case of violet and maximum in case of red in the glass, therefore, refractive index of red colour in glass is less than violet colour.
- The colour of an opaque object depends upon the wave bands it absorbs, reflects or transmits when white light is incident on it. If an object reflects all the colours, it appears white. If it absorbs all the colours, it appears black.
- The colour of the transparent object in white light depends upon:
  (i) colours of white light being absorbed, and
  (ii) colours of white light being transmitted.
- A green glass will absorb all the colours of white light but transmits only green.
- The colour of an opaque object in coloured light depends upon pigment present in the object. It is the pigment, which selectively absorbs or reflects coloured light falling on it.
- When a green light is incident on red opaque object, the red pigment will absorb green light and reflects none. Thus, the object appears dark.
- When blue light is incident on blue opaque object, the blue pigment will reflect the blue light and hence object appears blue.
- When yellow light is incident on white opaque object, the yellow light is reflected, because there is no pigment in white object. Thus object appears yellow.
- The colour of a transparent object in coloured light depends upon the pigment present in transparent object and the light absorbed or transmitted by it.
- A red object will appear black through blue glass, because red light coming from it absorbed by blue glass.
- A yellow flower will appear yellow through yellow glass because yellow light coming from object is transmitted by yellow glass.

- Red, blue and green are primary colours.
- Cyan, yellow and magenta form primary pigments.
- The regions of spectrum which do not excite retina and hence are not visible are collectively called Invisible spectrum. Infra-red and ultra-violet radiations are parts of it.
- The electromagnetic radiations beyond red end of visible spectrum are called infra-red radiations.
- The wave length of infra-red spectrum extends from 8000×10^{-10} m to $4,00,000 \times 10^{-10}$ m.
- White hot sources of light, such as sun, arc lamp, bruning gases or any other material are best-suited for producing infra-red radiations of higher intensity. However, all living beings, animals, plants or humans are infra-red emitters.
- Infra-red rays produce heating effect, therefore, they are used by the doctors for therapeutic purposes.
- Infra-red radiations have a very long wave length, so they do not easily get scattered in fog or smoke. Thus, they can be used for taking infra-red photographs with suitable photographic plates and filters in foggy weather.
- Since all objects are the emitters of infra-red radiations, therefore, specially prepared devices, i.e., night-vision devices can see the objects in darkness by receiving the infra-red radiations.
- Infra-red radiations are used in surface to air mssiles for tracking and destroying enemy planes. The on-board sensor of infra-red radiations in the nose of missile detects the heat trail left by enemy plane to locate its position.
- By measuring infra-red or heat radiations from crops via satelite we can find any change in the heat radiation pattern. This change generally indicates some disease.
- Laws of reflection and refraction are valid for invisible spectrum too.
- The region of spectrum which extends beyond violet colour of visible spectrum is called ultra-violet spectrum.
- Any source of light at temperature of more than 2500°C is a good source of ultra-violet radiation. Electric sparks, electric arc lamp, mercury vapour lamps. and sun-light are good sources of UV-radiations.
- The range of UV-radiations is between 4000Å to 100Å.
- UV-radiations produce flourescence in substances like zinc sulphide, barium sulphide, barium platinocyanide and quinine sulphate solution.
- UV-radiations produce chemical effect in silver salts.
- UV-radiations are absorbed by atmosphere and convert oxygen to ozone.
- UV-radiations can be detected by fluorescence.
- Fluorescence is the phenomenon, where a substance absorbs an incident light of smaller wave length and then reflects a light of longer wave legnth.

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- UV-radiations when absorbed by skin, stimulate the body to produce vitamin D, which is very good for growth of strong bones and teeth.

ACOUSTICS

- The scientific study of sound and sound waves is termed as Acoustics.
- The unit of measurement of the intensity of sound is decibel (dB).
- The average range of audible frequencies to which the human ear responds is usually between 20 Hz to 20,000 Hz.
- The safe range of audible sound is 0-120 dB.
- Vibrations at frequencies beyond 20,000 Hz are too fast for the human ear to respond. These vibrations are called ultrasonic vibrations. Infants, dogs and certain fishes are able to respond to these vibrations.
- Vibrations at frequencies below 20 Hz are too slow for the human ear to respond and they are called infrasonic vibrations. Such vibrations are produced during earthquakes.

SOUND AND WAVE MOTION

- Sound is a wave and requires a material medium for transmission.
- A transverse wave is one in which the motion of the individual particles of the medium takes place at right angles to the direction of propagation of the wave.
- Transverse waves can be generated in solids and liquids but not in gases.
- A longitudinal wave is the one in which the motion of individual particles of the medium takes place in the direction of propagation of the wave, resulting in the formation of alternate compressions and rarefactions.
- Longitudinal waves can be produced in solids, liquids and gases.
- Light waves are transverse in nature, while sound waves are longitudinal waves.
- The speed of sound is independent of loudness, provided the amplitude is not very large.
- The velocity of sound is independent of pressure.
- Sound travels faster in warm air. As the velocity of sound in air is 332 m/s at 0°C, its velocity at θ^0C is given by $C = 332 + 0.61\,\theta$.
- The presence of water vapour lowers the density of air, consequently the velocity of sound in humid air increases.
- The velocity of sound increases if the wind is blowing in the direction of sound wave propagation and vice-versa.
- Sounds of all frequencies travel with the same speed.
- Speed of sound is more in water than in air and still more in solids.
- The phenomenon due to which repetition of sound is heard, after reflection from distant obejct (such as high building or hillock) after the original sound from a given source dies off is called 'Echo'.

- Resonance is defined as a phenomenon when the frequency of applied external force is equal to the natural frequency of the body on which force is applied, such that it readily takes up the vibrations and begins to vibrate with an increased amplitude.
- Tuning forks are often mounted on sound boxes.The size and amount of air enclosed in the sound box is so adjusted that its natural frequency matches with the frequency of the tuning fork, and hence a loud sound is produced due to resonance.
- Soldiers are often asked to break their steps while crossing a bridge. This precaution is taken to prevent any sudden collapse of the bridge, due to matching of the natural frequency of the bridge with that of the impressed force due to the marching of soldiers.
- Pitch is the characteristic of musical sound, which enables us to differentiate between two sounds of equal loudness, coming from different frequencies.
- The higher the freqeuncy of a note, the higher is its pitch or the shriller is its note.
- The rate of flow of sound energy per unit is called intensity of sound. The rate of flow of sound energy per unit area and its effect on the ear collectively is called loudness of sound.
- The property by which two notes of the same frequency and same loudness can be distinguished from each other, because of the difference in wave forms is called quality of timbre.
- A wave form which travels at a constant speed of 3×10^8 m/s and is unaffected by electric or magnetic fields, such that it needs no material for its propagation is called electromagnetic wave.
- Light waves are transverse electromagnetic waves.
- Radio waves, television waves, microwaves, infra–red rays, visible light, ultra–violet rays, x-rays and gamma rays are major parts of electromagnetic spectrum in the order of decreasing wavelength or increasing frequency.
- Radio waves, TV-waves and micro-waves are produced by oscillating circuits in special vaccum tubes.
- Infra-red rays, visible radiation and ultra-violet rays are produced by the excitation of outer electronic shell in increasing order.
- X-rays are produced by the excitation of inner electrons of an atom and sudden destruction of high energy free electrons.
- Gamma radiation are produced by the nucleus of an atom, by the sudden destructions of high energy particles. They find use in the cure of cancer.

SOME CONVERSION FACTORS

- **Mass and Density**

$1\ kg = 1000\ g = 6.02 \times 10^{26}\ u$

$1\ slug = 14.6\ kg$

$1\ u = 1.66 \times 10^{-27}\ kg$

$1\ kg/m3 = 10–3\ g/cm^3$

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➢ **Length and Volume**

1 m = 100 cm = 39.4 inch = 3.28 ft.
1 mile = 1.61 km = 5280 ft.
1 inch = 2.54 cm
1 nm = 10^{-9} m = 10A
1 pm = 10^{-12} m = 1000 fm
1 light year = 9.46×10^{12}m
1 m^3 = 1000 L = 35.3 ft^3 = 264 gal

➢ **Time**

1 d = 86400 s

$1\ Y = 365\frac{1}{4}\ d = 3.16 \times 10^7\ s$

➢ **Angular Measure**

1 rad = 57.3° = 0.159 rev

π rad = 180° = $\frac{1}{2}$ rev

➢ **Speed**

1 m/s = 3.28 ft/s = 2.24 mi/h
1 km/h = 0.621 mi/h = 0.278 m/s

➢ **Force and Pressure**

1 N = 10^5 dyne = 0.225 *lb*
1 lb = 4.45 N
1 ton = 2000 *lb*
1 Pa = 1 N/m^2 = 10 dyne/cm^2
= 1.45×10^{-4} *lb*/$inch^2$
1 atm = 1.01 × 105 Pa = 14.7 lb/$inch^2$
= 76 cm–Hg

➢ **Energy and Power**

1 J = 10^7 erg = 0.239 cal = 0.738 ft. lb
1 kW.h = 3.6×10^6 J
1 cal = 4.19 J
1 eV = 1.60×10^{-19} J
1 Horsepower = 746 W = 550 ft. lb/s

➢ **Magnetism**

1 T = 1 Wb/m^2 = 10^4 gauss

FACTS TO REMEMBER

➢ Speed of light is maximum in vacuum.
➢ Longitudinal waves can't be polarized.
➢ Rainbow are always formed in direction opposite to the sun.
➢ The frequency of visible light varies between 400 nm to 700 nm.
➢ Colour blindness was first discovered by Horner (1976).

➢ Focal distance of lens is maximum for red-light and minimum for violet light
➢ 3-D image is known as hologram.
➢ If a transparent material is invisible in any liquid, then both of them have the same refractive index.
➢ Magnifying glass is convex lens of small focal length.
➢ If two mirrors are at an angle of 75° then the number of images is 5.
➢ Human eyes have convex lens.
➢ Raman effect is related to scattering.
➢ Optical fibers works on the principle of total internal reflection.
➢ Hypo or radium thiosulphate is used for fusing in photography.
➢ Power of sunglass is zero.
➢ Heat energy are transmitted as infra–red rays.
➢ The first use of telescope for research was by **Galeleo Galilie of Italy** in 1609.
➢ Power measures the degree of divergence or convergence and is measured in diopetres.
➢ Negative sign denotes divergence or a concave lens.
➢ Positive sign is for convergence or a convex lens.
➢ Air bubble in water behaves as concave lens.
➢ As temperature of medium increases, its refractive index increase.
➢ Refractive index of a material is independent of angle of incidence.
➢ The angle of deviation in refractions is given by d = (i – r),i = angle of incidence and r = angle of refraction.
➢ 100°C = 212°F = 373 K = 80 R.
➢ Bolometer is used for detection of infra–red rays.
➢ Specific heat of water is 1.0 calorie/gm–^{0}C.
➢ Two thinner blankets are more warmer than a single blanket equal to their width.
➢ Colour cloths are good absorber of heat.
➢ Ammonia is used as a coolant in regrigerator.
➢ If there is a relative motion between the source and the observer, then the frequency of sound heard by the observer might be different from the frequency of the source. (Doppler's effect).
➢ Echo forms due to reflection of sound.
➢ When two sound sources of nearly same frequency are played together, then beats occur.
➢ Number of beats per sound equal to difference between the frequencies of sources.
➢ The frequency of sound produced by supersonic engines are above audible range.
➢ The same note from 'Sitar' and 'Veena' have different quality.
➢ There is a coating of iron oxide on tape used in tapere-corder.
➢ The pitch of sound depends upon the frequency. If n is the frequency of open organ pipe and we close an end of the organ pipe, then the frequency will be n/2

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- At room temperature velocity of sound is 330ms^{-1}.
- There is no change in velocity, wavelength and frequency of refractive wave.
- Audible frequency ranges from 20Hz to 20,000 Hz.
- There is no change in frequency of sound when it changes medium but its velocity, direction and intensity will be changed.
- The direction of wave is independent of velocity, wavelength and frequency.
- The velocity of sound is increased with increasing density of the medium.
- Sensation of sound is for 1/10 second.
- Receiver of telephone converts electrical energy into sound energy.
- Wave is formed by repeated vibrations of particles of medium in which the wave is formed.
- Pulse is a wave set up by single disturbance of short duration.
- The change in frequency due to Doppler's effect is dependent on the velocities of observer and source.
- A stationary wave is characterised by the appearance of nodes and antinodes.
- There is a decrease of 2 in atomic number and decrease of 4 in mass number after emission of an α particle.
- There is an increase of 1 in atomic number after emission of a β particle.
- There is no effect of γ radiation upon atomic as well as mass number.
- Neutron was discovered by Chadwick.
- Carbon dating is used in determining age of fossils.
- Atomic mass unit (amu) is equal to $\frac{1}{12}$ of the mass of $_6C^{12}$.

  1 amu = 1.6×10^{-27} kg

  1 amu = 931 MeV
- Binding energy is the amount of energy required to separate each nucleons from the nucleus.
- In nuclear fission, a greater nuclei is broken into smaller nuclei and there is a huge amount of energy released. Atom Bomb works on nuclear fission.
- When two or more smaller nuclei are jointed together to form a large nuclei, the process is called nuclear fusion. A great amount of energy is released. Hydrogen bomb works on principle of nuclear fusion. Nuclear fusion is the source of the Sun's energy.
- Cadmium is a good absorber of neutrons, used as controller in atomic reaction.
- Nuclear reactor is used for controlled chain reaction.
- Heavy water, Graphite or Berilium oxide are used as moderator in nuclear reactor. (D_2O : heavy water).

- Polonium is first human made element.
- Mass of neutron is slightly greater than that of proton.
- Elements having atomic number greater than 83 must be radioactive.
- Cobalt-60 is normally used in radiation therapy.
- Before X-ray, Barium is given to the patient because Barium is good absorber of X-ray radiation.
- X-rays is used for determining structure of crystals.
- The unit of Plank's is J/S.
- Proton is ionized hydrogen atom.
- Cryogenic engine is used in space shuttle.
- Titanium is known as metal of future.
- Uranium oxide is known as yellow cake.
- Tritium is radioactive isotopes of Hydrogen.
- Tuning of radio is an example of resonance.
- Cobalt-60 is used in Leukemia treatment.
- Cybernetics is study of communication between human and machine.
- The filament of Halogen lamp is made of tungsten–iodine mixture.
- Ceramic is used in Super–conductivity.
- A transformer which increases the applied e.m.f. of an alternating current is called **Step–up transformer.**
- A transformer, which decreases applied e.m.f. of alternating current is called **step-down transformer.**
- A device which convert mechanical energy into electric energy is called **dynamo.** However, if it produces a fairly large amount of power, it is called **Generator.**
- Generator is based on the principle of electromagnetic induction.
- In generator, **armature** consists of laminated soft iron core, from the centre of which passes a steel axle.
- **Slip rings** of generator are made of gun metal.
- **Brushes** of generator are made out of carbon or gun metal.
- Coulumb is the unit of electric charge (coulumb = ampere/second).
- 1 coulumb = 6.25×10^{18} electron.
- Magnetic effect of electric current was discovered by Weston.
- Ammeter is used in DC as well as in AC.
- Resistance of Ammeter is very low.
- Resistance of Voltmeter is very high.
- Volmeter measures potential difference between two points.
- A parallel combination of a galvanometer and a small resistance is equivalent to an ammeter.
- A series combination of a galvanometer and a high resistance is equivalent to a voltmeter.
- Ammeter is always connected in series while voltmeter is always connected in parallel.

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- Electron volt is the unit of energy.
  1 ev = 1.6×10^{-19}J
- Watt is the unit of electric power, watt = volt × ampere = $\frac{\text{volt}}{\text{ohm}}$
  Kilowatt hour (KWH) is also the unit of electric power
  1 KWH = 3.6×10^{6}J
- The resistance of low power (watt) bulb is high.
- Filament of electric bulb is of Tungsten.
- Wire of electric heater is made of nichrome.
- Fuse wire is made up of lead and tin.
- Transformers work on the principle of electromagnetic induction.
- A step-up transformer can convert low voltage, high frequency AC to high voltage, low frequency AC.
- A step-low transformer converts high voltage, low frequency AC to low voltage, high frequency AC.
- Transformer works on AC only.
- Transformation ratio of step-up transformer is always greater than 1.
- Ohm-meter is the unit of specific resistance.
- Lead is used in storage battery.
- Sliver is the best conductor of electricity.
- Heating effect of current doesn't depend upon the direction of current.
- AC can't be used in electroplating.
- Soft iron is used in electric magnet.
- For preventing formation of eddy currents, laminated cores are used in transformer.
- Electric current is a continuous flow of electron.
- Capacity of battery is shown in 'Ampere-hour'.
- Chemical energy is stored in battery.
- Specific resistance of any conductor depends upon material of conductor and temperature.
- Dilute HCl is used in car battery.
- AC is not suitable for charging of storage battery.
- With increase in temperature there is decrease in resistance of Carbon, Silicon and Platinum.
- Muscovite is a common separator in electrical industries.
- Dry cell is primary cell.
- Cadmium cell is called standard cell.
- The frequency of AC mains in India is 50HZ.
- The voltage difference of AC mains is 230V.
- The resistance of Mercury is zero at 4K.
- Copper is the most suitable for electric wire, because it has maximum number of free electrons.

- Candalescent of tube-light is always greater than that of electric bulb of the same power
  1 KW = 1.34 HP
- Mica is a common insulator in electric industries.
- Fluorine is often added to toothpaste in the form of fluoride ions.
- Both fluorine and chlorine are added to water supplies for their germicidal properties.
- Rhodium is the rarest metal.
- Helium has the lowest boiling point of any element.
- Osmium is the densest element.
- Tungsten has the highest boiling point of all the elements. Hence, it is used for filaments in electric bulbs.
- Cesium is used in atomic clocks.
- Pure silicon is a semi-conductor and is used in electronic devices as the base for minute integrated circuits (ICs).
- Mercury is the only metal which is liquid at room temperature. It is very poisonous and affects mental health.
- 1 meter distance is equal to the length of 1,650,763.73 wavelength of pure orange lights emitted from Kr-86.
- If a body is dropped vertically down, and another is projected horizontally then both will reach the ground simultaneously but with different velocity.
- The ratio to distance traveled in 1st, 2nd, and 3rd seconds of freely falling body is 1:3:5.
- The ratio of maximum height reached by different bodies projected upwards with different velocity $\mu_1:\mu_2:\mu_3$ is equal to $\mu_1^2:\mu_2^2:\mu_3^2$.
- If a body is dropped from top of a tower of height h and another body is thrown up simultaneously with velocity u from the foot of the tower, then both of them would meet after time h/u.
- Choke coil works on principle of electro magnetic induction.
- If a person projected a ball outside from a moving car, then the path of the ball is a straight line for the person sitting in the car, but it should be a parabola for an observer on the ground.
- Retro-rocket is used for deceleration of rocket in space.
- The shape of rain drop is spherical due to surface tension.
- Goniometer is used in determining angle of crystals.
- Lactometer is used to determining purity of milk.
- The height of mercury column in barometer is independent of the diameter of glass-tube containing mercury.
- The frequency of second pendulum is 2s.
- Clouds are flying due to their least density and viscosity of air.
- Viscosity of gases increases with increase in temperature.
- The force of attraction between atoms of the same material is called cohesive force.
- The force of attraction between atoms of different material is called adhesive force.

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CHEMISTRY

INTRODUCTION

Chemistry is the branch of science concerned with the composition, properties, characteristics and reactions of substances. Chemistry, in our day to day lives, is associated with almost each and every task our body performs. In industry and production also chemistry is playing an important role. Chemistry is divided into various branches–**Inorganic Chemistry** is associated with the properties of compounds of the chemical elements contained in minerals. **Organic Chemistry** is concerned with the compounds of Carbon. **Biochemistry** is concerned with the carbon compounds found in living organisms. **Electrochemistry** deals with the relation between electricity and chemical change. **Geochemistry** is mainly associated with the chemical composition of rocks and minerals.

STATES OF MATTER

- Anything that occupies space and has mass or weight is called Matter.
- Matter undergoes changes which may be either chemical changes or physical changes.
- All matters exist in one of the three forms or states: solid, liquid and gas.
- The three states of matter are interconversible.

$$\text{SOLID} \underset{\text{cool}}{\overset{\text{heat}}{\rightleftharpoons}} \text{LIQUID} \underset{\text{cool}}{\overset{\text{heat}}{\rightleftharpoons}} \text{GAS}$$

KINETIC THEORY OF MATTER

- All matters are composed of small particles (molecules, atoms, ions).
- The particles are in continuous, never-ending motion. The higher the temperature, the faster is the motion, as thermal energy is converted into kinetic energy.
- The particles attract one another with a force which decreases with the increasing distance between them.

CHARACTERISTICS OF MATTER

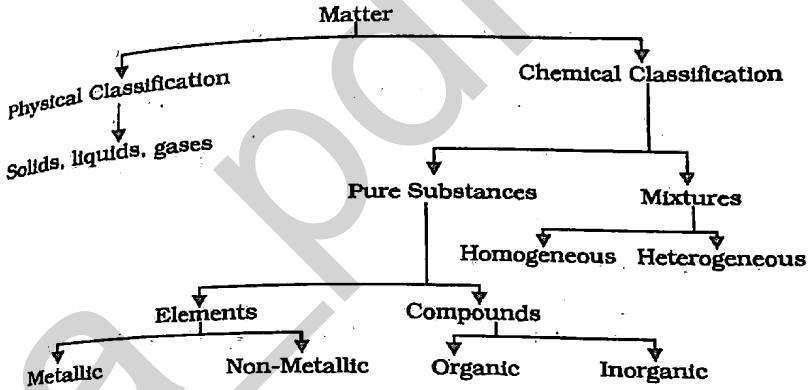
- In a solid, the particles are packed closely together, so inter-particle attractive force is very high.
- Inter–particle force is weak in liquids, so they are able to flow.
- This force is negligible in gases. so they are able to wander about.

CHANGES IN STATES OF MATTER

- Heating increases the kinetic energy and consequently motion of the particles and the rigid structure of the solid is lost.
- Further heating leads to escaping of the particles from the surface.

- When heat is removed from a gas (vapour) the kinetic energy of the particles is reduced and they become slower and thus come nearer. This leads to increase in inter-particle attractive forces and thus condensation and finally freezing.
- Sublimation occurs, where the attractive forces between the particles are low.

CLASSIFICATION OF MATTER



ELEMENTS

- An element is a pure substance that is composed of only one kind of atoms.
- An element cannot be composed from or decomposed into simpler substance by a physical or chemical change.
  Examples : Aluminium (Al), Hydrogen (H), Iron (Fe) etc.
- Metals are characterised by :
- Metallic lusture
- Good thermal and electrical conductivity
- Ductility (can be drawn into wires)
- Malleability (can be beaten into sheets) e.g.–Iron, Aluminium
- Non-metals are characterised by absence of above properties. e.g. Iodine, Chlorine etc.
- Metalloids are elements which exhibit properties midway between those of metals and non-metals, e.g., Arsenic, Antimony.
- Except Mercury, all metals are solid at ordinary temperatures.
- Except Bromine, all non-metals are gases or solids under ordinary conditions.

COMPOUNDS

- Compound is a pure substance that is composed of two or more elements chemically combined in definite and constant proportions. e.g. water (H_2O), Sodium Chloride (NaCl) etc.
- The separation of a compound into its elements by chemical means is called Analysis.

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- The formation of a compound by the union of elements is called Synthesis.

MIXTURES

- A mixture is matter composed by two or more substances (elements, compounds or both) in variable proportions in which each of its components still exhibit its own characteristics and properties.
- Mixtures can be heterogeneous i.e. non uniform, or homogeneous, i.e. the same throughout.
- Homogeneous mixtures have the same composition throughout the sample e.g. salt solution.
- Heterogeneous mixture consists of two or more parts which have different compositions.

PROPERTIES OF GASES AND GAS LAWS

Kinetik-Molecular theory of Gases

- Gases consist of molecules widely separated in space. The total volume of the molecules is negligible compared to the volume of the gas as a whole.
- Each molecule in a gas is in a continuous, very rapid, straight-line motion. The moving gas molecules frequently collide elastically with one another and with the walls of the container.
- The total kinetic energy of the gas remains unchanged during collisions.
- Inter–molecular attractive force is negligible in the gases.
- The average kinetic energy of the gas molecules is proportional to the absolute temperature.
- At a given temperature, all gases have the same kinetic energy.

Boyle's Law

- The volume (V) of a given mass of a dry gas is inversely proportional to the pressure (P), if the temperature remains constant i.e., $P\alpha \frac{1}{V}$

Charle's Law

- At constant pressure, the volume (V) of given mass of gas is directly proportional to the absolute (Kelvin) temperature (T) i.e. $V \propto T$.
- Kelvin temperature = Celsius temperature + 273 e.g., 27°C = (273+27) K = 300 K
- **STP:** By convention standard temperature and pressure conditions (STP) for volumes of gases have been accepted as 0°C (or 273K) and 1 atmosphere pressure (760mm Hg).

- ***Ideal Gas Equation :***

$\frac{PV}{T}$ = Constant, or $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Where, P_1, V_1, T_1 are the original pressure, volume and temperature respectively and P_2, V_2, T_2 are changed ones. It is used for calculating the change in volume of gases, when both temperature and pressure change.

Avagadro's Hypothesis

- Under the same conditions of temperature and pressure, equal volumes of all gases contain the same number of molecules.
- This number 6.023×10^{23} is called Avagadro's constant.

ATOMIC STRUCTURE

- An atom consists of a small positively charged heavy nucleus with negatively charged light electrons revolving round the nucleus in circular orbits.
- The nucleus contains protons and neutrons.
- Proton is a positively charged particle having an absolute charge of 1.6×10^{-19} coloumbs.
- Electron is a negatively charged particle having an absolute charge of 1.6×10^{-19} coloumbs.
- Neutron is an uncharged or neutral particle.

Symbols of some Important Particles

Particle	Symbol	Atomic No.	Mass No.
Alpha (α) particle	$^{4}_{2}He$	2	4
Beta(β) particle	$^{0}_{-1}e$	-1	0
Proton	$^{1}_{1}H$	1	1
Neutron	$^{1}_{0}n$	0	1
Gamma ray (γ)	$^{0}_{0}\gamma$	0	0
Deutron	$^{2}_{1}H$	1	2
Positron	$^{0}_{1}e$	1	0
Neutrino	$^{0}_{0}\upsilon$	0	0

FACTS TO REMEMBER

- Nucleus, consisting of protons and neutrons accounts for the whole mass of the atom.
- Extra-nuclear part is occupied by electrons orbiting in fixed energy levels.
- Having equal number of protons and electorns, atom as a whole is neutral.
- Mass number (A) is the number of protons plus the number of neurtrons in the nucleus, also called atomic mass.

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- Atomic number (Z) is a number equal to the number of protons in the nucleis.
- Element (Y) is represented as : ${}_{Z}Y^{A}$ e.g. ${}_{1}H^{2}$ represents hydrogen (H) with atomic mass = 2 and atomic number =1
- Electronic configuration is the manner in which electrons arrange themselves in the various orbits.

SOME PRINCIPLES

- *Heisenberg's uncertainly principle :* It is not possible to determine simultaneously the position and the momentum of a body to an arbitrary accuracy.
- *Pauli's exclusion principle :* No two electrons in an atom can have the same set of 4 quantum numbers.
- *Hund's rule :* Pairing of electrons in degenerate orbitals belonging to a particular sub-shell does not take place till each orbital is occupied by a single electron with parallel spin.
- *Aufbau's principle :* In the ground state of an atom and electron enters the orbital of lowest energy first any subsequent electrons are filled in order of increasing energies.

ISOTOPES

- **Isotopes** are atoms of the same element having the same atomic number, but different atomic weights or mass numbers. e.g. Protium (${}_{1}H^{1}$), Deuterium (${}_{1}H^{2}$), Tritium (${}_{1}H^{3}$) are isotopes of hydrogen. ${}_{6}C^{12}$ and ${}_{6}C^{13}$ are isotopes of carbon.

ISOBARS

- **Isobars** are atoms of two elements having the same mass number, though different atomic number, e.g. both Argon (Ar) and Calcium (Ca) have mass number = 40, C-14 and Nitrogen have mass number = 14

ISOTONES

- **Isotones** are atoms with different atomic number and mass number, but having same number of neutrons.

PERIODIC TABLE OF ELEMENTS

- Periodic table is the arrangement of elements according to some recurring property.
- Total number of known elements is 109, of which 92 are naturally occurring elements and others are artificially prepared in laboratories.
- Mendeleev's periodic table, based upon Atomic Weights was the first really successful arrangements of elements.
- Modern periodic table or the extended form or long form of the periodic table is based upon Atomic Number.

Groups

- Vertical columns of the table are called groups.
- Group-number is assigned to an element depending upon the number of valence electrons present in the atom of the element.
- There are 8 main groups and 18 vertical columns representing the various sub-groups, out of these,
- 14 columns represent 14 sub-groups of the first seven groups,
- 3 columns for the elements of group VIII,
- 1 column for the zero group elements,
- *Group 1 A:* Alkali metals,
- *Group II A:* Alkaline earth metals,
- Group VII A : Halogens,
- *Zero* Group: Noble gases,
- All Group B-elements: Transition metals, because their chemical properties are between those of elements in Group II and Group III.

Periods

- Horizontal rows are called periods.
- There are 7 periods in the table, each beginning with an alkali metal on the left and ending with a noble gas on the right [exception 1st and 7th period].

Periodic Properties

- Atomic radii is the distance between the nucleus and the valency shell of the atom.
- Ionisation (energy) potential is the amount of energy required to remove one or more electrons from the valency shell of an isolated gaseous atom.
- Electron Affinity is the amount of energy released on adding one or more electrons to the valence shell of an isolated gaseous atom.
- Electronegativity is the tendency of an atom to attract electrons to itself when combined in a compound.
- An element is considered as a metal, if it loses electrons when supplied with energy. When an element gains electrons, it is considered as non–metal.

CHEMICAL BONDING

- Chemical bonds are formed as a result of loss, gain or sharing of electrons between the atom of reacting elements.
- Atoms tend to combine together to change from an unstable form with an incomplete outer shell to a more stable form having.
- 2 electrons in the first and outer–most shell, e.g., Helium
- Or, 8 electrons in the outer–most shell, e.g., inert gases other than helium.

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- The linkage which actually holds the atoms together within the molecule is called a chemical bond.
- Cation is the positively charged particle formed by loss of an electron. e.g. Na^+
- Anion is the negatively charged particle formed by gain of an electron. e.g. cl^-
- Valence e.g. electron is the number of electrons present in the outer-most shell of an atom.
- Valency of an element is the number of electrons lost, gained or shared by one atom of the element during the course of chemical reaction.
- Electropositive nature is the tendency of an atom to lose electrons and form cations. e.g. Metals like sodium, potassium etc.
- Electro negative natrue is the tendency of an atom to gain electrons and become anion e.g. Non-metals like hydrogen, carbon, chlorine etc.,
- Electrovalent or ionic bond is the bond formed by transfer of one or more electrons, from the atom of an electropositive elements to the atom of an electronegative element, e.g., NaCl, $MgCl_2$,CaO.
- Covalent bond is the chemical bond formed between two combining atoms by mutual sharing of one or more electron of atoms of non–metallic element, e.g. H_2O, NH_3,HCl etc.
- A bond is polar, if the charge is unevenly spread over the bond and Non-Polar, if charge is even spread.
- Coordinate bond is a type of covalent bond in which only one of the atoms contributes both the electrons of the shared electron pair, e.g. H_2SO_4,NH_4.
- Hydrogen bond is an electrostatic force between covalently bonded hydrogen atom of one molecule and an electronegative atom (such as, Fluorine (F), Oxygen (O), Nitrogen (N) of another molecule)
- Hydrogen bond is responsible for exceptionally high melting and boiling points of water (H_2O). Ammonia (NH_3) and Hydrogen fluoride (HF).
- Van der Waal's bond is the force of attraction between neighbouring atom because of their different dipoles induced by instantaneous unsymmetrical distribution of electrons in the atom. It is responsible for condensation of inert elements, and gases, like H_2,N_2,O_2, Methane etc.
- Metallic bond is the attractive force between mobile electrons and the metallic Kernels, e.g. Gold, Silver, Copper etc.

CHEMICAL REACTION AND CHEMICAL EQUATIONS

- A chemical change is also termed as a chemical reaction.
- In combination reaction, a single new substance is formed by the union of two or more substances.

- In decomposition reaction, a substance breaks up into smaller, simpler substances.
- In displacement reaction, one element displaces another element from a compound and takes its place.
- A reaction, in which the constituents of two compounds mutually exchange their radicals to form two different compounds, is called a Double Displacement reaction. Its subtypes are:

1. **Precipitation reaction** in which two compounds in their aqueous state react to form an insoluble residue, called precipitate.
2. **Neutralisation reaction,** in which acids and bases mix and exchange their radicals to form salt and water.

- In redox reactions oxidation and reduction take place simultaneously.
- Oxidation is the process in which a substance loses electrons.
- Oxidation is also described as a process involving addition of oxygen, or removal of hydrogen.
- Reduction is the process involving gain of electrons.
- Reduction is also identified with removal of oxygen, or addition of hydrogen.
- Oxidising agent is a substance that brings about oxidation, e.g.; Oxygen, Chlorine, Concentrated sulphuric acid, Concentrated and dilute Nitric acid.
- Reducing agent is a substance that brings about reduction e.g.; Hydrogen, Carbon monoxide, Carbon, Ammonia, Coke, Charcoal, Hydrogen sulphide and sulphur oxides.
- Oxidation number is a charge assigned to an atom of a compound or of an ion according to some arbitrary rules.
- Energy is needed to break chemical bonds and energy is released when bonds are formed.
- Study of these energy changes is called Thermodynamics.
- *Exothermic reaction:* Heat is evolved
- *Endothermic reaction:* Heat is absorbed
- *Photochemical reaction:* Light is required
- *Chemiluminiscent reaction :* Electricity is required
- *Electrochemical reaction :* Electricity is produced
- Nickel and chromium plating is done to prevent steel articles from rusting.
- Gold and silver plating is done on iron or brass objects to improve their appearance.
- Electro-refining of metals is a process by which impurities from metals, extracted by chemical processes, are removed electrolytically to obtain a highly pure metal.

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- Metals generally refined by this process are:
  1. Zink
  2. Silver
  3. Nickel
  4. Lead
  5. Copper
  5. Aluminium
- Electrometallurgy is the extraction of metals from its ores by electrolysis.

ACIDS, BASES AND SALTS

- Acids are substances, which produce hydronium ion(H_3O^+) in their aqueous solution.
- Oxy-acids essentially contain oxygen along with hydrogen and other elements, e.g. H_2SO_4, HNO_3, H_2CO_3,
- Bases are substances producing hydroxyl ions in their aqueous solution.
- Oxides and hydroxides of metals (or metal like radicals) are called bases.
- Alkali is a water-soluble base, e.g. sodium hydroxide.
- A weak acid remains weak even if it is concentrated because it produces a low concentration of hydrogen ions.
- A strong acid remains a strong acid even if it is diluted, because it produces a high concentration of hydrogen ions.
- Acids generally have a sour taste, while bases have a bitter taste.
- Strong acids are corrosive and can burn through the skin.
- Bases are soapy to touch.

SOME IMPORTANT USES OF ACIDS BASES AND SALTS

Acids

- *Sulphuric acid*: Manufacture of fertilizers, chemicals, explosives, paints, dyes and drugs.
- *Nitric acid*: Also used in manufacture of fertilizers, chemicals, explosives, paints, dyes and drugs.
- *Hydrochloric acid*: Tanning and printing industry.
- *Citric acid*: In medicine (source of vitamin C), flavouring drinks.
- *Boric acid*: As an eye-wash, preservation of grains.
- *Acetic acid*: Flavouring food. food preservation.
- *Benzoic acid*: Food preservation.
- *Carbonic acid*: It lends 'fizz' to aerated drinks.
- *Oxalic acid*: In ink-stain removers.
- *Tartaric acid*: Constituent of baking powder (reacts with the sodium bicarbonate to release carbon dioxide which makes the dough light and spongy).

Bases

- *Sodium hydroxide*: Manufacture of soap.
- *Calcium hydroxide*:
  (i) Manufacture of bleaching powder, mortar,
  (ii) Softening of hard water,
  (iii) Neutralising acid in the soil and in water supplies.
- *Potassium hydroxide*: Alkaline batteries.
- *Magnesium hydroxide*: As an antacid to neutralise acidity caused by the hydrochloric acid in the stomach.
- *Aluminium hydroxide*: Foaming agent in fire extinguishers.
- *Ammonium hydroxide*: Used to remove grease stains from clothes.

Salts

- Salts are ionic compounds containing a positive ion (cation) and a negative ion (anion).
- Sodium chloride (NaCl) is a normal salt.
- Mohr's salt [$FeSO_4(NH_4)_2$, $SO_4.6H_2O$] and Alum [$K_2SO_4.Al_2(SO_4)_3.24H_2O$] are double salt.
- Hydrolysis is a reaction in which a salt reacts with water to form a solution which is either acidic or alkaline.
- Efflorescence is the property of salts to lose their water of crystallisation and are transformed into a powder at ordinary temperatures. *Examples*:
  1. Washing soda ($Na_2CO_3.10H_2O$); sodium carbonate decahydrate.
  2. Glauber's salt ($Na_2SO_4.10H_2O$); sodium sulphate decahydrate.
  3. Blue vitriol ($CuSO_4.5H_2O$); copper sulphate pentahydrate
  4. Epsom salt ($MgSO_4.7H_2O$); magnesium sulphate septahydrate
- Deliquescence is the property of salts to absorb moisture at ordinary temperatures to lose their crystalline form and form a saturated solution.
- Hygroscopy is the property of salts to absorb atmospheric moisture at ordinary temperature without dissolving in it.

ELECTROLYSIS

- Electrolysis is a chemical process by which a chemical substance, in its fused state or in aqueous solutions, is decomposed by the passage of an electric current, leading to the discharge of ions of the electrolyte at the two electrodes.
- Electrolyte is a compound which, in the fused state or in aqueous solution, allows the passage of an electric current and is decomposed by it.
- Example of strong electrolytes :
  1. Strong acids : Hydrochloric acid, nitric acid, sulphuric acid.

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2. Strong bases : Sodium hydroxide, potassium hydroxide, barium hydroxide.
3. Salts : Lead bromide, sodium chloride, silver nitrate.

➤ Examples of weak electrolytes :
1. Weak Acids : Acetic acid, carbonic acid, formic acid.
2. Weak bases : Ammonium hydroxide, magnesium hydroxide, copper hydroxide.
3. Salts : Lead acetate, sodium carbonate.

➤ Compounds, which in the fused state or in the aqueous solution do not dissociate into ions are called non-electrolytes.

➤ *Examples :* Distilled water, Acetone, Sugar solution, Petrol, Alcohol, Benzene, Glycerol,

➤ Electrodes are the two conducting poles of a metal or graphite, through which electric current, i.e., electrons enter or leave an electrolyte in fused or aqueous solution state.

1. Anode is the electrode connected to the positive terminal of the battery. The current enters the electrolyte through the anode. At the anode the anion loses electrons to form neutral atoms.
2. Cathode is the electrode connected to the negative terminal of the battery. The current leaves the electrolyte through the cathode. At the cathode, the cation gains electrons to form neutral atoms.

➤ Electrolytic cell or voltameter is the complete set-up or vessel consisting of electrodes and electrolytes, in which electrolysis takes place.

➤ Theory of Electrolytic Dissociation was first explained by Avante Arrhenius.

➤ Non-attackable electrodes are inert and do not enter into a chemical reaction with the electrolyte.

➤ Their inertness is because of their higher reduction potential than the ions present in the electrolyte, e.g. graphite, platinum.

SOLUTIONS, SOLUTE AND SOLVENT

➤ A solution is a homogenous mixture of two or more substances.

➤ The substance which is dissolved to make a solution is called solute and the liquid in which solute is dissolved is known as solvent.

➤ The true solutions are always homogenous and the size of solute particles is 10^{-8} cm.

➤ In a true solution, the solute particles cannot be distinguished from the solvent molecules even by using a microscope.

➤ A colloid is a kind of solution in which the size of solute particles is bigger than that of a true solution but smaller than those of a suspension.

➤ Milk, Blood, Ink, Soap solution, Gum, Jelly are example of colloidal solutions.

➤ The size of the solute particles in a colloidal solution is between 10^{-7} cm and 10^{-5} cm.

➤ The scattering of light by colloidal particles is called Tyndall effect.

METALS AND NON-METALS

➤ A metal is an electropositive element which is hard, sonorous, lustrous, malleable, ductile with tensile strength, and a good conductor of heat and electricity.

➤ Metals form basic or amphoteric oxides.

➤ A non-metal is an electronegative element which occurs as solids, liquids and gases. They are generally poor conductors of heat and electricity.

➤ Non-metallic solids are usually soft and brittle.

➤ Minerals are solid, naturally occurring as deposits in the earth's crust, and contain metals in the combined state, along with associated earthly impurties (gangue).

➤ Ores are commercially viable minerals.

➤ Alloy is a homogenous mixture of two or more metals (or metal and non-metal) combined in a definite proportion in their molten state.

➤ Amalgam is an alloy in which one of the components is mercury.

➤ Mercury and gallium, despite being metals are liquids at room temperature.

➤ Vermilion is made from the mercury ore, Cinnabar (Mercury-sulphide).

➤ Gold and platinum occur exclusively in free state.

➤ Copper, mercury and silver occur partly in free state.

➤ Most of the metals occur in the form of oxides, sulphides, carbonates, sulphates, chlorides and silicates.

➤ Lithium is the lightest metal.

➤ Iridium has the highest density among metals.

➤ *Liquation* is used to refine metals having a low melting point, e.g., lead and tin.

➤ *Distillation* is used to refine volatile metals like mercury and zinc which contain non-volatile impurities.

➤ *Oxidation* is used to refine metals containing volatile impurities, which are easily oxidised e.g., Pig iron.

➤ A carbonate ore is converted into metal oxide by Calcination.

➤ A sulphide ore is converted into metal oxide by Roasting.

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- The metal oxides are reduced to metal by carbon, aluminium or electrolytic reduction.
- The refining of metals can be done by electrolysis, liquation, distillation or oxidation methods.
- Frrth Floatation process is used for the concentration of sulphide ores.

COMPOUNDS OF SODIUM

The important compounds of sodium metal are Common Salt, Washing Soda and Baking Soda.

(1) Common Salt (Nacl)

- Common salt is sodium chloride, NaCl.
- It is a colourless crystalline substance which is highly soluble in water.
- It is hygroscopic due to the presence of small amount of magnesium chloride.

(2) Washing Soda (Sodium Carbonate)

- Chemically, washing soda is a carbonate of sodium metal.
- It is actually sodium carbonate deahydrate, $Na_2CO_3 . 10H_2O$.
- It is prepared from sodium chloride by the Solvay process.
- The raw-material used in the manufacture includes, Sodium Chloride (NaCl), Ammonia (NH_3) and Limestone.

(3) Baking soda ($NaHCO_3$)

- Its chemical name is sodium bicarbonate or sodium hydrognecarbonate.
- It is manufactured from sodium chloride by the Solvay process.
- Sodium bicarbonate is the primary product of the Solvay process.

COMPOUNDS OF CALCIUM

(1) Lime (Calcium Oxide, CaO)

- Chemically Lime is calcium oxide and its formula is CaO.
- It is also called as Quick Lime.
- It is prepared by heating limestone to a temperature of 800°C to 1000°C in a lime kiln.
- Its melting point is very high being 2600°C.

Use of Lime

(1) Calcium oxide (lime) is used in the manufacture of cement and glass.
(2) Calcium oxide (lime) is used for drying gases and alochol.
(3) Calcium oxide (lime) is used as a basic lining in furnaces.
(4) Calcium oxide (lime) is used in the preparation of calcium carbide, basic calcium nitrate, and calcium bisulphite.

Uses of Calcium Hydroxide (Slaked Lime)

(1) A solution of calcium hydroxide (slaked lime) in water called lime-water is used for testing carbon dioxide gas in chemistry laboratories.
(2) A suspensin of slaked lime in water is used in white-washing buildings. The calcium hydroxide solution applied to the walls reacts slowly with the carbon dioxide of air to form calcium carbonate which gives a bright appearance to the walls.
(3) Slaked lime is used by brick-layers (masons) to make mortar. Lime mortar is prepared by mixing slaked lime with sand and water.
(4) Slaked lime is used in the preparation of bleaching powder, caustic soda and ammonia.
(5) Slaked lime is used by the farmers to reduce the acidity of sand.
(6) Saked lime is used for softening temporary impurities of hard water.
(7) Slaked lime is used to remove hair from hides before they are tanned or converted into leather.

(2) Bleaching Powder

- Chemically, bleaching powder is calcium oxychloride.
- Its formula is $CaOCl_2$.
- It is produced by passing chlorine gas over dry slaked lime.
- It is soluble in cold water.
- It is a yellowish white powder which gives a strong smell of chlorine.

Uses of Bleaching Powder

(1) Bleaching powder is commonly used for bleaching washed clothes in laundry (laundry is a place where clothes are washed and pressed).
(2) Bleachng powder is used for bleaching cotton and linen in textile industry and for bleaching wood pulp in apper industry.
(3) Bleaching powder is used for disinfecting drinking water supply, i.e. for making drinking water free from germs.
(4) Bleaching powder is used for the manufacture of chloroform ($CHCl_3$).
(5) Bleaching powder is used for making wool unshrinkable.
(6) Bleaching powder is used as an oxidising agent in many chemical industries.

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(3) Plaster of Paris

- Chemically it is calcium sulphate hemihydrate.
- Its formula is $(CaSO_4)_2 \cdot H_2O$.
- It is prepared from gypsum.
- Gypsum is calcium sulphate dihydrate, $CaSO_4 \cdot 2H_2O$.
- When Gypsum is heated to a temperature of 120°C, it loses three-fourths of its water of crystallisation and forms Plaster of Paris.
- Plaster of Paris is a white powder.
- It sets into a hard mass on wetting with water.

Uses of Plaster of Paris

(1) Plaster of Paris is used in hospitals for setting fractured bones in the right position to ensure correct healing. It keeps the fractured bone straight. This use is based on the fact that when Plaster of Paris is mixed with water and applied around the fractured limbs, it sets into a hard mass. In this way, it keeps the bone joints in a fixed position.

(2) Plaster of Paris is used in chemistry laboratories for sealing the air-gaps in apparatus where air-tight arrangement is required.

(3) Plaster of Paris is used in making castings for statues, cheap ornaments, toys and decorative materials.

(4) Plaster of Paris is used as a fire-proofing material.

(5) Plaster of Paris is used in making black-board chalk.

Difference Between Metals and Non-metals

Metals	Non-metals
1. Metals have 1 to 3 electrons in the outer–most shell of their atoms.	Non-metals have 4 to 8 electrons in the outer-most shell of their atoms (except hydrogen which has 1 and helium which has 2 outer–most electrons).
2. Metals are malleable and ductile, i.e., metals can be hammered into thin sheets and drawn into thin wires.	Non-metals are brittle. They are neither malleable nor ductile.
3. Metals are good conductors of heat and electricity.	Non-metals are bad conductors of heat and electricity (except graphite which is a good conductor of electricity).
4. Metals are lustrous (shiny) and can be polished.	Non-metals are non-lustrous (dull) and cannot be polished (except graphite and iodine which are lustrous non-metals).
5. Metals are solids at room temperature (except mercury which is a liquid metal).	Non-metals may be solid, liquid or gases at the room temperature.
6. Metals are strong and tough. They have high tensile strenth	Non-metals are not strong. They have low tensile strength.
7. Metals form basic oxides.	Non-metals form acidic oxides or netural oxides.
8. Metals displace hydrogen from dilute acids.	Non-metals do not react with dilute acids and hence do not displace hydrogen from dilute acids.
9. Metals form electrovalent chlorides (ionic chlorides) with chlorine. These electrovalent chlorides are electrolytes, but non-volatile.	Non-metals form covalent chlorides with chlorine (which are non electrolytes, but volatile).
10. Metals usually do not combine with hydrogen. Only a few reactive metals combine with hydrogento form electrovalent metal hydrides.	Non-metals react with hydrogen to form stable, covalent hydrides,
11. Metals are reducing agents.	Non-metals are oxidising agents (except carbon which is a reducing agent).

ELEMENTS AND THEIR OCCURRENCE IN EARTH

- Earth is a rich source of elements, found either in native state or in compound form.
- The solid phase of the earth is called the lithosphere.
- Percentage distribution of elements in earth's crust is as shown below :

Element	Weight (%)	Element	Weight (%)
Oxygen	46.6	Silicon	27.7
Aluminium	8.3	Iron	5.1
Calcium	3.6	Sodium	2.8
Potassium	2.6	Magnesium	2.1
Titanium	0.4	Manganese	0.1
Other metals	>0.1	Hydrogen	0.1
Phosphorous	0.1	Other non-metals	<0.1

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- Ocean and seas, which form major component of hydrosphere, are again vast reservoirs of elements.
- The major elements are Chlorine, Sodium, Magnesium, Sulphur, Calcium, Potassium and Carbon in that order.
- The minor elements are Bromine, Boron, Strontium, Silicon, Nitrogen, Lithium, Aluminium and Rubidium.
- Four elements, Chlorine, Bromine, Sodium and Magnesium are recovered commercially from sea water.
- The Manganese nodules found in the sea bed may form a potential source of some of the less common metals.
- The gaseous phase of the earth is called atmosphere.
- The atmosphere mainly consists of nitrogen (78.09%), Oxygen (20.95%). Argon (0.93%) and other gases (<1%).
- Carbon dioxide forms about 0.03% of the atmosphere.
- Ozone exists mostly at the outer atmospheric level, where it helps in the absorption of solar ultraviolet radiation.
- *Examples* of elements accumulated in living organisms are :
  1. Iodine in sea weeds
  2. Vanadium in sea cucumbers
  3. Potassium in plant life
- Examples of elements concentrated in different parts of living beings are :
  1. Iron in blood
  2. Zinc in the eyes of certain animals
  3. Magnesium in chloroplast

FUELS

- The materials which are burnt to produce heat energy are known as fuels.
- On the basis of their physical state fuels can be classified into solid fuels, liquid fuels and gaseous fuels.
  - **(i) Solid fuels :** Coal, coke, wood, charcoal.
  - **(ii) Liquid fuels :** Petrol, diesel, kerosene, alcohol.
  - **(iii) Gaseous fuels :** Natural gas, coal gas, LPG, water gas, gobar gas, producer gas.
- The waste material of living objects like cattle dung and the dead parts of living objects like plants, trees, is called Bio-mass.
- Bio-mass contains carbon compounds and is the oldest source of heat energy for domestic purposes.
- Examles of Bio-mass being used as a fuel are, wood, cattle dung and agricultural wastes like bagasse.
- The destructive distillation of wood yields woodgas, Charcoal, methyl alcohol, acetic acid.
- Bio-gas is a mixture of methane, carbon-dioxide, hydrogen and hydrogen sulphide.
- The major constituent of bio-gas is methane.

- Bio-gas is obtained by the anaerobic fermentation of animal wastes in the presence of water.
- Khadi and Village Industries Commission (KUIC) is the major organisation engaged in the promotion and construction of bio-gas plants.
- Coal is a complex mixture of compounds of carbon, hydrogen and oxygen.
- Coal was formed by the decomposition of large plants and trees buried under the earth millions of year ago.

Type of Coal	Carbon Content
Peat	60%
Lignite	70%
Bituminous	80%
Anthracite	90%

- Bituminous coal is used as fuel in our households, and in industry.
- The destructive distillation of coal yields coal gas, ammoniacal liquor, coaltar and coke.
- Coal gas is a mixture of hydrogen, methane, and carbon monoxide.
- Water gas is a mixture of carbon monoxide and hydrogen.
- Producer gas is a mixture of carbon monoxide and nitrogen.
- Petroleum oil was formed by the decomposition of the remains of extremely small plants and animals, buried under the sea millions of years ago.
- The refining of petroleum is done by the process of fractional distillation.

Fractions of Petroleum

Fraction	Molecular composition (Alkanes present)	Boiling range	Uses
1. Gas	C_1 to C_4	Below 40°C	Gas is used as a fuel; in the production of carbon black and hydrogen; in the production of liquefied petroleum gas (LPG) and in the manufacture of gasoline (petrol) by polymerisation

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2. Gasoline or Petrol	C_5 to C_{12}	40°C to 170°C	Gasoline is used as a motor fuel; as a solvent; for dry cleaning and for making petrol gas.
3. Kerosene	C_{12} to C_{16}	175° to 275°C	Kerosene is used as a household fuel; as an illuminant (for lighting) and for making oil gas.
4. Gas oil and Diesel Oil	C_{15} to C_{18}	250° to 400°C	Used as furance fuel; fuel for diesel engines,and for making petrol by cracking.
5. Lubricating oil, Vaseline, and Paraffin wax	C_{16} to C_{50}	Above 350°C	Lubricating oil is used for lubrication; Vaseline is used for making toilet goods and grease, Paraffin wax is used for making candles.

- The organic compounds prepared from the hydrocarbons obtained from petroleum and natural gases are called petrochmicals.
- D.D.T., B.H.C., Ethyl Alcohol, Benzene are important petrochemicals.
- Petroleum gas is a mixture of butane, propane and ethane.
- Petroleum gas liquefied under pressure is called Liquefied Petroleum Gas (LPG).
- LPG consists mainly of butane and small amount of propane and ethane.
- Ethyl mercapton is added to LPG to help in the detection of gas leakage.
- Natural gas mainly consists of methane (CH_4) and small quantities of ethane and propane.
- The process of breaking bigger hydrocarbon molecules into smaller hydrocarbon molecules by heating in the presence of a catalyst is called cracking.
- The amount of heat produced by burning a unit mass of the fuel completely is known as its calorific value.
- The calorific value is expressed in Kilojoules per gram, KJ/g.

Calorific Value of Some Fuels

Fuel	Calorific Value
Wood	17 KJ/g
Coal	30 KJ/g
Kerosene oil	48 KJ/g
Petrol	50 KJ/g
Bio-gas	40 KJ/g
Natural gas	40 KJ/g
LPG	50 KJ/g
Methane	55 KJ/g

NOBLE GASES

- These are : Helium, Neon, Argon, Krypton, Xenon and Radon.
- Also called 'rare gases', as they are present in very small quantities in the air.
- Radon is not present in air.
- Also called 'inert gases', as they do not enter into chemical reactions.
- Helium is used for filling meteorological balloons and also by sea divers.
- Neon is used in making advertising signs.
- Argon is used to create an inert atmosphere in chemical reactions and in electric bulbs.
- Krypton and Xenon are used in electrical valves and TV tubes and also in lighthouses and miner's lamp.

Common Organic Compounds

Common name	Chemical name
Marsh gas	Methane
Chloroform	Trichloromethane
Methanol	Methyle Alcohol
Ethanol	Ethyl Alcohol
Vinegar	Acetic acid

SOME USES OF ELEMENTS AND COMPOUNDS

Ozone (O_3)

1. For disinfecting water for drinking purpose
2. For bleaching delicate fabrics, oils starch etc.
3. For purifying air in crowded places
4. For the ozonolysis of organic compounds

Hydrogen peroxide (H_2O_2)

1. As an anticolour in bleaching
2. For restoring the colour of lead painting
3. For preserving milk, wine and other liquids

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4. In the manufacture of many inorganic and organic compound
5. As an antiseptic, for washing wounds, teeth and ears under the name perhydral

Ammonia (NH_3)

1. In the manufacture of nitric acid and sodium carbonate
2. As a refrigerant
3. In the manufacture of rayon
4. As an important reagent

Nitric Acid (HNO_3)

1. In the manufacture of ammonium nitrate
2. In the manufacture of sulphuric acid
3. In the manufacture of dyes, perfumes and synthetic silk
4. In purification of gold and silver

Borax ($Na_2B_4O_7.10H_2O$)

1. In laboratory for borax lead test
2. In the manufacture of enamels and glazes for earthen pots
3. In the candle industry
4. In preparation of medicinal soaps
5. In making of optical glass
6. Used for softening water

Boric acid (H_3BO_3)

1. In manufacture of enamels and pottery glazes
2. For preservation of food in industry
3. In the manufacture of pigments and borax
4. In medicines as an eye wash

Silica (SiO_2)

1. As sand which is a building material
2. In manufacture of glasses
3. Silica gel ($SiO_2.NH_2O$) is used in chromatography and also for absorbing moisture

Sulpher (S)

1. In manufacture of sulpher dioxide and sulphuric acid
2. In manufacture of matches, gun powder, fireworks etc.
3. In making sulpha drugs
4. For disinfecting rooms
5. In vulcanisation of rubber

Sulphuric acid (H_2SO_4)

1. In fertiliser industry
2. In petroleum refining
3. In chemical industry
4. In metallurgy
5. In manufacture of explosives such as T.N.T.

6. In manufacture of paints, plastics, pigments
7. As a drying and dehydrating agent
8. For clearing the surface of metals before electroplating

Sodium thiosulphate ($Na_2S_2O_3.5H_2O$)

1. In photography as a frizzing agent
2. As a preservative for fruit products
3. As an antichlor in bleaching
4. As a volumetric agent for the estimation of iodine
5. Used in medicines

Fluorine (F_2)

1. As an oxidizing agent
2. Fluorine and its compound (NF_3, OF_2) are used as rocket fuel
3. In manufacture of plastic known as teflon
4. In manufacture of fluorocarbons from (CF_2Cl_2)
5. Preparation of uranium hexafluoride

Bromine (Br_2)

1. In preparation of ethylene bromide which is mixed with tetra-ethyl lead and added to the petrol as an anti-knock
2. In manufacture of Ag Br used in photography
3. In manufacture of dyes, drugs etc.
4. In manufacture of benzyl bromide-a tear gas

Iodine (I_2)

1. As a laboratory reagent
2. In making of medicines and dyes
3. AgI is used in photographic emulsion

Helium (He)

1. In filling discharge tube
2. In gas chromatography
3. To protect metal surfaces from oxidation during the welding of steel

Krypton and Xenon (Kr and Xe)

1. For filling incandescent metal filament of bulbs
2. Kr-Xe mixture is used in some flash bulbs
3. Xe is used in research laboratories for detecting mesons

Radon (Rn)

1. In treatment of cancer
2. In radioactive researches

Sodium

1. Sodium amalgam is used for preparation of organic compounds
2. Liquid Na is used as a coolant in nuclear reactors
3. In sodium vapour lamps
4. As reagent to detect presence of Na, S and Halogens

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Potassium (K)

1. as a fertiliser in agriculture

Sodium Chloride (NaCl)

1. As a table salt
2. In manufacture of Na_2CO_3. NaOH, Cl_2 etc.
3. For salting out soaps
4. In freezing mixtures
5. In tanning and textile industry

Sodium Carbonate (Na_2CO_2)

1. For softening hard water
2. For washing purposes in industries
3. Na_2CO_3–K_2CO_3 is used as a fusion mixture
4. In petroleum industries
5. In manufacturing of soasps, glasses, paper, borax etc.
6. As a reagent in laboratories

Sodium hydroxide (NaOH)

1. In manufacture of soaps, paper, artificial silk etc.
2. In petroleum industry
3. In purification of bauxite
4. In textile industry for mercerizing cotton fabrics.
5. As a chemical reagent for machines and metal sheets

Postassium Chloride (KCl)

1. As a fertilizer
2. In preparation of potassium compounds

Potassium bydroxide (KOH)

1. In manufacture of soft soaps
2. Absorbing carbondioxide and sulphar dioxide
3. In some organic reactions

Magnesium (Mg)

1. As a reducing agent
2. Alloy with Al used in aircraft industries
3. Mg-powder in flash light
4. Mg $(OH)_2$ is used as antacid

Calcium (Ca)

1. Removes traces of air from vacuums tube
2. It is a powerful reducing agent
3. To remove moisture from alcohol

Calcium oxide (CaO)

1. As a building material
2. In manufacture of caustic soda
3. As a flux in metallurgy

4. In manufacture of dying stuffs
5. In drying gases and alcohol

Calcium hydroxide ($Ca(OH)_2$)

1. As a building material
2. As a white wash material
3. For softening hard water
4. For detection of CO_2

Calcium carbonate ($CaCO_3$)

1. As a building material
2. In manufacture of quick lime
3. In metallurgy
4. As a constituent of tooth-pastes

Calcium Sulphate ($CaSO_4 . 2H_2O$)

1. For manufacture of Plaster of Paris and ammonium sulphate
2. In manufacture of cement and mortar
3. In preparation of black board chalks
4. As a drying agent

Aluminum Chloride ($AlCl_3$)

1. As a catalyst in Friedal Crafts reaction
2. As a catalyst in cracking of petroleum
3. As a mordant in dying

Potash alum ($K_2SO_4 . Al_2(SO_4)_3 . 24H_2O$)

1. In purification of water
2. As a mordant of dying and calico-printing
3. In tanning leather
4. To stop bleeding from a fresh cut

Ferric oxide (Fe_2O_3)

1. As a red pigment
2. For metal polishing
3. As a catalyst

Ferric Chloride ($FeCl_3$)

1. In medicines as astringent and antiseptic
2. As a mordant in dying
3. As a reagent in Fridel Crafts reaction
4. In block making

Ferrous sulphate ($Fe SO_4 . 7H_2O$)

1. As a mordant in dyeing and tanning industries
2. In manufacture of blue-black ink
3. In manufacture of Mohr's salt, ferric oxide, ferric alum etc.
4. As an insecticide in agriculture

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Copper (Cu)

1. In making utensils
2. In making electrical wire
3. In manufacturing electric goods
4. For preparing alloys
5. In electroplating and electrotyping
6. For preparing copper salts
7. As a coinage metal
8. In jwellery

Silver (Ag)

1. In ornaments
2. In silvering of mirrors and in photography.
3. In silver plating
4. In some medicines
5. In making useful alloys

Gold (Au)

1. In jwellery and is an article of wealth
2. As a coinage metal
3. In covering temple domes
4. In dental filling
5. For gold plating other metals

Copper Sulphate ($CuSO_4 . 5H_2O$)

1. Anhydrous salt is used to test the presence of moisture
2. As a mordant in dying and calico printing
3. In electroplating and electrofixing of metals
4. Used as a fungicide

Mercury (Hg)

1. Used in various instruments
2. In mercury vapour lamps
3. In medicines
4. In preparing amalgams
5. As an electrode in various electrolytic process

Zinc Oxide (ZnO)

1. As a white paint
2. In ceramics and rubber industries
3. As an ointment in medicine
4. As a catalyst

Zinc Chloride ($ZnCl_2$)

1. As a dehydrating agent in organic reactions
2. As a flux in soldering
3. In preparation of vulcanised rubber
4. In dry cells

Tin (Sn)

1. In tinning of copper and brass utensils
2. In tin plating
3. For making tin foils
4. For making a number of alloys

Lead (Pb)

1. For making water pipes
2. In lead storage batteries
3. In manufacturing bullets, shots etc.
4. For making lead chamber
5. For preparing $(C_2H_5)_4$ Pb Which is an anti knocking agent for petrol
6. For making pigments
7. For making a number of alloys

Carbon dioxides (CO_2)

1. In preparation of aerated water
2. As a fire extinguisher
3. In manufacture of washing soda
4. As a refrigerant
5. For artificial respiration (85% of O_2 + 5% of CO_2–carbogen)
6. In purification of cane sugar juice

Carbon Halides (CX_4, X is F, Cl, I, Br)

1. CCl_4 is used as a solvent
2. CCl_4 is used as fire extinguisher called pyrene
3. CF_2Cl_2 is used as a refrigerant
4. CCl_4 is also used as medicine

Carbides

1. SiC–Carborundum is second hardest substance
2. Tungsten carbide is used for making tools
3. Calcium carbide is used for preparing acetylene
4. Be_4C is also very hard and is used as a shield against radioac tive radiations

IMPORTANT PROCESSES

Bosch process	:	Hydrogen
Castner process	:	Sodium
Down process	:	Sodium
Nelson cell	:	NaOH
Caster Kellner cell	:	NaOH
Lowing process	:	NaOH
Solvay process of Ammonia soda process	:	Na_2CO_3 and $NaHCO_3$
Leblanc process	:	K_2CO_3
Precht process	:	K_2CO_3

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Mac Arthur Forrest process (Cyanide process)	:	Ag
Parke's process	:	Ag
Pattinson's process	:	Ag
Cupellation process	:	Ag (Purification)
Mond process	:	Ni
Baeyer's process	:	Al
Serpeck's process	:	Al
Hoop's process	:	Al (Purification)
Hall-Heroult process	:	Al
Goldschmidt process	:	Thermite welding
Carter process	:	Basic lead carbonate (White lead)
Haber's process	:	NH_3
Birkeland-Eyde process	:	NO, HNO_3
Ostwald process	:	NO, HNO_3
Deacon's process	:	Cl_2
Lead chamber process	:	H_2SO_4
Contact process	:	H_2SO_4
Kaldo and L.D. process	:	Steel
Corey-House	:	Alkane
Oxo process	:	Alcohol
Dow's sea water process	:	Mg
Piageon process	:	Mg
Cyanamide process	:	NH_3
Bessember-Thomas process	:	Steel
Siemens process	:	Steel
Frasch process	:	Sulphur
IMI process	:	Ti

IMPORTANT COMPOUNDS/MINERALS AND FORMULAS

Name		**Formula**
Magnesite	:	$MgCO_3$
Dolomite	:	$MgCO_3.CaCO_3$
Kieserite	:	$MgSO_4.H_2O$
Epsomite	:	$MgSO_4.7H_2O$
Talc	:	$Mg_2(Si_2O_5)_2$ $Mg(OH)_2$
Magnesia alba	:	$(MgCO_3)_x$ $(Mg(OH)_2)y$. ZH_20
Sorrel's cement (magnesia cement)	:	$MgCl_2.5MgOx.H_2O$
Lime stone, marble or chalk	:	$CaCO_3$
Gypsum	:	$CaSO_4.2H_2O$
Plaster of Paris	:	$CaSO_4.1/2H_2O$
Anhydrite	:	$CaSO_4$
Fluorspar	:	CaF_2

Phosphorite	:	$Ca_3(PO_4)_2$
Quick lime	:	CaO
Slaked lime	:	$Ca(OH)_2$
Soda lime	:	$Ca(OH)_2$ + $NaOH$
Chlorapatite	:	$3Ca_3(PO_4)_2.CaCl_2$
Apatite (Fluorapatite)	:	$3Ca_3(PO_4)_2.CaF_2$
Pearl ash, Potash	:	K_2CO_3
Sylvine	:	KCl
Carnallite	:	$KCl.MgCl_2.6H_2O$
Felspar	:	$KAlSi_3O_3$
Saltpetre (Indian saltpetre)	:	KNO_3
Kainite	:	$KCl.MgSO_4.3H_2O$
Schonite	:	$K_2SO_4.MgSO_4.6H_2O$
Calgon (Graham's salt)	:	$(NaPO_3)_n$
Chile saltpetre	:	$NaNO_3$
Salt cake	:	$NaSO_4$ (anhydrous)
Glauber's salt	:	$Na_2SO_4.10H_2O$
Nitre salt	:	$NaHSO_4$
Borax	:	$Na_2B_4O_7$. $10H_2O$
Soda ash	:	Na_2CO_3 (anhydrous)
Washing soda	:	$Na_2CO.10H_2O$
Crystal carbonate	:	$Na_2CO_3.H_2O$
Baking soda	:	$NaHCO_3$
Coinage metals	:	Cu,Ag and Au
Caro's acid	:	H_2SO_5
Marshall's acid	:	$H_2S_2O_8$
Borazine (Inorganic Benzene)	:	$B_3N_3H_6$
Boron nitride (Inorganic graphite)	:	(BN)x
Copper pyrites	:	$CuFeS_2$ or Cu_2S. Fe_2S_3
Cuprite (Ruby copper)	:	Cu_2O
Copper glance	:	Cu_2S
Malachite	:	$Cu(OH)_2$. $CuCO_3$
Azurite	:	$Cu(OH)_2.2CuCO_3$
Blue vitriol	:	$CuSO_4.5H_2O$
Argentite (Silver glance)	:	Ag_2S
Horn silver (Chlorargyrite)	:	$AgCl$
Ruby silver (Pyrargyrite)	:	Ag_3SbS_3
Argentiferrous galena	:	$PbS + Ag_2S$
Lunar caustic	:	$AgNO_3$
Zinc blende	:	ZnS
Calamine	:	$ZnCO_3$
Zincite (Red ZnO)	:	ZnO
Willemite	:	Zn_2SiO_4

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Bauxite	:	$Al_2O_3.2H_2O$
Diaspore	:	$Al_2O_3.H_2O$
Cryolite	:	Na_3AlF_6
Kaolinite	:	$Al_2O_3.2SiO_2.2H_2O$
Mica	:	$K_2O.3Al_2O_3.6SiO_2.2H_2O$
Alum shale	:	$Al_2O_3 \times SiO_2 + FeS_2$
Alum stone (Alunite)	:	$K_2SO_4.Al_2(SO_4)_3.4A(OH)_3$
Cassiterite (Tin stone)	:	SnO_2
Galena	:	PbS
Anglesite	:	$PbSO_4$
Masscote (Litharge)	:	PbO
Haematite (Red haematite)	:	Fe_2O_3
Limonite (Brown haematite)	:	$Fe_2O_3.3H_2O$
Magnetite	:	Fe_3O_4
Siderite (Spathic iron ore)	:	$FeCO_3$
Iron pyrites	:	FeS_2
Mohr's salt	:	$FeSO_4.(NH_4)_2.SO_4.6H_2O$
Green vitriol	:	$FeSO_4.7H_2O$
Asbestos	:	$CaMg_3(SiO_3)_4$
Aqua-regia	:	Conc. HNO_3 + Conc. HCl (1:3 part)
Anhydrone	:	$Mg(ClO_4)_2$
Barytes	:	$BaSO_4$
Baryta water	:	$Ba(OH)_2$ solution
Bleaching powder	:	$CaOCl_2$
Boranes	:	Hydride of boron
Brine	:	NaCl solution
Carborundum	:	SiC
Cementite	:	FeC
Chinese white	:	ZnO
Caliche	:	$NaNO_3 + NaIO_3$
Caustic potash	:	KOH
Calomel	:	Hg_2Cl_2
Corrosive sublimate	:	$HgCl_2$
Dry ice	:	solid CO_2
Freon	:	CF_2Cl_2
Hydrolith	:	CaH_2
Hypo	:	$Na_2S_2O_3.5H_2O$
Lead pencil	:	Graphite
Laughing gas	:	N_2O
Litharge (Masscote)	:	PbO
Mortar	:	Salked lime + sand (1:3 in water)

Matte	:	$Cu_2S + FeS$
Minium	:	Pb_3O_4
Micro cosmic salt	:	$NaNH_3.HPO_4$
Milk of magnesia	:	Paste of $Mg(OH)_2$ in water (Anti-acid)
Marsh gas	:	CH_4
Nitro chalk	:	$[NH_4NO_3 + (NH_4)_2 CO_3]$
Nitrolim	:	$CaCN_2$ (a fertilizer) + C
Nitrophos	:	$Ca(H_2PO_4)_2 + 2Ca(NO_3)_2$
Baking powder	:	$NaHCO_3 + Ca(H_2PO_4)_2$ + starch
Oil of vitriol	:	Conc. H_2SO_4
Oleum	:	$H_2S_2O_7$
Phosgene	:	$COCl_2$
Pig iron	:	Impure form of iron
Producer gas	:	A mixture of CO + N_2 + H_2
Quartz	:	SiO_2
Quick silver	:	Hg
Refrigerant	:	CO_2. NH_3, CF_2Cl_2 etc
Red lead	:	Pb_3O_4
Rochelle salt	:	Sodium-potassium tartrate
Rust	:	$Fe_2O_3.\times H_2O$
TNT	:	Trinitro toluene (an explosive)
TNB	:	Trinitro benzene (an explosive)
Tincal	:	$Na_2B_4O_7.10H_2O$
Water glass	:	Na_2SiO_3
Water gas	:	CO + H_2
Wrought iron	:	Pure form of iron
Yperite	:	Mustard gas
Zinc white	:	ZnO

IMPORTANT REAGENTS

Fehling solution	:	Copper sulphate + potassium tartrate (Rochelle salt) + NaOH
Tollen's reagent	:	$AgNO_3$ solution + NaOH solution + NH_4OH
Benedict solution	:	Alkaline solution of cupricion complexed with citrate ions
Schiff's reagent	:	Dilute solution of rosaniline hydrochloride in water, colour has been discharged by passing SO_2
Soda bleach	:	A mixture of Na_2O_2 and dilute HCl
Soda lime	:	A mixtue of $Ca(OH_2)$ + NaOH
Fusion mixture	:	A mixture of $Na_2O_3 + K_2CO_3$
Lithopone	:	A mixture of ZnS + $BaSO_4$
Nessler's reagent	:	K_2HgI_4
Nitrolim	:	Calcium cyanamide + graphite

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Superphosphate	:	Calcium dihydrogen phosphate + $CaSO_4$
Baeyer's reagent	:	Cold alkaline $KMnO_4$ solution
Lindlar catalyst	:	Palladised charcoal deactivate with sulphur compounds
Milk of magnesia	:	Suspension of $Mg(OH)_2$ in water
Lucas reagent	:	A mixture of conc. HCl and anhy. $ZnCl_2$
Fenton's reagent	:	H_2O_2 $FeCl_3$

IMPORTANT ALLOYS

Aluminium bronze	:	Cu + Al
Brass	:	Cu + Zn
Bronze	:	Cu + Sn
Bell metal	:	Cu + Sn
Coin alloys (Red)	:	Cu + Zn + Sn
Coin alloys (White)	:	Cu + Ag + Zn + Ni
Duralumin	:	Al + Cu + Mg + Mn
Electron	:	Mg + Zn
German Silver (nickel silver)	:	Cu + Zn + Ni
Fun Metal	:	Cu + Sn + Zn
Magnalium	:	Al + Mg
Pewter	:	Pb + Sn
Solder	:	Pb + Sn
Type metal	:	Pb + Sb + Sn
Wood metal	:	Bi + Pb + Sn + Cd
Y-alloy	:	Cu + Al
Devarda's alloy	:	Cu + Al+Zn
Ferrosilicon	:	Fe + Si
Ferrovanadium	:	Fe + V
Monel metal	:	Ni + Cu + (Fe + Mn is traces)
Nimonic series	:	Ni + Cr + Co + Al + Ti
Hastelloy C.Nochrome	:	Ni + Cr

SCIENTISTS AND THEIR CONTRIBUTIONS

Scientist		Contribution
Neils Bohr	:	Atomic model, Long form of periodic table
Burzelius	:	Catalysis
H. Becquerrel	:	Radioactivity
Bronsted-Lowry	:	Acid-Base concept
J. Chadwick	:	Dicovery of neutron
Debye-Huckel	:	Theory of strong electrolytes
de Broglie	:	Wave nature of electron
Faraday	:	Laws of electrolysis
Fajan	:	Polarisation of anion
Goldstein	:	Discovery of proton
Helmholtz	:	First law of thermodynamics

Hund-Mulliken	:	Electronegativity scale; Molecular orbital theory
Heitlor-London	:	Valence bond theory
Madam Curie and F. Joliot	:	Artificial radioactivity
Libby	:	Radioactive dating
Lawrence	:	Cyclotron
Maxwell	:	Kinetic theory of gases
Mendeleef	:	Periodic table
Mulliken	:	Charge on electron
Mosley	:	Modern periodic law
Ostwald	:	Dilution law for weak elecrolytes
Pauling-Slater	:	Valence bond theory
Planck	:	Wave nature of light
Rutherford	:	Discovery of nucleus, nuclear reactions
Roentzen	:	Discovery of X-rays
Rayleigh-Ramsay	:	Discovery of Argon
Ramsay-Travers	:	Discovery of Ne, Kr, Xe
Soddy-Fajan	:	Group displacement law
Sorenson	:	pH
Schulze-Hardly	:	Coagulatin by electrolyte
Thomson	:	Discovery of election, photo electric effect
Tyndall	:	Light scattering by solute particles
Yukawa	:	Discovery of Mesons

NATURAL OCCURENCE OF SOME ACIDS

- Citric acid – Citrus fruits (lemon, orange)
- Lactic acid – Sour milk
- Uric acid – Urine
- Formic acid – Sting of bees and ants
- Butryic acid – Rancid butter
- Tartaric acid – Tamarind, grapes, apples
- Mallic acid – Apples
- Stearic acid – Fats
- Hydrochloric acid – Gastric juice
- Acetic acid – Vinegar

pH SCALE

- pH scale is used to measure the strength of an acid.
- If pH = 7 solution is netural
  pH > 7 solution is alkaline
  pH < 7 solution is acidic
- Water is neutral, having pH = 7.
- Body enzymes act only at specific pH-values.
- Crops need specific pH for enhanced growth.

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Alloy of Copper

Name	% composition	uses
Brass	Cu : 60% to 80% Rest Zn	utensils and bullet
Bronze	Cu: 75% to 90% Rest Sn	utensils and statue
Phosphorus bronze	Cu: 84.75% to 97.5% Sn: 15% P: 0.25–2.5%	galvanometer
German silver	Cu: 50% to Zn: 25%, Ni; 25%	utensils
Al Bronze	Cu: 80–90% to Al: 7–12% Sn:0.5%	jwellary, golden paints coins
Monel metal	Cu: 30%, Ni: 65%, Re + Mn: 30%	acid pump
Gun metal	Cu: 87%, Sn: 10%, Zn: 3%	in gun industries
Bell metal	Cu: 80%, Sn: 20%	in bells

INVENTIONS, DISCOVERIES AND THEORIES

- **Aeroplane :** Orville Wright and Wilbur Wright–the Wright Brothers (USA); 1903
- **Aerosol :** Lyle Goodhue (USA); 1941
- **Airship :** Non-rigid; Henry Giffard (France in 1952; Rigid : Graf Ferdinand von Zeppelin (Germany) in 1900.
- **Alcohol thermometer :** Fahrenheit (Germany); 1709
- **Anti-polio vaccine :** Jonas E. Salk; 1955
- **Antiseptic surgery :** Joseph Lister; 1867
- **Artificial radioactivity :** Madame Joliot and Irene Curie; 1934
- **Atom bomb (uranium fission) :** Otto Hahn; 1941
- **Atomic numbers :** Mosley; 1913
- **Atomic structure :** Bohr and Rutherford; 1913
- **Atomic theory :** Dalton; 1803
- **Automobile Stream :** Nicolas Cugnot (France) in 1769; First petrol-engined car : Educard Delamare-Deboutteville (France) in 1883; First successful petrol-engined car; Karl Benz (Germany) in 1855
- **Bacteria :** Anton van Leuwenhoek (Holland); mid 1670s
- **Ball bearings :** (wooden) Benvenuto Cellini of Italy in 1543; (modern) Philip Vaughan of Wales in 1794.
- **Balloon :** Jacques and Joseph Montgolfier (France); 1783
- **Ballpoint pen :** John J. Loud (USA) ; 1888. (First practical models-Ladisloa and George Biro of Hungary in 1938).
- **Barbed wire :** Joseph F. Glidden (USA); 1873
- **Barometer :** Evangelista Torricelli (Italy); 1644
- **Battery :** Alessandro Volta (Italy); 1800
- **Bicycle :** Kirkpatrick Macmillan (Scotland); 1839
- **Bicycle tyres :** John Boyd Dunlop (Scotland); 1888

- **Bifocal lens :** Benjamin Franklin (USA); 1780
- **Blood circulation and fucntioning of heart :** Harvey; 1628
- **Blood transfusion :** Karl Land Steiner and James Harrison
- **Braille :** Louis Braille (France); 1829
- **Bunsen burner :** Robert Wilhelm von Bunsen (Germany); 1858
- **Burglar alarm :** Edwin T. Holmes (USA); 1851
- **Calculating machine :** Pascal (France); 1642
- **Carbon paper :** Ralph Wedgwood (England); 1806
- **Carburetor :** Gottlieb Daimler (Germany); 1876
- **Cellophane :** J.E. Brandenberger (Switzerland); 1900
- **Celluloid :** Alexander Parkes (England); 1861
- **Cement :** Joseph Aspdin (England); 1824
- **Ceres (asteroid) :** Giuseppe Piazzi (Italy); 1801
- **Chain drive :** Leonardo da Vinci; 1491-92
- **Chloroform :** James Young Simpson
- **Cholera bacillus :** Robert Koch; 1884
- **Chronometer :** John Harrison (England); 1735
- **Cinema :** Auguste and Louis Lumiere; 1895
- **Circumference of the earth :** Jean Picard and J.F. Hayford
- **Clock :** Mechanical : Hsing and Liang Ling-Tsan (China), 725; Pendulum Christian Huygens (Netherlnds)-1657
- **Computer :** Charles Babbage (Britain); 1834
- **Cosmic rays :** Victor Hess (Australia); 1912
- **Crescograph :** J.C. Bose (India); 1928
- **Dacron :** J.R. Whinfield and J.T. Dickson (Engand); 1941
- **DDT :** Paul Muler
- **Dental plate :** Anthony A. Plantson (USA)-1817; (in rubber) Charles Goodyear in 1855
- **Deuterium heavy hydrogen :** H.C. Urey; 1932
- **Diesel engine :** Rudolf Diesel (Germany); 1893
- **Disc brake :** F. Lanchester (England); 1902
- **Diving suit :** Augustus Siebe; 1837
- **Dynamite :** Alfred Nobel (Sweden); 1866
- **Dynamo (principle) :** Michael Faraday (England); 1831
- **Elastic :** Thomas Hancock (19th century)
- **Electric blanket (Law of) Electric current :** George Simon Ohm (Germany); 1827
- **Electric fan :** Schuyler Shaats Wheeler (USA); 1882
- **Electric flat iron :** H.W. Seeley (USA); 1882
- **Electric generation (static) :** Otto von Gueriche (Germany); 1660
- **Electricity :** Michael Faraday (England)
- **Electric light :** James Lindsay (Scotland); 1835
- **Electric lamp :** Thomas Alva Edison (USA); 1879
- **Electric motor :** DC-Zenobe Gramme (Belgium); 1873, AC-Nikola Tesla (USA); 1888
- **Electric Torch :** Bristol Electric Lamp Company; 1891

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- **Electromagnet :** William Sturgeon (England); 1824
- **Electron theory :** Bohr; 1913
- **Electronic computer :** J.G. Brainerd, J.P. Eckert and J.W. Mauchly (USA); 1942
- **Engine (railway) :** Stephenson; 1814
- **Escalator :** Jesso Reno (USA) and Charles Wheeler (USA) independently; 1892
- **Evolution (theory) :** Charles Darwin (England); 1858
- **Film :** Musical : Lee de Forest (USA) in 1923; Talking : Warner Bros (USA) in 1926
- **Fire extinguisher (modern type) :** George Manby; 1816
- **Fluorescent light :** (Principle) Antoine-Henari Becquerel (France); 1895
- **Flying shuttle :** John Kay (England); 1733
- **Fountain pen :** Lewis E. Waterman (USA); 1884
- **Gas fire :** Philippe Lebon (France); 1799
- **Gas lighting :** William Murdock (Scotland); 1792
- **Gas stove :** James Sharp (England)
- **Generator :** Piciontti (Italy); 1860
- **Gramophone :** Thomas Alva Edison (USA)
- **Hearing-aid (electronci) :** Miller Reese Hutchinson (USA); 1901
- **Helicopter :** Launoy and Bienvenu (France) in 1784-built the first model helicopter in Europe that could fly. E.R. Mumford (1905)-designed the first helicopter capable of carrying a person; Louis Breguet (France) built a four-rotor craft that undertook the first manned flight in 1907.
- **Helium :** Pierre J. Janseen (France); 1868
- **(Laws of) Heredity :** Gregor Johann Mendel (Australia); mid-1800s
- **Homoeopathy :** Hahnemann
- **Hydrogen :** Henry Cavendish (England); 1766
- **Incandescent bulb :** Thomas Alva Edison (USA); 1879
- **Induction of electric current :** Michael Faraday; 1841
- **Insulin :** Frederic Grant Banting (Canada) and Charles Best; 1921
- **Intelligence tests :** Alfred Binet and Theodore Simon (France); 1905
- **Jet engine :** First turbo-jet engine for flight in 1939 designed by Hans von Ohain (Germany). Practical and successful turbojet by Frank Whittle (Britain)-first flight in 1941
- **Juno (asteroid) :** Heinrich Olbers (Germany); 1804
- **Laser :** Charles H. Townes (USA) and A.L. Schawlow; 1958-60
- **Laughing gas (nitrous oxide) :** Joseph Priestley (Britain); 1772
- **Ligthning conductor :** Benjamin Franklin (USA); 1752
- **Locomotive :** Richard Travithick (England); 1804
- **Logarithms :** First book of tables by John Napier (Scotland); 1614
- **Loudspeaker :** Rice-Kellogg (USA); 1924
- **Machine gun :** Richard Gatling (USA); 1861

- **Man-made fibre :** Joseph Swan; 1885
- **Match (safety) :** John Lundstrom (Sweden); 1855
- **Microphone :** Alexander Graham Bell (USA); 1876
- **Mcroscope :** Zacharis Jansen (Netherlands); about 1590. Electron microscope-Vladimir Kosme Sworykin (Russia and then, USA) in 1939
- **Motorcycle :** Edward Butler (Englnd); 1848
- **Microwave oven :** Englishmen John Randall and H.A.H. Boot's invention of magnetron in 1940
- **Motor scooter :** Greville Bradshaw (England); 1919
- **Neon lamp :** George Claude (France); 1915
- **Neptune :** (By mathematics alone) John C. Adams (England); 1843-45. Johann G. Galle and his assistant, Heinrich L.D. Arrest of Germany (1846) credited
- **Nylon :** Wallace H. Carothers (USA); 1938
- **Oxygen :** Joseph Priestley (England) and Carl Scheele (Sweden) independently; 1770s
- **Parachute :** First design by Leonardo da Vinci (1485). First demonstration L.S. Lenormand (France); 1783
- **Paraffin :** Auguste Laurent (France); 1830
- **Parking meter :** Carl Magee (USA); first used in 1935
- **Penicillin :** Alexander Fleming (England); 1928
- **Periodic Law (of chemistry) :** Mendeleyev (Russia)
- **Petrol engine :** First internal combustion engine-Etienne Lenoir (1860); the four-stroke engine-Nikolaus Otto (Germany); petrol engine for the modern vehicle-Gottlieb Daimler and Karl Benz, independently.
- **Phonograph :** Thomas Alva Edison (USA); 1877
- **Photography :** (on metal): J. Nicephore Niepce (France) in 1826; (on paper); W.H. Fox Talbot (England) in 1835; (on film) : John Carbutt (USA) in 1888
- **Planetary motion :** Johann Kepler (Germany); 1600
- **Plastic :** First plastic material, Parkesine by Alexander Parkes (1850)
- **Powerloom :** Edmund Cartwright (England); 1785
- **Psycho-analysis :** Sigmund Freud (Austria)
- **Pressure Cooker :** Denis Papin (England); 1679
- **Printing press :** Johan zu Guttenberg (Germany); 1455
- **Printing (rotary) :** Richard Hoe (USA); 1846
- **Propeller (ship) :** Francis Smith (England); 1827
- **Quantum theory :** Max Planck (Germany); 1901
- **Radar :** Experiment by Americans Gregory Breit and Merle A. Tuve (1925) often considered the first practical use of radar.
- **Radioactivity (uranium) :** Antoine Henri Becquerel (France) discovered natural radioactivity (1896)
- **Radium :** Marie Curie (France); 1898

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- **Radio telegraphy :** (Over one km)-Ernest Lord Rutherford of New Zealand in 1895; (trans-Atlantc)-Guglielmo, Marconi of Italy in 1901
- **Radio transmitter :** Alexanerson; 1914
- **Railway (underground) :** Suggested by Chrles Pearson (England) in 1846. Electric-opened in 1890
- **Rayon :** Count Hilaire de Chardonnet (France); 1892
- **Razor :** (Safety) King Camp Gillette (USA)-1895; (Electric) Jacob Schick (USA)-1931
- **Record (long playing) :** Petter Goldmark (USA); 1948
- **Refrigerator :** First compression machine-Jacob Perkins (USA) in 1834. Use of ammonia-James Harrison (Scotland) in 1837
- **(Concept of) Relativity :** Albert Einstein (Germany-born American)
- **Revolver :** Samuel Colt (USA); 1835
- **Rubber :** Latex foam-1928; tyres-R.W. Thompson (England) in 1845; vulcanized-Charles Goodyear (USA) in 1841; waterproof-Charles Macintosh (Scotland) in 1819
- **Safety lamp :** Humphrey Davy (Engand); 1816
- **Safety pin :** William Hunt (USA); 1849
- **Seed drill :** Jethro Tul; 1701
- **Seismograph :** Robert Mallet
- **Sewing machine :** Barthelemy Thimonnier (France); 1830. The double-pointed needle-Charles Weisenthal (England) in 1755
- **Ship :** Steam-J.C. Perier (France) in 1775; Turbine-Charles Parsons (England) in 1894
- **Shorthand (modern) :** Issac Pitman (Britain); 1837
- **Silicone :** F.S. Kipping (England) ; 1904
- **Skyscraper :** William Le Baron Jenny (USA); 1882
- **Spinning jenny :** James Hargreaves (England) in 1784
- **Spinning mule :** Samuel Crompton (England); 1779
- **Steamboat :** John Fitch (USA); 1787
- **Steam engine :** Thomas Savery (England) in 1639. (Piston) Thomas Newcomen of England in 1712. (Condenser) James Watt of Scotland in 1765
- **Steam turbine :** Charles Persons (after 1884)
- **Steel production :** Henry Bessemer (England); 1885
- **Steel (stainless) :** Harry Brearley (England); 1913
- **Stethoscope :** Rene T.H. Laennec (France); 1816
- **Streetcar :** Railed 1550; electric-E. Warner von Siemen (Germany) in 1879
- **Submarine :** Cornelius Drebbel (Dutchman living in England); demonstrated in 1624
- **(Phenomenon of) Superconductivity :** (Holland); 1911
- **Synthetic dyes :** William Henry Perkin (England); 1856
- **Tank (military) :** Ernest Swinton (England); 1914
- **Telegraph code :** Samuel F.B. Morse (USA); 1837

- **Telephone :** Alexander Graham Bell (USA); 1876
- **Teleprinter :** Emile Bando, John George Halseke
- **Telescope :** Hans Lippershey (Netherlands); 1608
- **Television :** First proper TV picture transmitted by John Logie Baird (Scotland); 1926
- **Thermometer :** Galileo Galilei (Italy), 1593. Mercury thermometer-Fahrenheit in 1720
- **TNT (high explosive) :** Will Brand
- **Tractor :** Gasoline-engined; John Froelich (USA) in 1892; Caterpillar; Benjamin Holt (USA) in 1900
- **Transformer :** Michael Faraday (England); 1831
- **Transistor :** First demonstrated by John Bardeen, William Shockley, Walter Brattain (USA); 1948
- **Typewriter :** Basic-idea-Henry Mill (England); 1714. The first one designed by Christopher Latham Sholes (USA) with Carlos Glidden and Samuel W. Soule (1867)
- **Ultraviolet rays (curative effect) :** Niels Ryberg Finsen (Denmark)
- **Uranium fission :** Otto Hahn (Germany); Bohr (Danish); Fermi (Italy)
- **Vaccination (small-pox) :** Edward Jenner; 1796
- **Vacuum cleaner :** Herbert Booth in early 20th century
- **Vacuum flask :** James Dewar; 1892
- **Velocity of light :** Fizeau; 1902
- **Video recorder :** (Using gramophone discs) J.L. Baird in 1928; (using tape) Alexander Poniatoff in 1956
- **Watch (self-winding) :** Abraham-Louis Breguet (France); 1791
- **Welder (Electric) :** Elisha thomson (USA); 1877
- **Wireless telegraphy :** G. Marconi (Italy); 1896
- **X-ray :** Wilhelm von Roentgen (Germany); 1895

FACTS TO REMEMBER

Most reactive solid element	:	Li
Most reactive liquid element	:	Cs
Most reactive gaseous element	:	F
Highest electronegativity	:	F
Highest ionization potential	:	H
Lowest electron affinity	:	Noble gases (zero)
Liquid element of radioactive nature	:	Francium (Fr)
Total number of radioactive elements in periodc table	:	25
Volatile d-block elements	:	Zn, Cd, Hg
Element containing no neutron	:	$_1H^1$
Most abundant element of earth	:	Oxygen (O)
Rarest element of earth	:	Astatine (At)
Most abundant metal of earth	:	Al

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Element having maximum tendency for catenation	:	Carbon
Lightest element	:	H
Heviest naturally occurring element	:	U^{238}
Poorest conductor of current	:	Pb (metal), S (non-metal)
Amphoteric non-metal	:	Si
Elements showing diagonal relationship	:	Li–Mg, Be–Al; B–Si
Metalloids elements	:	B, Si, Ge, As, Sb Te
Non-metals having metallic luster		Graphite, Iodine
Element sublime on heating	:	I
Noble metals	:	Au, Pt
Amphoteric metals	:	Zn, Al, Sn, Pb
Non-metal having highest m.pt, b. pt	:	Diamond
Metals showing highest ox. no.	:	Pu, Os
Element having highest tensile strenth	:	Boron
Coolant in nucler reactors	:	D_2O
Latest discovered element	:	Hahnium (Ha, atomic no. 105) Eka (Eka mercury atomic no. 112)
Element kept in water	:	P (yellow)
Elements kept in kerosene oil	:	Na, K, I_2, Cs
Dry ice or Cardice	:	CO_2
Artificial explosive	:	Dynamite
First noble prize of chemistry was given to	:	Vant Hoff
Tincture iodine (antiseptic)	:	I_2 in alcohol
Some commonly used oxidants	:	H_2 O_2, SO_2, SO_3, Cl_2, H_2SO_4, HNO_3
Some commonly used reductants	:	SO_2, H_2S, Cl_2, Bleaching power
Neutral oxides of non-metals	:	CO, N_2O, NO, H_2O
Dry bleacher	:	O_3
Natural explsovie	:	NCl_3
Amphoteric oxides	:	ZnO, PbO, Al_2O_3, SnO, BeO
Some polymorphic elements	:	O, S, P
Some isomorphous substances	:	$FeSO_4.7H_2O$, $MgSO_4.7H_2O$, $ZnSO_4.7H_2O$, $Na_2S_2O_3.5H_2O$, $FeSO_4.7H_2O$

BIOLOGY

INTRODUCTION

Biology (Bios = life, logos = study) is defined as the study of Plants and Animals. Biology as a subject encompasses in itself various functions of life that constitutes a living organism. These vital functions are feeding, movement, breathing, interaction with the environment, reproduction etc. Biology also includes a variety of other crucial topics like structure and function of organisms, inheritance, growth, development, behaviour etc. Thus to provide a wider perspective to Biology, a new term 'Life Sciences' has been introduced to include all the above mentioned studies. Broadly there are two main divisions of Biology — Botany and Zoology. But both Botany and Zoology have various branches and each forms a new discipline in Biology.

BRANCHES OF BIOLOGY

1. **Morphology** – It deals with the study of external features of an organism. For example a plant is made up of roots, stem, leaf, flower, fruit etc.; man has eyes, ears, nose, arms, legs etc.
2. **Anatomy** – The study of gross internal structures of plants and animals is known as internal morphology or anatomy. For example, man has heart, liver, lungs, kidney, pancreas, stomach etc.
3. **Histology** – The branch of biology which deals with the cellular structures of plants and animals is known as histology.
4. **Cell Biology** – It deals with the structure, function, reproduction and all other activities of a cell itself.
5. **Physiology** – It is the study of various processes and functions (like digestion, respiration, excretion etc.) of the life that make an organism.
6. **Embryology** – The branch of biology that deals with the study of various events and changes that occur in the formation of zygote and then to transform it into an individual till the birth is known as **embryology**.
7. **Ecology** :– The branch of biology which deals with the study of organisms with respect to their environment is termed as ecology.
8. **Taxonomy** :– The branch of biology that deals with identifying, naming (nomenclature) and classifying organisms into various groups is known as taxonomy.
9. **Genetics** :– The characters are always transmitted from parents to their children or from one generation to the next generation. For this the nucleus of the cell has chromosomes which bear genes on them. Genes are chemically made–up of DNA (deoxy ribonucleic acid). This DNA acts as a hereditary material. **Heredity** is the science dealing with the study of resemblances and differences between the parents and their off–springs. While, Genetics is a larger field of biology which involves the study of heredity plus the reasons governing **heredity**.

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10. **Organic Evolution** – It deals with the study of how simple and primitive forms have changed to, gradually over a period of time, more complex and present day forms of life. The vast variety of plants and animals have come up due to organic evolution.
11. **Palaeobiology** – It deals with the study of origin, structure and growth of various forms of life that have existed in the past and only the fossils are available now. **Palaeobotany** deals with the study of fossil plants; and **Palaeozoology** deals with the study of fossil animals. The study of fossils, as such, is known as Palaeontology.
12. **Molecular Biology** – It deals with the study of various complex organic molecules of which the organism is made. For example, the structures of various enzymes or proteins, carbohydrates, fats, nucleic acids, hormones etc. It also includes the ways they are metabolised in our body.
13. **Space Biology** – It deals with the effects of space conditions on an organism. It is also called as **Exobiology**.
14. **Radiation Biology** – It is the study of harmful and useful effects of various radiations (α β, γ rays etc.) on the organisms.
15. **Anthropology** – It is the study of physical and mental constitution of man, his cultural development, social conditions in the past and present. In other words, it is the study of evolution of man through culture.
16. **Agriculture** – It is the science of producing plants and animals useful to man. It includes the cultivation of land, breeding and management of crops and animals.
17. **Agronomy** – It is a branch of agricultural science and deals with the study of crops and soils in which they grow.
18. **Soil Science** – It is the study of structures, types and dynamics of the soil.
19. **Horticulture** – It is a branch of agriculture that deals with the study of growing vegetables, fruits and ornamental plants.
20. **Pathology** – It is a science that deals with the study of nature of diseases, their causes, symptoms and effects.
21. **Entomology** – It is a branch of science dealing with the study (habits, classification, functions, structures etc.) of insects.
22. **Protozoology** – It is the study of unicellular organisms.
23. **Bacteriology** – It is the study of bacteria.
24. **Ichthyology** – It is a branch of science that deals with the study of fishes.
25. **Ornithology** – It is a branch of science that deals with the study of birds.
26. **Herpetology** – It is the study of amphibians and reptiles.
27. **Veterinary Science** – It is the study of diseases of domesticated animals and their health care.
28. **Poultry Science** – It deals with the study of domestic fowls such as chickens, ducks and geese.

29. **Sericulture** – It deals with the management and breeding of silk worms to produce silk.
30. **Silviculture** – It is the science of studying the establishment, development, care and reproduction of valuable timber trees.
31. **Forestry** – It is the sciene of developing, cultivating and conserving forests to have the maximum utility.
32. **Apiculture** – It is the science of keeping and breeding of honey bees to obtain honey and bee'swax.
33. **Dairy Technology** – It is the application of science for the manufacture of milk products.
34. **Microbiology** – It is a science dealing with the structure, function, uses etc. of microscopic organisms.
35. **Pharmacology** – It is a science dealing with the knowledge of drugs and the preparation of medicines.
36. **Psychology** – It is a science dealing with the qualities and behaviour of human mind.
37. **Pharmacy** – It is a science of preparing and compounding medicines and dispensing them according to the medical prescriptions.
38. **Physiotherapy** – It is the science of treatment of diseases, body weakness or defects by physical methods like massage and exercise.
39. **Nutrition** – It is the study of nourishment of human beings or other organisms.
40. **Genetic Engineering** – It involves the manipulations at gene level so as to produce an organism with new and desired characters.
41. **Biomedical Engineering** – It is the science of producing spare parts of man, implants artificial limbs, heart lung machines etc.
42. **Food Technology** – It is the application of science for the processing and preservation of foods.

BIOLOGICAL CLASSIFICATION

➤ There are seven main categories used in any plan of classification —

1. SPECIES

➤ A species is a population of plants or animals which are genetically distinct, reproductively isolated and similar in morphological characteristics. The members of a species can freely interbreed among each other. For example, a population of lions represents the species *Panthera leo*; and a population of tigers comprises the species *Panthera tigris*.

2. GENUS

➤ It is a category consisting of two or more species. In general, species in a genus usually have many features in common. Such groups of common features are known as correlated characters. Each species of a genus is given a scientific name based on binomial nomenclature. For example; the genus *Solanum* includes the

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species *Solanum melongena* (brinjal), Solanum tuberosum (potato); *Solanum nirgum* (makoi) and *Solanum xanthocarpum* (Kanteli).

3. FAMILY

➢ This category comprises one or more genera having some common features but differing from the genera of other families in having certain characteristic differences. For instance, the family Papilionaceae represents all the genera of the pulses; and the family Graminae contains all the genera of cereals and millets.

4. ORDER

➢ It consists of one or more families having certain common characters which differ from families of other orders in some diagnostic characters. For example, the order Carnivora includes the families felidae (which includes lions, leopards and tigers) and Canidae (which represents dogs and foxes).

5. CLASS

➢ It consists of one or more orders having certain characters in common but differ from orders of other classes in some other characters.

6. PHYLUM

➢ It comprises one or more classes having certain common diagonstic characters but differ from classes of other phyla in some other diagnostic characters.

7. KINGDOM

➢ It is the highest category in the plan of classification. Each kingdom has several independent phylum which in turn, represent specific classes, orders, families and genera.

KINGDOM OF LIVING BEINGS

Kingdoms	Characters	Members
1. Monera	Unicellular, prokaryotic, Autotrophic mode of nutrition, Asexual reproduction, Multiplication by amitosis	Archaebacteria (ancient bacteria), Eubacteria (true bacterial), cyanobacteria and Blue green algae
2. Protista	Unicellular, Eukaryotic, Aquatic, Autotrophic and Heterotrophic mode of nutrition, asexual repoduction by division into two, sexual reproduction by fusion.	Protozoans, slime moulds and water moulds
3. Fungi	Multicelluar, Eukaryotic, no true tissues, cell wall made up of chitin, Heterotrophic, saprobiotic, parasitic mode of nutrition (absorptive), asexual and sexual reproduction by spores and gametes respectively.	Bread mould, yeasts, mushrooms.

Kingdoms	Characters	Members
4. Plantae	Multicelluar, non-mobile forms, Eukaryotic, cell wall made up of cellulose, well developed tissues, photosynthetic-autotrophic mode of nutrition, asexual repoduction by multiplication, distinct sex organs life-cycle exhibits alternation of generations.	Algae, liverworts, mosses ferms, conifers, flowering plants.
5. Animalia	Multicellular, mobile forms, Eurkaryotic, well developed tissues, Heterotrophic mode of nutrition, sexual reproduction with distinct sex organs, control and co-ordination system, distinct embryological development.	Sponges, cnidarians, worms, insects, molluscs, star fish, fishes, amphibians, reptiles, birds and mammals.

CYTOLOGY

A Comparison of Prokaryotes and Eukaryotes

Eukaryote :– Within the cell, in most of plants and animals, there are various **membrane bound** structures called as organelles like mitochondria, chloroplast, nucleus, etc. Such a cell is known as an **eukaryote**. There are non-membrane bound organelles also present in eukaryotic cells. They are mainly the ribosomes and centriole. Each cell organelle performs a specific function of the cell in a well organised manner.

Prokaryote :– In bacteria and blue green algae cells, there are no definite cell organelles and the nucleoplasm and cytoplasm is not separated. Such a cell is known as a **prokaryote**. Prokaryotic cells can also carry out all biological functions similar to those of eukaryotic cells. However, the absence of membrane bound structures within the cell simply shows that they are primitive cells.

Difference between Plant cell and Animal cell

Plant Cell	Animal Cell
1. Cells are covered by a cell wall made up of cellulose.	A Cell wall is absent.
2. Centrioles with centrosome are absent (excpet a few lower plants).	Centrioles with centrosome are present near the nucleus.
3. Plastids containing pigments are present.	Plastids are absent.
4. Goldi bodies are in the form of a number of unconnected units called dictyosomes.	Golgi bodies are localized and consists of connected complexes.
5. Vacoules are large in size and more in number.	Vacoules are either absent or a few only.

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Structure and Function of Cell Organelles

Organelle	Structure	Function
1. Cell Wall	Found in plant cells only; mainly made up of cellulose and hemicellulose, chitin (fungus), protein (bacterial).	(i) It provides shape, strength and rigidity to the cells. (ii) Cell protection (iii) Transport of various substances (iv) Helps in cell expansion
2. Nucleus	Contains DNA and protein; limited by a nuclear membrane in eukaryotic cells, nuclear membrane not formed in prokaryotic cells, contains nucleolus; nucleoplasm contains chromatin material.	(i) Division of the cell (ii) Inheritance of characters. (iii) Controls various metabolic activities of the cell.
3. Mitochondria	Two membranes — larger membrane folded inside the smaller membrane forming crisase; the inner surface of the inner membrane has a number of F_1 or elementary particles.	Site of cellular respiration (Krebs cycle and electron transport chain); associated with the release of energy by the oxidation of food (oxidative phosphorylation).
4. Plastids	Double membraneous structure, inner membrane in the form of thylakoids forming stroma and grana, They are of three types: (i) **Chloroplasts** contain chlorophyll (ii) **Chromoplasts** contain pigments other than chlorophyll (iii) **Leucoplasts** do not contain any pigment.	(i) Site of photosynthesis in green plants. (ii) Release of energy in the process of photosynthesis (photophosphorylation). (iii) Provide different colours to flowers and fruits. (iv) Store the food of the plant body.
5. Endoplasmic reticulum	Membrane folds forming cisternae, vesicles and tubules; of two types **SER** (without ribosomes) and **RER** (with ribosomes).	Provides surface for various chemical reactions and the transport of substances within the cell.
6. Golgi Complex	Stacks of membranes in the form of cisternae, vacuoles and vesicles; in plant cells known as **dictyosomes**.	Secretion, absorption and transport of various susbtances within the cell.
7. Lysosomes	Small membrane sacs containing hydrolytic enzymes; classified as primary lysosomes, secondary lysosomes, autophagic vacuoles and residual bodies depending upon the physiological state of their action.	Digestion of own cell organelles, "suicidal bags of a cell".
8. Microbodies (i) Peroxisomes	Small-sized organelles containing enzymes like catalyses and oxidases.	Photorespiration in plant cells and lipid metabolism in animal cells.
(ii) Spherosomes	Small spherical bodies having high deposits of fats and lipids; enzymes like acid phosphates are found.	Exact function not known, show some lytic activity.
(iii) Glyoxysomes	Small bodies found in the seeds of groundnut and castor (that contain fatty acids).	During germination converts fatty acids to soluble carbohydrates — glyoxylate cycle.
9. Ribosomes	Small bodies containing RNA and proteins; a group of ribosomes attached to a mRNA strand forms polyribosomes.	Site of protein synthesis.
10. Centriole	Two dot-like bodies present near the nucleus; shows 9+0 pattern of arrangement of microtubules.	(i) Forms spindle-fibres at the time of cell division. (ii) Involved in the formation of cilia and flagella of the cell. (iii) Helps in the formation of sperms from spermatids.
11. Cilia and Flagella	Surrounded by a membraneous covering; shows 9+2 pattern of arrangement of microtubules.	(i) Locomotion in unicellular organisms (ii) Transport of substances in higher organisms.
12. Microtubules and Micro-filaments	Long, unbranched cylindrical tubes made up of proteins like tubulin and actin; forms network in the cytoplasm of the cell.	(i) Maintenance of Cell and chromosome movements. (ii) Contraction and relaxation of muscles.
13. Vacuoles	Membraneous bags filled with cell-fluids; membrane is known as tonoplast.	(i) contain various materials (ii) Osmo-regulatory in function

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Difference between DNA and RNA

	RNA	DNA
(i)	The sugar is ribose.	The sugar is deoxyribose
(ii)	It is a single-stranded strcuture	It is a double-stranded structure
(iii)	Adenine, guanine, uracil and cytosine are the four bases.	Adenine, guanine, cytozine and thymine constitute the four bases.
(iv)	It is found both in the nucleus and in the cytoplasm.	It is found only in the nucleus.

BOTANY

➤ Botany is the scientific study of plants.

Classification of Plants

A. Cryptogamae :– These plants do not bear flowers or seeds and reproduce by spores. They have three divisions.

1. **Thallophyta** :– They are most primitive plants devoid of any body differentiation. They are divided into three classes :
   - (a) **Algae** :– They are simple plants, largely found in marine or freshwater habitats. Some algae are terrestrial also. e.g. Blue green algae (Nostoc), green algae (Ulothrix), red algae (Batra).
   - (b) **Fungi** :– These simple plants lack chlorophyll and are generally saprophytic or parasitic. e.g. Agaricus, Aspergillus, Rhizopus.
   - (c) **Lichens** :– Lichens grow on rocks, tree-trunks and are symbiotic associations between algae and fungi, e.g. Usnea, Parmelia.
2. **Bryophyta** : These are simple, terrestrial plants commonly found in moist habitats. e.g. Funaria, Riccia. They are divided into two classes–
   - (a) **Hepaticae (Liverworts)** :– A class of bryophytes containing prostrate thallose dichotomously branching plants bearing unicellular rhizoids e.g. Pellia, Marchanitia.
   - (b) **Musci (Mosses)** :– This class includes erect leafy plants with multicellular rhizoids. e.g. Funaria, Mnium.
3. **Pteridophyta** : These are vascular non-seed bearing plants. They are found mainly in shady or damp places. e.g.Azolla, Pteris, Marsilea, Pteridium.

B. Phanerogamae : These are higher plants bearing flowers and seeds. There body is differentiated into root, stem and leaves and vascular system are well-developed. These are divided into Gymnosperms and Angiosperms.

1. **Gymnosperms** :– These are the naked seeded vascular plants. They includes cycads and conifers.

   - (a) **Cycads** : They grow in the warmer regions of the plains and have high ornamental value. e.g. Cycas Circinalis.
   - (b) **Conifers** :– They are the most predominant gymnosperms. They are a good source of timber, resin and turpentine oil. e.g. Pines, Fir, Cedar.
2. **Angiosperms** :– They are vascular seed plants characterised by their flowers containing the male and female reproductive structures. These are further divided into two groups :
   - (a) **Monocotyledons** :– They are characterised by a single cotyledon in the seed. e.g. wheat (Triticum Vulgare), rice (Oryza Satina), Maize (Zea Mays).
   - (b) **Dicotyledons** :– They are characterised by having two cotyledons in the seed e.g. Rose (Rose Indica), apple (Malus Silvestris), Pea (Pisum Sativum).

PLANT STRUCTURE AND FUNCTIONS

The Root

➤ The Plant structure that grows into the soil and anchors the plant to the ground.
➤ Roots develop from the radicle of the embryo.
➤ Roots differ from shoots in lacking chlorophyll and in the arrangement of Xylem and Phloem.

Kinds of Root Systems

(1) **Tap Root System** :– Root develops from the radicle and continues growing actively producing later branches. Tap roots are characteristic of most of the dicot plants. They are mostly present in some annual plants.
(2) **Adventious Root System** :– Root develops from any part of the plant other than the radicle. They occur in grasses and may be regarded as characteristic of monocot plants.

Modifications of Roots

(1) **Fusiform** :– Swollen root with tapering at both ends. e.g. radish.
(2) **Napiform** :– Root is globular and tapers abruptly e.g. beet root.
(3) **Tuberous** :– Root with no definite shape e.g. 4'O clock plant.
(4) **Fasciculated** :– When storage roots occur in cluster e.g Dahila.
(5) **Beaded** :– When roots are swollen at frequent intervals e.g. bitter gourd.
(6) **Assimilatory** :– Which develop chlorophyll and photosynthesis e.g. Tinospora and Trapa.
(7) **Haustoria** :– They are the roots of the parasitic plants which penetrate the host tissue e.g. in cuscuta.

Functions of Root

(1) The roots absorb water and minerals from the soil.
(2) The roots fix the plant to the soil firmly.

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(3) The roots absorbed water and minerals are translocated to the stem through the xylem of the root.
(4) Some roots help in vegetative propagation of species.
(5) Some roots store food and become swollen.
(6) Some roots manufacture food through photosynthesis.
(7) In parasitic plants roots penetrate the host stem to obtain food and water.

The Stem

- Stem is a longitudinal axis upon which are borne the leaves, buds and reproductive organs of the plants.
- The stem along with its leafy branches constitutes the shoot system of the plant.

Categories of Stem

(1) **Tree** :– A tree possesses a main stout stem called the trunk and bears branches.
(2) **Shurb** :– The stem is 3 to 10 ft long and bears branches near the base of the plant. e.g. Rose, Jasmine etc.
(3) **Herb** :– Soft and pliable stem. e.g. Tomato, Tulsi.

Forms of the Stem

(1) **Erect Stems** :– These are stout stems and can stand erect without any external support. e.g. Neem, Mango, bamboo.
(2) **Weak Stems** :– These stems are thin, delicate, weak and are unable to stand erect e.g. Portulaca, Cuscuta, Grass.

Modifications of Stems

(1) **Underground Modifications** :– They are of four types.
  (i) **Rhizome** :– horizontally grousing, fleshy, underground stem e.g. Ginger, Turmeric etc.
  (ii) **Bulb** :– The stem is reduced to a disc like structure, bearing concentric layers of fleshy leafy bases that comprises the food store e.g. Onion garlic.
  (iii) **Tuber** :– A swollen underground stem that contains stored food, and acts as an organ of perennation and vegetative propagation. e.g. Potato.
  (iv) **Corm** :– Short erect fleshy swollen underground stem. e.g. Alocasia, Colocasia.

(2) **Subaerial Modifications** :– These are of four types.
  (i) **Runner** :– e.g. Grass, Oxalis.
  (ii) **Stolon** :– e.g. Jasmine, Strawberry.
  (iii) **Offset** :– e.g. Water hyacinth.
  (iv) **Sucker** :– e.g. Rose, Chrysanthemum.

(3) **Special Modifications** :
  (i) **Stem tendril** : e.g. Grapes,

  (ii) **Thorns** : e.g. Citrus, Bougainuillea.
  (iii) **Phylloclade** : e.g. Cactus.
  (iv) **Bulbils** : e.g. Aloe.

The Leaf

- Leaf is a flattened appendage of the stem that arises as a superficial outgrowth from the apical meristem.
- Leaves are the chief photosynthetic organs of the plant.
- Collectively leaves constitute the foliage of the plant.
- Leaves initiate from the shoot meristem as Primordia and gradually emerge as they grow older.

Types of Leaves

- Depending upon the incision of lamina, they are of two kinds — (i) Simple leaves (ii) Compound leaves.
- **Simple Leaves** :– A leaf is said to be simple when its lamina is entire or is incised but the incision do not touch the midrib.
- **Compound leaves** :– A leaf is said to be compound when its lamina is completely divided into distinct segments or leaflets.
- Compound leaves may be of two types (a) Pinnate and (b) Palmate.

Modifications of Leaves

(1) Leaf Tendrils :– e.g. Sweep pea, Wild pea.
(2) Leaf Hooks :– e.g. In Bignonia unguis – cati
(3) Leaf Spines :– e.g. In Berberis, Opuntia.
(4) Leaf Scales :– e.g. In Asparagus, Ruscus
(5) Phyllodes :– e.g. In Acacia moniliformis, Parkinsonia aculeata.

Functions of Leaves

(1) The most important function is the manufacture of organic food through photosynthesis.
(2) Gaseous exchange, necessary for photosynthesis and respiration takes place through leaves.
(3) Stomata borne on the leaves helps in the process of transpiration.
(4) In Insectivorous plants, leaves are modified into insect-traps.
(5) In some plants, leaves store water to resist drought.

The Flower

- Flower is the characteristic reproductive structure of an angiosperm.
- Morphologically, the flower is considered as a shoot bearing nodes and modified floral leaves.
- Flowers exhibits wide variation in size, shape, colour and arrangement of floral parts.

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Basic Plan of Flowers

- The stalk of the Flower is called Pedicel.
- Sepals are green, leaf-like structure that arise at the base of a flower and forms the outermost circle of appendage.
- Collectively the Sepals are referred to as Calyx.
- The Whorl of appendages that arise inner to sepals and petals.
- Petals are brightly coloured and are collectively called Corolla.
- The third group of appendages consists of Stamens, collectively called the Androecium.
- Each Stamen consists of a slender stalk, the Filament and the Anther.
- The Stamens are the male reproductive organs of the flower.
- The centre of the flower contains the female reproductive whorl called the Gynoecium or Pistil.
- Pistil is composed of one or more carpels.
- Each Carpel consists of three parts — Stigma, Style and Ovary.
- Inside the ovary the ovules develop from the Placenta.

Pollination

- The term pollination refers to the transfer and deposition of pollen on the stigmatic surface of the flower.

Types of Pollination

Technical Term	Agencies of Pollination
Anemophily	Wind
Hydrophily	Water
Entomophily	Insects
Ornithophily	Birds
Chiropterophily	Bats

IMPORTANT INFORMATION

(i) **Hypogynous Flowers :–** When the ovary is situated on the torus above all other floral parts. e.g. Mustard, Tomato.

(ii) **Perigynous Flowers :–** The thalamus forms a cup shaped structure around the ovary and bearls sepals, petals and stamens. e.g. Rose.

(iii) **Epigynous Flowers :–** The thalamus is cup shaped and is fused with the ovary such that the other floral parts arise on the top of the ovary. e,g, Cucumber, Apple.

(iv) **Hermaphrodite :–** Flowers that contain both stamen and pistil.

(v) **Unisexual :–** Flowers that bear organs of only one sex.

(vi) **Monoecious :–** Plants that bear flowers of both sexes. e,g, Maize.

(vii) **Dioecious :–** Denoting a plant species in which male and female flowers are borne on separate individuals.

Plant Hormones and their functions

Hormone	Functions
Auxins	Prevent premature fall of leaves, fruits etc., promotes enlargement, stimulates respiration.
Gibberellins	Promote germination, promote flowering, break dormancy of buds.
Ethylene	Triggers fruit ripening, accelerates abscission of leaves, flowers and fruits.
Cytokinin	Break dormancy in seeds, delay the ageing process in plants.
Abscisic Acid	It is a growth regulator, involves in the dormancy of seeds, acts as a stress hormone.

FRUITS

- A Fruit is a ripened ovary.
- Fruit is formed through the processes of pollination and fertilization which stimulates the ovary to grow and as a response ovary grows into a fruit.
- The fruit consists of a fruit wall, the Pericarp.

Zones of Fruit Wall (Pericarp)

1. Epicarp :– Outer Skin.
2. Mesocarp :– Sweet, edible flesh.
3. Endocarp :– innermost hard zone that enclosed the seed.

Types of Fruits

1. **True Fruits :–** Fruit which is derived only from the single ovary of a single flower and in the development of which no other part outside the ovary has taken part is called the true fruit e.g. Mango, Organe.
2. **False Fruit :–** When apart from the ovary other floral parts also take part in the formation of fruit, it is called as false fruit. e.g. Apple, Banana.
3. **Simple Fruits :–** A simple fruit is one in which ovary takes part in development e.g. Bean, Mustard, Citrus.
4. **Aggregate Fruit :–** In an aggregate fruit each free carpel developes independently to form a bunch of fruits e.g. Strawberry, Custard apple.
5. **Composite Fruit :–** A composite or multiple fruit develops from an inflorescence by the fusion of flowers and their parts e.g. Pineapple.

NUTRITION IN PLANTS

- Autotrophic Nutrition and Heterotrophic Nutrition are two modes of Plant Nutrition.
- Sixteen essential elements are required for the normal growth of plants.

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- Sixteen essential elements includes ten Macroelements and six micro-elements.
- Macronutrients :– Carbon, Hydrogen, Oxygen, Nitrogen, Phosphorus, Potassium, Magnesium, Sulpher, Calcium, Iron.
- Micronutrients :– Boron, Copper, Manganese, Zinc, Molybdenum, Chlorine.

Nitrogen Nutrition in Plants

- Atmosphere is the ultimate source of nitrogen.
- Nitrogen cannot be used directly but has to be fixed to form compounds.
- Higher plants utilise nitrogen in the oxidised forms such as nitrate (NO_3^-) and nitrite (NO_2^-) or in the reduced form (NH_4^+).
- The best known nitrogen fixing symbiotic bacterium is Rhizobium.
- Free living micro–organisms such as the cynobacteria and photosynthetic bacteria can also fix nitrogen.
- In nitrogen fixation the dinitrogen of the atmosphere is reduced to ammonia with the help of enzyme nitrogenase.
- Soil bacteria like Nitrosomonas and Nitrosococcus are capable of converting amonia to nitrite (NO_2^-) ions.
- Then, these ($NO2^-$) ions are converted into Nitrate ($NO3^-$) by Nitrobacters
- These nitrates are absorbed by the plants through their ross.

Mineral elements in Plants and Their Deficiency Symptoms

Elements	Deficiency symptoms
Nitrogen	Stunted growth, chlorosis.
Magnesium	Chlorosis, Yellowing of leaves.
Calcium	Stunted growth.
Phosphorus	Poor growth, leaves dull green
Potassium	Yellow edges to leaves, premature death.
Sulphur	Chlorosis, leaf curls, woody stems.
Iron	Chlorosis, reduced growth.
Manganese	Chlorosis, grey spots on leaves.
Boron	Brow heart disease.
Copper	Dieback of shoots.
Molybdenum	Retardation of growth.
Zinc	Malformed leaves, reduced flowering and fruiting.

ROLE OF MINERAL ELEMETNS IN PLANTS

Element	Obtained as	Regions of plant in which required	Functions
Sulphur	SO_4^{2+}	Stem and root tips; young leaves; remobilised during senescence	Constituent of certain proteins, vitamins (thiamine, biotin, CoA) and ferredoxin
Iron	Fe^{3+}	Everywhere; collects along leaf veins	Constituent of ferredoxin and cytochromes; activates catalase; required for synthesis of chlorophyll
Manganese (trace)	Mn^{2+}	Leaves and seeds	Activates certain enzymes (carboxylases)
Molybdenum (trace)	MO^{3+} or MO^{4+}	Everywhere; MO^{3+} particularly in roots	Activates certain enzymes in nitrogen metabolism
Boron (trace)	BO_3^{3-} or $B_4O_2^{2-}$	Leaves and seeds	Required for uptake and utilisation of Ca^{2+}, pollen germination and cell differentiation, carbohydrate translocation.
Copper (trace)	Zn^{2+}	Everywhere	Activates certain enzymes
Zinc (trace)	Cu^{2+}	Everywhere	Activates various enzymes especially carboxylases, part of carbonic anhydrase and various dehydrogenases; needed for auxin synthesis.
Chlorine	$C1^-$	Everywhere	With Na^+ and K^+ helps determine solute concentration and anion-cation balance in cells; essential for oxygen evolution in photosynthesis.
Nitrogen	$NO_2^-NO_3^-$ or NH_4^+	Everywhere particularly in meristematic tissues	Constituent of proteins, nucleic acids, vitamins, hormones, coenzymes, ATP, chlorophyll
Phosphorus	$H_2PO_4^-$	Younger tissues, withdrawn from older, metabolically less active cells	Constituent of Cell membrane, certain proteins; all nucleic acids and nucleotides; required for all phoshphorylation reactions.
Potassium	K^+	Meristematic tissues; buds, leaves, root tips	Helps determine anioncation balance in cells; involved in protein synthesis; involved in formation of cell membrane and in opening and closing of stomata; increases hardiness; activates enzymes and helps in maintenance of turgidity of cells.
Calcium	Ca^{2+}	Meristematic and differentiating tissues; accumulates in older leaves	Involved in selective permeability of cell membranes; activates certain enzymes; required for development of stem and root apex, and as calcium pectate in the middle lamella of the cell wall.
Magnesium	Mg^{2+}	Leaves; withdrawn from ageing leaves and exported to developing seeds	Activates enzymes in phosphate metabolism; constituent of chlorophyll; maintains ribosome structure

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Photosynthesis

- Photosynthesis is the process by which green plants trap solar energy and convert it into chemical energy of carbohydrates.
- Photosynthesis is the only source of energy for all organisms.

$$6\,CO_2 + 2\,H_2O \xrightarrow[\text{Chlophyll}]{\text{Sun light}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

- The light reaction ocurs in the grana of cel's chloroplast and th This reaction, O_2 is liberated, ATP and $NADPH_2$ is formed.
- The dark reaction occurs in the stroma of chloroplast and CO_2 absorbed from the atmosphere is reduced to make Carbohydrate.
- Only 0.2% of the light energy incident on earth is utilised by pho tosynthesis organisms.
- Leaf is the major organ of photosynthesis in plants.
- All green parts of the plants have chloroplasts.
- Chloroplasts are enveloped by double membrane enclosing stroma, in which grana are present. The grana contains pigments such as Chlorophyll.
- Photosynthesis involves two distinct phases :- Photochemical phase (light reactions) and biosynthetic phase (dark reactions).
- The light reaction occurs in the grana of cill's chloroplast and th the reaction, O_2 is liberated ATP and $NADPH_2$ is formed.
- The dark reaction occures in the stroma of Chloraplast and CO_2 absorbed from the atmosphere is reduced to make carbohydrate.

Respiration

- Respiration is the chemical breakdown of food to release the en ergy.
- Respiration is of two types –

1. **Anaerobic respiration** :- Respiration which takes place in the absence of oxygen. The process can be represented through the following equation

   $C_6H_{12}O_6 \rightarrow 6O_2 + 6H_2O + 673$ kilo calorie energy.

2. **Aerobic Respiration** :- Respiration which uses oxygen is called aerobic respiration. The process can be represented through the following equation

   $C_6H_{12}O_6 \rightarrow 6O_2 + 6H_2O + 673$ kilocalorie energy

FACTS TO REMEMBER

- Phyllotaxy is the way in which leaves are arranged on stem.
- P-Proteins are proteinaceous structures present in sieve tubes.
- Para rubber and Indian rubber are obtained from the latex of *Hevea Brasiliensis* and Ficus elastica, respectively.
- Latex of poppy (*Papaver somniferum*) yields opium which contains the alkaloid morphine.
- Latex of banana contains tannins.

- Shrubby climbers which climb with the help of hooks are called stragglers e.g., Artabotrys.
- Suckers developing in Musa are called sword suckers.
- Wood is secondary xylem formed by vascular cambium during secondary growth.
- Soft-wood is non-porous wood because it lack vessels.
- Softwood is generally produced by Gymnosperms e.g. coniferous woods.
- Lightest wood is found in Ochroma pyramidale (= *Ochroma Lagopus*).
- Heaviest Wood occurs in *Guaiacum officinale*. In India, it occurs in *Acacia sundra*.
- Most durable soft wood is obtained from the plants of *Cedrus deodara*.
- Most durable wood is obtained from Tectona grandis (Teak).
- There is no distinction between heart wood and sap wood in *Salix, Populus*, etc.
- In Morus, Taxus, the heart wood is most abundant and the sap wood zone is quite thin.
- Heart wood is dark coloured due to deposition of extractives and is considered durable.
- Number of annual rings decrease as we proceed from base to the top of tree.
- The bark of **Cinnamomum zeylanicum** (Dalchini) is used as a flavouring material.
- **Psychrometer** is an instrument measuring both relative humidity and transporation.
- **Trace element** is an element which is needed in very small amounts in plants.
- **Tracer elements** are the atoms of chemical elements called isotopes. They differ in atomic weight but not in chemical properties, Examples ^{14}C, ^{18}O and ^{32}P.
- Molybdenum is the micro–nutrient required by the plants in least quantity.
- Potassium is required for the activity of about 40 enzymes.
- Manganese is essential for photolysis of water.
- Prokaryotes absorb the element nitrogen in gaseous form.
- Characteristic pungent smell of onion and garlic is due to sulphur compounds.
- Gold has been reported to occur in the stems of *Equisetum*.
- **Goerick** (1940) developed hydroponics.
- **Photometer** is an apparatus used for measuring the rate of transpiration.
- **Porometer** is an apparatus for assessing the relative sizes of stomata.
- **Tensiometer** is an instrument used for measuring soil water tension.

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ZOOLOGY

- Zoology is the scientific study of animals.

Basis of Classification

- The animal kingdom is divided into two main sub-kingdoms – Protozoa and Metazoa.
- Protozoa are unicellular or acellular organisms. Metazoa are multicellular organisms.
- The two major groups of Metazoans are the non-chordates and the choradates.
- They derive the names from the absence or presence of NOTO-CHORD.
- A notochord is present at same time in the life of Chordates.
- Non-Chordates don't possess a notochord at any stage of their life.

Non-Chordates :– This group consists of the following phyla :

(1) Protozoa

- They are the most primitive, microscopic, unicellular organisms.
- They occur either singly or in colonies.
- Many protozoa lives as parasites in the body cavities, tissues and cells of animals and plants.
- They reproduce by fission, budding, by spores or sexually.
- Examples includes, Amoeba, Paramecium, Vorticella, Euglena, Trypnosoma.

(2) Porifera

- Sponges are the most primitive group of animal. Most of them are marine and sessile.
- Body consists of layer of cells lining of non-living matrix.
- The matrix consists of calcareous and siliceous spicules embedded in the gelatinous material.
- Flagellated collar cells line canals, while flattened cells line the outer & inner surfaces.
- Amoeboid cells wander through the matrix carrying food between cells.
- Water and food is drawn through collar cells & expelled through, Osculum.
- Sponge reproduce asexually by fragmentation. During sexual reproduction some cell become egg or sperm cells.

(3) Platyhelminthes (Flatworms)

- Mostly parasite. The liver and blood fluke (fasciola & schistosoma) are prevalent in places with poor sanitation and unprotected water supply.

- Flatworm help biologist to understand animal evolution.
- They are acoelomates with blind sac body plan, exhibit bilateral symmetry and triploblastic.
- They require a flat body because each cell has to be near external body surface and internal surface of branched digestive cavity to obtain oxygen and nutrient & removal of waste product.
- Flatworm can regenerate and reproduce asexually. They are HERMOFRODITE or Bisexual, e.g. Fluke, Marine flatworm, Planaria, Tapeworm.

(4) Nemathelminthes (Roundworms)

- Round worms have tube within tube body plan with mouth, pharynx, intestine & anus.
- The muscular pharynx allows the parasitic nematode to suck blood from the host.
- They are pseudocoelom. Sexes are usually separated, often with small male and large female individuals.
- Several nematodes infect plant roots and other lives as parasite in animals e.g. Hookworm. Filaria worm, Guinea worm, Pinworms etc.

(5) Cnidaria (Coelentrata)

- Mainly Marine.
- Hydra is fresh water form, Corals & sea anemones found in shallow warm sea & Jelly fish found in cooler water.
- Cnidarians exhibit a blind sac body plan and are radially symmetric, advance than sponges in having true tissue, acoelomate, body wall consist of only two layer (ectoderm & endoderm) i.e. DIPLOBLASTIC.
- Most ecoderm cell are contractile and posses muscular fiber, some transmit stimuli & form primitive nervous system.
- Muscles and nerve cells allowed body to co-ordinate in to movements.
- Stinging cells (unique to cnidarians) mainly in ectoderm of the tentacles discharge-stinging organ called NEMATOSYST.
- Endodermis cells, lining blind sac, specialized in digestive enzyme. Undigested matter is egested from mouth.
- Cnidarians exhibit two basic body forms, the Polyp & Medusae.
- In many Cnidarians, polyp gives rise to medusa by budding & medusae form polyp by sexual reproduction.
- Hydra doesn't have medusae stage. They reproduce sexually at polyp stage & do exhibit locomotion.

(6) Annelida (Segmented Worms)

- Segmented with bilateral symmetry, soft and have true body cavity.

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- Body is covered with true chitnious cuticle.
- Bristles on the lower side help to grip the ground during locomotion in earthworm.
- A close circulatory system of blood vessel, a heart to move the blood is found for the first time in annelids in evolution of animals.
- Mostly Hermaphrodite but sexes are separate in polychaetes. Some grow asexually by regenaration e.g. Nereis, Earthworm, Blood sucking leech.

(7) Mollusca

- It is second largest animal phylum after arthropoda.
- They breathe through gills. Land snails and slugs (a shell less form) have lungs.
- Single coiled shell forms the largest class of mollusc. Bivalve (two hinge shell) form the second largest class e.g. oyster, clam and mussels.
- Bivalves have no sensory tentacles & their foot is reduce in to tongue shaped structure, which help them burrow over sea floor.
- CHEPHALOPODS include squids and octopus. They have mantle cavity modified in to where water can expelled with force, which help animal to have fast.
- Their foot and head region is modified into structure bearing eyes and tentacles.

(8) Arthropoda

- Arthropoda consist largest group of animals. It includes four major classes – Arachnida, Crustacea, Myriapods, & Insecta.
- Success of arthropoda is to a large extent due to their unique cuticle, it's lightweight, and tough and hard chitin composed of protein and polysaccharides.
- Body is bilaterally symmetrical, segmented and divided in head, thorax, and abdomen.
- A characteristic feature is jointed legs, which may be variously modified for walking, swimming and feeling.
- Arthropod eyes may be simple or compound.
- Compound eye is made of many identical units, each with own lens. So, several separate images are formed. This enables the detection of slightest movement.
- Sensory structures in arthropods are antennae.
- Arthropods, particularly insects also communicate by chemicals called PHEROMONES.
- Sexes are separate. In few aquatic arthropods fertilization is external, but in others fertilization is internal.
- Eggs are laid by most arthropods, i.e., VIVIPAROUS

- In some (e.g. scorpion), the eggs hatch within the female body i.e. VIVIPAROUS.
- In some arthropods development is direct. The young hatched from egg resembles the adult. They grow by MOULTING.
- To enable growth the exoskeleton is periodically shed by a process is called moulting.
- In others, developments occur through series of transformations called METAMORPHOSIS.

Arachnids

- Six pair of appendages. Posterior four pairs are legs, anterior two are for feeding.
- Head and thorax are fused.
- Wings and antennae are absent. e.g. spider, scorpion, tick and mites.

Crustaceans

- Distinctive with two pair of antennae.
- Head and thorax are fused.
- Appendages are present in all segment, mostly aquatic e.g. Crabs, crayfish, prawns, water flea, lobster, and shrimps.

Myriapods

- Body has numerous segments. Each segment bear one or two pair of legs.
- One pair antennae e.g. centipedes, millipedes.

Insects

- Body is divided in thorax, abdomen and head, distinctly.
- Thorax bears three pair of legs. The second and third segment may have wings.
- Insects could be graded into four groups, based on absence or presence of wings and type of deployments :

1. Wingless form e.g. silverfish.
2. Wings not foldable: dragon and damselflies.
3. Wings foldale, grass hopper, locust, cricket, cockroach, termites, & some aphids.
4. Wings insects can both, fold their wings and exhibit complete metamorphosis: this group include most successful and diverse insects.

9. Echinodermata

- Consist of only marine animals.
- All adult echinoderms are radially symmetrical, but their larvae are bilaterally symmetrical.
- Spiny skin contains calcareous plate.

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- Their most distinctive feature is WATER VASCULAR SYSTEM, it consists of radiating canals and tubefeets. Their main function is locomotion and capture of food.
- Echinoderms have proper circulatory system.

10. Chordates

- The name chordate refers to the notochord which these animals possess, either throughout or during early embryonic life.
- Chordate are divided into two sub-phylums, Invertebrates and Vertebrates.

(A) Invertebrate Chordates

- These are also known as Protochordates.
- These forms are without a backbone but they do possess a notochord.
- Invertebrate chordates are further sub–divided into three super class, Caphalochordata, Hemichordata, Urochordata.
- Respiration occurs typically by gills.
- They are cold blooded.
- They are divided into Placodermic, Chondrichtthyes, Osteichthyes.

(B) Vertebrate

- Vertebrates represent the largest group of the chordates.
- In Vertebrate the notochord is present only during embryonic development.
- The gill slits remain functional only in gill–breathing fishes.
- This subphylum is further divided into two super class – Agnatha and Gnathostomata.

(i) Agnatha

- They are fish–like forms with no jaws and no scales.
- The skeleton is cartilaginous.
- All are parasites on other fishes.
- Examples are sea lamprey, hag fish.

(ii) Gnathostomata

- These are the Vertebrates with jawed mouth.
- This superclass is further subdivided into five classes.

(1) Pisces

- It includes true fishes.
- All are aquatic.
- The body bears fins.

(2) Amphibians

- Toad, frog, newt, salamander.

- Amphibian live only in fresh water, have moist, smooth, nonscaly skin..
- In frog and toads, the four limbs have fore toes while hind limb have five.
- Nostriles are use for perceiving odour and in respiration.
- The amphibians heart is three chambered. Gas exchange takes place in lungs, moist skin and moist cavity.

(3) Reptiles

- Cold blooded, body protected with waterproof scaly exoskeleton.
- They respire through lung, eardum is depressed.
- Reptiles are oviparous.
- Respirations in reptiles improve due to development of ribs, which help expand and contract the body cavity.
- Heart is three chambered. In crocodile heart is four chambered.
- Two feature make reptiles truly land animals :
  1. Development of internal fertilization.
  2. The presence of special third membrane in yolk filled egg called "AMNION". The amnion enclose embryo and provide watery environment during development.

(4) Aves

- Characteristic features are presence of feather and power of flight.
- Birds have a reptilian ancestry. Feather are highly modified reptilian scales.
- Their egg resembles reptilian egg but have calcareous shell.
- Body is streamlined, fore limb converted to wings. Long feather are essential for flight. Weight reduced due to hollow bones, Heart and Lung improve in order to transport oxygen. Heart is four chambered.
- Warm blooded.
- Few birds have wholly or partly lost the ability to fly. e.g.; emu, ostrich, and cassowary.
- In absence of teeth birds swallow food. The digestive tracts have additional chambers the CROP and GIZARD.
- The *crop* store and soften food, where as muscular *gizzard* help in crush in and churning it. Some birds store small stone in their gizzard for effective churning.

(5) Mammals

- The most unique characteristic is milk producing mammary gland.
- Mammals are viviparous, with exception of two; egg lying animal, the platypus and echidna.
- Other features are presence of hair on body and sweat glands in skin. External Car is present in most of mammal. Heart is four chambered.

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- Other than eggs lying there are two major groups :
  1. MARSUPIALS
  2. PLACENTAL
- Marsupials are common in Australia. Young one is nourished in special pouch e.g. kangaroo, koala, Tasmanian wolf.
- Placental can arranged in four evolutionary series :
  1. The insectivorous : The most primitive mammals are insect feeding ones e.g. Shrew, mole, hedgehog, and bats. The EDENTATES or tooth less mammals are related to insectivorous e.g. anteater or pangolin, armadillo. PRIMATES also evolve from shrew like animals.
  2. Whales, dolphins and porpoises.
  3. Rodents : rat, mice, squirrel, and beavers. Two pair of long chisel like incisor characterizes them. Rabbits and hares are also closely related.
  4. Carnivorous and Ungulates (hoofed mammals) and elephant : carnivores include cat like lion, tiger, leopard, cheetah, hoise cat. Ohter major group is dog like — wolfs, foxes, jackals, & dogs. Seal, walrus and sea lion are aquatic carnivores.
- Ungulates are divided into two groups–even hooofed ungulate (cows, buffaloes, sheep, goats, camel, pig, giraffes, hippopotamus) and odd toed ungulates (horse, donkey, zebra, rhino). There is no cud–chewing animal in this group.

Organs of Excretion — Invertebrates

Excretory System	Invertebrates
1. Canal System	Sponges
2. Hypostomal Opening	Hydra
3. Flame Cells	Tapeworm like fluke and Planaria
4. Nephridia	Annelids like Earthworm, leech
5. Green Glands	Prawn
6. Malphigian Tubules	Insects

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ELEMENTARY PHYSIOLOGY AND HYGIENE

- Cells of multi–cellular organisms undergo differentiation and each type of cell is specialised for a limited number of specific functions.
- One or more types of specialised cells are set in specific extracellular materials to constitute a tissue.
- An organ is made up of different types of tissue. Each organ performs specific functions, which depend on the collective and integrated activities of its tissues.
- Several organs constitute an organ system. Organs of a system function in a coordinated manner to carry out a major life process.

Human Body

- The Human Body can be divided into nine systems :
  1. The Digestive System
  2. The Respiratory System
  3. The Circulatory System
  4. The Excretory System
  5. The Endocrine System
  6. The Reproductive System.
  7. The Skeletal System
  8. The Muscular System
  9. The Nervous System

The Digestive System

- Digestion is the process of biochemical transformation of complex and large food particles into simpler form, making it suitable for absorption and assimilation. The process of the breakdown of large food molecules into simpler compounds is catalysed by special enzymes.

Organs involved and their functions

- **The Mouth :** Ingestion and chewing takes place in the mouth with the help of teeth. A starch hydrolysing enzyme, Ptyalin is present in the Saliva.
- **The Oesophagus :** The mouth leads to a funnel-shaped pharynx which communicates with a long muscular tube-like oesophagus. The oesophagus opens into the stomach.
- **The Stomach :** The stomach is a large muscular sac. The stomach has many glands on its wall. The cells of these glands secrete HCI, protein-digesting enzymes and mucin in the lumen of the stomach. The mixture of their secretions in the gastric lumen is called Gastric Juice. It digests proteins in the stomach.
- **The Small Instentine :** The small intenstine is distinguished into three parts, viz, Duodenum, Jejunum and Ileum. The common bileduct opens into Duodenum and drains juices from Pancreas and liver. The Jejunum follows duodenum and is longer and more coiled. The last part or ileum is also highly–coiled and opens into the large intenstine. Nearly all absorption of digested material takes place through the wall of the ileum through the villi.

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➤ **The Large Intestine :** The large intestine has three parts, Caecum, Colon and Rectum. The walls of the large instentine absorb much of the water. So it is not lost from the body. The semi-solids which remain are called faeces. They are stored in large intenstine and passed out at intervals through the anus.

STAGES IN DIGESTION

Part of the Alimentary Canal	Gland and its secretion	Enzyme secreted	Substrate	Product of Digestion
Mouth	**Salivary gland :** Saliva	Salivary amylase (Ptyalin)	Starch	Maltose
Oesophagus	None	None	None	None
Stomach	Glands lining the stomach : Gastric juice and hydrochloric acid.	Pepsin in adults Renin in children	Proteins Milk proteins (Caseinogen)	Proteoses and Peptones Casein
Duodenum	**1. Liver :** bile	None	Fats	1. Emulsified fat 2. Provides an alkaline medium for the action of intenstinal juices
	2.Pancrease : Pancreatic Juice	1. Amylopsin 2. Trypsin 3. Steapsin (lipase)	Starch Proteins Fats	Maltose Proteoses, peptose, peptides, amino acids Fatty acids and glycerol
Ileum	**Glands lining the ileum :** Intenstinal juice.	Erepsin (Peptidase) Maltase Sucrase (invertease) Lactase	Proteins and peptides Maltose Sucrose Lactose	Amino acids Glucose Glucose and Fructose Glucose and Glactose
Colon	None	None	None	Absorbs water and mineral salts
Rectum	None	None	None	Temporarily stores undigested food

The Respiratory System

➤ The Respiratory System takes in oxygen from the air and expels carbon dioxide and water vapour.

➤ The mammalian respiratory system consists of nasal cavity, nasopharynx, larynx, trachea, bronchi, bronchioles and lungs.

➤ The lungs are enclosed in double walled sacs called PLEURA.

➤ During inspiration, the diaphragm and some intercostals muscles contracts, due to which diaphragm moves down. The volume of Thorax increases, which lead to fall in pressure inside.

➤ Expiration is carried out passively by relaxation of diaphragm and intercostals muscles. The volume of thorax decreases and pressure inside thorax and lungs increases.

The Circulatory System

➤ The Circulatory System is constituted of following important parts :

1. **Arteries :** A large thick walled blood vessels that carries blood from the heart to the limbs and organs. All arteries except the pulmonary artery carry oxygenated blood.
2. **Veins :** A blood vessel that conveys blood from the capillary network in the tissues to the heart. All veins except the pulmonary vein carry deoxygenated blood.
3. **Heart :** The human heart is situated in the thorax between the lungs with its apex resting on the diaphragm. It consists of four chamber viz two Atria (Auricles) and two Ventricles. The Auricles receive blood from the veins. The ventricles pump blood into the arteries. Human heart beats at the rate of about 72/min in the resting condition.

The Excretory System

➤ Metabolism of different chemical susbstances produces different waste products in the body. The process of elimination of waste products from the body is called excretion.

➤ Important constituents of the Excretory system are :

1. Skin

➤ Human skin possess glands for secreting two fluids on its sufrace viz. sweat from sweat glands and sebum from sebaceous gland.

➤ Sweat is an aqueous fluid containing mainly sodium chloride, lactic acid, urea, amino acids and glucose.

➤ Sebum is wax–like secretion which eliminates some lipids, hydrocarbons and fatty acids.

2. Kidney

➤ Kidneys are the urine forming organs. Nephrons are functional units of kidney. They form urine and drain it ultimately into the pelvis of kidney, from where the ureter arises. Ureters from both the kindly finally open into urinary bladder which stores it temporarily. Urethra arises from the neck of the bladder and conducts urine to the exterior. The act of voiding the urine is called Micturition.

3. Lungs

➤ Lungs regularly participate in the excretion of some volatile materials by respiration. The entire volume of carbondioxide, produced in the body, and some moisture are regularly excreted in the expired air.

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4. Liver :–

- Liver is principal organ for the excretion of cholesterol, bile pigments (bilirubin and biliverdin) and inactivated products of steroid hormones, some vitamins and many drugs.

The Nervous System

- The Nervous System receives information about external and internal changes, conducts such information between different parts of the body and coordinates the activities of different organs and tissues in the light of those changes.
- The Nervous System consists of the Central Nervous System, Peripheral Nervous System and Autonomic Nervous System.

The Central Nervous System

- The Central Nervous System consists of brain and spinal cord.
- The forebrain consists of cerebrum, the largest part of human brain.
- Brain and spinal cord are covered by three connective tissue membrane–pia matter, archnoid matter and dura matter.
- An extra–cellular fluid called CEREBROSPINAl FLUID occurs between pia and archnoid mater. It affords some protection to CNS against mechanical injury and shock, it exchange materials.
- Hypothalamus contain higher nerve centres for temperature regulation, hunger, thirst and emotional functions. It secretes neurohormones which control secretions of anterior pituitary hormones. It synthesises the posterior pituitary hormones.
- Cerebellum is second largest portion of brain located at base, under the cerebrum.
- Cerebral hemisphere divided into frontal, parietal, temporal and occipital.
- The spinal cord is a series of 31 sections called segments. Each segment giving rise to pair of spinal nerve.

Peripheral Nervous System (PNS)

- PNS is composed of spinal nerves and cranial nerves.
- Neurons and nerve fibres conduct nerve impulses from the CNS to peripheral organ are called EFFERENT NEURONS and NERVE FIBRES.
- Neurons and nerve fibres conduct nerve impluses from periphery to CNS are called EFFERENT NEURONS & NERVE FIBRE.
- Neurons and nerve fibres which cause movement of the muscles are called MOTOR NEURONS and NERVE FIBRE.

Autonomic Nervous System (ANS)

- Nerves conveying impulses to glands involuntary muscles and heart muscles constitute ANS.
- ANS is divided into two Sympathetic and Parasympathetic nervous system.

- Sympathetic nerves enhance the force and rate of heart beat, constrict blood vessel, raise arterial blood pressure, dilate pupils, relax urinary bladder.
- Parasympathetic nerves, decrease both rate and force of heart beat, dilate many blood vessel, lower the blood pressure, constrict the pupils, contract the urinary bladder.

The Skeletal System

Axial Skeleton (80 bones)	
Skull	
Cranium	8
Face	14
Ear ossicles	6
Hyoid bone	1
Vertibral column vertebrae (cervical 7, thoracic 12, lumbar 5, sacrum 1, coccyx1)	26
Thorax : Sternum	1
Ribs	24
Appendicular Skelton (126 bones)	
Upper Regions	
Pectoral girdle : Clavicle	2
Scapula	2
Arm : Humerus (upper arm)	2
Radius	2
Ulna	2
Carpals (wrist)	16
Metacarpals (palm)	10
Phalanges (jingers)	28
Lower extremities : Pelvic (hip) Girdles	2
Femur (thigh)	2
Tibia	2
Fibula	2
Patela (knee cap)	2
Tarsals	14
Metatarsals	10
Phalanges	28

The Endocrine System

- Endocrine glands secrete hormones into the blood. Hormones are informational molecules. They regulate functions of other organs and tissues. Their actions are more widespread and slower than nerve impulses. They coordinate the activities of different organs and tissues.

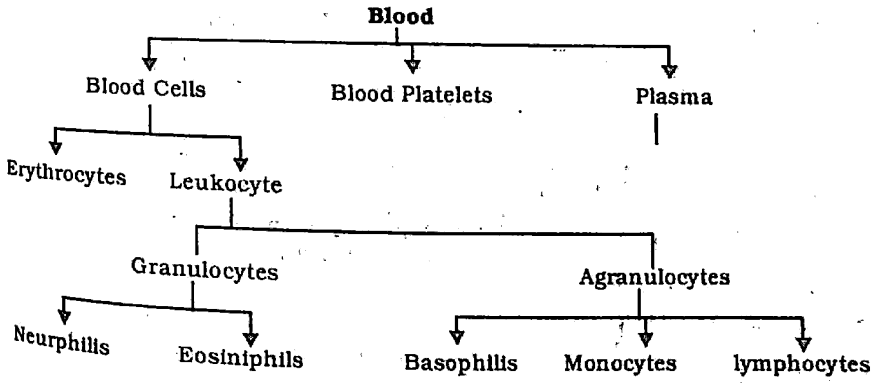
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Endocrine System and its Founctioning

Gland/ Location	Secretion	Function	Hyposecretion	Hypersecretion
1. Pituitary gland/ Attached to the hypothalamus of the brain.				
a. Anterior lobe	1.Adrenocorticotrophic hormone, follicle stimulating hormone, thyroid stimulating hormone.	Control the activities of the thyroid, adrenal gland and the gonads.		
	2.Human growth hormones (Hgh)	Stimulate general body growth.	Dwarfism	Gigantism (during growth years) Acromegaly (in adults)
	3. Prolactin	Stimulate the mammary glands to produce milk.		
b. Intermediate pituitary	Melanocyte stimulating hormone	Regulates amount of pigment in skins of certain animals.		Darkening of skin
c. Posterior lobe	1. Vassopressin	Stimulates kidneys to retain water, causes blood vessels to constrict.	Diabetes insipidus	
	2. Oxytocin	Stimulates the muscles of the utrerus to contract during labour.		Exopthalmic goitre
2. Thyroid/On either side of the trachea, in front of the larynx.	Thyroxine	Increases rate of metabolism and maintains energy balance.	Cretinism, Myxedema Simple goitre	
	Calcitonin	Regulates calcium and phosphate levels in the blood.	Tetany	
3.Adrenal gland/ Superior to each kidney.				
a. Adrenal cortex	1. Glucocorticoid (especially cortisol)	Regulate metabolism. Help body adjust to stress.	Addison's disease	
	2. Mineralocorticoid (especially aldosterone)	Stimulate kidney to retain sodium and excrete potassium.		
	3. Gonadocorticoid (espcially androgens)	Stimulate development of secondary sexual characteristics especially in males.	Prepuberty males develop female secondary sex characteristics & vice versa.	In adults, results in acute change in secondary sex characteristics.

b. Adrenal medulla	Adrenaline	Carbohydrate metabolism. Helps body adapt to stress and other extreme conditions.		Prolonged 'fight' or 'flight' symptoms which wears down the individual.
4. Parathyroid/ Embedded in the posterior surface of the thyroid gland.	Parathormone	Regulates calcium metabolism.	Tetany	Demineralisation of bones
5. Pancreas/ Slightly below the stomach.	1. Glucagon	Raises blood sugar level.		
	2. Insulin	Lowers blood sugar level.	Diabetes mellitus	Insulin shock.
	3. GHIH (Somatotrophin)	Inhibits secretion of glucagon and insulin.		
6. gonads a. Testes (male)/ In the scrotum in males	Testosterone and androsterone	Development of primary and secondary sex characteristics in males. Influences sex instincts and reflexes.		
b. Ovaries (female)/In the pelvic cavity.	1. Oestrogen	Development of the primary and secondary sex characteristics in females.		
	2. Progesterone	Prepares the uterus for the implatation, retention and growth of the foetus.		
	3. Relaxin	Helps to dilate the cervix towards the end of pregnancy to enable child birth.		
7. Thymus/Posterior to breastbone, between the lungs.	Thymosin, thymoprotein	Initiates production of lymphocytes, antibodies.		

BLOOD



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- Blood is a fluid connective tissue.
- Erythrocytes (RBC) are most numerous of the formed element of blood.
- Their most characteristic feature is presence of haemoglobin.
- The total number of erythrocytes per microliter of blood is known as total count of RBC. It averages 5m and 4.5m million in adult man and adult women respectively.
- The total count would be low in anaemia.
- The abnormal rise in total count in RBC is called *polycythemia*.
- Erythrocyte participate in transporting oxygen from lungs to tissue.
- CO_2 is carried in both plasma and RBC as bicarbonate.
- In foetus, erythrocytes are mainly formed in the liver and spleen. But from birth onwards, erythrocytes are formed in red bone marrow.
- Erythrocyte has average life of 120 days.
- Iron and proteins are essential raw material while B_{12} and folic acid stimulate synthesis and maturation.
- Leukocytes (WBC) are devoid of haemoglobin and are nucleated.
- Neutrophils and monocytes protect the body against microbes.
- Lymphocytes secrete antibodies in the blood to destroy microbes and their toxin.
- The number of leukocytes per micro litre of blood is called total count of WBC. It is normally 5000 in humans.
- Blood Platelets (thermocytes) are non nucleated, round or oval, biconvex cell.
- Their normal life span is a week.
- When blood vessel is injured, platelets get clamped at the injured spot and release certain chemical called Platelete Factor, which promote blood coagulation.
- The extra–cellular fluid is straw-coloured, slightly alkaline, and aqueous called plasma, which is 30%-35% of blood.
- Plasma contains 92% of water. Plasma contain three major classes of plasma protein – *albumin, globulin* and *fibrinogen*. It serves as source of protein for tissue cell.
- Albumin and globulin retain water in blood plasma. A fall in plasma protein leads to filtering out of excessive volumes of water from blood to tissue. This is why hands and feet get swollen with accumulated fluid in person suffering from dietary deficiency of protein.
- Plasma functions in transport, body immunity, prevention of blood loss, retention of fluid in blood, maintenance of pH, uniform distribution of heat.

Functions of Blood

1. Transport
   (a) Respiratory gases
   (b) Nutrients
   (c) Waste products
   (d) Hormones, enzymes, minerals
2. Protective Function
   (a) Production of antibodies
   (b) Phagocytosis
   (c) Clotting mechanism
3. Regulatory Function
   (a) Body temperature
   (b) pH balance
   (c) Fluid balance

Blood Coagulation

- Coagulation is brought about by hydrolysis of soluble fibrinogen of plasma to insoluble fibrin. This is catalysed by an enzyme called thrombin. Fibrin precipitate as network of fibres.
- Thrombin occurs in blood as an inactive globulin called Prathrombin.
- In case of injury, Coagulation promoting substances called Thromboplastins are released, which help in formation of enzyme Prothrombinase. This enzyme hydrolyses prothrombin to thrombin. Ca^{2+} ions are essential for both the activation and action of thrombin.

Blood Groups

- K. Landsteiner classified human beings in four groups on the basis of the reactions of their blood A, B, AB and O.
- Blood compatibility depends upon chemicals called agglutinogen or antigens on the surface of the red cells and chemicals called agglutinin or antibodies in the plasma.
- There are two types of antigen: A and B; and two types of antibody: anti-A and anti-B.
- **Blood group A** has A antigen on its red cells and anti–B antibody in its plasma.
- **Blood group B** has B antigen on its red cells and anti A antibody in its plasma.
- **Blood group AB** has A and B antigen on its red cells and no antibodies in its plasma.
- **Blood group O** has no antigens on its red cells but has both anti-A and anti-B antibodies in its plasma.
- Blood Transfusion. Anti-A plasma agglutinates A red cells, and anti-B plasma agglutinates B red cells. So these combinations of plasma and red cell are incompatible as far as blood transfusion is concerned.

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(ANTIGENS AND ANTIBODIES)

Blood group	Antigen	Antibody	May donate blood to	May receive blood from
A	A	b	A, AB	A, O
B	B	a	B, AB	B, O
AB	A, B	neither a nor b	AB	A, B, AB, O
O	neither	a, b	A, B, AB, O	O
		A nor B		

Possible/impossible Blood groups of Children from parents of various Blood Groups

Blood group of parents	Possible blood group of children	Blood group of children not possible
A × A	A or O	B or AB
A × B	O, A, B, AB	—
A × AB	A, B, AB	O
A × O	O or A	B or AB
B × B	B or O	A, AB
B × AB	A, B, AB	O
B × O	O or B	A, AB
AB × AB	A, B, AB	O
AB × O	A, B	O, AB
O × O	O	A, B, AB

GENETICS

- The term 'Genetics' was coined by Watson to describe the study of inheritance and variation and the factors controlling them.
- Today the subject has three main subdivisions — Mendelian genetics, population genetics and biochemical genetics.
- Heredity may be defined as the transmission of characteristics from one generation to successive generations of living things.
- The first quantitative study of inheritance was carried out by Gregor Mendel in Garden Peas (Pisum Sativum).
- Gene is a unit of heredity.
- The various forms of a gene are called ALLELES.
- Individual organisms in which the members of a pair of alleles are different are said to be Heterozygous.
- Individuals in which the members of a pair of alleles are same are said to be Homozygous.
- The Genotype is the genetic constitution of an organism.
- The observable characteristics of an organism constitutes its Phenotype.

- The ability of a gene to have many effects is called Pleiotropy.
- Pedigree analysis is a system to analyse the distribution and movement of traits in the family tree.
- The Chromosome Theory of Inheritance states that Mendelian genes are located on chromosomes, and it is the chromosomes that segregate and independently assort.
- The sexually reproducing animals have, in each of their cells, a set of chromosomes called autosomes and a pair of sex chromosomes (X and Y).
- In human females there are two X chromosomes and in males one X and one Y Chromosome.
- Har Gobind Khorana, along with his associates, manufactured short DNA molecules having a known sequence of bases.
- These DNA molecules synthesized messenger RNA molecules also of known base sequence. These RNA molecules then directed protein synthesis and from the sequence of the proteins, the codes were directly established. This is a milestone in the history of genetics. For this, Khorana shared with M.W. Nirenberg and R.H. Holley (1968) Nobel prize in medicine.

Genetic Disorders

- ***Albinism*** **:** caused by recessive gene, which block the conversion of amino acid *tyrosine* to melanin. Effect is absence of pigment in skin, hair and iris of eyes.
- ***Down syndrome*** (Mongolism) : caused by trisomy of chromosome 21. Effect is physically and mentally retarded patient.
- ***Glactosemia*** **:** caused by recessive autosomal gene, results in defect in enzyme system utilizing sugar glactoselead to high–level of glactose in blood; resulted in development of cataract and brain damage.
- ***Hemophilia*** **:** caused by sex–linked recessive gene; produce defective protein, essential for clotting of blood.
- ***Huntington's disease*** **:** caused by dominant autosomal gene; lead to progressive deterioration of nervous system. Peculiar feature developed between 30 to 40 years.
- ***Klinefelter syndrome*** **:** because of additional X-chromosome; resulted in improper development of tastes.
- ***Muscular Dystrophy*** **:** caused by sex linked recessive gene, resulted in childhood muscle weakness and atrophy.
- **Phenylketomine (PKU) :** caused by recessive autosomal gene in homozygous condition, results into accumulation of acid phynalanine and brain damage. It can be prevented by giving phynaline diet.
- **Sickle Cell Anaemia :** caused by recessive gene lead to abnormal haemoglobin molecule.
- **Tay-Sach disease :** caused by autosomal recessive gene-resulted in cerebral degeneration, epilepsy, paralysis and blindness.

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- **Thalassemia** – (Cooley's anaemia) mostly in children caused by recessive gene-resulted in abnormally in haemoglobin.
- **Turner Syndrome** : caused by lack of X chromosome (OX); resulted in phenotypical female but have rudimentary sex organ and mammary gland.

FOOD AND NUTRITION

Balanced Diet

- A diet is balanced if it contains all the nutrients in the correct amount.
- A balanced diet is related to the state of one's age, health and occupation.
- Carbohydrates, proteins, fats, vitamins and minerals are Nutrients.
- Carbohydrates and fat; provide energy.
- Proteins : growth and repair of cellular mechanism.
- Vitamin and minerals : aid vital reaction in cells and tissue.
- Roughage : proper digestion.
- For Pregnant woman and children protein requirement is high.
- For Hard–working adult carbohydrates and fats requirement is high.

Important Facts

- Carbohydrates are more suitable for the production and energy in the body than protein and fats because carbohydrate molecules contain relatively more oxygen than the others.
- Carbohydrates are supplied to the tissues mainly as blood sugar.
- Carbohydrates are also stored in the tissues as glycogen.
- Athelets, labourers doing heavy work and mountaineers should live on high carbohydrates.
- 1 gm yield 17 KJ or 4.1 K cal.
- Carbohydrates account for 60 – 80% energy requirement.
- Fats gives twice energy than carbohydrates because it contains less oxygen.
- 1 gm fat oil give 37 kg or 9.45 k Cal.
- Butter, ghee, cheese, milk, egg, yolk, nut, meat are rich sources of fat.
- Fat is insoluble in water and soluble in organic solvent.
- Fats are stored as lipid in our body.
- Few fats cannot be synthesized by our body are called Essential fat. The most important of these is Unoleic acid (all vegetable oil contain, except coconut oil).
- Unsaturated fat : Low melting point, more reactive.
- Saturated fat : Occur mostly in animal fat, high melting point, solidify at room temperature.
- The principal nutritional role of proteins is to build tissue structures.

- Some of the proteins cannot be synthesized in the animal body and must be supplied with food in adequate amounts. They are called Essential Amino Acid. Other Amino Acids may be synthesized in the body, are called Non-Essential Amino Acid.
- Eight–amino–acids are considered essential for human nutrition. These are methionine, theronine, tryptophan, valine, leucine, isoleucine, lycine and phenylalanine.
- Plants proteins are frequently deficient in one or more essential amino acids. They are considered nutritionally inferior to animal proteins with respect to essential amino acids.
- Linoleic, linolenic and arachidonic acids are essential fatty acids.
- Groundnut, beans, cereals (maize and wheat), pulses are source of plant protein.

Mineral Deficiency Diseases

Minerals	Sources	Daily Requirement	Functions	Deficiency signs
Calcium	Milk, Cheese, hard water, green vegetables, fish, meat etc	1.0–15 gm	Essential for the formation of bones, teeth, coagulation of milk, contraction of muscle, neuro-muscular excitabilituy, permeability of the capillaty endothelium and activation of certain enzymes.	Rickets (malformation of bones), tetany etc.
Potassium	All food stuffs	4 gm	It plays an important role in maintaining intracellular osmotic pressure, intracellular reation, CO_2 carriage, cardiac and muscular contraction.	Retardation of bone growth, lowering of heart rate, paralysis of muscle, hypertrophy of Kidney, sterility.
Magnesium	Green vegetables, bread, meat, etc.	300 to 350 mgm.	It is essential for the formation of bones and teeth and muscular contraction. It activates the enzyme, phosphatase.	Vascular disturbances, hyperexcitability, convulsions, tetany etc.
Iron	Green leaves, peas, lentils, fruits, meat, fish, liver, egg etc.	5 to 20 mgm	It is one of the main constituents of haemoglobin, cytochrome and myoglobin. It is related to oxygen carriage	Anaemia

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			in blood in the form of haemoglobin, and acts as oxygen store for muscle in the form of myoglobin. It is also related to the tissue oxidation in the form of cytochrome.	
Copper	Green vegetables, milk, brain, liver, etc.	2 mgm	It acts as an important component of many enzymes e.g., cytochrome oxidase, tyrosinase, uricase.	Anaemia, Wilson's disease
Iodine	Common salts, sea weeds, milk, fish etc.	0.05 mgm	It is an essential constituent of the hormone thyroxine (an active principle of thyriod gland).	Goitres
Sodium	Common salt, milk water, different food-stuffs etc.	5-10 gm	Essential for normal functions of cells, contraction of muscles, excitation of nerves. It helps to maintain blood reaction, formation of HCL of gastric juice, osmotic pressure and absorption.	Reduction of fat deposit, atrophy of muscles and testis, lung infection, retarded bone formation and growth.
Phosphorus	Cereals, legumes, fish, meat, eggs, liver, kidney etc.	1-1.5 gm	It is an essential constituent of cells, bones and teeth. It takes an essential role in muscular contraction, phosphorylation of sugars, fats, blood coagulation, enzymatic functions of Vitamin B-Complex, regulation of pH of cells, blood and urine etc.	Rickets, Osteomalacia, dysfunction of renal tubules etc.

Some Important Protozoan parasites of man

Parasite	Habitat	Mode of infection	Effects on Man
Entamoeba histolytica	Colon; in the mucous membrane	Infection by the encysted spores being swallowed with contaminated food or water	Ulceration of the intestine and dysentery
Entamoeba Coli	Colon; in the lumen	-do-	Harmless
Entamoeba gingivalis	Buccal cavity; in and around teeth	No cysts formed : infection possibly direct with sputum	-do-
Trypanosoma gambiense and Trypanosoma rhodesiense	1. Blood 2. Cerebro-spinal fluid	Transmission by Tsetse fly -do-	1. Gambia fever (occurs in Africa) 2. Sleeping sickness (occurs in some African countries)
Lieshmania donovani	Bloodcells of the capillaries in spleen, bone-marrow and liver	Transmission by sandfly	Kala-azar
Leishmania tropica	Endothelian cells	Transmission by sandfly or direct contact	Delhi Sores
Trichomonas hominis	Colon	Not definitely known	Diarrhoea
Trichomonas buccalis	Mouth	-do-	Non-Pathogenic Veginitis
Trichomonas vaginalis	Vagina	-do-	
Giardia intestinalis (=G.lamblis)	Intenstine especially of chilren	By cysts being swallowed with food or water	Diarrhoea
Balantidium Coli	Colon	-do-	Balantidial dysentory
Plasmodium	Red Corpuscles	Transmission by Anopheles	Malaria

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Diseases Caused by Protozoans

Disease	Pathogen responsible	Habitat	Mode of transmission and incubation period	Main symptoms of disease
Malaria	Plasmodium	Passes thorugh a developmental phase in liver, resides inside RBCs. and carried by blood to all organs	Transmitted to man by bite of an infected female anopheline mosquito.	Three stages : Cold stage, headache, shivering and rising termperature. Fever stage-fever rises to its maximum, severe headache, pain in back and joints, vomiting; Swaeting stage-profuse sweating, fall in temperature, pain relieved.
Amoebic dysentery or Amoebiasis	Entamceba histolytica	Large intestine	Transmitted from man to man through ingestion of cysts in drinking water, vegetables and food contaminated with faeces.	Acute dysentery with blood and mucous in stools, and severe abdonimal pain, Secondary complications include formation of multiple abscesses in liver, lung brain, spleen and ulceration of skin, vagina and penis.
Sleeping sickness (Trypanosomiasis)	Trypanosoma brucei	Reaches lymph nodes via lymphatics blood and infests brain	Transmitted by bite of tseste fly	Fever, severe headache, enlargement of glands at back of neck, rash on the back and chest, joint pains, swelling of eyelids, ankles and hands, trembling, loss of appetite, no desire to work except sit ot sleep, mental disturbances, coma and death.
Kala-azar or black sickness	Leishmania donovani	Reticuloendothelial cells	Man becomes infected by bite of sandfly	Enlargement of spleen, liver, fever, jaundice, skin becomes dark through pigmentation.

IMMUNIZATION SCHEDULE

S.No.	Age	Vaccine	Dose
1.	New born	BCG	–
2.	Within 15 days	'O' Polio	–
3.	6th week	DPT and Polio	First dose
4.	10th week	DPT and Polio	Second dose
5.	14th week	DPT and Polio	Third dose
6.	9–12 months	Measles	One dose
7.	18–24 months	DPT and Polio	First booster
8.	15th month–2 years	MMR Vaccine	–
9.	2-3 years	Typhoid	Two doses at one month interval
10.	4-6 years	Dual Antigen and Polio	Second booster
11.	10th year	TT and Typhoid	First booster
12.	16th year	TT and Typhoid	Second booster

BCG – Tuberculosis Vaccine (bacille Calmette Guerin)
DPT – Diphtheria, Pertussis (whooping cough), Tetanus
MMR – Mumps, Measles and Rubella vaccine
TT – Tetanus Toxoid

Diseases caused by Worms

Disease	Pathogen responsible and its habitat	Mode of Transmission	Main symptoms of disease
Taeniasis	Taenia solium; small intestine (jejunum) of man	Part of the life cycle in pig, man get infected on eating pork, infected stage being mature cyst (cysticercus) in pork.	Abdominal discomfort, chronic indigestion, anemia, diarrhea, alernating with constipation
Ancylosioniasis or 'Hook-worm disease'	Ancyclostoma dooudenale; small intestine (jejunum) of man	Transmission from person to person, filariform larvae passed out in faeces, man picks up infection walking barefoot on faecally contaminated soil.	Dermatitis; reddish, itchy papule along the path traversed by larvae; severe anaemua; duodenal ulcer, constipation. Pateint pale, face puffy with swelling oif lower eyelids, oedema of feet and ankle.
Ascariasis	Ascaris lumbricoides; small intestine (jejunum) of man	Transmission from person to person, ripe eggs passed out in faeces, infection affected by swallowing ripe Ascaris eggs with raw vegetables	Larvae in lung cause pneumonia. May give rise to typhoid like fever causes protein and Vitamin A deficiencies resulting in protein

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			calorie malnutrition and night blindness respectively. Can cause appendicitis, jaundice by blocking lumina of appendix and billary passages.
Enterobiasis or 'Pinworm' disease	Enterobius vermicularis; caecum and vermiform appendix	Transmission from one person to another by ingestion of eggs in contaminated food or drink. Autoinfection itching in anus; scratching anus and ripe eggs on fingers transferred to food ingestion of such food.	Eczematous condition round the anus, bed-wetting at night, inflammation of vermiform appendix.
Filariasis	Wuchereria bacrofti; lymphatic vessels and lymph nodes	Part of the life cycle in mosquito in which larvae develop and become infective to man, with mosquito bite larvae deposited on skin which enter through puncture wound and reach lymphatic channels.	Elephantiasis i.e. enormous enlargement certain body parts such as that of leg, scrotum, penis, labia, clitoris, breast, forearm.

Food Adulteration

- Cereals (wheat) – mud, grit, soapstone
- Dals – Khesari dal, mentil yellow (a dye)
- Haldi – lead chromate
- Dhania – Cowdung, horsedung
- Black Pepper – dried papaya seeds
- Chilli powder – Sawdust, brick powder
- Mustard Seeds – argemone seeds
- Edible Oils – cheaper oil
- Milk – extraction of fat, addition of starch
- Honney – Jaggery, Sugar

Source and role of Principal vitamins

Vitamin	Best Food Source	Function	Deficiency disease
Retinol : (Vitamin A) (Fat soluble)	Carrots, Yellow and green vegetables. Other sources include butter, milk, fish, liveroil	Synthesis of the visual purple of the retinal rods. Maintains general health and vigour of epithelial cells. Hence essential for good skin and hair.	**Xerophthalmia** : dyring of cornea and ulceration. **Night blindness** : inability to see in the dark. **Keratinization of epithelium** : Dry skin and hair.
Thiamine (Vitamin B_1) (Water Soluble)	Whole grains, yeast, liver, egg, pork, nuts	Carbohydrates metabolism. Ensures normal functioning of the central nervous system.	**Beri-beri** : Partial paralysis of skeletal muscles and digestive disturbances
Riboflavin (Vitamin B_2) (Water Soluble)	Cereals, legumes, milk egg, liver, kidney, yeast	Essential carbohdydate and protein metabolism especially in the cells of the eye, skin, intestines, and blood.	Characterised by corneal ulceration and cracking of skin (especially around the lips).
Niacin (Water Soluble)	Lean meat, liver, milk eggs, nuts, whole grains	Inhibits production of cholesterol and helps in the breakdown of fats, proteins and carbohydrates.	**Pellagra** : Characterised by dermatitis (skin inflammation), diarrhoea and dementia (loss of intellectual function).
Pyridoxine (Vitamin B_6) (Water Soluble)	Salmon, yeast, yogurt, corn, spinach, cheese, cereals & legumes. Also synthesised by intestinal bacteria.	Essential for amino-acid metabolism. Assists production of antibodies.	**Epileptiform** seizures observed in children. Symptoms include dermatitis of eyes, nose and mouth; retarded growth.
Folic Acid (Water Soluble)	Yeast, liver, green leafy vegetables. Synthesized by intenstinal bacterial also.	Helps normal production of blood cells. Identified in chromosomes an important reproductive factor.	**Macrocytic anaemia** : Production of abnormally large red blood cells.
Cyanocobalamine (Vitamin B_{12}) (Water Soluble)	Liver, Kidney, meat, eggs, milk and cheese. (Note : Absent in vegetables, only Vitamin containing cobalt).	Necessary for red blood cells formation and normal functioning of nervous system.	**1. Pernicious anaemia** **2. Neuro-psychiatric abnormalities** : Memory loss, mood and personality changes.
Ascorbic acid (Vitamin D) (Water Soluble)	Citrus fruits, tomatoes, cabbage.	Influences permeability of capillary walls. Develops immunity against disease. Forms collagen.	**Scurvy** : Swollen gums, teeth loss, bleeding gums.

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Calciferol (Vitamin D) (Fat Soluble)	Fish liver oil, egg yolk, milk, butter. Also synthesized in the human body by the skin under the influence of sunlight.	Controls calcium and phosphorus metabolism which contribute to formation of teeth and bones.	Rickets (in infants) Bones becomes soft (deformed) **Oesteomalacia** (demineralization of bones)
Tocopherol (Vitamin E) (Fat Soluble)	Wheat germ, fresh nuts, seed oils, green leafy vegetables	As anti-oxidant which protects lipids of cells membranes against oxygen damage.	Deficiency not reported in humans. Causes **sterility** in **rats.**
Phyllo-quinones (Vitamin K) (Fat Soluble)	Liver, spinach, cauliflower, green tomatoes.	Assists in the production of prothrombin and other factors that ensure normal clotting of blood.	**Haemorrhage** : Subcutaneous and intramuscular bleedings due to delayed clotting time.

Diseases caused by Viruses

Disease	Pathogen responsible	Mode of transmission and incubation period	Main Symptoms of the disease
Small pox	Variola Virus	Direct contact (droplets); indirect by infected article; 12 days	Onset sudden or gradual, High fever, headache, backache skin rash on third day, passes through stages of macules (bright red spots), papules, vesicles (with clear fluid), postules (with pus like fluid) and scabs (dried crusts). Scabs fall off and leave behind pitted pock marks.
Chicken pox	Varicells virus	Direct contact (droplets); indirect by infected objects; 12-16 days	Fever, cold, skin eruption starts as red spots, vesicles and crusts. Scab : formation in 36 hours which fall off within 5 to 20 days.
Common Cold	Rhinovirus	Contact : 2-5 days	Headache, cough, nasal discharge, mild fever.
Rabies (Hydrophobia)	Rabies virus (rhabdovirus)	Bite of a mad (rabit) dog: 2-16 weeks or longer	Headache, nausea, vomiting, fever, insomnia, hoarse voice, sight of water sends throat muscles into painful spasms (feat

			of water), convulsions, paralysis, death.
Dengue fever or breakbone fever	Dengue virus (arbovirus)	Mosquito (Aedes) bite; 4-8 days	Fever, headache, pain in joints, back muscles and eye balls, skin rash for a few days, prolonged convalescence.
Acquired Immuno Deficiency Syndrome (AIDS)	Human T. cell Leukemia Virus (HTLVIII) ; also called-LAV (retrovirus)	Via blood and sperm among homosexuals, heterosexuals, intravenous drug-users, hemophiliacs promiscuous individuals and prostitutes.	Loss of 10% or more of body weight, fever of unknown origin, pneumonia, brain tumours, haemorrahage, unremitting diarrhoea, swelling of lymph glands, mouth ulcers.
Measles (Rubella)	Measles (paramyxo-virus)	Direct contact, virus transmitted through air by droplets during talking, coughing and sneezing; 10-14 days	First stage marked by running nose, sneezing, fever, headache, backache and chills. Second stage starts 2-3 days later with inflammation of mucous membrane of upper respiratory tract, constant flow of mucus and a red blotchy skin rash.
Mumps	Mumps virus (paramyxo-virus)	Direct contact; virsun in saliva and secretion of nose invades salivary glands; 12-21 days.	First stage marked by high fever, headache, backache, reddened taste buds, either excess of saliva or mouth and throat very dry. In second stage swelling of salivary glands about ear and jaws for 7-10 days.
Viral encephalitis	Pollo virus (enterovirus)	Contact houseflies, fleas, food and water; 7-14 days.	Headache, stomach upset, vomiting, high fever, sore throat and loose bowels.

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Diseases and Associated body part

Ailment	Part or region affected	Ailment	Part or region affected
1.Arthritis	Joints	2. Bronchitis	Lungs
3. Carditis	Heart	4. Colitis	Intestines
5. Cystitis	Bladder	6. Conjunctivitis	Eye
7. Dermatitis	Skin	8. Gastritis	Stomach
9. Glossitis	Tongue	10. Hepatitis	Liver
11. Meningitis	Brain	12. Myelitis	Spine
13. Nephritis	Kidneys	14. Neuritis	Nerves
15. Otitis	Ear	16. Osteomyelitis	Bones
17. Peritonitis	Abdomen	18. Rhinitis	Nose
19. Tonsilitis	Throat		

Types of Cancer

Carcinoma	Cancer of epithelial cells of the skin and the lining of the internal organs
Osteoma	Tumours of the bones
Glioma	Tumours of the connective tissues in the brain and central nervous system
Melanoma	Tumours of the pigmented moles found on the skin
Lymphoma	Tumours of lymph glands
Leukaemia (blood cancer)	Uncontrolled proliferation with plenty of immature W.B.C. and lymph gland enlargement; anaemia

Human body at a glance

- Normal blood pressure : 80 to 120
- Teeth : 32
- Volume of Blood : About 7 liters in normal body of about 7% of the total body weight
- Largest part of human brain : cerebrum
- Biggest organ : Liver
- Heart Beat : 72 times in a minute
- Master gland : Pituitarty
- Number of Bones : 206
- Number of Muscles : 525
- Number of chromosomes : 46 or 23 pairs

Milestones in Medicine

Discovery	Time	Person	Country
Ayurveda	2000-1000 BC	Atreya	India
Western Scientific Therapy	460-370 BC	Hippocrates	Greece
Yoga	200-100 BC	Patanjali	India
Ashtanga Hridaya	c.550 AD	Vagbhata	India
Sidhayoga	c.750	Vrdukunta	India
Anatomia	1316	Mondino	Italy
Chemotherapy	1493-1541	Paracelsus	Switzerland

IMPORTANT DISCOVERIES

Discovery	Year	Person	Country
Circulation of blood	1628	Willaim Harvey	Britain
Biochemistry	1648	Jan Baptista Van Helmont	Belgium
Bacteria	1683	Leeuwenhock	Netherlands
Neurology	1758-1828	Franz Joseph Gall	Germany
Physiology	1757-1766	Albrecht Von Haller	Switzerland
Vaccination	1796	Edward Jenner	Britain
Histology	1771-1802	Marie Bichat	France
Stethoscope	1819	Rene Laennec	France
Embryology	1792-1896	Karl Ernest-Van Baer	Estonia
Morphine	1805	Friderich Sertumer	Germany
Chloroform as anasethetic	1847	James Simpson	Britain
Hypodermic Syringe	1853	Alexander Wood	Britain
Rabies Vaccine	1860	Louis Pasteur	France
Bacteriology	1872	Ferdinand Cohn	Germany
Leprosy Bacillus	1873	Hansen	Norway
Cholera T.B. germs	1877	Robert Koch	Germany
Malaria germs	1880	Laveran	France
Diphtheria germs	1883-84	Klebs & Loffler	Germany
Aspirin	1889	Dreser	Germany
Virology	1892	Ivanovski & Bajernick	Russia, Netherlands
Psycho-analysis	1895	Sigmund Freud	Austria
Serology	1884-1915	Paul Ehrlich	Germany
Anti-toxin (science of immunity)	1890	behring & Kitasato	Germany, Japan
Adrenaline	1894	Schafer and Oliver	Britain
Endocrinology	1902	Bayliss & Starling	Britain
Electro-cardiograph	1903	Willem Einthoven	Netherlands
Typhus Vaccine	1909	J. Nicolle	France
Sex Hormones	1910	Eugen Steinach	Austria
Vitamins	1912	Sir F.G. Hopkins	Britain
Vitamin A	1913	McCollum and M.Davis	USA
Vitamin C	1919	Froelich Holst	Norway
Synthetic antigens	1917	Landsteiner	USA
Thyroxin	1919	Edward Calvin Kendall	USA
Insulin for Diabetes	1921	Banting & Best	Canada
Vitamin D	1925	McCollum	USA
Panicillin	1928	Alexander Fleming	Britain
Electro-encephalogram	1929	Hans Berger	Germany
Cardiac Pacemaker	1932	A.DS. Hyman	USA
Vitamin B1	1936	Minot & Murphy	USA
Cortisone	1936	Edward Calvin Kendall	USA
D.D.T. (Dichloro-Diphenyl-Trichloroethane)	1939	Paul Muller	Germany
Rh-factor	1940	Karl Landsteiner	USA
LSD (Lysergic acid diethylamide)	1943	Hoffman	Switzerland

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Streptomycin	1944	Selman Waksmann	USA
Kidney Machine	1944	Kolf	Netherlands
Chloromycetin	1947	Burkholder	USA
Aureomycin	1948	Duggar	USA
Reserpine	1949	Jal Vakil	India
Terramycin	1950	Finlay & Others	USA
Cryo-Surgery	1953	Henry Swan	USA
Open Heart Surgery	1953	Walton Lillehel	USA
Poliomyelitis Vaccine	1954	Jonas Salk	USA
Poliomyelitis Vaccine (oral)	1954	Albert Sabin	USA
Oral Contraceptive Pills	1955	Gregory Pincus	USA
Artificial Heart	1957	Willem Kolff	Netherland
Use of artificial heart (for surgery)	1963	Michael de Bakey	USA
Heart Transplant Surgery	1967	Christian Barnard	S. Africa
CAT Scanner	1968	Godfrey Hounsfield	Britain
Nuclear magnetic resonance imaging	1971	Raymond Damadian	USA
Recombinant–DNA technology	1972-73	Paul Berg, H.W. Boyer, S. Cohen	USA
First Test Tube Baby	1978	Steptoe & Edwards	Britain
Positron Emision Tomography	1978	Louis Sokoloff	USA
Gene Therapy on humans	1980	Martin Clive	USA
Small Pox eradicated	1980	W.H.O. Declaration	USA
Genes associated with Cancer	1982	Robert Weinberg & others	USA

Goals to be achieved by 2000-2015 ad per the NHP 2002

Eradicate Polio and Yaws	2005
Eliminate Leprosy	2005
Eliminate Kala Azar	2010
Eliminate Lymphatic Fillariasis	2015
Achieve Zero–level growth of HIV-AIDS	2007
Reduce mortality by 50% on account of TB, Malaria and other Vector and water–born diseases	2010
Reduce prevalence of blindness to 0.5%	2010
Reduce IMR to 30/1000 & MMR to 100/100000	2010
Increase utilisation of public health facilities from current level of 20% to 75%	2010
Establish an integrated system of surveillance, national health accounts and health statistics	2005
Increase health expenditure by Government from 0.9 per cent of the GDP at present to 2 per cent of GDP	2010
The States to increase expenditure on health sector from 5.5 per cent to 7 % of their Budget And further increase to 8%	2005 2010

IMPORTANT FACTS

- The only movable bone in the skull of man is mandible or jaw bone.
- The vertebral column has 33 vertebrate.
- Stapes in the ear is the smallest bone.
- 1st seven pair of ribs are known as true ribs.
- Pair 8th, 9th, and 10th attach indirectly to sternum and are thus called false ribs.
- 11th and 12th rib do not attach to sterum and are called floating ribs.
- Femur is the longest bone.
- 1st vertebra is called atlas, it supports the head.
- 2nd vertebra is called axis.
- Hyoid is a U-shaped bone, that supports the tongue.
- Cavity in pectoral girdle is called–Glenoid cavity.
- Cavity in pelvic girdle is called acetabulum.
- Tooth enamal is the hardest susbtance in our body.
- Spontaneous involuntary, activities, evoked by stimulation of receptors are called Reflexes.
- Ureoletic animals include man and all other mammals, aquatic mammals like whales and seals, amphibian like toad and frog and shark, stingray, alligators and turtle.
- Man can concentrate urea in urine more than 100 times its concentration in blood.
- Nephrons are functional unit of kidney.
- An opaque, white fibro elastic capsule called SCLERA, and transparent layer, bulging white of the eye, called CORNEA.
- In case of eye transfer, only cornea is used.
- RETINA is inner–most light sensitive, made up of many layers of cells and fibre.
- Bitter taste is evoked by quinine, morphine, caffeine, nicotine, and urea. It is also produced by cation of many inorganic salts like Magnesium salts.
- Salty taste results mainly from cations like Na^+.
- Major cells of Immune system are WBC, are of two type B-cells and T-cells.
- T-cells are responsible for cellular immunity and B-cell produce antibodies.
- The body has thousands of antigen-specific B-cells.
- Allergies are caused by ALLERGENS, which are generally weak antigens.
- In first exposure, it helps in formation of antibody.
- In second exposure antibodies react and release histamine which are responsible for inflammatory responses.

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- Anti-histamines control allergic reaction.
- T-cells respond to antigens by producing clone of T-cells. Each T-cells recognize specific antigen.
- The Killer T-cell directly attack and destroy antigen.
- The Helper T-cell act to stimulate antibody production by B-cells.
- The Suppressor T-cells suppress the total immune reaction keeping it from attacking the body's own cells. (life of T-cells 4-5 years).
- Both B-cells and T-cells also produce memory cells and effector cells.
- Gene Therapy, in human, is to replace a 'faulty gene' by a normal healthy functional gene.
- Cloning is a process of producing many identical organisms or clones.
- Stem cells have ability to divide for indefinite periods in culture and to give rise to specialised cells.
- The fertilised egg is a totipotent.
- Eyes capable of focusing the images of objects are possessed only by vertebrates and some higher invertebrates like prawn, crab and insects.
- Many insects such as honey bee, flies, butterflies and moth possess chemoreceptors for taste sensation at their feet.
- Some mammals like rhesus monkey, dogs, pig and cat possess taste sensation for water. Man does not possess taste buds for tasting water.
- Kidneys are the urine forming organs of vertebrates.
- The kidney consists of an outer layer of tissue called renal cortex and an inner tissue called renal medulla.
- An abnormal rise in arterial blood pressure is called *Hypertension*. A rise in blood cholesterol may lead to deposition of cholesterol this cause the arteries to lose their elasticity. This is called *Arteriosclerosis*. The stiffened arterial wall fails to exert moderating effect on blood pressure.
- *Hypertension* is an abnormally low pressure. It may result from chronic vasodilatation of arterial, anaemia, and blood loss due to bleeding or failure of pumping action of heart.
- The mast cells store inflammation producing substances such as histamine, which help in defence by attracting phagocytes to injured tissue.
- Normal blood sugar level: 80-100mg per 100ml of blood.
- Cholesterol: 50-180mg per 100ml.
- About 30% of CO_2 entered into RBC, combined with globin part of deoxyhemoglobin to form *carbaminohemoglobin*.
- The connective tissue provides structural framework and support to different tissue forming an organ.
- First man–made cereal is Triticosecale (Rai + wheat).

- Milk is rich source of all vitamins except Vitamin C.
- Vitamin D (skin) & K (liver) can be synthesised by our body.
- Deficiency of protein, carbohydrates and fats results in 'protein – energy– malnutrition'.
- Protein deficiency – Kwashiorkor, Marasmus.
- In Kwashiorkor (rejected child) skin crack and become scaly, abdomen swell, hair become reddish.
- Marasmas child show all above symptoms besides wasting of muscles.
- Disease restricted to given region and arising from its specific environment condition are called Endemic disease. Such as goiter in Sub-Himalayan region.
- Pellagara is common amongst people living on a maize diet, because maize interferes with the absorption of niacin in boby.
- Overdose of water soluble vitamin does not cause any harm.
- Accumulation of fat soluble Vitamin can be toxic–Disease caused by it is called Hypervitaminosis.
- Vitamin A accumulate in liver, while Vitamin D promotes high Ca^{++} absorption which damage the kidney where it is deposited.
- Human eye is sensitive only to wavelength ranging from 380 to 760 mm.
- Human being, apes, monkey, birds, lizards, turtles and some fishes possess colour vision.
- Genetically modified DNA fragments are termed as recombinant DNA. These can be cloned and amplified virtually to an unlimited extent.
- Genetic engineering is essentially the alternation of genetic make–up of cells by deliberate and artificial means.
- DNA ligase enzymes are used to join DNA fragments.
- They do so by forming again phosphodiester bond.
- New technology like gene gun are also available for vectorless direct gene transfer.
- Transgenics or transgenic organisms are also called Genetically Modified Organisms (GMOs).
- Dendirte carry impulse towards the cells, Axon away from the cells.
- Acetylecholine is the chemical transmitter of impulse between synaptic knobs.
- The ligament connects bone at the joints and hold them in a position.
- Cartilage is bone but semi-rigid and flexible connective tissue.
- Bone is solid and strong connective tissue.
- The matrix is heavily deposited with appatite salts of calcium and phosphorus.
- Adipose tissue is a connective tissue rich beneath the skin, around kidney in mesentry and bone narrow.

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- Besides fibroblast, macrophages collagen and elastic fibres, adipose tissue also contain Fat cells.
- The adipose tissue synthesize, store and metabolises fat. It prevents heat loss by forming heat insulating layer beneath the skin and forms shock absorbing cushions.
- The contraction and relaxation of cardiac chamber are respectively known as Systole and Diastole.
- Human heart beats at the rate of about 70/min in the resting condition.
- Tachycardia : A rapid heart or pulse rate of over 100/min.
- Bradycardia : A slow heart rate of below 60/min/
- The smaller the animal, the higher its metabolic rate and consequently greater is the need for pumping action of the heart.
- The heart rate increases during exercise, fever and emotions like anger and fear.

Important Institutes of Medical Research and Biotechnology

- National Institute of Immunology (NII), New Delhi
- National Centre for Cell Science (NCCS), Pune
- National Brain Research Centre (NBRC), New Delhi
- National Centre for Plant Genome Research, New Delhi
- National Bioresource Development Board, New Delhi
- Centre for DNA Finger-Printing and Diagnostics (CDFD), Hyderabad
- National Institute of Ayurveda, Jaipur
- National Institute of Homoepathy, Kolkata
- National Institute of Unani Medicine, Bangalore
- National Institute of Siddha Medicine, Chennai
- National Institute of Naturopathy Medicine, Pune
- Morarji Desai National Institute of Yoga, New Delhi
- Rashtriya Ayurveda Vidyapeeth, New Delhi
- Central Council for Research in Ayurveda and Siddha (CCRAS)
- Central Council for Research in Unani Medicines (CCRUM)
- Central Council for Research in Homoeopathy (CCRH)
- Central Council for Research in Yoga and Naturopathy (CCRYN)
- All India Institute of Hygiene and Public Health, Kolkata (W. Bengal)
- All India Institute of Medical Sciences, New Delhi (Delhi)
- All India Malaria Institute, Delhi
- Central Research Institute, Kasauli (Himachal Pradesh)
- Indian Institute of Experimental Medicine, Kolkata (W. Bengal)
- Institute of Ayurvedic Studies and Research, Jamnagar, (Gujarat)
- National Institute of Communicable Diseases, Delhi
- Nutrition Reserach Laboratory, Coonoor (Tamil Nadu)
- Tuberculosis Institute, Delhi

AGRICULTURE AND ANIMAL HUSBANDRY

- Agriculture and Domestication of animals constitutes an important stage in the evolution of modern man.
- The surplus generated from agriculture and large scale use of animal power provided a new momentum to the development of human society.
- India is fortunate enough to possess rich agricultural resources.
- They include a wide variety of fertile soils, ample water for irrigation and a growing season almost all the year round.
- The variety of soils and variations in climatic conditions from region to region makes it possible to grow a large number of crops in our country.
- Different kinds of agriculture are practised in varying environmental conditions.

TYPES OF CULTIVATION

1. Shifting Cultivation

- It is a form of primitive agriculture.
- Cultivator clears a small piece of forest by burning.
- It is also known as 'slash and burn' agriculture.
- Mainly food crops are grown.

2. Sedentary Agriculture

- Farmers adopt a particular cropping pattern.
- Livestock farming becomes an integral part of agriculture.
- Different types of agricultural implements are used.

3. Intesive Agriculture

- Characterised by small land holdings.
- Higher inputs of capital and labour per hectare of land.
- Yield per hectare is quite high.
- Rice is the main crop.

4. Extensive Agriculture

- Large scale farming on large holdings.
- Sophisticated agricultural machines are utilised.
- Low per hectare productivity but the total production is quite high.
- Generally adopted in areas of low population density with high man-land ratio.

5. Subsistence Agriculture

- Sole objective is of sustaining one's family.
- Specialisation of crops is not possible.
- The farmers grow as many crops as are required for their household consumption.

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6. Commercial Agriculture

- The main aim is to sell the produce in the market.
- An important characteristic is crop specialisation.
- Plantation agriculture is an important form of commercial agri. culture.

7. Mixed Farming

- In it equal emphasis is laid on crop production and livestock rear. ing.
- The main objective is not only to produce cereal crops but also fodder and cash crops on the same scale.

8. Dairy Farming

- Cattle rearing particularly rearing of milk cows in order to meet demand of milk and milk products in urban areas is referred to as dairy farming.
- Dairy is highly labour intensive activity.
- Dairy farming requires large capital.
- Dairy farming in India has been organised on sound footing in Gujarat through dairy cooperatives.

9. Truck Farming

- Cultivation of vegetables for market is known as truck farming.
- It is an intensive farming.
- It is done with the help of irrigation, manure and HYV seeds.

10. Horticulture

- Major products are fruit and flowers.
- There is great regional variation in production of fruits and flow. ers.

Types of Agriculture based on Management

1. **Peasant Agriculture :** It is organised by the farmers individually. They own the land as well as other factors of production.
2. **Cooperative Farming :** All the members of the cooperative col. lectively own the factors of production.
3. **State Farms :** The factors of production are owned by the State. In India Suratgarh farm is an example of State Farm.

Important Institutes of Agriculture and Allied Activities

- Central Arid Zone Research Institute, Jodhpur (Rajasthan)
- Cotton Technological Research Laboratory, Mumbai (Maharashtra)
- Central Rice Research Institute, Cuttack (Orissa)

- Central Plantations Crops Research Institute, Kasargod (Kerala)
- Central Potato Research Institute, Shimla (Himachal Pradesh)
- Central Tobacco Research Institute, Rajamundry (Andhra Pradesh)
- Central Tuber Crops Research Institute, Thiruvananthapuram (Kerala)
- Central Soil Salinity Research Institute, Karnal (Haryana)
- Central Inland Fisheries Research Institute, Barrackpore (West Bengal)
- Central Marine Fisheries Research Institute, Mandapam Camp (Tamil Nadu)
- Central Institute of Fishries Technology, Ernakulam (Kerala)
- Deep Sea Fishing Research Station, Mumbai (Maharashtra)
- Central Sheep and Wool Research Statistics, New Delhi
- Central Coconut Research Station, Ernakulum (Kerala)
- Fruit Research Institute, Sabour (Bhagalpur, Bihar)
- Indian Veterinary Research Institute, Muketshwar and Izatnagar (UP)
- Indian Agriculture Research Institute, New Delhi
- Sugarcane Breeding Institute, Coimbatore (Tamil Nadu)
- Indian Council of Agricultural Research (N. Delhi)
- Dairy Research Institute, Karnal
- Indian Botanical Survey, Kolkata
- Jute Research Institute, Barrackpore
- Goat Research Institute, Mathura
- Sugarcane Research Institute, Lucknow
- Bee Research Institute, Pune
- Cotton Research Institute, Mumbai
- Poultry Training Institute, Bangalore
- Silk Research Institute, Mysore
- Coffee Research Institute, Chickmanglur
- Leather Research Institute, Chennai
- Potato Research Institute, Shimla
- Tea Research Institute, Jorhat
- Rubber Research Institute, Kottayam
- Tobacco Research Institute, Rajamundri
- International Centre for Plantation Affair, Banglore
- National Research Institute for Spices, Calicut
- Indian Dairy Corporation, Anand

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MAJOR PRODUCING STATES IN INDIA

CROPS

- **Rice** : Uttar Pradesh, West Bengal, Andhra Pradesh, Punjab, Bihar, Tamil Nadu
- **Wheat** : Uttar Pradesh, Punjab, Haryana, Bihar
- **Bajra** : Madhya Pradesh, Gujarat, Rajasthan
- **Ragi** : Karnataka, Tamil Nadu, Jammu & Kashmir
- **Jowar** : Maharashtra, Rajasthan, Madhya Pradesh
- **Maize** : Karnataka, Haryana, Gujarat
- **Pulses** : Madhya Pradesh, Uttar Pradesh, Maharashtra, Bihar
- **Barley** : Uttar Pradesh, Rajasthan, Haryana, Punjab
- **Groundnut** : Gujarat, Andhra Pradesh, Tamil Nadu
- **Sesamum** : Orissa, Karnataka, Gujarat
- **Rapeseed & Mustard** : Rajasthan, Uttar Pradesh, Haryana
- **Jute** : West Bengal, Assam, Bihar, Orissa
- **Cotton** : Maharashtra, Gujarat, Punjab, Andhra Pradesh
- **Rubber** : Kerala, Karnataka, Tamil Nadu
- **Sugarcane** : Uttar Pradesh, Maharashtra, Tamil Nadu
- **Tobacco** : Andhra Pradesh, Gujarat, Bihar
- **Tea** : Assam, West Bengal, Kerala, Tamil Nadu, Punjab
- **Cocoa** : Kerala, Karnataka, Tamil Nadu
- **Coffee** : Karnataka, Tamil Nadu, Kerala

SPICES

- **Pepper** : Kerala, Karnataka, Tamil Nadu
- **Turmeric** : Andhra Pradesh, Orissa, Tamil Nadu
- **Coriander** : Rajasthan, Andhra Pradesh
- **Chillies** : Andhra Pradesh, Maharashtra, Tamil Nadu, Karnataka, Bihar, Madhya Pradesh, Rajasthan
- **Ginger** : Himachal Pradesh, Madhya Pradesh, Maharashtra
- **Cardamon** : Kerala, Karnataka, Tamil Nadu

FRUITS

- **Banana** : Maharashtra, Gujarat, Tamil Nadu, Kerala
- **Grapes** : Maharashtra, Karnataka, Punjab, Andhra Pradesh, Tamil Nadu, Haryana
- **Mango** : Maharashtra, Gujarat, Uttar Pradesh, Bihar, West Bengal, Andhra Pradesh
- **Pomgranate** : Maharashtra
- **Sapota** : Maharashtra, Gujarat

Types of Irrigation

Type	Percentage of Total Irrigated Area	Dominant areas
Tube Well (well irrigation)	51%	Punjab, Haryana, U.P
Tank Irrigation	6%	Tamil Nadu, Andhra Pradesh, Karnataka, Punjab, Haryana, U.P., Bihar, West Bengal
Canal Irrigation	33%	

Diseases of Major Crops

Name of the crop	Disease	Pathogen	Symptoms
1. Rice (paddy)	Blast	Fungus, Pyricularis oryzae	Brown boat-shaped lesions (spots) appear on the margins of leaves.
2. Wheat	Rust	Fungus, Puccinia graminis	Yellow, brown or black elongated spots appear on leaves and straws.
3. Sugar-cane	1. Red rot	Fungus Collector-trichum falcatum	Small red spots on leaf mid-rib appear. The pith sugarcane look.
	2. Grassy shoot	Fungus	Production of many tin tillers from the base.
6. Ground-nut	Tikka	Fungus, Cercospora personata	Light brown oval-shaped lesions appear on leaf-lets, petioles and stems.
7. Mustard	1. White rust	Fungus	White or cream yellow scattered pustules appear on the lower surface of leaves.
	2. Downy mildew	Fungus	Yellow irregular spots appear on leaves. In severe infection, the inflorescence is malformed, twisted and covered with white powder.
4. Chick pea	Wilt	Fungus	The leaves become yellow and dry up Roots turn black and decompose.
5. Pigeon pea	Stem rot	Fungus	Development of brown to dark brown lesions on the stem near soil surface. These lesions girdle the stem and plant dies.

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Plant diseases caused by Mycoplasma

Diseases	Plant/Crop
Sesamum phyllody	Sesamum
Little leaf diseases	Brinjal
Bunchy top of Papaya	Papaya
Peanut witches broom	Peanut
Potato witches broom	Potato
Little leaf of Sweat Potato	Sweat Potato
Sweet Potato witches brown	Sweat Potato
Asteryellow corn Smut	Corn
Spike diseases of Sandalwood	Sandalwood

(a) **Seed-Borne diseases** : Brown or sesame leaf spot of rice, red rot of sugar-cane, bacterial blight of rice and angular leaf spot of cotton.

(b) **Air-borne diseases** : Blast of rice, black stem and coffee rust caused by fungi infections.

(c) **Soil-borne diseases** : Root knot of tomato, tikka disease of ground-nut, smut of bajra and green ear of brain.

Insect Pests of Major Crops

Name of the crop	Name of Insect-pests	Zoological name	Nature of damage
Rice	1. Gundhy or Rice bug	1. Leptocorisa acuta	1. Attack during post-flowering period
	2. Leaf hopper	2. Nephotettix	2. Attack on leaves.
Wheat	1. Gujhia weevil	—	1. Grubs feed on the roots and adults cut the growing points.
	2. Shoot fly	—	2. Attack seedlings and kill the central shoots
Sugarcane	1. Top borer	1. Scirpophaga nivella	1. Larvae bore into the mid-rib of leaves and make tunnel. Later on it enters into growing point and damage it.
	2. Shoot borer	2. Chilo infuscatellus	2. The caterpillars bore into the central shoot and make tunnel downward. They feed inside the soft issue.
	3. Sugarcane leaf hopper	3. Pyrilla perpusilla	3. Both nymph and adult suck sap from underside of the leaf.
Groundnut	White grub	—	The grubs feed on roots. Adult-beetles feed on leaves.
Mustard	1. Aphids	1. Brevicoryne brassicae	Both nymph and adult suck the sap of all the plant parts.
	2. Painted bug	2. Bagrada hilaris	Both nymph and adult suck the sap of leaves at the seedling stage.
Chickpea (Gram)	Pod borer	—	The caterpillars first feed on tender leaves.Later on make holes in the pods and feed the developing grain.

Chemical Fertilizers

▼ **Nitrogenous Fertilizers.** The nitrogen containing fertilizers are called nitrogenous fertilizers. Examples of the nitrogenous fertilizers are :

1. Ammonium sulphate — $(NH_4)_2SO_4$
2. Ammonium nitrate — NH_4NO_3
3. Sodium nitrate — $NaNO_3$
4. Urea — $CO(NH_2)_2$

▼ **Phosphatic Fertilizers.** The phosphorus containig fertilizers are called phosphatic fertilizers. Examples of phosphatic fertilizers are :

1. Calcium dihydrogen phosphate or Superphosphate — $Ca(H_2PO_4)_2$
2. Ammonium phosphate — $(NH_4)_3PO_4$
3. Ammonium hydrogen phosphate or Ammophos — $(NH_4)H_2PO_4$

▼ **Potassium Fertilizers.** The important potassium fertilizers are :

1. Potassium chloride — KCl
2. Potassium sulphate — K_2SO_4
3. Potassium nitrate — KNO_3

State	Fertilizer per hectare	Rice Production per hectare
Punjab	129	4500
Tamil Nadu	100	2500
Bihar	30	1000
Manipur	9	700

SOME COMMON WEEDS

Some Common weeds found in wheat and rice fields :

1. Wild Oat (Javi)
2. Grass (Ghaas)
3. Amaranthus (Chaulai)
4. Chenopodium (Bathua)
5. Convolvulus (Hiran Khuri)

Important Weeds of Kharif Season

1. Saathi (Trianthema)
2. Amaranthus (Chaulai)
3. Wild Sorghum
4. Nut grass (Cyperus rotundus)

Important Weeds of Rabi Season

1. Chenopodium album (Bathua)
2. Wild Oat
3. Mandoosi (Phalaris)
4. Hirankhuri (Convolvulus pluricaulis)

Some Common Weedicides

1. 2, 4-D (2, 4–Dichlorophenoxy acid)
2. Butachlor
3. MCPA (2–Methyl 2–Chloro 1–Phenoxy Acetic Acid)

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Some Common Pesticides

1. D.D.T. (Dichloro Diphenyl Trichloroethane)
2. B.H.C. (Benzene Hexa Chloride)
3. Malathion
4. Copper Oxychloride
5. Sulphur
6. Zinc Phosphide
7. Warfarin
8. Agrosan
9. Ceresan

Important Irrigational and Multipurpose Projects

River	Project	Associated States
Sutlej	Bhakra Nangal	Haryana, Punjab & Rajasthan
Pawana	Bhima I	Maharashtra
Krishna	Bhima II	Maharashtra
Chambal	Chambal	Joint Project of M.P. and Rajasthan
Damodar	Damodar Valley Project	West Bengal and Bihar
Chenab	Dulhasti Power Project	Jammu and Kashmir
Hooghly	Farakka	West Bengal
Gandak	Gandak	Bihar and U.P.
Ghataprabha	Ghataprabha	Karnataka
Hasdeo	Hasdeo Bango Project	Madhya Pradesh
Mahanadi	Hirakund	Orissa
Godavari	Jayakwadi	Maharashtra
Tapti	Kakrapara	Gujarat
Kangsbati and Kumari	Kangsbati	West Bengal
Karjan	Karjan	Gujarat
Kosi	Kosi	Bihar
Koyana	Koyana	Maharashtra
Krishna	Krishna Project	Maharashtra
Kukadi	Kukadi	Maharashtra
Ghagra	Left Bank Ghagra Canal	Uttar Pradesh
Ganga	Madhya Ganga Canal	Uttar Pradesh
(The irrigation scheme will utilise releases from Hirakund Reservoir)	Mahanadi Delta Scheme	Orissa
Mahi	Mahi	Gujarat
Malaprabha	Malaprabha	Karnataka
Mayurakshi	Mayurakshi	West Bengal
Krishna	Nagarjunasagar	Andhra Pradesh
Panam	Panam	Gujarat
Perimbikulam	Parambikulam Aliyar	Tamil Nadu and Kerala
Godavari	Pochampad	Andhra Pradesh
Beas	Pong Dam	Punjab
Ramganga	Ramganga Ranjit Sagar Dam	Uttarakhand
Ravi	(Thein Dam)	Punjab
Rihand	Rihand	Uttar Pradesh
Sabarmati	Sabarmati	Gujarat
Ghagra	Sharda Sahayak	U.P.
Sone	Sone High Level Canal	Bihar
Tawa	Tawa	Madhya Pradesh
Bhagirathi	Tehri Dam	Uttarakhand
Tungabhadra	Tungabhadra	Andhra Pradesh & Karnataka
Tapti	Ukai	Gujarat
Krishna	Upper Krishna	Karnataka
Penganga	Upper Penganga	Maharashtra
Jhelum	Uri Power Project	Jammu and Kashmir

Shifting Cultivation and its Different Names

Name	Region	Name	Region
Jhuming	India	Ladang	Malaysia
Chengin	Philippines	Milpa	Central America, Mexico
Konuko	Venezuela	Roka	Brazil
Masole	Zaire Basin		

ANIMAL HUSBANDRY

- The branch of agriculture which deals with the feeding, shelter, health and breeding of domestic animals is called animal husbandry.
- India has the largest livestock population, accounting for about 57 per cent of the world buffalo population and 15 per cent of the cattle population.
- Due to low economic status of the livestokc owners, much of the livestock is reared under sub–optimal conditions.
- Livestock sector provides regular employment to about 11 million in principal status and 8 million in subsidiary status.
- Women constitute 69 per cent of the labour force in livestock sector as against 35 per cent in crop farming.
- Fisheries sector occupies a very important place in the socio-economic development of the country.

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BREEDS OF ANIMALS

Indian breeds of buffaloes

1.	Murrah	Punjab, Haryana, Uttar Pradesh
2.	Bhadawari	Uttar Pradesh, Madhya Pradesh
3.	Jaffrabadi	Gujarat
4.	Surti	Rajasthan, Gujarat
5.	Mehsana	Gujarat
6.	Nagpuri or Ellichpuri	Central and South India
7.	Nili Ravi	Punjab, Haryana

COW BREEDS

Milch Breeds

1.	Gir	Gujarat, Rajasthan
2.	Sahiwal	Punjab, Haryana, Uttar Pradesh
3.	Red Sindhi	Andhra Pradesh
4.	Deoni	Andhra Pradesh

Draught breeds

1.	Malvi	Rajasthan, Madhya Pradesh
2.	Nageri	Delhi, Haryana, Uttar Pradesh
3.	Hallikar	Karnataka
4.	Kangayam	Tamil Nadu and the other parts of South India.

General Utility Breeds

1.	Haryana	Haryana, Punjab, Bihar, Madhya Pradesh, Gujarat
2.	Ongole	Andhra Pradesh
3.	Kankrej	Gujarat
4.	Tharparkar	Andhra Pradesh, Gujarat

GOAT BREEDS

Breed	**Distribution**
1. Gaddi	Himachal Pradesh
2. Kashmiri Pashmina	Hills of Kashmir, Tibet, Himachal Pradesh
3. Jamunapari	UP, MP
4. Beetal	Punjab
5. Marwari	Rajasthan
6. Berari	Maharashtra
7. Malabari	Kerala
8. Bengal	Bihar, Orissa

PIG BREEDS

Breeds Distribution	**Indian Breeds**
1. Desi	Uttar Pradesh, Bihar, Punjab, Madhya Pradesh
2. Ghori	Manipuri, Assam, Meghalaya, Arunachal Pradesh
Exotic Breeds	
3. Berkshire	U.K.
4. Large White Yorkshire	U.K.

5.	Landrace	U.S.A., Switzerland and Denmark
6.	Tamworth	U.K.
7.	Duroc	U.S.A.

HORSE BREEDS

Breeds	**Distribution**
1. Kathiawari	Rajasthan, Gujarat
2. Marwari	Rajasthan
3. Bhutia	Bhutan, Punjab
4. Manipuri	North eastern mountains
5. Spiti	Himachal Pradesh
6. Zanskari	Ladakh

SHEEP BREEDS

1.	**Gurej**	Gurej tehsil, Kashmir
2.	**Karnah**	Kol in Kashmir
3.	**Bhararwal**	Lower hills of Himalayas
4.	**Gaddi**	Jammu region, Kullu/Kangra valleys and Chamba/Mandi areas of H. P.
		Mahasu and Kinnaur district of H.P.
5.	**Rampur Bushair**	Punjab, S. Rajasthan
6.	**Lohi**	Bikaner division, Rajasthan
7.	**Bikaneri**	Jodhpur, Jaipur, Pali, Barmer districts of Rajasthan
8.	**Marwari**	Saurashtra and Gujarat
9.	**Kuchi (Dhesi)**	Kathiawar, Kachchh, S. Rajasthan and N. Gujarat
10.	**Kathiawari**	SE Maharashtra and adjoining A.P.
11.	**Deccani**	Nellore district of A.P.
12.	**Nellore**	Bellary/Kurnool districts of A.P.
13.	**Bellary**	Karnataka state
14.	**Mandhya**	Karnataka state
15.	**Bandhur**	

Poultry Breeds

Domestic fowl (Gallus domestics)

American Type : Plymouth Rock, Red Rhode Island, New Humpshire.

English Type : Sussex, Australorp.

Mediterranean Type : Leghorn, Minorca.

Indian Type : Ghagus, Busra, Donki, Aseel, Black Bengal, Tellicherry etc.

Asiatic Type : Brahma, Cochin, Langshan.

SHEEP AND USES

Breeds	Uses
1. Lohi	Yield good quality wool and milk
2. Rampur Bushair	Fleece is brown in colour, yield superior cloth.
3. Nali	Produce superior wool for making of carpets
4. Bhakarwa	Suitable for the production of high quality woolen shawls
5. Deccani	Gives mutton, wool is not formed
6. Nellore	Gives mutton, wool is not formed
7. Marwari	Produces coarse quality wool.
8. Patanwadi	Produces wool that is used for army hosiery

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FISH

- A large section of the Indian population uses fish as food particularly those living in coastal areas.
- Fish and other variety of sea food are rich in proteins.
- Fish liver oil is rich in Vitamins A and D.
- On the basis of their habitat, fish are mainly divided into two categories : (i) Marine Fish (ii) Fresh Water Fish
- **Marine Fishes of India :–** Bombay Duck, Eel, Hilsa, Pomphret, Salmon, Sardine.
- **Fresh Water Fishes of India :–** Catla, Tirica, Rohu, Malli, Singhara, Calbasu.
- The production of fishes in fresh water is called Pisciculture.
- India is the third largest producer of fish and second largest producer of inland fish in the world.
- The fisheries sector provides employment to over 1·1 million people engaged fully, partially or in subsidiary activities pertaining to the sector.
- Potential of fish production from marine and inland sources has been estimated at 3.9 million tonnes and 4.5 million tonnes, respectively.

DISEASES IN ANIMALS

Viral Diseases of Animals	
Diseases	**Animals**
Foot and Mouth Disease	All cattle
Pox	Cow, Buffalo, sheep, goat, fowl
Dermatitis	Sheep and goats
Bacterial Diseases of Animals	
Disease	**Animals**
Fowl Cholera	Poultry Birds
Diarrhoea of chick	Poultry Birds
Rinderpest	Cattle
Tuberculosis	Cattle and Birds
Anthrax	Cattle, sheep, goats, pigs

Diseases of Animals Transmitted to Human Beings

- Bacterial Diseases :– Anthrax, Tuberculosis, Brucellosis
- Viral Diseases :– Rabies, Cow Pox, Encephalitis
- Fungal Diseases :– Aspergillosis, Actinomycosis, Ringworm
- Parasitic :– Ascariasis, Amebiosis, Trypnosomiasis

IMPORTANT INSTITUTES

1. Central Sheep Breeding Farm, Hissar
2. Central Fodder Seed Production Farm at Hessarghatta (Karnataka)
3. The Central Institute of Fisheries, Nautical and Engineering Training, Kochi
4. The Central Institute of Coastal Engineering for Fisheries, Bangalore
5. The National Research Centre on Pigs, Guwahati.

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SCIENCE & TECHNOLOGY

NANOTECHNOLOGY

- Nanotechnology is the design, characterisation, production and application of structures, devices and systems by controlling shape and size at the nanoscale. Eight to ten atoms span one nanometer (nm). The human hair is approximately 70,000 to 80,000 nm thick. Nanoscience is the world of atoms, molecules, macromolecules, quantum dots, and macromolecular assemblies.
- With the help of nanotechnology, a large set of materials with distinct properties (optical, electrical, or magnetic) can be fabricated.
- Nanoparticles take advantage of their dramatically increased surface area to volume ratio. Their optical properties, e.g. fluorescence, become a function of the particle diameter.
- When brought into a bulk material, nanoparticles can strongly influence the mechanical properties, such as the stiffness or elasticity.

BIONANOTECHNOLOGY

- The biological and medical research scientists have exploited the unique properties of nanomaterials for various applications e.g., contrast agents for cell imaging and therapeutics for treating cancer.
- Biological tests measuring the presence or activity of selected substances become quicker, more sensitive and more flexible when certain nanoscale particles are put to work as tags or labels.
- Magnetic nanoparticles, bound to a suitable antibody, are used to label specific molecules, structures or microorganisms. For example, gold nanoparticles tagged with short segments of DNA can be used for detection of genetic sequence in a sample.
- The overall drug consumption and side-effects can be lowered significantly by depositing the active agent in the morbid region only and in on higher dose than needed. This highly selective approach reduces costs and human suffering. The could hold small drug molecules transporting them to the desired location.
- Some potentially important applications include cancer treatment with iron nanoparticles or gold shells.
- Nanotechnology can help to reproduce or repair damaged tissue. This so called "tissue engineering" makes use of artificially stimulated cell proliferation by using suitable nanomaterial-based scaffolds and growth factors.

CHEMISTRY & ENVIRONMENT

- Chemical catalysis and filtration techniques are two prominent examples where nanotechnology already plays a role. The synthe-

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sis provides novel materials with tailored features and chemical properties e.g.nano particles with a distinct chemical surrounding or specific optical properties. Chemical catalysis benefits especially from nano particles, due to the extremely large surface to volume ratio.

- The application potential of nanoparticles in catalysis ranges from fuel cell to catalytic converters and photocatalytic devices. Catalysis is also important for the production of chemicals. A strong influence of nanochemistry on wastewater treatment, air purification and energy storage devices is to be expected. Mechanical or chemical methods can be used for effective filtration techniques.
- Nanoporous membranes are suitable for a mechanical filtration with extremely small pores smaller than 10 nm. Nanofiltration is mainly used for the removal of ions or the separation of different fluids.

ENERGY

- The most advanced nanotechnology projects related to energy are: storage, conversion, manufacturing improvements by reducing materials and process rates, energy saving e.g. by better thermal insulation, and enhanced renewable energy sources.
- Nanotechnology can help to increase the efficiency of Solar light conversion by specifically designed nanostructures. The degree of efficiency of combustion engines is not higher than 15-20% at the moment. Nanotechnology can improve combustion by designing specific catalysts with maximised surface area.
- The most prominent nano structured material in fuel cells is the catalyst consisting of carbon supported noble metal particles with diameters of 1–5 nm. Suitable materials for hydrogen storage contain a large number of small nanosized pores. Many nanostructured materials like nanotubes, zeolites or alanates are under investigation.
- Nanotechnology can contribute to the further reduction of combustion engine pollutants by nanoporuous filters, which can clean the exhaust mechanically, by catalytic converters based on nanoscale noble metal particles or by catalytic coatings on cylinder walls and catalytic nanoparticles as additive for fuels.

INFORMATION & COMMUNICATION

- Current high-technology production processes are based on traditional top down strategies, where nanotechnology has already been introduced silently. The critical length scale of integrated circuits is already at the naonoscale (50 nm and below) regarding the gate length of transistors in CPUs or DRAM devices.
- In the modern communication technology traditional analog electrical devices are increasingly replaced by optical or optoelectronic devices due to their enromous bandwidth and capacity, respectively. Two promising examples are photonic crystals and quantum dots.

CONSUMER GOODS

- Nanotechnology is already impacting the field of consumer goods, providing products with novel functions ranging from easy-to-clean to scratch-resistant. Already in use are different nanoparticle improved products.
- Nanotechnology can be applied in the production, processing, safety and packaging of food. A nanocomposite coating process could improve food packaging by placing anto-microbial agents directly on the surface of the coated film.
- Nanocomposites could increase or decrease gas permeability of different fillers as is needed for different products. They can also improve the mechanical and heat-resistance properties and lower the oxygen transmission rate.
- The First sunglasses using protective and antireflective ultrathin polymer coatings are on the market. For optics, nanotechnology also offers scratch resistant coatings based on nanocomposites.
- The use of nanofibers makes clothes water– and stain-repellent or wrinklefree. Textiles with a nanotechnological finish can be washed less frequently and at lower temperatures.

NANO SCIENCE IN INDIA

- **Nano-Tube Filter :** The scientists from Banaras Hindu University have devised a simple method to produce carbon nanotube filters that efficiently remove micro-to nano-scale contaminants from water and heavy hydrocarbons from petroleum. Made entirely of carbon nanotubes, the filters are easily manufactured. The nanotube composition makes the filters strong, reusable, and heat resistant, and they can be cleaned easily for reuse.
- **Typhoid Detection Kit :** Using the nano sensor, developed by Prof. A. K. Sood of IISc, Bangalore, a Typhoid Detection Kit has been developed by DRDE, Gwalior. Typhoid fever caused by Salmonella Typhi is a major health problem and an important challenge to health authorities of third world countries due to unsatisfactory water supply, poor sanitary conditions, malnutrition, emergence of antibiotic resistant strains etc.
- **Gas Flow Induced Generation of Voltage from Solids :** Prof. A. K. Sood, professor of Physics at IISc and his student Shankar Ghosh have found that the liquid flow in carbon nano tubes can generate electric current. One of the most exciting applications to emerge from the discovery is the possibility of a heart pacemaker–like device with nanotubes, which will sit in the human body and generate power from blood. Instead of batteries, the device will generate power by itself to regulate defective heart rhythm.
- **Drug Delivery System :** A research group headed by Professor A.N. Maitra of the University of Delhi has developed 11 patentable technologies for improved drug delivery systems using nanoparticles. Four of these processes have been granted U.S. patents. One of the important achievements at the initial stage of drug delivery research was development of a reverse micelles based process for the synthesis of hydrogel and 'smart' hydrogel nanoparticles for en-

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capsulating water-soluble drugs. This method enabled one to synthesize hydrogel nanoparticles of size less than 100 nm diameter.

➤ **Microwave Carbon Nano Tubes Production :** DMSRDE, Kanpur is synthesizing non-aligned, quasi-aligned and aligned Carbon Nano-Tubes with a batch size of 50 grams using a fast synthesis process. It has a maximum operating temperature 12000 C. The CNTs will have applications in EM absorbers, composites, gas sensors, flow monitors, field emission devices.

ENERGY

➤ Energy is an essential input for economic development and improving the quality of life.

CONVENTIONAL SOURCES OF ENERGY

1. COAL

➤ Coal is the main source of energy in the country and accounts for about 67 per cent of the country's commercial requirement.

➤ Coal is also an essential input in steel and carbo-chemical industries.

➤ As on January 1, 2004 coal reserves of India, down to depth of 1200 metre have been estimated at 2,45,693 million tonnes by the Geological Survey of India.

➤ Coal production in the country is now almost completely in the public sector coal companies, e.g., Coal India Limited (CIL) and Singareni Collieries Company Limited (SCCL), except for a few captive mines of TISCO, IISCO, DVC and Bengal Emta.

➤ Coal India Limited producing almost 90 per cent of the country's total coal production, has seven coal producing subsidiaries, namely, Eastern Coalfields Limited (ECL), Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Northern Coalfields Limited (NCL), Southern-Eastern Coalfields Limited (SECL), Maharashtra Coalfields Limited (MCL) and Western Coalfields Limited (WCL).

➤ The eighth subsidiary Central Mine Planning and Design Institute Limited (CMPDL) is the planning and design institute.

➤ Lignite reserves in India have been estimated at around 35,363 million tonnes.

➤ Out of this, 4,150 million tonnes is in the Neyveli area of Cuddalore district in Tamil Nadu of which 2,360 million tonnes has been proved.

➤ Lignite reserves have been identified in Rajasthan, Gujarat, Jammu & Kashmir and Kerala.

2. PETROLEUM

➤ Crude oil production in the country during the year 2003-04 was 33.378 MMT which is 1 per cent higher than previous year.

➤ During the year 2003-04, the share of crude oil production for ONGC, OIL and private/joint venture companies was about 78.1 per cent, 9.0 per cent and 12.9 per cent.

➤ The gross import of crude oil and petroleum products (including imports by private and parallel marketes) during the year 2003-04 was 98.331 MMT valued at Rs. 93,205 crore.

➤ The export of petroleum products including private parties was 14.620 MMT valued at Rs. 16,781 crore.

➤ Despite the discovery of new sources of unconventional energy, petroleum products remain the primary energy sources in India after coal, with its consumption increasing at very steep rate from 3.5 MMT in 1950 to about 107.5 MMT in 2003-04.

➤ Our present indigenous prduction of crude oil from which the petroleum products are primarily manufactured, is only about 32 MMT.

➤ This is about 30 per cent of country's annual requirement.

3. NATURAL GAS

➤ Production of natural gas in 2003-04 was about 1.8 per cent higher than previous year, respectively, while for gas production, the share of ONGC, OIL and private joint venture companies was about 73.8% and 20.3% respectively.

4. HYDRO-POWER

➤ Hydro-power is a renewable and pollution free source of generating power.

➤ It requires a perennial flow of large volume of water, falling from a height.

➤ A readily available market is an essential requirement for generating HEP as electricity cannot be stored.

➤ The hydro-electric power generation is a capital intensive activity. It requires huge capital outlays.

5. NUCLEAR POWER

➤ The main objective of India's nuclear energy programme, as defined in the Atomic Energy Act of 1948, is the development of various nuclear applications like power generation.

➤ The executive agency for all activities pertaining to atomic energy in the country is Department of Atomic Energy (DAE), which was set up in 1954.

➤ Nuclear Power stations are located at Kota in Rajasthan, Tarapore in Maharashtra, Kalpakkam near Chennai, Narora in Uttar Pradesh and Kakrapar in Gujarat.

➤ Nuclear energy production faces serious problem pertaining to disposal of waste and hazards of radio activity.

PUBLIC SECTOR UNDERTAKINGS AND OTHER ORGANISATIONS

NATIONAL THERMAL POWER CORPORATION (NTPC)

➤ The National Thermal Power Corporation Limited (NTPC) was incorporated in November, 1975 with the objective of planning, promoting and organising integrated development of thermal power in the country.

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- NTPC is a schedule 'A' 'Navratna' company having a total approved investment of Rs. 79,336.67 crore.
- The commissioned capacity of NTPC–owned stations as on 31st March, 2004 is 21,749 MW.

POWER TRADING CORPORATION OF INDIA LIMITED

- Power Trading Corporation of India was incorporated primarily to support the Mega Power Project in private sector by acting as a single entity to enter into Power Purchase Agreement (PPA) with Independent Power Producers (IPPs) on one side and multipartite/ multiplayer PPAs with the users/ State Electricity Boards (SEBs) under long–term arrangement.
- The Government has also identified PTC as a nodal agency to deal with matters relating to exchange of power between India and its neighbouring countries.

POWER GRID CORPORATION OF INDIA LIMITED (PGCIL)

- The Power Grid Corporation of India Limited (PGCIL) was incorporated as a Goverment of India enterprises on October 23rd, 1989 for establishment and operation of regional and national power grids to facilitate transfer of power within and across the regions.
- It has been recognised as *a mini-ratna* category-1 PSU.
- During the year 2003-04, the organisation has earned a net profit of about Rs. 740 crore on a turnover of about Rs.2,783 crore.

TEHRI HYDRO DEVELOPMENT CORPORATION LIMITED

- The Tehri Hydro Development Corporation (THDC) was incorporated on July 12th, 1988 as a joint venture of the Government of India and Government of Uttar Pradesh to execute the 2,400 MW Tehri Hydro Power Complex in Tehri Garhwal (Uttarakhand) and also to plan, promote and organize the development and harnessing of hydro-electric projects in Bhagirathi-Bhilangana Valley as may be entrusted to the Corporation by the Government.
- The Corporation is presently engaged in the implementation of Tehri Hydro Power Complex (2,400 MW) comprising of Tehri Dam and HPP, Stage-1, (1,000 MW) and 400 MW Koteshwar HE Project and Tehri Pumped Storage Plant (1,000 MW).
- The project will generate 6,5000 MWs of energy per year on completion of entire Complex (3,568 MWs on completion of Stage-I).
- The project will provide drinking water facilities for Delhi, and towns and villages of Uttarakhand and U.P.

POWER FINANCE CORPORATION LIMITED

- The Power Finance Corporation Limited (PFC), New Delhi, was incorporated on July 16th, 1986 and was declared a public financial institution in August 1990.
- The main objectives of the Corporation include financing of power generation projects, transmission and distribution works, renovation and modernisation of power plants, system improvement and energy conservation schemes, maintenance and repair of capital equipment.
- *PFC has been declared as Mini Ratna* (Category I) PSU.

RURAL ELECTRIFICATION CORPORATION LIMITED

- The Rural Electrification Corporation Limited (REC) was set up in 1969 with the primary objective of providing financial assistance for rural electrification in the country.
- REC is a schedule 'A' organisation.
- Up to 31st March 2004, 3, 05,064 villages have been reported electrified under the projects financed by REC.

SATLUJ JAL VIDYUT NIGAM LIMITED

- The Satluj Jal Vidyut Nigam (SJVN) Ltd. (formerly Nathpa Jhakri Power Corporation Ltd) was incorporated on May 24th, 1988 as a joint venture of the Government of India and the Government of Himachal Pradesh to plan, investigate, organise, execute, operate and maintain hydro-electric power projects in the Satluj basin in the Himachal Pradesh.
- The equity-sharing ratio of Government of India and Government of Himachal Pradesh is 3:1 respectively.
- The 1500 MW, Nathpa Jhakri Hydro-electric Power Project is the first project undertaken by SJVN.

NATIONAL HYDRO ELECTRIC POWER CORPORATION (NHPC)

- NHPC was set up in 1975 to promote the development of hydro–electric power in the Central Sector.
- NHPC is a schedule 'A' enterprise of the Government.
- NHPC has got nine commissioned power stations with installed capacity of 2,475 MW and plans to add 4,357 MW during Tenth Plan.

DAMODAR VALLEY CORPORATION

- The Damodar Valley Corporation (DVC), the first multi–purpose river valley project of the Government of India, was set up in July, 1948 for the unified development of Damodar Valley region spread over the state of Jharkhand and West Bengal.
- DVC's main projects include four dams at Maithon, Panchet, Tilaiya and Konar, with connected hydro-electric power stations (except at Konar), thermal power station at Bokaro 'A' Bokaro 'B', Chandrapura, Durgapur, Mejia and also one gas turbine station at Maithon.
- DVC supplies power to coal mines, steel plants, railways and other big industries, besides State Electricity Boards of Jharkhand and West Bengal.
- The total derated capacity of DVC in April, 2004 was 2,761.5 MW comprising 2,535 MW of thermal, 144 MW of hydel and 82.5 MW from gas turbine station.

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GAS AUTHORITY OF INDIA LIMITED

- Gas Authority of India Limited (GAIL) is one of the 'Navratna' en... terprises and ranks among the top 10 public sector enterprises in India.
- The company was incorporated in 1984 for handling post-explo... ration activities relating to transporation, processing, distribution and marketing of natural gas.
- The company was assigned the priority task of setting up the cross-country HBJ pipeline.
- Presently GAIL is the largest company in India for processing, transmission and distribution of natural gas.
- GAIL is operating system seven LPG recovery plants at Bijaipur (Phase I and II) in Madhya Pradesh, Vaghodia and Gandhar in Gujarat, Lakwa in Assam, Usar in Maharashtra and Auraiya in U.P.

NON-CONVENTIONAL SOURCES OF ENERGY

- The mineral-based energy, whether coal, mineral, oil or nuclear minerals, may not be depended upon as these resources are ex... haustible.
- Scientists world over are trying to develop and obtain energy from inexhaustible resources like sunlight, wind, tidal waves, Bio-gas, and geo-thermal energy sources.
- The importance of increasing the use of renewable energy sources was recognized in the country in the early 70s.
- The country has today among the world's largest programmes for renewable energy.
- The activities cover all major renewable energy sources of interest, such as bio-gas, bio-mass, solar energy, wind energy, small hydropower and other emerging technologies.
- The Ministry of Non-Conventional Energy Sources (MNES) created in 1992 is the nodal agency of the Government for all matters relating to non-conventional/renewable energy.
- The Ministry has established the following institutions for technology development and application of various renewable energy sources.
- **Energy Centre :** The Centre functions as a National testing and standardize centre for solar energy materials, components and systems, takes up collaborative research projects, and provides advisory and consultancy service to industry and users.
- **Sardar Swaran Singh National Institute of Renewable Energy** (SSS NIRE) : An autonomous registered society has been established near Jallandhar in Punjab.
- **Centre for Wind Energy Technology (C-WET) :** It has been established, as an autonomous body (registered society), at Chennai.
- India being a tropical country, has a vast potential of ocean energy.
- The various forms of ocean energy are waves, ocean thermal energy conversion, currents and tides.
- Of these, tides can be harnessed for large developments.
- India is the fourth largest producer in the world of Solar cells and photovoltaic (PV) modules.

- India now has a very good R&D base for the development of technologies for harnessing renewable/ non-conventional energy sources. These include small scale and medium/large scale industries, both in the public sector as well as the private sector.
- Technical guidance and help has been provided to many developing country for the construction of bio-gas plants.
- The world's largest solar steam cooking system for cooking food for 15,000 people has been installed in October 2002 at Tirumala, Tirupati Devasthanam in Andhra Pradesh and is functioning well.
- About 23 MW of module production was achieved, which is 5.1 per cent of the world production.
- The National Project on Bio-gas Development was initiated in 1981-82 for promotion of family type bio-gas plants which aim at providing a clear cheap source of energy in rural areas, producing enriched organic manure supplementing the use of chemical fertilizers, improving sanitation hygiene and removing the drudgery of women.
- Three types of designs of biogas plants, namely, the floating drum type KVIC design, fixed dome type, and bag type portable digester made of rubberised nylon fabric are being propagated under this programme.

Power Stations of India

State	Thermal Power Stations	Hydel Power Stations	Nuclear Power Stations
Andhra Pradesh	Ramagundam (coal) Kothagudem (Super thermal coal) Vijayawada (Super thermal coal) Muddanur	Sivasamudram Nagarjunasagar Upper Sileru Lower Sileru Muchkund Srisailam	—
Assam	Bongaigoan (oil based) Namrup	—	—
Bihar	Chandrapura (coal) Santaldih (coal)	Kosi, Tilaiya Panchat, Maithon	
Jharkhand	Barauni (oil) Bokaro (coal)		
Gujarat	Gandhinagar (oil) Sabarmati (oil) Dhuvaran (super thermal) (based on oil/natural gas) Vanakbari, Ahmedabad	Ukai	Kakrapar
Haryana Punjab Himachal Pradesh Orissa	Faridabad (coal) Bhatinda, Ropar Panipat (coal) Subernerekha (coal)Talcher (super thermal coal), Balimela	Bhakra Nangal Dehar Shamen (naptha) Hirakund	— — —

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Madhya Pradesh	Panki (coal) Parichha (coal) Satpura (coal)	Gandhi Sagar Chilla	—
Chhattisgarh	Korba (coal) Amarkantak (coal)		—
Rajasthan	Badarpur, Indraprastha	—	Kota
Uttar Pradesh	Obra (super thermal coal), Singrauli (coal) Harduaganj Kanpur	Yamuna Ramganga	Narora
Tamil Nadu	Ennore (coal) Neyveli (lignite)	Rihand Jogindernagar Mettur, Lower Bhavani, Kundah, Pykara, Periyar, Kodayar	Kalpakkam
West Bengal	Durgapur, Bandel, Titagarh (oil), Kolkata	Damodar Valley Raman, Farakka	—
Karnataka	Yelahanka (oil) Raichur	Kalindi Sharavathy	—
Kerala	—	Jog Fall Sabarigri, Idukki Pallivasal	
Maharashtra	Trombay (oil) Uran (oil) Busawal (coal) Nashik, Parli, Chandrapur, Koradi	Tata Koyna	Tarapore

SPACE SCIENCE IN INDIA

- The foundation of space research in India was laid in 1962 when the Government of India entrusted the task of developing a programme on space responsible to its Department of Atomic Energy.
- The Department of Atomic energy set up a National Committee which indentified two major objectives for India's space research programme.
- These objectives were–
  - (i) To utilise space technology for the rapid development of mass communications and education, especially in the far-flung rural areas.
  - (ii) To utilise space technology for the timely survey and management of the country's natural resources.
- During the formative decade of 1960s, space research was conducted by India, mainly, with the help of sounding rockets.
- The Indian Space Research Organisation (ISRO) was formed in 1969.
- In the history of the Indian space programme, 1970s were the era of experimentation during which experimental satellite programmes like Aryabhatta , Bhaskara, Rohini and Apple were conducted.
- The success of those programmes led to the era of operationalisation in 1980s during which operational satellite programmes like INSAT and IRS came into being.
- Today, INSAT and IRS are the major programmes of ISRO.
- Antrix, the commercial arm of ISRO is marketing India's space services globally.

SPACE PROGRAMME OF INDIA : MILESTONE

1962 : Indian National Committee for Space Research (INCOSPAR) formed and work on estbalishing Thumba Equatorial Rocket Launching Station (TERLS) started.

1963 : On November 21, 1963, first sounding rocket launched from TERLS.

1965 : Space Science and Technology Centre (SSTC) established in Thumba.

1967 : Satellite Communication Earth Station was set up at Ahmedabad.

1968 : TERLS dedicated to the nation, February 2.

1969 : The Indian Space Research Organisation constituted for peaceful exploration of space.

1972 : Department of Space and Space Commission constituted.

: Air borne remote–sensing experiments committee for surveying earth resources.

: Air-borne remote-sensing experiments.

1972-76 : The first Indian satellite "Aryabhatta" launched from USSR

1975 : on April 19.

1975-76 : Satellite Instructional Television Experiment (SITE) conducted.

1977 : Satellite Telecommunication Experiments Project (STEP) carried out.

1979 : The second Indian satellite "Bhaskara-I" launched from USSR on June 7.

1980 : Second Experimental launch of SLV-3, "Rohini" satellite successfully placed in orbit.

1981 : On November 20, 1981 "Bhaskara-II" launched.

: On June 19, 1981, "APPLE," an experimental geostationary communication satellite successfully launched.

1982 : INSAT-1A, launched (April-10), deactivated due to propellant depletion.

1983 : The SLV-3 launches the D2 Rohini satellite from Sriharikota (April 17)

: INSAT-1B satellite launches into space by the US space shuttel Challenger (August 30).

1984 : Sq. LDr. Rakesh Sharma – first Indian to travel in space.

1987 : First developmental launch of ASLV (March 24) flight unsuccessful.

1988 : The first indigenously built remote–sensing satellite IRS-1A launched (March 17) INSAT-1C, the third multipurpose satellite launched (July 22).

1990 : INSAT-1D launched into space by the US Delta rocket from the Eastern Space and Missiles Centre, Florida, (June 12).

1991 : IRS-1B launched by the Russian 'Vostok' rocket (August 29).

1992 : The Augmented Satellite Launch Vehicle (ASLV) successfully launched from Sriharikota (May 20).

: INSAT-2A, the first indigenously built multi-utility satellite, launched into space by Ariane Vehicle from Kourou (July 10).

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1994 : ...-2B, the second indigenously fabricated multipurpose satellite launched in space, by Ariane rocket from Kourou (July 23).
: ASLV-D4 successfully launched from Sriharikota (May 4) and PSLV-D2 successfully launched from Sriharikota. (October 15).
1995 : INSAT-2C satellite launched in space, by Ariane rocket from Kourou, French Guyana. (December 7, 1995).
1996 : PSLV-D3 successfully launched IRS-P3 (March 21).
1997 : INSAT-2D placed in orbit by Ariane rocket from Kourou (June 4).
: PSLV -C1 successfully put into orbit IRS-1D (September 29).
1999 : PSLV-C2, the indigenously built Polar Satellite Launch Vehicle was launched from Sriharikota (May 1999).
2000 : INSAT-3B, the first of its kind in III series was launched successfully (March 2000).
2001 : ISRO's Polar Satellite Launch Vehicle, PSLV-C3 successfully launched three satellites — TES of India, BIRD of Germany and PROBA of Belgium.
2002 : On January 24, 2002, INSAT-3C successfully launched by Ariane from Kourou, French Guyana.
2003 : PSLV-C5 successfully launch "Resource Sat-1" on October 17, 2003
2004 : On September 20, 2004, GSLV–F–01 successfully launched educational satellite "EDUSAT".
2005 : On May 5, 2005, PSLV-C6 successfully launched "CARTOSAT-1".
2006 : On July 10, 2006 GSLV-G-2 unsuccessfully launched "INSAT-4C".
2007 : On January 10, 2007 PSLV-C-7 successfully launched "CARTOSAT-2".
2007 : On April 23, 2007 PSLV-C-8 successfully launched "AZAIL" (Italy).
2007 : On September 2, 2007 GSLV-F-04 successfully launched INSAT-4CR.
2008 : On January 21, 2008 PSLV-C10 successfully launched 'TEKSAR'.
2008 : On April 24, 2008 PSLV-C 9 successfully launched 'CARTOSAT-2A'.
2008 : On October 22, 2008 PSLV-C-11 successfully launched 'CHANDRAYAN–I'.
2009 : On November 23, 2009 PSLV-C-14 successfully launched 'OCEANSAT-2'.
2010 : On July 12, 2010 PSLV-C-15 successfully launched 'CARTOSAT-2B', ALSAT-2A, NLS 6.1 AISSAT-1, NLS 6.2 TISAT-1 and STUDSAT.
2011 : On April 20, 2011 PSLV-C-16 successfully launched RESOURCESAT-2, YOUTHSAT and X-SAT.
2011 : On July 15, 2011, PSLV-C-17 successfully launched GSAT-12.

Indian space programme : At a Glance

Satellite	Date	Type	Launch Vehicle	Result
Aryabhatta	19-04-75	Scientific	Cosmos	Successful
Bhaskara–I	07-06-79	Geosurvey	Cosmos	Successful
Rohini	10-08-79	Geosurvey	S.L.V.3	Unsuccessful
Rohini D-1	18-07-80	Geosurvey	S.L.V. 3	Successful
Rohini	31-05-81	Scientific	S.L.V.3	Successful
Apple	19-06-81	Communication	Ariane	Successful
Bhaskara–II	20-11-81	Geosurvey	Cosmos	Successful
INSAT-1A	10-04-82	Multipurpose	Delta	Unsuccessful
Rohini	17-04-83	Scientific	S.L.V.3	Successful
INSAT-1B	30-08-83	Mutlipurpose	Space Shuttle	Successful
SROSS–I	24-03-87	Technical	ASLV-D1	Unsuccessful
IRS-1A	17-03-88	Remote sensing	Vostok	Successful
SROSS–II	17-07-88	Technical	ASLV-D2	Unsuccessful
INSAT-1C	21-07-88	Multipurpose	Ariane–4	Unsuccessful
INSAT-1D	12-06-90	Multipurpose	Delta	Successful
IRS-1B	29-08-91	Remote sensing	Vostok	Successful
INSAT-2A	10-07-92	Multipurpose	Ariane	Successful
INSAT-2B	23-07-93	Multipurpose	Ariane	Successful
IRS-P1	20-09-93	Remote sensing	PSLV-D1	Unsuccessful
SROSS-4	04-05-94	Scientific	ASLV-D3	Successful
IRS-P2	15-10-94	Remote sensing	PSLV-D2	Successful
INSAT-2C	07-12-95	Telecom	Ariane-4	Successful
IRS-1C	28-12-95	Remote sensing	PSLV-D3	Successful
IRS-P3	20-03-96	Remote sensing	PSLV-D3	Successful
INSAT-2D	20-04-97	Telecom	Ariane	Unsuccessful
IRS-1D	29-09-97	Remote sensing	PSLV	Successful
INSAT-2E	03-04-99	Multipurpose	Ariane	Successful
INSAT-3B	22-03-2000	Multipurpose	Ariane	Successful
G-SAT-1	18-04-2001	Multipurpose	GSLV-D	Successful
INSAT-3C	24-01-2002	Communication	Ariane-4	Successful
MET SAT	12-09-2002	Meteorology	PSLVC-4	Successful
INSAT-3A	10-04-2003	Multipurpose	Ariane-5	Successful
INSAT-3E	28-09-2003	Communication	Ariane-5	Successful
Resrouce SAT-I	17-10-2003	Remote sensing	PSLV-C5	Successful
EDUSAT	20-9-2004	Education	GSLVF	Successful
CARTOSAT-I	05-05-2005	Cartography	PSLV C-6	Successful
INSAT-4A	22.12.2006	Telecom	Ariane-5	Successful
INSAT-4C	10.07.2006	Telecom	GSLV-FO2	Unsuccessful
CARTOSTAT-2, LAPAN TUBESAT, PAHUNSAT	10-01-2007	Multipurpose	PSLV-C7	Successful
INSAT-4B	12.03.2007	DTH Services	Ariane	Successful
INSAT-4CR	02.09.2007	Telecom	GSLV-FO4	Successful
TECSAR	21.01.2008	Remote sensing	PSLV-C10	Successful
CARTOSAT-2A	24.04.2008	Multipurpose	PSLV-C9	Successful
CHANDRAYAN-1	22.10.2008	Obs. of Moon	PSLV-C11	Successful
OCEANSAT-2	23.11.2009	Multipurpose	PSLV-C14	Successful
CARTOSAT-2B	12.07.2010	Remote sensing	PSLV-C15	Successful
RESOURCESAT-2 & OTHERS	20.04.2011	Multipurpose	PSLV-C16	Successful
GSAT-12	15.07.2011	Communication	PSLV-C17	Successful

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INDIAN SATELLITE SYSTEM

INSAT – SATELLITES

- 'INSAT' means Indian National Satellite.
- 'INSAT' system started with the launch of INSAT-1A on April 10, 1982 from Cape Canaveral.
- The Indian National Satellite (INSAT) is a multipurpose operational satellite system for domestic telecommunication, meteorological observations and data relay nationwide direct satellite television broadcasting and radio, television programme distribution. The system is a joint venture of Department of Space (DoS), Department of Telecommunication (DoT), Indian Meteorological Department (IMD), All India Radio (AIR) and Doordarshan.
- INSAT-1 series were made by the United States (US) for India and launched by foreign rockets.
- INSAT-2 series were made by India and launched by foreign rockets.
- INSAT is one of the largest domestic communication satellite system in the world with six satellites, INSAT-2DT, INSAT-2E, INSAT-3A, INSAT-3B, INSAT-3C and INSAT-3E. The INSAT system also includes a few transponders leased from other agencies for meeting the current demands.
- INSAT-3A/3B/3C are all in orbit, while INSAT–3E was launched in September 2003, from Kourou in French Guyana, augmenting India's telecommunication, broadcasting and meteorological services.
- On September 20, 2004, India's Geosynchronous Satellite Launch Vehicle (GSLV) successfully launched EDUSAT, the country's first thematic satellite dedicated exclusively for educational services.
- EDUSAT is specially configured for audio-visual medium, employing digital interactive classroom and multimedia and multi-centric system.
- The satellite has five Ku–band transporters and six C-band transponders.
- EDUSAT provides connectivity for school, college and higher levels of education and also to support non-formal education including developmental communication.

APPLICATIONS OF COMMUNICATION SATELLITES

- The INSAT system was supposed to carry out three independent tasks, namely–

1. Tele Communications
2. Television and Radio Broadcasting
3. Meteorological Observations

- Remote areas and offshore islands have been connected with rest of the nation using INSAT system.
- Interactive education system has been provided a big boost.

- Nation–wide library networking has been initiated on a large scale.
- INSAT communication services have been used in mobile satellite services, rural telegraphy, telemedicine, computer networking etc.
- The INSAT T.V. network today provides access to over 80 per cent of India's population.
- Regions of South-East Asia and Middle–East are now able to receive Indian Television through INSAT-2C.
- Education television broadcasting through INSAT has been introduced from primary level to university level.
- The entire radio networking of all radio broadcasts in the country is now through INSAT.
- The meteorological data gathering with Very High Resolution Radiometer (VHRR) on board INSAT-2 series has vastly improved weather forecasting.
- INSAT system provides meteorological services through Very High Resolution Radiometer (VHRR) and CCD cameras on some of its spacecraft.
- Cyclone monitoring through meteorological imaging and cyclone warning throgh disaster warning receivers has been operationalised.

INDIAN REMOTE SENSING SATELLITE SYSTEM

- Today, India has the largest constellation of Remote Sensing Satellites which are provding services both at the national and global levels.
- From the Indian Remote Sensing (IRS) Satellites, data is available in a variety of spatial resolutions starting from 360 metres and highest resolution being 5.8 meters. Besides, the state-of-the-art cameras of IRS spacecraft take the pictures of the Earth in several spectral bands.
- The first Indian Remote Sensing Satellite, IRS-IA was launched on March 17, 1988.
- The second Indian Remote Sensing Satellite IRS-IB was launched on August 29, 1991.
- The Indian Remote Sensing Satellite system, comprising IRS-IC, IRS-ID and IRS-P4 besides IRS-P3, is the largest such system in the world today.
- The Polar Satellite Launch Vehicle PSLV-C5 launched in October 2003 putting into orbit the Indian Remote Sensing Satellite IRS-P6, also known as RESOURCE Satellite-1.
- This is the first time when the PSLV placed a satellite of over 1,30[illegible] kg in orbit.
- The Resourcesat is the most sophisticated Remote Sensing satellite of the ISRO.
- Resourcesat has application in agriculture, forestry, land and water resources, and disaster management.
- On May 5, 2005 PSLV-C6 put the 1560 kg CARTOSAT-1 into obrit at a height of 627 km.

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- CARTOSAT-1 is the heaviest Remote Sensing Satellite to be orbited by a PSLV.
- TECSAR is the Remote Sensing Satellite to be orbited by a PSLV-C-10.

APPLICATIONS OF REMOTE SENSING

- IRS imagery is used for agricultural crop acroage and yield estimation.
- It has important application in drought warning, flood warning and damage assessment.
- IRS imagery is used for groud and surface water harvesting, monitoring of reservoirs and irrigation command areas to optimise water use.
- Forest survey and management and wasteland identification and recovery are other allied uses in this regard.
- IRS imagery has also been used for mineral prospecting and forecasting of potential fishing zones.
- With regard to the applications in planning and management, IRS data is being used for urban planning, flood prone area identification and the consequent suggestions for mitigation measures.

LAUNCH VEHICLES

- The first Indian Satellite Launch vehicle was SLV-3.
- The first successful flight of SLV-3 took place from the Sriharikota range in July 1980. It carried a small Indian built satellite Rohini-1 and placed it a near -earth orbit.
- Two more successful launches of SLV-3 were conducted in May, 1981 and April, 1983 with the Rohini Satellites.

AUGMENTED SATELLITE LAUNCH VEHICLE (ASLV)

- ASLV represents the next stage in India's Launch Vehicle Development Preogramme.
- ASLV was an improved version of SLV-3.
- The ASLV was derived from the SLV-3 with the addition of two boosters.
- ASLV was 24 metres high and its capacity reached 150 kg payload in LEO.
- The first two flights of ASLV carrying SROSS-1 and SROSS-2 satellites respectively, failed. The first flight was in March, 1987 and second in July, 1988.
- The third launcher ASLV-D 3, was launched in May, 1992 carrying the SROSS-3 satellite. The satellite was successfully placed in low earth orbit of 400 km.
- The final ASLV-D4 was launched in May, 1994 and was a success.

POLAR SATELLITE LAUNCH VEHICLE (PSLV)

- PSLV was designated to carry much heavier satellites of the IRS class to Polar Sun-Synchronus orbits.

- The PSLV is a 4-stage launcher measuring 44 metre high with a 2.8 metre diameter and weiging 275 tones.
- The first development flight i.e., PSLV-D1 in 1993 was unsuccessful.
- The PSLV-D2 launch in October, 1994 successfully placed IRS-P2 in the Polar Sun-Synchronous Orbit (PSO).
- The second developmental launch in March, 1996 successfully placed IRS-P3 in PSO.
- It was in September, 1997 that first successful operational flight PSLV-C1 was undertaken. It placed IRS–1D in PSO.
- The PSLV-C2 in May, 1999 lifted and placed three satellites–the Indian IRS-P4, the Korean KITSAT-3 and the German TUBSAT in PSO5.
- The PSLV-C3 in October, 2001 placed three satellites - the Indian TES, the Belgian PROBA and the German BIRD.
- India's Space Programme reached new heights, the successful launch of the 44.4 metre tall four-stage PSLV C-6 carrying the CARTOSAT-1 and HAMSAT satellite, on May, 2005.
- CARTOSAT-2, LAPAN, TUBESAT and PAHUNSAT is the heaviest Remote Sensing Sattellite to be orbited by PSLV-C7.

GEOSTATIONARY SATELLITE LAUNCH VEHICLE (GSLV)

- GSLV represents the most advanced generation of Indian Launch Vehicle.
- GSLV is a Delta-II class medium launch vehicle, with an objective of placing 2.5 metric tone payloads into GTO.
- GSLV is a three stage launch vehicle. The stage 3 and 4 of PSLV are replaced by a single, cryogenic stage in GSLV. The first stage in GSLV is a solid propellant core motor with four liquid propellant strapons. The second stage is a liquid propulsion system. The cryogenic upper stage has oxygen and liquid hydrogen.
- On April, 18, 2001 the GSLV-D1 was successfully launched from the Sriharikota and placed GSAT-I in the GTO.

CRYOGENIC TECHNOLOGY

- A cryo engine used liquid hydrogen and liquid oxygen as propellants. It is called cryo engine because both these gases are required to be cooled to extremely low temperatures, called Cryogenic temperature.
- It is in GSLV that Cryogenic engines have been used for the first time.
- Cryogenic engines provides two important benefits i.e., greater thrust power and lower weight of propellants, due to which it is possible to carry additional payload.
- Cryogenic technology is crucial for the success of the GSLV programme as it seeks to place a 2500 kg satellite in a 36000km high geostationary orbit.

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ANTRIX

- ANTRIX, the commercial arm of ISRO is a single window agency for marketing Indian space capabilities. It is playing a key role in the worldwide availability of IRS data through Space Imaging, USA.
- ANTRIX also provides IRS specific data processing equipment.
- It offers launch services using India's PSLV. Two German, one Korean and one Belgiam satellites have already been successfully launched by PSLV.
- Through ANTRIX, Telemetry, Tracking and Command support from the Indian ground stations are offered.

IMPORTANT TERMINOLOGY

- **Space :** The vast and limitless region which exists beyond the earth's atmosphere.
- **Space Exploration :** The collection of information about the various objects present in outer space is called 'space exploration'.
- **Satellite :** A satellite is a celestial object which revolves round a planet in circular path or elliptical path. The satellites are of two types– Natural satellites and Man-made satellites.
- **Orbit :** The closed path of a satellite around the earth is called its orbit. The orbit of a satellite may be circular or elliptical in shape.
- **Apogee :** It is the farthest point from the earth on the obrit of a satellite.
- **Perigee :** It is the nearest point from the earth on the orbit of a satellite.
- **Inclination :** The inclination of the orbit of a satellite is the angle made by the orbit of the satellite with the equator of the earth.
- **Low Earth Orbit (LEO) Satellites :** The satellite is stationed at a relatively low altitude (ranging between 200 to 900 kms) above the surface of the earth. They have an elliptical orbit.
- **Polar Orbit Satellites :** Such satellites move from pole to pole i.e., from North Pole to South Pole and vice versa. These satellites have near circular orbit in a pole to pole direction.
- **Sun Synchronous Satellites :** A satellite that always appears in a fixed position vis-a-vis sun is called a 'sun-synchronous satellite.'
- **Geo-stationary Satellite :** Geo-stationary orbit is at a high altitude of about 36000 km. It is a circular and equatorial orbit. Communication satellites are normally geo-stationary satellites.
- **Rocket Propellants :** Rocket fuels or rocket propellants are special fuels which are highly compact, having very high calorific value, burn extremely rapidly, and leave no residue on burning. There are two types of rocket propellants, solid rocket propellants and liquid rocket propellants. The solid rocket propellants are a mixture of solid hydrocarbon and a solid oxidising agent. Most of the propellants used in rocket are liquid.

E.g. of Rocket Propellants : Liquid Hydrogen, Synthetic Rubber, Liquid Ammonia, Alcohol, Hydrazine, Kerosene oil, Paraffin Wax, Methyl Hydrazine.

INSTITUTIONS ASSOCIATED WITH SPACE RESEARCH

- Vikram Sarabhai Space Centre (VSSC), Thiruvananthapuram
- ISRO Satellite Centre, Bangalore
- Space Application Centre, Ahemdabad
- SHAR Centre, Sriharikota, Andhra Pradesh (the main launch centre of ISRO)
- Liquid Propulsion Systems Centre, Mahendragiri (Tamil Nadu), Thiruvananthapuram and Bangalore
- Development and Educational Communication Unit (Ahmedabad)
- ISRO Telemetry, Tracking and Command Network, Bangalore
- Master Control Facility at Hassan in Karnataka
- ISRO Inertial Systems Units, Thiruvananthapuram
- Physical Research Laboratory, Ahmedabad

ATOMIC RESEARCH

- Pandit Jawaharlal Nehru and Dr. Homi. J. Bhabha laid the foundation for Nuclear Energy Programme in India.
- India's nuclear research programme aims to develop and utilise nuclear energy for peaceful purposes such as power generation, applications in agriculture, medical sciences, industry and other areas.
- The objectives of India's nuclear energy programme have been defined in the Atomic Energy Act of 1948.
- The Department of Atomic Energy (DAE) was created in 1954.

ATOMIC RESEARCH INSTITUTES AND OTHER ORGANISATIONS

Research Centre

- Bhabha Atomic Research Centre (BARC) – Mumbai.
- Indira Gandhi Centre for Atomic Research (IGCAR) – Kalpakkam.
- Centre for Advanced Technology (CAT) – Indore
- Variable Energy Cyclotron Centre (VECC) – Kolkata
- Atomic Minerals Directorate for Exploration and Research (AMD)– Hyderabad

Industrial Organisations

- Heavy Water Board (HWB) – Mumbai
- Nuclear Fuel Complex (NFC) – Hyderabad
- Board of Radiation and Isotope Technology (BRIT) – Mumbai

Public Sector Undertakings

- Nuclear Power Corporation of India Ltd, (NPCIL) – Mumbai
- Uranium Corporation of India Ltd. (UCIL) – Jadugoda (Jharkhand)
- Indian Rare Earth Ltd, (IRE) – Mumbai
- Electronics Corporation of India Ltd. (ECIL) – Hyderabad

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Aided Institutes

- DAE financially supports seven autonomous national institutes.
- Tata Institute of Fundamental Research (TIFR) – Mumbai
- Tata Memorial Centre (TMC) – Mumbai
- Saha Institute of Nuclear Physics (SINP) – Kolkata
- Institute of Physics (IOP) – Bhubaneswar
- Harish Chandra Research Institute (HRI) – Allahabad
- Institute of Mathematical Sciences (IMSc) – Chennai
- The Institute for Plasma Research (IPR) – Ahmedabad

AUTONOMOUS SCIENTIFIC RESEARCH INSTITUTIONS

Department of Science and Technology provides grants-in aids to 16 autonomous scientific research institutions engaged in frontier areas of research in basic and applied sciences :

- **Bose Institute, Kolkata** is devoted to fundamental and applied reserch in physical and life sciences.
- **Agharkar Research Institute, Pune,** research in basic and applied aspects in the fields of biological sciences.
- **Shri Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram**–developing biomedical engineering and technology; providing and demonstrating high standards of patient care in advanced medical specialties and developing post-graduate training programme of the highest quality in these fields.
- **Indian Association for the cultivation of Sciences, Kolkata**–studies on solid state physics, material sciences, theoretical physics, spectroscopy, energy research, chemistry including biological chemistry, polymer science etc.
- **Indian Institute of Astrophysics, Bangalore**–research in emerging as well as interdisciplinary areas of astrophysics and heavenly bodies and development of instruments used in astrophysical studies.
- **Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore**–research in frontier areas of chemistry, physics of materials, computational fluid dynamics, geodynamics, condensed matter theory, animal behaviour genetics etc.
- **Raman Research Institute, Bangalore**–research in basic sciences such as astronomy, astrophysics, liquid crystals etc.
- **S.N. Bose National Centre for Basic Sciences, Kolkata**–promoting advanced studies in selected branches of basic sciences.
- **Birbal Sahni Institute of Palaeobotany, Lucknow**–research in the are of palaeobotany, its relevance in modern context.
- **Indian Institute of Geomagnetism, Mumbai**–observiing and understanding some of physical processess taking place in the innermost crusts of the earth as well as phenomena occurring on the sun and in near earth and interplanetary space.
- **Wadia Institute of Himalayan Geology, Dehradun**–basic research in areas of biostratigraphy, petrology and geochemistry, sedimentology, tectonics and environmental geology to understand the geodynamics of the Himalayan regions.
- **International Advanced Research Centre for Powder Metallurgy and New Materials, Hyderabad**–the development of high performance materials, and processes.
- DST also extends financial and administrative support to the following academies and professional bodies which are engaged in the promotion of Science and Technology in the country through the involvement of scientists and engineers;
- Indian Academy of Sciences, Bangalore
- Indian National Science Academy, New Delhi
- Indain National Academy of Engineering, New Delhi
- National Academy of Sciences, Allahabad
- Indian Science Congress Association, Kolkata.

NUCLEAR POWER PROGRAMME

- The Department of Atomic Energy (DAE) is following a three stage programme which envisages building of, on a commercial scale, Pressurised Heavy Water Reactors (PHWRs), Fast Breeder reactors (FBRs) and Thorium based reactors.

FIRST STAGE : PHWR PROGRAMME

- It took off in the sixties. Initially two boiling reactors were set up at Tarapore in Maharashtra.
- The station was commissioned in 1969 and was collaborative venture with General Electric of USA.
- The PHWR programme commenced with the building of two pressurised heavy water reactors (PHWRs) at Rawatbhata (Rajasthan).
- These reactors built partly with Canadian collaboration, started commercial production in 1972 and 1980.
- Later, in 1984 and 1986 two indigenous PHWRs were commissioned at Kalpakkam (Tamil Nadu). With this, the Department achieved comprehensive capability in the design, construction and operation of PHWRs.
- With its R & D endeavour and the support of the Indian industry, DAE standarsized 220 megawatt PHWR design.
- The Nuclear Power Corporation of India Limited (NPCIL), a public sector undertaking of DAE, is responsible for the design, construction and operation of nuclear power reactors.
- Two such reactor units were commissioned at Narora (Uttar Pradesh) in 1989 and 19991.
- The design of the 220 megawatt atomic power reactors was further improved, and the indigenous technology of PHWR reached commercial maturity with the commissioning of two 220 megawatt power reactors at Kakrapar (Gujarat) in 1992 and 1995 and two each at Kaiga (Karnataka) and Rawatbhatta in 1999 and 2000.

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- With a total installed capacity of 3260 MW, 15 atomic Power reactors–2 boiling water reactors (BWR), 12 pressurised heavy wa... ter reactos (PHWR) and one 540 MW PHWR are under operation...
- One 540 MW PHWR Tarapore Atomic Power Project – (3) & Maharashtra, two 1,000 MW light water reactor (Russain VVER Kundankulam Atomic Power Project in Tamil Nadu, and two 2... MW PHWR each at Kaiga (3&4) in Karnataka and Rawatbhata (5&6) in Rajasthan, are under construction. These are being co... structed by the Nuclear Power Corporation of India.
- These will add 3,420 MW to take the total installed capacity u... 6,680 MW in the coming few years.
- To provide a parallel stream for faster growth of nuclear powe... India has entered into an agreement with the Russian Federa... tion for setting up an atomic power station comprising tw... pressurised water reactors of 1,000 MW capacity each a... Kudankulam (Tamil Nadu). Here construction has begun with th... first pour of the reactor concrete on March 31, 2002.
- The reactors are scheduled for completion in 2007/2008. India has acquired an experience of about 200 reactor years of nuclear powe... plant operation.
- The average capacity factor of the plants has also touched a new high of 89 per cent.
- DAE has an ambitious nuclear power programme aiming at achiev... ing an installed nuclear power capacity of 20,000 MWe by the year 2020.

SECOND STAGE : FAST BREEDER REACTOR PROGRAMME

- The research and development in the field of Fast Breeder Reactor (FBR) undertaken in the early sixties at Trombay, marked the beginning of the second stage of the Nuclear Power Programme.
- To develop R&D capabilities in the field of fast reactors, the Reactor Research Centre (now Indira Gandhi Centre for Atomic Research, IGCAR) was set up in 1971 at Kalpakkam.
- The Centre commenced work on setting up the 40MWt (13MWe) Fast Breeder Test Reactor (FBTR) in 1972.
- The reactor attained criticality in October, 1985. The critical components of the reactor were manufactured in India.
- Its fuel, that used mixed carbides of Uranium and Plutonium, was developed at Trombay.
- This is the first fast reactor of its kind in the world that uses such a fuel core.
- These fast breeder systems produce more fuel than what they consume FBRs can increase fuel utilisation by about sixty times of what is possible with PHWRs.
- Thus, FBRs generate electricity and build up fuel inventory.
- The design of 500 MW sodium cooled Prototype Fast Breeder Reactor (PFBR) is ready and its construction is underway, with the Government giving its nod.

- The Prototype Fast Breeder Reactor is being constructed by the Bhartiya Nabhikiya Vidyut Nigam Ltd. (BHAVINI).
- Nuclear Reactors based on Pressurized Heavy Water technology (PHWR) utilise natural uranium, in which case only 0.6 per cent of it gets used in energy production, while in Fast Breeder Reactors, the natual Uranium utilisation increases to over 75 per cent.
- India's first prototype FBR has a construction period of 7 years and after its completion, the Department of Atomic Energy proposes to build four more FBRs of 500 MW each by the year 2020.
- It also proposes to undertake desigining and development of 1,000 MW FBRs. With this programme, the target of 20,000 MW by 2020, may be achieved.

THIRD STAGE : THORIUM BASED REACTORS

- The third stage of the Indian Nuclear Power Programme, envisaging the use of Thorium for power generation, has already begun.
- The efforts have resulted in the successful design and operation of 30KW (normal power) reactor Kamini, at IGCAR, which uses Uranium– 233 fuel obtained from irradiated Thorium.
- The reactor is being used for irradiation of specimens for experimental/forensic purposes.
- The technologies relating to the production of Uranium–233 have been established.
- Thorium fuel bundles have also been successfully used in the nuclear power programme, Bhabha Atomic Research Centre (BARC) has been developing the 300 MW. Advanced Heavy Water Reactor (AHWR).
- The reactor, a vertical pressure tube type cooled by light water and moderated by heavy water, incorporates several passive features in line with the concept of innovative advanced reactor systems.
- AHWR, which will use both Thorium–Uranium–233 and Thorium Plutonium mixed oxide as fuel, is in technology development phase.

INDIA'S NUCLEAR REACTORS

- 4 August, 1956 Apsara – first research reactor in Asia, attains critically at Trombay.
- 10 July, 1960 CIRUS – the 40 MWe research reactor attains critically.
- 14 January, 1961 Research reactor ZERLINA attains critically, (It was decomissioned in 1983).
- 2 October, 1969 Tarapore atomic power station starts commercial operation.
- 18 May, 1972 Research reactor PURNIMA-1 attain critically.
- 30 November, 1972 Unit-1 of Rajasthan atomic power station at Kota begins commercial operation.

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- 1 November, 1980 Unit-2 of Rajasthan atomic power station goes commercial.
- 27 January, 1984 Unit-1 of Madras atomic power station at Kalpakkam starts commercial operation.
- 10 May, 1984 Research reactor PURNIMA-II, fuelled by Uranium-233, attains critically.
- 8 August, 1985 Research reactor Dhruva (100MWe) attains critically.
- 18 October, 1985 Fast Breeder Test Reactor (FBTR) at Kalpakkam attains critically.
- 12 March, 1986 Units-2 of Madras atomic power station goes commercial.
- 12 March 1989, Unit-1 of Narora atomic power station attains critically.
- 9 November, 1990 Research reactor PURNIMA-III, a Uranium-233 fuelled reactor, attains critically.
- 24 October, 1991 Unit-2 of Narora atomic power station attains critically.
- 3 September, 1992 Unit-1 of Kakrapara atomic power station attains critically.
- 8 January, 1995 Unit-2 of Kakrapar atomic power station attains critically.
- 20 October, 1996 Kalpakkam mini reactor (KAMINI), with Uranium-233 fuel, attains critically at IGCAR, Kalpakkam.
- 24 September, 1999 Unit-2 of Kaiga atomic power station attains critically.
- 24 December, 1999 Unit-3 of Rajasthan atomic power station attains critically.
- 26 September, 2000 Unit-1 of Kaiga atomic power station attains critically.
- 3 November, 2000 Unit-4 Rajasthan atomic power station attains critically.

Nuclear Reactors Under Construction

Name	Location	Capacity (MWe)
Rajasthan Atomic Power Station (RAPS-3 and 4)	Rawatbhatta (Rajasthan)	440
Kaiga Atomic Power Station (KGS 3 and 4)	Karnataka	440
Kakrapar Atomic Power Station (KAPS-3)	Surat (Gujarat)	440
Kudankulam Atomic Power Station (KAPS-1 and 2)	Kanyakumari (Tamil Nadu)	2000

Heavy Water Plants

Location	Capacity in MW/Year
1. Nangal (Punjab)	14
2. Tuticorin (Tamil Nadu)	49
3. Baroda (Gujarat)	45
4. Kota (Rajasthan)	85
5. Talcher (Orissa)	very little
6. Taj (Maharashtra)	100
7. Munuguru (Andhra)	185
8. Hazira (Gujarat)	100

NUCLEAR TESTS CONDUCTED BY INDIA

Pokhran I :– On May 18, 1974, India conducted its first nuclear underground test.

- The test was conducted in Pokhran area of Jaisalmer District in Rajasthan.

Pokhran II :– On May 11, 1998, India conducted three nuclear underground tests on Pokhran range in Rajasthan — (1) a fission device (2) a low yield device and (3) a thermo nuclear device.

- The low yield device will enable Indian Scientists to carry forward their research with a sound computer simulation capacity, supported by subcritical experiments.
- The three nuclear tests covered the full spectrum of nuclear weapons.
- On May 13, 1998, two further undeground tests were conducted.

DEFENCE

DEFENCE UNDERTAKINGS

- Eight Public sector undertakings currently function under the Department of Defence Production.

1. The Hindustan Aeronautics Limited (HAL)

- HAL was set up in 1964 with its corporate office at Bangalore.
- It is the largest public sector undertaking under the Department of Defence Production.
- The HAL's products range consists of aircraft, engines, accessories, avionics, structures for aerospace vehicles, statellites and industrial and marine gas turbine engines.
- The HAL has established joint ventures BAe-HAL, Indo-Russian Aivation Ltd., with international participation.

2. Bharat Electronics Limited (BEL)

- It was established in 1954 and its corporate office is in Bangalore.
- BEL has nine units in the country.
- It is engaged in the design, development and manufactures of sophisticiated state-of the-art electronics equipments for the use

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of defence services, para military oragnisations and other government users like AIR, Doordarshan, Police Wireless, Department of Telecommunications.

3. The Bharat Earth Movers Limited (BEML)

- It was established in May, 1964 and commenced its operations from January, 1965.
- Government holds over 61.23 per cent of equity shares in BEML.
- The BEML has three manufacturing divisions located at Bangalore, Kolar Gold Fields (KGF) and Mysore.

4. Garden Reach Ship-builders and Engineers Limited (GRSE)

- The Government of India acquired it in 1960 with its corporate office at Kolkata.
- The GRSE builds and repairs warships and auxiliary vessels for the Navy and the Coast Guard.
- Its product range includes frigates carrier, oil tankers, petrol vessels, attack craft, high technology ship borne equipment, tubing pumps, diesel engines etc.

5. Goa Shipyard Limited (GSL)

- The GSL is located at Vasco-da-Gama.
- It primarily builds small and medium size Naval vessels and repair ships and vessels.
- The company has undertaken construction, repair, refit of variety of vessels for the Indian Navy and the Coast Guard as well as non-defence sectors.

6. The Bharat Dynamics Limited (BDL)

- It was set up in 1970 with corporate office at Hyderabad for manufacture of guided missiles.
- The company has two units at Kachanbagh and Medak.
- It possesses the capability to produce advanced guided missile systems.
- The BDL is the prime production agency for missile weaponry systems.

7. Mishra Dhatu Nigam Limited (MIDHANI)

- It is located at Hyderabad and incorporated on November 20, 1973 with the primary objective of ushering in self reliance in special metals and alloys for strategic sectors like Defence, Space and Atomic Energy as well as hi-tech commercial industries in India.

Defence Research and Development Organisation (DRDO)

- Defence Research and Development Organisation (DRDO) was formed in 1958 by amalgamating Technical Development Establishments (TDEs) of the Indian Army and the Directorate of Technical Development and Production (DTDP) with the Defence Science Organisation (DSO).

- DRDO laboratories are engaged in a variety of Defence technologies covering various disciplines like aeronautics, armaments, electronics, combat vehicles, engineering systems, missiles, advanced computation, naval systems etc.

INTEGRATED GUIDED MISSILE DEVELOPMENT PROGRAMME

- Integrated Guided Missile Development Programme (IGMDP) was launched in 1983.
- Its objective was to design and build missiles indigenously with the help of technologies already available in the country.
- The missile systems to be designed and developed were–
- Tactical Surface to Surface Missile 'PRITHVI':
1. Intermediate Range Ballistic Missile (IRBM) 'AGNI'
2. Short Range Surface to Air Missile 'TRISHUL'
3. Medium Range Surface to Air Missile 'AKASH'
4. Anti Tank Guided Missile 'NAG'

INDIAN MISSILE SYSTEMS

(A) AGNI

- Agni is an intermediate range ballistic missile (IRBM).
- It can carry a payload of 500-1000 kg upto a range of 1000-2500 km.
- It can carry both conventional and nuclear war head.
- AGNI can be launched from a platform and can also be mounted on road-mobile launchers.
- AGNI-I has a ranage of about 700 km.
- AGNI-II is a two stage solid propellant missile with a range of 2000 to 2500 km.
- AGNI-III has a 3500 km plus range.
- The missile had advanced features like Global Positioning System.

(B) PRITHVI

- PRITHVI is a surface to surface battlefield tactical missile, having a range of upto 250 km.
- PRITHVI can carry a 500 kg payload upto 250 km or a 1000 kg payload upto 150 km.
- It can carry both conventional and nuclear warhead.
- PRITHVI-I has a strike range of 150 km with a one tonne warhead. It has been fully inducted into the army.
- PRITHVI-II or the airforce version of Prithvi has undergone several successful tests.
- PRITHVI-III or naval version of Prithvi, also called DHANUSH has been successfully test-fired.

(C) TRISHUL

- TRISHUL is a surface to air missile having a short range of 500 metres to 9 km.
- It has a radar guided surveillance, tracking and guidnace mechanism for accurate interception of targets.

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- It can be used by Army, Navy, and Airforce.
- TRISHUL has undergone several successful test flights.

(D) AKASH

- 'AKASH' is a surface to air missile having a range of 25 km.
- It is a multi-target air defence weapon that can target four to five enemy aircrafts of missiles at a time.
- It will be the first Indian missile system to use Scramjet principle for its propulsion.
- AKASH was test–fired for the first time on August 14, 1990 from the Interim Test Range, Chandipur.
- The quick reaction Air Defence Missile 'AKASH' has undergone several consecutive successful flight trails in guide mode.

(E) NAG

- NAG is an anti-tank missile having a range of 4 km.
- NAG is a third generation missile having 'fire and forget' capability.
- It can be fired at night and during bad weather conditions as it uses imaging infrared guidance.
- First test of NAG missile was conducted on November 23, 1990.

OTHER TECHNOLOGICAL ACHIEVEMENTS IN DEFENCE SECTOR

ELECTRONIC WARFARE SYSTEM

- India announced the development of the first ever indigenously built and largest integrated electronic warfare system on January 19, 2004.
- The system has been named as "Samyukta" and it is the first state-of the–art integrated electronic warfare system for the army.
- Defence research laboratories have already developed similar system for the navy called "Sangraha" and for the Air Force called "Tempest".

BRAHMOS

- It is a supersonic cruise missile, jointly developed by India and Russia.
- It is the first and only supersonic cruise missile that uses liquid ramjet technology.
- Brahmos-II, the land to land version of the supersonic cruise missile was test–fired for the first time in the Army configuration in a desert range in Rajasthan on December 21, 2004.

'ASTRA' MISSILE TEST–FIRED

- India successfully test-fired a prototype of the beyond visual range (BVR) air to air missile 'Astra' from the Chandipur interim test range.
- The 'Astra' missile is being developed indigenously to arm all fighters in the IAF's inventory, including the Light Combat Aircraft (LCA) when it becomes fully operational by around 2010.

- The 3.8 m long 'Astra' version has a strike range of 25-40 km.

'Saras' Makes Maiden Test Flight

- 'Saras' is India's first indigenously built civilian aircraft.
- It recorded its maiden flight in Bangalore on May 29, 2004.
- 'Saras' has been designed and developed by the National Aerospace Laboratories (NAL).
- 'Saras' is designed to touch a speed of 550 km an hour and cruise an altitude of 7500 metres.
- The aircraft's maximum take-off weight is 61,00 kg.
- It is equipped to carry a payload of 1232 kg.

Missiles

S.No.	Type	Range
1.	Inter Continental Ballistic Missile (I.C.B.M.)	upto 14,800 km
2.	Submarine Launched Ballistic Missile (S.L.B.M.)	upto 9,100 km
3.	Medium Range Ballistic Missile (M.R.B.M.)	upto 500 km
4.	Short Range Ballistic Missile (S.R.B.M.)	upto 900 km

ANTARCTICA

- Antarctica lies completely in the southern hemisphere with the south pole almost in its centre.
- Antarctica is the only continent which is completely frozen and is therefore knwon as the 'White Continent.'
- Antarctica is the coldest and loneliest landmass on the earth.
- The mainland of Antarctica was first discovered in 1820, but real exploration began only in the twentieth century.
- About 99 per cent of the continent remains covered permanently with ice, the average thickness being approximately two to five kilometers.
- Queen Maud Range divides the continent almost into two equal parts.
- Mount Erebus is the only live Volcano in Antarctica.
- Vegetation mainly consists of lichens nad mosses.
- The climate in Antarctica is severe. At the south pole the lowest temperature has been recorded at–95°C during winter. Mid summer temperature normally does not rise about 0°C.
- It is summer in Antarctica from November to February. The sun never sets during this period. On the other hand, during winter May August the sun never rises.
- About 70 per cent of world's supply of fresh water is stored in the ice-caps and ice-sheets of Antarctica.
- Antarctica provides unique opportunities to scientists to learn more about earth. This continent therefore is called a 'Continent for Science.'
- The highest mountain of the continent is the Vinson Massif (5,139 metres) in Elsworth land.
- The highest point in eastern Antarctica is Kirkpatrick (4,528 metre) in the Trans-Antarctica Mountains.

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- Antarctica is delimited by the Antarctic circle (60°32'S) and also by the climate isotherm of 10°C of the warmest month of the year, January.
- The continent is studded with more than 50 sceintific research stations operated by various Nations.

The Antarctica Treaty

- India signed the Antarctica Treaty of 1959 and became a consultative member of the Antarctica club in 1983.
- The scientific Committee on Antarctica Research admitted India as a member in 1984.

Bodies connected with Antarctica Treaty

- SCAR : Scientific committee on Antarctica Research.
- COMNAP : Council of Managers of National Antarctic Programmes.
- SCALOP : Standing Committee on Antarctic Logistic Operation.

The Antarctica Expeditions

- The Antarctica Research Programme in India was initiated in 1981.
- So far 23 scientific expeditions have been launched on a regular basis.
- Two expeditions to the southern oceans for carrying out research in the thrust area of polar science viz Weddel Sea Expedition and Krill Expedition for assessment of Krill Resources in Antarctica water, were also undertaken.
- The Indian station 'Maitri' is situated in the Central Droning Maud land of east Antarctica.
- From 1999 onwards the Indian sceintific expeditions to Antarctica are launched from cape town, South Africa.
- Scientific experiments being carried out at Antarctica are in the field of measurements of Green House gases, tele seismic studies, permanent GPS tracking at Maitri, study of crack propagation on ice sheet, communication at Maitri and polar logisitics

Latest Develoments

- **30.10.2004** :– The National Centre for Antarctic and Ocean Research (NCOR) is to open a state of the art National Ice core laboratory in its campus providing an antarctic like atmosphere for acquiring scientific knowledge. This would be the first of its kind in south Asia.
- **13.11.2004** :– Indian plans its third permanent station in Antarctica. Estimated at a cost of Rs. 15 crore, it is expected to be completed over next 3 to 4 Antarctic summers. This station follows the earlier Indian stations, 'Dakshin Gangotri' and 'Maitri' stations.
- **08.02.2005** :– India to set up another station at Antarctica to address the geopolitical, economic and scientific needs of the country more effectively. Scientists have already been working on these issues from the existing station 'Maitri.'

The Antarctica Expedition

Expedition	Date	Led by	Features
First	6 Dec, 1981	Dr. S.Z. Qasim	Set up the unmanned wheather station 'Dakshin Gangotri'.
Second	1 Dec, 1982	Dr V.K. Raina	Wireless communication established. Rock Samples were also collected.
Third	3 Dec, 1983	Dr. H.K. Gupta	Site for base camp was identified after survey for the first time two women, Dr. Aditi Pant and Dr. Sudipti Senagupta took part in the expedition.
Fourth	4 Dec, 1984	Dr.B.B. Bhattacharya	Geological and seismological surveys were conducted. Three cottages, at a distance of 70 km from Dakshin Gangotri were built,. A thirteen member team stayed back for winter studies.
Fifth	30 Nov,1985	Dr. M.K. Kaul	Information about weather and climate was collected.
Sixth	26 Nov, 1986	Dr.Arun Parulekar	Studies conducted on Oceanography, ozonehole, non-conventional wind energy.
Seventh	Nov. 1987	R. Sengupta	Maitri Structure accomplished along with postoffice
Eigth	Nov. 1988	R. Sengupta	Establishment of winter-camp at Maitri.
Ninth	Nov. 1989	R. Ravindra	Permanent Lab at Maitri, Green house for horticultural study.
Tenth	Dec. 1990	A.K. Hanjura	SODAR : SOUND Defective and Ranging System established
Eleventh	Nov. 1991	S. Mukherji	Acrosos Ozone relationship established
Twelfth	Dec. 1992	V.K. Dhargalkar	Maitri contributers to international ROSA project.
Thirteenth	Dec. 1993	G.Sudhakar Rao	Biogeochemical Parameters of lakes included.
Fourteenth	Dec. 1994	S.D. Sharma	Email links with Maitri established
Fifteenth	Dec. 1995	A. Chaturvedi	Geological Mapping of 3,000 Sq. Km.
Sixteenth	Dec. 1996	A.L. Kapoor	Environment clean up operation conducted
Seventeenth	Dec. 1997	K.R. Sivan	Permanent analog VLF Monotoring Station Established
Eighteenth	Dec. 1998	MV Polarbird	Ajay Dhar Land-route estabalished beyond the Orwin mountain to the south.
Nineteenth	Dec. 1999	MV Magdalena	Arun Chaturvedi First expedition from South Oldendorff Africa, Permanent Environment Lab.
Twentieth	Dec. 2000	M. J. D'souza	Seismic station was upgraded
Twenty First	6 Jan, 2002	Dr. P.C. Pandey	
Twenty Second	6 Jan, 2003	R. P. Lal	Installation of Telemedicine
Twenty Third	December, 2003	Dr. Arun H. Hunchinal	Operation is going on
Twenty Fourth	December, 2004	—	Recomended by Capetown of South Africa
Twenty Fifth	December, 2006	L. Prem Kishore	Previous Research work will be sustain
Twenty Sixth	9 Jan, 2007	Joy Paul	Landed at Antarctica on January 9, 2006
			26th expedition team released by C.M. Rumd of sea pole from Goao.

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ECOLOGY & ENVIRONMENT

ECOLOGY

- The term **Ecology** is coined by famous biologist Ernest Haickel.
- **Ecology** is formed from two Greek words **oikos** and **logos** meaning hapitat and study respectively.
- Ecosytem is a self sustaining, structural and functional unit of biosphere.
- It is an open system and depends upon solar energy from outside as its energy source.
- The concept of Ecosystem is first propounded by A.G. Tansley in 1935.

STRUCTURE OF ECOSYSTEM

- An ecosytem consists of two major components biotic and abiotic.

(a) Abiotic component : The abiotic components are **inorganic** (carbon, nitrogen, sulpher, carbon dioxide etc.), **organic** (lipids, carbonydrates etc.) substances and **climatic factors** such as air,

(b) Biotic Component : These are discussed below :

(i) Producders are the chlorophyll bearing plants such as algae, grass and trees. These are also called **autotrophes.**

(ii) Cosumers are the organisms, whose food requirements are met by feeding on other organisms. They are refered to as hetroptophs.

- Those who feed directly on plants (autotrophs) are called **herbhivores** (grasshopper, reabbit etc.)
- The animals who feed on herbivores are known as **carnivores** (chawk, lions)
- The organisms which can feed on both plants and animals are omnivores (fox, humans, cockroaches)

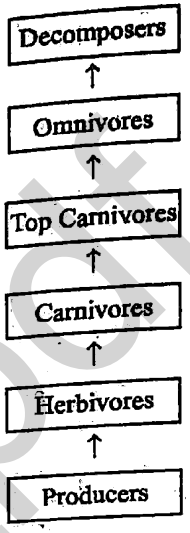
(iii) Decomposers are manily bacteria and fungai.

FOOD-CHAINS AND FOOD-WEBS

- The process of food transfer from the source in plants through a series of organisms, with repeated eating and being eaten, is called a **food-chain.**
- The shorter the food chain, the greater is the available energy.
- A simple generalized food chain is :

  Producers → herbivores → Carnivores
- The network of food chains is called a **food web.**

TROPHIC LEVELS



BIODIVERSITY

- The variety and variability of all animals, plants and micro organisms found on earth is called bio-diversity.
- India is one of the 12 megadiversity countries of the world for its great diversity of plant life, especially the angiosperms.

WILDLIFE PROTECTION

- At present, the protected area network comprises 92 national parks and 500 sanctuaries covering an area of 1.56 lakh sq. km.
- The Wildlife (Protection) Act, 1972 adopted by all States except Jammu and Kashmir (which has its own Act),governs wildlife conservation and protection of endangered species. This Act prohibits trade in rare and endangered species.
- An Inter state Committee has been set up to review the Widlife (Protection) Act, 1972 and other laws. India is a signatory to the Convention on International Trade in Endangered Species (CITES) of wild flora and fauna.
- The Wildlife (Protection) Amendment Bill 2002 was passed by the Parliament during the Winter Session, 2002.
- Under Project Tiger, launched on 1 April 1973, 27 Tiger Reserves have been set up in 17 states covering an area of about 37,761 sq. km.
- Under the Project Elephant, which was launched in February 1992, 14 Elephant reserves have been set up during the year.
- A Central Zoo Authority has been set up to look after the management of zoological parks in the country.

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Name of the Tiger Reserves in States with Year of Creation and Area

Sl. No.	Year of Creation	Name of Tiger Reserve	State	Total Area (in Sq Kms)
1.	1973-74 1999-2000	Bandipur	Karnataka Nagarhole (extension)	866
2.	1973-74	Corbett	Uttarakhand	642
3.	1973-74	Kanha	Madhya Pradesh	1316
4.	1973-74	Manas	Assam	1945
5.	1973-74	Melghat	Maharashtra	2840
6.	1973-74	Palamu	Jharkhand	1677
7.	1973-74	Ranthambhore	Rajasthan	1026
8.	1973-74	Simlipal	Orissa	1334
9.	1973-74	Sunderbans	West Bengal	2750
10.	1978-79	Periyar	Kerala	2585
11.	1978-79	Sariska	Rajasthan	777
12.	1982-83	Buxa	West Bengal	866
13.	1982-83	Indravati	Chattisgarh	759
14.	1982-83	Nagarjunsagar	Andhra Pradesh	2799
15.	1982-83	Namdapha	Arunchal Pradesh	3568
16.	1987-88 1999-2000	Dudhwa	Uttar Pradesh Katerniaghat (extension)	1985 811
17.	1988-89	Kalakad-Mundanthurai	Tamil Nadu	551 800
18.	1989-90	Valmiki	Bihar	
19.	1992-93	Pench	Madhya Pradesh	840
20.	1993-94	Tadoba Andhari	Maharashtra	758
21.	1993-94	Bandhavgarh	Madhya Pradesh	620
22.	1994-95	Panna	Madhya Pradesh	1162
23.	1994-95	Dampha	Mizoram	542
24.	1998-99	Bhadra	Karnataka	500
25.	1998-99	Pench	Maharashtra	492
26.	1999-2000	Pakhui-Nameri	Aurnachal Pradesh-Assam	257 1206
27.	1999-2000	Bori, Satpura, Pachmari	Madhya Pradesh	1486
	Total			**37761**

Important Wildlife Sanctuaries and National Parks of India

Wildlife Sanctuaries & National Park	State	Species of Animals
Kaziranga National Park, Jorhat	Assam	Rhinocerors, wild buffalo, bison, sambar, swamp deer, hog deer, wild pig, elephants
Manas Wildlife Sanctuary, Barpeta	Assam	Elephants leopards, wild buffalo, swamp deer, hog deeer, sambar
Keibul Lam Joo National Park	Manipur	Thamin (Sangai), brow antlered deer, hog deer, wild bar, panther, fishing cats, and water birds.
Ushakothi Wildlife Sanctuary, Sambalpur	Orissa	Elephant, panther, leopard, tiger, bison, wild boar and deer.
Simlipal Tiger Santuary, Mayurbhanj	Orissa	Tiger, elephant, leopard, wolf, chital, sambar, deer, guar, flying squirrel, peacocks.
Betla National Park	Bihar	Tiger, leopard, gaur, sambar, muntjac, nilgai, wolf,w ater, and woodland birds
Madumalai Sanctuary, Nilgiri	Tamil Nadu	Tiger, leopard, gaur, sambar, barking deer, wild dog, Nilgiri langur, bennet monkey, child boar, 4-homed antelope
Anamali, Pollachi	Tamil Nadu	Nilgiri langur, elephant, gaur, tiger, panther, sloth, wild boar
Bandipur National Park, Mysore	Karnataka	gaur, chital, elephant, sambar, birds crested hawk, serpent eagles, tiny eared owl.
Corbett National Park, Nainital	Uttarakhand	Tigers, Sambar, Chital, para (Hog Deer) and Munjtac (Barking Deer), Elephants, porcupine, wild pigs and fox.
Dudhwa National Park, Lakhimpur-Kheri	U.P.	Barasingha, tigers, sambar, Nilgai, sloth, bears, leopards and rhinoceros.
Bandhavagarh National Park, Shahdol	M.P.	Tiger, leopard, sloth bears, gaur, sambar, chital, muntiac, nilgai, chinkara, wild pigs.
Kanha National Park, Mandla	M.P.	Barasingha (Swamp deer), squirrel, jackal, wild pig, cheetal, black buck.
Sariska Sanctuary, Alwar	Rajasthan	Nilgai, Chital, sambar, jackals, hares, porcupine, tigers and leopards
Ranthambhor Tiger Sanctuary, Sawai Madhopur	Rajasthan	Tiger, leopards, sambar, caracal.
Keoladeo Ghana Bird Sanctuary, Bharatpur	Rajasthan	Siberian crane, egrets, ducks, chinese coots, storks, kingfishers, spoonbills
Desen National Park, Jaisalmer	Rajasthan	Chinkara, black buck, desert fox, Great Indian Bustard
Dachingam Sanctuary, Srinagar	J&K	Pied woodpecker, Himalayan griffon, magpie, golden oriole (birds), bear.
Jaldapara Sanctuary, Jalpaiguri	West Bengal	Elephants, rihnoceros, deer, leopard, wild boar.
Sundarbans Tiger Reserve, 24 Parganas	West Bengal	Crocodiles, leopard, deer, sea turtles.

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Mangroves in India

Mangrove	State
Northern Andaman and Nicobar	Andaman and Nicobar
Sunderbans	West Bengal
Bhitar Kanika	Orissa
Loringa	Andhra Pradesh
Krishna Estuary	Andhra Pradesh
Godavari Delta	Andhra Pradesh
Mahanadi Delta	Orissa
Pichavaram	Tamil Nadu
Point Calimere	Tamil Nadu
Goa	Goa
Gulf of Kutch	Gujarat
Coondapur	Karnataka
Achra	Maharashtra
Ratnagiri	Maharashtra
Vembanad	Kerala

INSTITUTES RELATED TO FORESTS AND WILDLIFE

- Forest Research Institute, Dehra Dun
- Institute of Arid Zone Forestry Research, Jodhpur
- Institute of Rain and Moist Deciduous Forests, Jorhat
- Institute of Wood Sciences and Technology, Bangalore
- Tropical Forestry Research Institute, Jabalpur
- Temperate Forest Research Centre, Shimla
- Institute of Forest Genetics and Tree Breeding, Coimbatore
- Institute of Social Forestry and Eco-rehabilitation, Allahabad
- Institute of Forestry Research and H.R. Development, Chhindwara
- Centre for Forest Productivity, Ranchi
- Advanced Centre for Bio-technology and Mangrove Forests, Hyderabad
- Indian Plywood Industries Research and Training Institute, Bangalore
- Indian Institute of Forest Management, Bhopal
- Wildlife Institute of India, Dehradun (Uttaranchal)
- Salim Ali Centre for Ornithology and Natural History, Coimbatore (Tamil Nadu)

NATIONAL INSTITUTIONS DEVOTED TO OCEAN RESEARCH

1. National Institute of Ocean Technology, Chennai
2. National Centre for Antarctic and Ocean Research, Vasco-da-Gama, Goa

SURVEYS OF NATURAL RESOURCES

1. Botanical Survey of India (BSI), Kolkata (1890)
2. Zoological Survey of India (ZSI), Kolkata (1916)
3. Forest Survey of India (FSI), Dehra Dun (1981)

SOME ENVIRONMENTAL LEGISLATIONS OF INDIA

- **Environmental (Protection) Act, 1986** : In the wake of Bhopal tragedy, the Government of India enacted the Environment (Protection) Act, 1986 (EPA) under Article 253 of the Constitution. The Purpose of the Act is to act as an "umbrella" legislation designed to provide a framework for Central Government co-ordination of the activities of various Central and State authorities established under previous laws, such as Water Act & Air Act.
- **The Wildlife (Protection) Act, 1972** :– The Act provides for the protection of Wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto. It extends to the whole of India, except the State of Jammu and Kashmir.
- **Forest (Conservation) Act, 1986** :– It has been enacted to check indiscriminate deforestation/diversion of forest land for non-forest purposes.
- **The Public Liability Insurance Act, 1991** : It provides for mandatory insurance for the purpose of providing immediate relief to the persons affected by accidents occurring while handling any hazardous substances.
- **The National Environmental Tribunal Act, 1995**, It seeks to constitute a Tribunal with Benches to award compensation for damage to persons, property and the environment arising out of any activity involving hazardous substances.

INSTITUTIONS RELATED TO ECOLOGY AND ENVIRONMENT

- Centre for Ecological Sciences, Bangalore
- Centre for Mining Environment, Dhanbad
- Centre for Environmental Education, Ahmedabad
- C.P.R. Environmental Education Centre, Chennai
- Salim Ali Centre for Ornithology and Natural History, Coimbatore
- Centre for Environmental Management of Degraded Ecosystems, Delhi
- Tropical Botanical Garden and Research Institute, Thiruvananthapuram

POLLUTION

Water Pollution

- The oceans are the biggest ecosystems and the largest economic resource of our planet.
- The oceans are increasingly turning into huge dumping areas of all kinds of garbage.
- Eight per cent of all pollution in the seas comes from land–based activities.
- Three–quarters of the world's mega cities are located by the sea and 40 per cent of the world's population now lives within 60 km of the seacoasts.
- By 2010, 80 per cent of the world's population will live within 100 km, of the coast. Death and disease caused by the polluted coastal waters costs the global economy $12.8 billion a year. Rivers that run into them carry silt, untreated sewage, industrial wastes and rubbers from the interior areas of the land.
- Oil pollution in particular is an inevitable consequence of the dependence of a rapidly growing population on oil–based technology.
- The biologcal and physical effects of oil pollution include reduction in light transmission, dissolved oxygen reduction, smothering, asphyxiation, disgusting smells, scum deposits on beaches, damage to water birds and marine organisms, and a food chain by

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toxic components finally reaching organisms harvested for human consumption.

- An estimated 21 million barrels of oil runs into the oceans each year from street run-off, effluents from factories and from ships flushing their tanks.
- Over the past decade, an average of 600,000 barrels of oil has been accidentally spilled from ships into the sea every year.

Air Pollution

- An undesirable change in the physical, chemical or biological characteristics of air is called air pollution.
- The substances which pollute the air are called pollutants.
- The pollution of air may be caused by natural processes or by human activities.

Air Pollution due to Natural Processes

(i) Gases released along with lava from volcanic eruptions.
(ii) Smoke from forest fires and frog
(iii) Winds and storms
(iv) Decomposition of plant and animal remains.

Air Pollution due to Human Activities

- The main cause of air pollution is the smoke emitted by various sources.
- The smoke is emitted into air by factories, automobiles, thermal power stations etc. due to which the air gets filled with soot, carbondioxide and carbon monooxide.

Particulate Matters in the Atmosphere

- Particulates are finely divided solid or liquid particles suspended in the air. e.g., Dust, Smoke, Fumes, Mist, Spray, Fly-ash.
- Air contains a large number of particulates.
- A small fraction of the particulates present in the air are metallic particles. Mainly these are of Lead, Mercury, Arsenic, Zinc, Iron, and Tin metals.
- The two metallic particles which are extremely harmful for human beings are those of lead and mercury.

Acid Rain

- The acidic gases like sulphur dioxide and nitrogen dioxide present in polluted air produces acid rain.
- The sulphur dioxide gas present in polluted air forms sulphuric acid whereas nitrogen dioxide gas present in polluted air forms nitric acid, which then falls to the earth with rain water.
- When acid rain falls over a historical monument then the acid present in it reacts chemically with the marble ($CaCO_3$) of the monument and damages it slowly.

Noise Pollution

- The disturbance produced in our environment by the undesirable loud sounds of various kinds is called noise pollution.
- Important sources of noise pollution are machines in factories, means of transpport, various types of electrical gadgets at home etc.
- The unit of measurement of the intensity of sound is decibel (dB).
- The human ear is sensitive to sounds having intensities from 0 decibel to 180 decibel.

Noise Scale

1. Breathing	10 db
2. Wind in the trees	20 db
3. Whisper	20-30 db
4. Ticking Clock	30 db
5. House in a quiet street	35 db
6. Radio Music	50-60 db
7. Loud conversation	60 db
8. Office noise	60 db
9. Children playing	60-80 db
10. Lawn mower	60-80 db
11. Vacuum cleaner	80 db
12. Traffic noise	60-90 db
13. Sports car	85-90 db
14. Heavcy truck traffic	90-100 db
15. Loud Radio	100 db
16. Motor Cycle	105 db
17. Pneumatic drill	110 db
18. Thunderstorm	110 db
19. Rock Music (electrically amplified)	120 db
20. Aircraft noise	90-120 db
21. Jet take-off (at 100 m distance)	120 db
22. Jet engine (at 25 m distance)	140 db
23. Space Vehicle launch (from a short distance)	140-170 db

Pollution due to Heavy metals

Heavy Metal	Sources	Impact
Mercury	Mining, paper-pulp, thermal plants, cement, cosmetics, electrical equipment	Minimata disease (disorder of nervous system)
Iron	Coal mining	Skin becomes sensitive to light
Lead	Mining, coal, automobile, paper, dyeing, petro-chemicals etc.	Learning disability, mental retardation
Chromium	Tannery, thermal plants, mining, fertiliser, textile, photography	Bronchial Asthma, allergies
Cadmium	Coal, Nuclear Power plants, batteries, ceramics, toys	Itai Itai disease (fragile bones)
Nickel	Mining, fertilisers, thermal plants, chocolate, automobile, electroplating	Dermatitis, Pheumonia

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Some chemical air pollutants

Pollutants	Sources	Effect
Nitrogm oxides	Motor vehicle exhausts, soft coal.	Inhibit cilia action so that soot and dust penetrate far into the lungs.
Phosgenes	Chemical and dye manufacturing	Induce couhging, irritation, and sometimes fatal pulmonary edema.
Sulphur dioxides	Coal and oil combustion	Cause chest constriction, headache, vomiting and death from respiratory ailments.
Suspended particles	Incinerators; almost any manufacturing	Cause emphysema, eye irritations and possibly cancer.
Hydrogen cyanides	Fumigation, blast furnaces, chemical manufacturing, metal plating	Interfere with nerve cells, produce dry throat, indistinct vision, headache.
Hydrogen flourides	Petroleum refining, glass etching, aluminium and fertilizer production.	Irritate and corrode all body passages.
Hydrogen sulphides	Refineries and chemical industries, bituminous fuels	Smell like rotten eggs, cause nausea, irritate eyes and throat.
Ammonia	Chemical processes – dye making, explosives, lacquer, fertiliser	Inflame upper respiratory passages.
Arsines	Processes involving metals or acids containing arsenic soldering.	Breakdown red cells in blood, damage kidneys; cause jaundice.
Carbon monoxides	Gasoline motor exhaust; burning of coal	Reduce oxygen-carrying capacity of blood.
Chlorines	Bleaching cotton and flour, many other chemical processes.	Attack entire respiratory tracts and mucous membranes of eyes, cause pulmonary edema.

Ten main Countries Emitting Carbon Dioxide

Country	Per Person CO_2 Emission (Tonne per person)	Percentage in Total CO_2 emission
USA	19.88	23.7
China	2.51	13.6
Russia	9.17	7.0
Japan	9.17	5.2
Germany	10.83	4.0
India	0.86	3.6
U.K.	9.64	2.6
Ukraine	8.35	2.0
Italy	7.40	1.9

Percentage Increase of Concentration of Green House Gases and Their Warming Capacity

Gas	Average Growth Rate (Percentage)	Heating Capacity	Contribution in Global Warming (Percentage)
Carbon dioxide	0.5	1	55
Methane	1.0	36	20
Nitrous Oxide	0.3	140	5
HFC	0.4	14600	6
PFC	0.4	17000	12
Ozone	0.5	430	2

Emission of green house gases and C.F.C.s in various countries

Country	Green House Gas	C.F.C
USA	1000	350
USSR (erstwhile)	690	180
Brazil	610	16
China	380	32
India	230	0.7
Japan	220	100

INTERNATIONAL ATTEMPTS TOWARDS POLLUTION CONTROL

1. The 1972 UN Stockholm Conference

- It focused international attention on environmental issues, especially those relating to environmental degradation and "trans–boundary pollution".

2. Rio Earth Summit (3-14 June 1992)

- It proclaimed the concept of sustainable development as a workable objective for everyone around the world, whether at the local, national, regional or international levels.
- A major achievements of "Earth Summit" was Agenda 21, a comprehensive programme of actions demanding new ways of investing in our future to reach global sustainable development in the 21st Century.

3. Johannesburg Summit 2002

- The Summit took place in Johannesburg, South Africa from 26th August to 4th September, 2002.
- Important accords of the Summit includes, to halve by 2015 the two billion people without access to sanitation and drinking water, and to significantly cut the rate of species extinction by 2010.

4. Kyoto Protocol

- The Kyoto Protocol came into force on February 16, 2005.

Features of Kyoto Protocol

1. Annex-1 (39 industrialised countries) countries to reduce emission by an average of 5.2 per cent relative to levels pervailing in 1990.
2. Countries of the Developing World exempted from making targeted reductions but are to measure their emissions.
3. Cuts to apply to all six-Greenshouse Gases.
4. The commitment period will be 2008 to 2012.
5. Inculsion of defined 'sinks' or carbon absorbent material limited to afforestation, reforestation and deforestation since 1990.
6. Acceptance of emissions, trading, joint projects implementation and the Clean Development Mechanism towards fulfilling emission cuts.

5. The Montreal Protocol

- The Montreal Protocol came into force in January 1989 and is the legal basis for the worldwide effort to safeguard the ozone layer through controls on production, consumption and use of ozone depleting substances.
- By December 1995, 150 countries had ratified the Montreal Protocol, so becoming Parties to it and legally bound by its requirements.

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- At meeting held in London and Copenhagen in 1990 and 1992, the controls were strengthened and broadened to cover other chemicals. Instead of merely a reduction in production and consumption of five CFCs and three halons, the Protocol now requires developed countries to phase out 15 CFCs, three halons, 34 HBFCs, carbon tetrachloride and methyl chloroform.

GREEN HOUSE GASES

- Green House gases are those that trap heat in the earth's atmosphere. The main one is **carbon dioxide**, most of which comes from burning fuel.
- Carbon dioxide accounts for about 60 per cent of contribution to global warming by Green House gases.
- **Methane** forms naturally in swamps, lakes and marshes, and is also generated as a result of human activities such as livestock farming, paddy field cultivation and underground disposal of waste minerals.
- The atmospheric concentration of methane increased from about 700 ppbv (ppbv is a unit for ratio of volume in parts per billion) before the Industrial Revolution to some 1,720 ppbv (about 2.5 times) in 1994, as human activities have expanded.
- Although low in concentration, methane accounts for about 20% of contribution to global warming by Green House gases.
- **Nitrogen suboxide** is a byproduct of the combustion of organic substances and nitrogen fertilizers. The atmospheric concentration of nitrogen suboxide, about 275 ppbv before the Industrial Revolution, had increased to 312 ppbv by 1994 (about 1.1 times)
- The intensity of its Green House effect (global warming index), in terms of the 100–year total effect based on its atmosheric residence time, is 310 times that of carbon dioxide, but its contribution to global warming is only about 6 per cent because of its low concentration.
- **CFCs** are artificial gases that did not exist in nature before the Industrial Revolution. They have been in wide use as coolant gases in air conditioners and refrigerators, and as industrial cleansing agents.
- In recent years, CFCs have come to be known as an ozone layer destroyer, but they are also Green House gases.

POLLUTION CONTROL IN INDIA

Central Pollution Control Board

- The Central Pollution Control Board (CPCB) is the national apex body for assessment, monitoring and control of water and air pollution.
- The executive responsibilities for enforcement of the Acts for Prevention and Control of Pollution of Water (1947) and Air (1981) and also of the Water (Cess) Act, 1977 are carried out through the Board.
- The CPCB advises the Central Government on all matters concerning the prevention and control of air, water and noise pollution and provides technical services to the Ministry for implementing the provisions of the Environment (Protection) Act, 1986.

Environment Impact Assessment

- The Programme of Environment Impact Assessment (EIA) was introduced in 1978.
- A notification issued in January 1994 makes EIA statutory for 29 categories of developmental projects under various sectors such as industry, mining, irrigation, power, transport, tourism, communication, etc.
- Recently, one more item Meta Amino Phenyl has been added to the list.

Vehicular Pollution Control

- Rules for mass emission standards known as India–2000, similar to Euro-I for all categories of vehicles manufactured from April 1, 2000, have been notified and made effective throughout the country.
- Stringent emission standards known as Bharat-II, similar to Euro-II norms have been made effective from April 1, 2000, in the National Capital Region.
- Twenty–four highly–polluted areas have been identified in the country for concerted efforts for pollution control.
- The National Air Quality Monitoring Programme has been expanded to comprise 290 stations covering 90 cities and towns in 24 States and five Union Territories in the country.
- Minimum National Standards (MINUS) for 70 categories of polluting industries have been evolved.
- Seventeen categories of heavily polluting industries have been identified.
- They are cement, thermal power pant, distilleries, sugar, fertiliser, integrated iron and steel, oil refineries, pulp and paper, petro–chemicals, pesticides, tanneries, basic drugs and pharamaceuticals, caustic soda, zinc smelter, copper smelter and aluminium smelter.

Environment Movements in india

Movement	Leader/s	Place	Objective
Chipko Movement	Goura Devi, Sunderlal Bahuguna, Chandi Prasad Bhat	U.P. (Now Uttarakhand) in 1973	Against deforestation
The Bishnoi Movement	a sage called Sambaji	Rajasthan	Against Cutting of Trees
Silent Valley Movement	—	Western Ghat	Against a hydro-electric Project
Narmada Bachao Andolan	Baba Amte, Medha Patkar	Madhya Pradesh	Against multipurpose project over Narmada river.

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COMPUTER

Computer today has become an important part of our lives. Infact today we are living in the age of Information Revolution which is much to be owed, to the ability of computers of disseminating information at an incredible speed. From education to entertainment and from communication to business, computers are present every where. Thus in this, era of Information, it is cruacial to have the basic knowledge of computer, its parts, its components and its application find way in a variety of fields. A sound theoretical base of computer and its applications would enhance the knowledge level of the reader and would definitely make the journey in the colourful world of computers, an exhilarating one.

Generations of Computer : The first four generations of computers were based on, vacuum tube technology; the transistor and integrated circuit technology; and the very large scale integrated (VLSI) technology, respectively.

➤ The important feature of the fourth generation VLSI technology was the use of a microchip weighing a few grams. A thin silicon chip using 0.13 micron technology has a memory capacity of one Gigabyte (10^9bit). Today the development has entered the area of "artificial Intelligence." These are generally called as fifth generation of computers.

HISTORY

➤ The genesis of mechanical/digital computing can be traced back to Blaise Pascal (1623-1662) and GW Liebnitz (1646-1716). However, Charles Babbage (1792-1871) was the first to imagine a machine that could process data. He designed first difference engine and analytical engine and an all purpose calculating machine. He is rightly known as the father of computer science.

BINARY SYSTEM

➤ Zero and one in their endless combination constitute binary system on which computers are based. A scheme of numeration with base ten requires, ten symbols or ciphers (including zero), whereas an arithmetic with the base two requires only two ciphers: 0 and 1.

➤ The binary numbers for the following numbers are written as 0-0, 1-1, 2-10, 3-11, 4-100, 5-101, 6-110, 7-111, 8-1000, 9-1001, 10-1010,11-1011, 15-1111, 16-10000.

➤ Under the binary system all ordinary arithmetical operations are reduced to their simplest form. The binary system of numeration was used early in the 17th century by Thomas Harriot.

CLASSIFICATION OF COMPUTERS

➤ Computers can be classified into five types-Portable Computer, Mini Computer, Mainframe Computer, Micro Computer and Super Computer.

➤ **Portable Computer:-** These are the computers which can be carried from one place to another in the form of a briefcase or diary. It includes Laptop, Notebook and Personal Digital Assistant (PDA).

➤ **Micro Computer-**These are single user computers..Micro computers are often called as Personal Computers (PCs). The home computer is a PC providing education, entertainment, information and communication facility at home.

➤ **Mini Computer:-** They are medium level, multiuser computers. As compared to Mainframe Computers, these computers operate at slower speeds and have lesser memory. These are used by Insurance companies, Bank, Factories for keeping the records.

➤ **Mainframe Computer:-** Mainframe computers are expensive, large centralised computers. It is a multiuser computer and has large memory. It is capable of having speeds of the order of several billions of floating-point-operations per second. These computers help in railway reservation and such other operations.

➤ **Super Computer:-** Super computers are extensively used for solving very large computational problems in scientific research, engineering, industry, defence and business for variety of applications like molecular dynamics, aerospace, nuclear-weapon, seismic studies, oil-explorations, geology etc. ANUPAM, Cray-1, Param Padma are some super computers.

IMPORTANT DEVELOPMENTS IN THE FIELD OF COMPUTER

➤ 1938:- Konrad Zuse built the World's first binary digital computer, the Z1.
➤ 1948:- Claude Shannon identified the bit as the fundamental unit of data and the basic unit of computation.
➤ 1955 : The first fully transistorised computer, TRADIC developed.
➤ 1958 : Jack Kilby created the first integrated circuit.
➤ 1960 : COBOL designed for business use.
➤ 1964 : BASIC Created.
➤ 1965:- PDP-8, the first commercially successful mini computer developed.
➤ 1973:- Ethernet method of network connection devised.
➤ 1984:- Apple Computer launched the Macintosh, the first successful mouse driven computer.
➤ 1989:- Virtual Reality, a computer generated 3-D environment developed.
➤ 1993:- Intel introduces Pentium Processor.
➤ 2000:- Microsoft unveils Windows 2000.
➤ Intel announces Pentium 4.
➤ Microsoft unveils its C# (C–sharp) language.

THE SUPER COMPUTERS

➤ The Cray-1 is the first super computer. It was designed and built by Seymour Cray in 1976.

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- The first multiprocessor super computer is Cray X-MP. It was developed in 1988.
- The first wireless super computer is Cray- T 90.
- In India, BARC, since 1991 is involved in developing series of parallel computing architectures to meet high performance computing needs of in–house researchers.
- Super computers developed in India are- PARAM, ANUPAM, MTPS, PACE, CHIPPS, FLOSOLVER MK5.
- In 2003, India developed 'Param Padma'. It was developed after four years of research and at a cost of Rs. 50 crore.
- In November 12, 2007 a supercomputer EKA developed by Tata Group Pune based Computational Research Laboratories.

e-WORLD

(i) **e-book** :- An electronic book that is published in a format that is small in size, portable and at the same time have all the features of a print version.

(ii) **e-paper** :- It is a portable, reusable storage and display medium that can be repeatedly written on several times. It is use for applications such as e-book, e-Newspaper etc.

(iii) **e-library** :- It is a virtual library that stores and delivers exclusive content, collection of articles, reports, features and tools.

(iv) **e-tailware** :- It is the software for creating on-line catalogues, ordering forms, credit checking and similar services for Web sites that sell goods and services to consumers.

(v) **e-mail** :- 'Electronic mail', it is the act of sending and receiving messages through internet.

(vi) **e-governance** :- It is the application of Information and Communication Technologies to the process of government functioning. Its objective is to provide speedy, responsive and transparent governance. Various e-governance projects have been launched in India. These includ, 'Gyandoot' (Madhya Pradesh), 'FRIENDS' (Kerala), 'AKSHAYA', (Kerala).

COMPUTER ABBREVIATIONS

- ACD : Automatic Call Distributor.
- ADCP : Advanced Data Communication Protocol.
- ALU : Arithmetic Logic Unit.
- ASCII : American Standard Code for Information Interchange.
- ATDM : Asynchronous Time Division Multiplexing.
- BACP : Bandwidth Allocation Control Protocol.
- BASIC : Beginners All-Purpose Symbolic Instruction Code.
- BERT : Bit Error Rate Test.
- BIOD : Block Input/Output Daemon.
- BPS : Bit Per Second.
- CARP : Cache Array Routing Protocol.
- C-DAC : Centre for Development of Advance Computing.

- C-DOT : Centre for Development of Telematics.
- CXML : Commerce Extensible Markup Language.
- DAP : Data Access Protocol.
- DBML : Data Base Markup Language.
- DBMS : Data Base Management System.
- DHTML : Dynamic Hyper Text Markup Language.
- DIP : Dial-up Internet Protocol.
- DMA : Direct Memory Access.
- DOS : Disk Operating System.
- DRAM : Dynamic Random Access Memory.
- EAP : Extensible Authentication Protocol.
- EBCDIC : Extended Binary Coded Decimal Interchange Code.
- EDI : Electronic Data Interchange.
- EEPROM : Electronically Erasable Programmable Read Only Memory.
- EIP : Enterprise Information Portal.
- EPROM : Erasable Programmable Read-Only Memory.
- FDMA : Frequency Division Multiplexing Access.
- FLOPS : Floating Point Operations Per Second.
- FPS : Fast Packet Switching.
- FSP : File Service Protocol.
- FTAM : File Transfer Access and Management.
- FXS : Fax Transmit Format.
- GDP : Gateway Discovery Protocol.
- GSM : Global System for Mobiles.
- GUI : Graphical User Interface.
- HDF : Hierarchical Data File.
- HDLC : High Level Data Link Control.
- HDML : Handheld Device Mark-up Language.
- HDTV : High Definition Television.
- HID : Human Interface Device.
- HSSI : High Speed Serial Interface
- HTTPS : Hypertext Transfer Protocol Secure.
- ICM : Image Colour Matching.
- ICMP : Internet Control Massage Protocol.
- IDRP : Interdomain Routing Protocol.
- IDS : Intrusion Detection System.
- IMAP : Internet Message Access Protocol.
- INSP : Internet Name Server Protocol.
- IOS : Internetworking Operating System.
- IP : Internet Protocol.
- IPP : Internet Printing Protocol.
- ITSP : Internet Telephony Service Provider.
- JPEG : Joint Photographic Experts Group.
- KBPS : Kilobits Per Second.
- LAWN : Local Area Wireless Network.
- LPP : Light-weight Presentation Protocol.

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- MAN : Metropolitan Area Network.
- MAP : Mobile Application Port.
- MAPI : Mail Application Programming Interface.
- MB : Mega Bytes.
- Mbps : Mega bits per second.
- MCB : Memory Control Block.
- MCR : Magnetic Card Reader.
- MDLP : Mobile Data Link Protocol.
- MFLOPS : Million Floating point Operations Per Second.
- MFM : Modified Frequency Modulation.
- MGCP : Media Gateway Control Protocol.
- MIB : Management Information Base.
- MIDI : Musical Instrument Digital Interface.
- MIME : Multipurpose Internet Mail Extension.
- MIPS : Millions of Instruction Per Second.
- MIS : Management Information System.
- MMX : Multimedia Extension.
- MOLAP : Multi-dimension Online Analytical Processing.
- MPEG : Moving Pictures Expert Group.
- NAP : Network Access Point.
- NASDAQ : National Association of Securities Dealers Automated Quotation.
- NAT-PT : Network Address Translation-Protocol Translation.
- NETBIOS : Network Adapter Basic Input Output System.
- NFAR : Network File Access Routine.
- NSP : Network Services Protocol.
- NVRAM : Non-Volatile Random Access Memory.
- OAIS : Open Archival Information System.
- OLTP : Online Transaction Processing.
- OMAP : Open Multimedia Application Platform.
- PAP : Password Authentication Protocol.
- PCM : Pulse Code Modulation.
- PDN : Public Data Network.
- PDP : Packet Data Protocol.
- PIN : Personal Identification Number.
- PRISM : Parallel Reduced Instruction Set Multiprocessing.
- PROM : Programmable Read Only Memory.
- PSDN : Packet-Switched Data Network.
- RAM : Random Access Memory.
- RARP : Reverse Address Resolution Protocol.
- RDBMS : Relational Data Base Management System.
- RIP : Routing Information Protocol.
- RTCP : Real-time Transport Control Protocol.
- SDRAM : Synchronous Dynamic Random Access Memory.
- SGML : Standard Generalized Markup Language.
- SIM : Subscriber Identification Module.
- SLIP : Serial Line Internet Protocol.

- SNA : Sub Network Access Protocol.
- SQL : System Query Language.
- SSML : Security Services Markup Language.
- STP : Spanning Tree Protocol.
- SWAP : Superior Wireless Application.
- SYSOP : System Operator.
- TCP/IP : Transmission Control Protocol/Internet Protocol.
- TDMA : Time Division Multiple Access.
- TFLOPS : Tera Floating-Point Operations Per Second.
- UDMA : Ultra Direct Memory Access.
- UIML : User Interface Markup Language.
- VOIP : Voice Over Internet Protocol.
- VRAM : Volatile Random Access Memory.
- VRML : Virtual Reality Modelling Language.
- VSAM : Virtual Storage Access Method.
- WCCP : Web Cache Control Protocol.
- WML : Wireless Markup Language.
- WSDL : Web Services Description Language.
- XAML : Extensible Authority Markup Language.
- XML : Extensible Markup Language.
- ZIP : Zone Information Protocol.

COMPUTER TERMINOLOGY

- **Assembly Language :** It is a low-level of language which uses mnemonic statements to generate machine code. It is typified by its speed of execution and small executable file size. They are hardware specific and therefore programme written on one particular machine may not work on another.
- **Association for Women in Computing (AWC) :** A professional society dedicated to the advancement of women in computer related fields. Founded in 1978.
- **Advanced Technology Attachment Packet Interface(ATAPI) :** A standard that makes it very easy to connect a CD-ROM drive to an Enhanced IDE host adapter.
- **Active Server Pages (ASP) :** A standard for scripting server side web pages.
- **Analog :** Describing a system, particularly an electronic device, that uses a continuous physical quantity to represent information.
- **ANSI (American National Standard Institute) :** ANSI is an organisation that fosters the development of technology standards in the United States. ANSI works with industry groups and is the US member of the International Standards Organisation (ISO) and the International Electrotechnical Commission (IEC).
- **API (Application Programming Interface) :** API is a method prescribed by a computer operating system or an application programme which a programmer who is writing an application programme can use to make requests of the operating system or another application.

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- **ARPA Net :** A predecessor of the Internet where the methodology and software on which the Internet is based were tested. No longer in existence. Started in 1969 with funds from the Defense Department's Advanced Projects Research Agency.
- **ASCII :** American Standard Code for Information Interchange. This is a de-facto worldwide standard for code numbers used by computers to represent all upper and lowercase English letters, numbers, punctuation, etc.
- **Back-up File :** A compy of file created as safety precaution in case any harm occurs to the original.
- **BAK :** The MS-DOS file name extension usually attached to a file containing backup data.
- **BAR Code :** A printed pattern of wide and narrow vertical lines (bar) used to represent numerical code in machine readable form. A bar code reader scans bar code with the help of special device and converts the bar code into a readable data with the help of special software.
- **Beginner's All-Purpose Symbolic Instruction Code (BASIC) :** An easy to use high level programming language which is now replaced by improved version of Microsoft Visual Basic.
- **Basic Input/Output System (BIOS) :** A set of programmes encoded in Read Only Memory (ROM) in IBM PC-compatible computers. These programmes handle start up operations and low-level control for hardware such as key boards, monitor and diskdrives.
- **Bulletin Board Service/System (BBS) :** A commercial data communications network where users/subscribers can send messages, get advice on software or use entertainment features by means of direct-dial modern links. The popularity of Internet has eroded the popularity and use of BBS.
- **Blind Carbon Copy (BCC) :** In e-mail, a copy of message that is sent to one or more persons without the knowledge of other recipients. Also called **Blind Courtesy Copy.**
- **BGP :** Border Gateway Protocol.
- **BMP :** Bitmap (file name extension): this is file name extension for files which contains images stored as a set of bits.
- **Bit :** A short form for binary digit. A bit is capable of recording 'off' or 'on' condition in the form of binary digit '0' or '1' respectively.
- **Byte :** Contiguous bits form a byte.
  1 Kilobyte = 1024byte
  1 Megabyte- 1,048,576 bytes.
- **Boot :** An initiating automatic routine that is read into RAM when a computer is first turned on. This provides the necessary environment for subsequent loading of all or part of the operating system, software applications etc. It prepares the computer for use. The process of starting the computer is called boot and restarting is called warm boot.

- **Bootstrap Protocol (BOOTP) :** It is an internet protocol that enables work stations or local area network to find their Internet Protocol (IP) addresses dynamically.
- **Bits per inch (bpi) :** In magnetic media such as backup tape drives or disk drives, the measurement of the media's recording density is done in bpi.
- **Broadband Integrated Services Digital Network (BISDN) :** A high band width digital telephone standard of transmitting upto 1.5Mpbs over fiber optic cables.
- **BOPS :** Billions Operations Per Second.
- **Bubblejet Printer (BJP) :** A variation of the inkjet printer concept that uses the heating element instead of piezoelectric crystals to shoot ink from nozzles.
- **BANDWIDTH :** The amount of data that can flow through a channel. The higher the bandwidth, the more data that can travel at one time.
- **Binary File :** A file containing information such as a program, compressed archive, an image or a document etc., the contents of the file generally can't be displayed or printed without using some program.
- **Browser :** Browser is a client software that allows the user to display and interact with a hypertext document i.e., it is a client software which helps users to navigate the www.
- **Bus :** A bus is a transmission path on which signals are dropped off or picked up by devices that are attached to it. If a device is addressed by the signal, it pays attention, otherwise, it discards the signal. The term comes from autobuses that travel along a fixed route, picking up and dropping off passengers.
- **C :** C is a programming language that has been widely used for operating systems and applications. Many versions of UNIX- based operating systems are written in C.
- **C++ :** C++ is an object-oriented version of the popular C programming language. It combines the C language features with object-oriented capabilities. It has been adopted as the in-house programming language of a number of companies like Sun Microsystems and Apple Computers.
- **CAD (Computer-Aided Design) :** CAD is a software used by architects and engineers to create technical drawings
- **CASE (Computer-Aided Software Engineering) :** CASE is a computer-assisted method to organise and control software development. It is especially useful in large, complex projects that involve many software components and people. It allows the designers, code writers, testers, planners and managers to share a common view of where the project stands.
- **COBOL(Common Business-Oriented Language) :** COBOL was the first high-level programming language for business applications. Over the past 35 years, many payroll, accounting and other business applications have been written in COBOL, and they are still in use.

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- **Communications Software :** A programme that controls the moderm and establishes connectivity with another computer.
- **Cyber Space :** Cyber means to steer guide or control. This term was first used in science fiction. It means the global pool of in- formation held on computer networks, connected together by so- phisticated transmission technology, that can be accessed by any one.
- **Cache :** It is a memory storage area that keeps frequent use data readily available to the computer so that the Computer does not retrieve them from slow storage devices.
- **Compressed Application Binary (CAB) :** It is Microsoft com- pressed file format.
- **Computer Aided Design (CAD) :** A CAD programm is used to de- sign a wide ranging industrial products, ranging from machine parts to home using computer.
- **Computer Aided Design and Drafting(CADD) :** Used for indus- trial design and technical drawing. It is similar to CAD except that it has additional features that enable the user to produce drawing conforming to engineering conventions.
- **Computer Aided Software Engineering(CASE) :** The use of soft- ware package to

CD : Compact Disc.
CD-DA : Compact Disc-Digital Audio.
CD-I : Compact Disc-Interactive.
CD-R : Compact Disc- Recordable.
CD-RW : Compact Dist-Rewritable.
CPU : Central Processing Unit.
CGI : Common Gateway Interface.
CHAT : Conversational Hypertext Access Technology.

- **Clock :** An electronic circuit that generates evenly spaced pulses at speeds of millions of Hertz(MHz). The pulses are used to synchronise the flow of information through the computer's in- ternal communication channels.
- **Clock Speed :** The speed of computer is measured in clock speed. High clock speed is synonymous with high processing capability. Clock speed is measured in Mega Hertz(MHz).
- **.Com :** Command- It is a file name extension.
- **.com :** Commercial business. It is domain name as appears in website address like www.Indya.com.
- **Com :** In MS-DOS, Com is a device name that refers to the serial ports available in the computer. A computer can have upto four Comports designated as COM1,COM2, COM3 and COM4.
- **Computer Virus :** A programme designed as a prank or as sabo- tage that replicates itself by attaching to other programmes and carrying out unwanted and sometimes dangerous operation. Internet technologies have made the 'connected' computer more vulnerable to be attacked by virus.

- **CON :** Console-A terminal consisting of keyboard and monitor. In multi-user system console is synonymous with terminal.
- **CGI :** Common Gateway Interface. A way of interfacing computer programmes with HTTP or WWW servers so that a server can offer interactive sites instead of just static text or images.
- **CGI :** Common Gateway Interface (file name extension). A file that makes it possible for HTTP server to interface with computer programmes to provide interactive functions.
- **DATACOM :** Data Communication.
- **DBMS :** Database Managements Systems: An application programme that provides the tool for data retrieval, modification, deletion and insertion.
- **RDBMS :** Relational Database Management System.
- **Defragmentation :** A procedure in which all files on a hard disc are re-written on disc so that all parts of each file are written to contiguous sectors. This is done to improve the speed of computer.
- **Desktop Computer :** A personal computer or professional work- station designed to fit on standard office desk that's equipped with sufficient memory and disk storage to perform business computing tasks.
- **Desktop Publishing (DTP) :** The use of personal computer for the purpose of printing pages having text and/or graphics using desk- top publishing software is called Desktop Publishing.
- **Digital Signature :** An encrypted tamper-proof attentation that is usually attached to encrypted e-mail message or certificate.
- **DOS :** Disc Operating System.
- **DLL :** Dynamic Link Library: The MS-DOS file name extension attached to collection of library routines.
- **DMA :** Direct Memory Access.
- **DNS :** Domain Name System.
- **Dot Matrix Printer (DMP) :** An impact parameter that forms text and graphic images by hammening the pin end against a ribbon in a matrix (pattern) of dots. These printers are fast and cheap but the output is of poor quality and creates noise.
- **Dots per inch (dpi) :** A measure of resolution that states the num- ber of dots that the device can print, scan or display in a linear inch.
- **DUN :** Dial up Networking.
- **Dial-up access :** Access to the Internet through a telephone line and a modem.
- **Digital :** Digital technology generates, stores and processes data in terms of two states: positive and non–positive. The positive state is expressed or represented by the number 1 and the non-positive state by the number 0. Data that is transmitted or stored with digital technology is expressed as a string of 0s and 1s. Digital technology is mainly used with new communication media, such as satellite and fibre optic transmission.
- **DNS :** Domain Name System, a distributed database system for translating computer names, like glasbm01.vsnl.net.in into a nu- meric IP addresses like 202.54.130 and vice-versa.

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- **DOMAIN :** The highest subdivision of the Net, usually referring to a country or the type of organisation, such as edu for education, or .com for commercial.
- **Domain :** The smaller network making up the Internet, and having many computers or even smaller networks within it, is called a domain. The domain may represent either a type of organisation or a geographical location.
- **Download/Upload :** To download is to transfer a file from another computer to the user's computer. To upload is to send a file to another computer.
- **EAROM :** Electrically Alterable Read Only Memory.
- **EDI :** Electronic Data Interchange. A standard for the electronic exchange of business documents such as invoices and purchase orders.
- **EDRAM :** Eraseable/Extended Dynamic Read Only Memory.
- **EGA :** Enhanced Graphics Adapter.
- **ERP :** Enterprise Resource Planning. The planning and management of all resources in an enterprise is called ERP. An ERP system is multi-module software system. A ERP typically contains relational database and application for managing, purchasing inventory, personnel etc.
- **EXE :** Executable (file name extension)
- **E-zine :** Electronic Magazine. Also called digizine.
- **XML :** Extensible Markup Language.
- **Ethernet :** It is the most popular type of LAN, in which communications through radio frequency signals is carried by a co-axial cable. Software protocols used by Ethernet Systems vary, but include TCP/IP and Navel Netware.
- **Ethernet Card :** A network adapter that enables a computer to connect to an Ethernet. It is a printed circuit board that is in built or motherboard or is plugged on computer which is on Ethernet.
- **Extranet :** An Intranet (Internal TCP/IP network) that has been selectively opened to a firm's suppliers, customers and strategic allies.
- **FAQ :** Frequently Asked Questions.
- **FAT16 :** A file Allocation table that restricts the maximum size of a hard drive to 2.1 GB. This limitation stems from the use of 6 bit addressing method.
- **FAT 32 :** A FAT that uses 32–bit operating system and removes the previous limitation of 2.1 GB of hard disk by employing a 32 bit cluster addressing system.
- **FDD :** Floppy Disk Drive.
- **FAX :** Facsimile- To send printed pages between two location using telephone lines.
- **FLOP :** Floating point operations per sec. This is the unit of measurement of the speed at which computer carries out floating point operations.

- **File Transfer Protocol (FTP) :** A client/server protocol for exchanging files with a host computer.
- **File Allocation Table (FAT) :** It is a hidden file located in sector 0 on a floppy/Hard disk. It contains information about the sizes of files stored and also the information about which cluster contain which file.
- **.GOV :** It is governmental domain name denoting a government office or agency.
- **.GIF :** It is file extension where acronym for Graphics Interchange Format. These files are widely used to encode and exchange graphics files on the Internet.
- **GML :** Generalised Markup Language.
- **GSP :** Global Service Provider.
- **Green PC :** A computer system designed to operate in energy efficient manner.
- **Graphical User Interface (GUI) :** A design for the part of program that interacts with the user and that uses icons/graphic representations to represent programme features.
- **Greeking :** The use of symbols to show text or graphics that cannot be shown in sufficient detail for the whole document to be legible is called greaking. Some word processors use a print preview feature that's similar to greeking.
- **.H :** Header (file name extension. Used in programming language c/ctl).
- **HDML :** Handheld Device Markup Language.
- **Handshaking :** A method for controlling the communication between two devices so that one device transmits data only when the other device is ready.
- **HIMEM :** High Memory.
- **HDD :** Hard Disk Drive.
- **HPC :** Handheld Personal Computer.
- **HFS :** Hierarchial File System: In an operating system a method of organising files in tree structure. The topmost level called root directory which contains leaves called sub-directories which further contain sub-directors. Such a file systems is called HFS.
- **HTML :** Hyper Text Markup Language. It is markup language behind the appearance of documents on the World Wide Web (WWW).
- **HTTP :** Hyper Text Transfer Protocol. The protocol most often used to transfer information form WWW server to browsers, which is why web addresses begin with http://
- **HTTPS :** Hyper Text Transfer Protocol Secure. A variation of HTTP that provides special security for online transaction on WWW.
- **IBM :** International Business Machine.
- **ICMP :** Internet Control Message Protocol. It is an extension to the original Internet Protocol that provides much needed error and congestion control.

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- **IMAP :** Internet Message Access Protocol. IMAB is one of the two fundamental protocols in the internet e-mail (other being POP3) that governs how and where user stores their incoming mail messages. In IMAP, mails are stored on the mail server.
- **Info Bahn :** A form preferred by some for the Information Superhighway, a high speed information system that would link homes, schools and offices.
- **Inkjet Printer :** A non-impact printer that forms an image by spraying ink from a matrix of tiny jets.
- **IANA :** Internet Assigned Numbers Authority. A unit of Internet Architecture Board (IAB) that supervises the allocation of IP (Internet Protocol) addresses, port address and other numerical standards on the Internet.
- **IP :** Internet Protocol: In TCP/IP, the standard that describes how an Internet Connected Computer should break data down into the packets for transmission across the network, and how those packets should be addressed so that they arrive at their destination. IP is the connectionless part of TCP/IP protocols.
- **ISDN :** Intergrated Services Digital Network.
- **IP Address :** A 32-bit binary number that uniquely and precisely identifies the location of a particular computer on the Internet.
- **ISP :** Internet Service Provider.
- **JDK :** Java Development Kit is a package of Java utilities and development tools created by Sun Microsystems that represents the de facto standard for the Java Programming language.
- **JPEG :** Joint Photographic Experts Group. A graphics format that is ideal for complex pictures/graphics.
- **JSP :** Java Server Pages.
- **Kb :** Kilobit.
- **KB :** kilobyte.
- **LAWN :** Local Area Wireless Network.
- **LAN :** Local Area Network.
- **LCD :** Liquid Crystal Display. It is a low-power display technology used in laptop computers and small battery power electronic devices.
- **LED :** Light Emitting Diode. A small electronic device made from semiconductor materials.
- **LINUX :** An operating system designed by Linus Torvalda.
- **LPT :** Line Printer Terminal. It is a device name that refers to a parallel port to which one can connect parallel printers.
- **Mainframe :** A multiuser computer designed to meet the computing needs of a large organisation. Originally, the term mainframe referred to the metal cabinet that housed the CPU.
- **MFLOPS :** Million Floating Point Operations per second.
- **MDLP :** Mobile Data Link Protocol.
- **MIME :** Multipurpose Internet Mail Extension. It is an internet standard that specifies how tools such as e-mail programs and

web browsers can transfer multimedia files (including sound, graphics and video) via internet. Prior to MIME all the data transferred via the Internet had to be coded in ASCII text.

- **MIPS :** Million Instructions per sec. It is a method of measuring the rate at which the computer executes microprocessor instructions.
- **ML :** Machine Language.
- **MODEM-** Modulator Demodulator. A device that converts the digital signals generated by the serial port to the modulated analog signals required for transmission over a telephone line and likewise transforms incoming analog signals to their digital equivalents.
- **MP3 :** MPEG-I Audio layer III (MPEG Audio Layer 3).
- **MRAM :** Magnetic Random Access Memory.
- **MSCDEX :** Microsoft Compact Disk Extension.
- **MIDI :** Musical Instrument Digital Interface. A standard communications protocol for the exchange of information between computers and musical synthesisers.
- **MTOPS :** Millions of Theoretical Operations per Second.
- **Net BIOS :** Network Basic Input/Output System.
- **NCIC :** National Crime Information Centre.
- **NIC :** Network Information Centre.
- **ODBC :** Object Database Connectivity. It is a standard that enables applications (including web browsers) to communicate with variety of database applications.
- **OEM :** Original Equipment Manufacturer.
- **OOP :** Object Oriented Programming.
- **OP Code :** Operation Code.
- **OS :** Operating System.
- **OMR :** Optical Mark Recognition.
- **OOPS :** Object Oriented Programming and System.
- **PABX :** Private Automatic Branch Exchange.
- **PAN :** Personal Area Network.
- **PDF :** Portable Document Format. It is a file extension/a portable document file format created by Adobe Systems.
- **PIM :** Personal Information Manager. It is a program that stores and retrieves a variety of personal information including notes, memos, names and addresses etc.
- **P-Mail :** Paper Mail.
- **PNP :** Plug and Play. A hardware standard that requires each hardware be capable of identifying itself.
- **POP3 :** Post Office Protocol. An internet e-mail standard that specifies how an internet connected communicates as mail handing agent.
- **POST :** Power on Self-Test. It is internal testing which is performed when the computer is started or reset. Encoded in ROM, the POST program first checks the microprocessor by having it perform a simple operations.

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- **PPP :** Point to point Protocol. One of the two standards by which computers are connected directly to internet via dial up telephone connection. (The other is s1 IP).
- **PROM :** Programmable Read-Only Memory.
- **PSTN :** Public Switched Telephone Network.
- **PEA :** Pocket Ethernet Adapter.
- **PIF :** Picture Interchange format file. (A file extension).
- **PIN :** Personnel Identification Number : It is a digital number used for accessing highly secure information.
- **Protocol :** In computer terminology, it is a set of rules or standard designed so that computers can exchange information with a minimum of error.
- **Random Access Memory (RAM) :** It is computer's primary working memory in which program instructions and data are stored so that they can be accessed directly by the CPU via processor's high speed external data bus. RAM is often called Read/Write Memory. In RAM-CPU can read and write data. RAM does not retain its contents when the power to the computer is switched off.
- **Types of RAM and their background of usage :** Till a decade ago, the only type of RAM available was DRAM (Dynamic RAM), so named because it changes its content constantly. Specifically the DRAM then available was EDO-RAM (Extended Data-Out DRAM); while the RAM was working on current bit, it was already extending its reach for the next bit.
- EDROM was replaced by SDRAM (Synchronous DRAM) in 1990's. In this, the access speed was increased over the earlier EDO-RAM. At present most of the computers use it.
- However in 1998, a radically different technology of RAM called-RDRAM (Rambus DRAM) came in which some architectural modifications were done to increase the speed. All the Pentium-4 PC's are tied with RDRAM. But this RAM is quite expensive.
- In 2000, a new variant of SDRAM that offers faster performance, comparable to RDRAM, and price closer to SDRAM was launched which is called DDR-RAM (Double Data Rate-RAM).
- **RDBMS :** Relational Data Base Management System. It is a database management system that comes with all necessary support programs, programming tools and documentation.
- **Read Only Memory (ROM) :** It is the portion of computers storage that does not lose its contents when one switches off the computer. ROM contains essentials system programmes that cannot erased.
- **Rich Text Format (RTF) :** A text formatting standard developed by Microsoft that allows the word processor to create file with some of the formatting instructions.
- **Ripper :** A programme that can extract audio tracks from audio CD's and write these to computer's hard disk–generally to WAV files. Also called CD ripper.

- **Scandisk :** A Window utility that checks magnetic disks (Floppies and Hard Disk) for errors such as lost clusters and file system irregularities.
- **SCSI :** Small Computer System Interface. A high speed interface that can connect to a computer, devices such as hard drives, ROM Floppy drives, tape drives, scanners and printers.
- **SDK :** Software Development Kit.
- **SGRAM :** Synchronous Graphic RAM. It is a type of DRAM that can synchronise with the computer's clock speed enabling significantly higher speed of data transfer as compared to earlier DRAM.
- **S-HTTP :** Secure Hyper Text Transfer Protocol. It is the extension of HTTP that supports secure commercial transactions on web.
- **SLIP :** Serial Line Internet Protocol. The earliest of the two ways in which a PC connects to Internet through Dial Up Networking. SLIP defines the transport of data packets through an asynchronous telephone line. Therefore, SLP enables computers not directly connected to LANs to be fully connected to the Internet.
- **SMTP :** Simple Mail Transport Protocol. It is an Internet protocol that governs the transmission of e-mail over computer networks. It does not provide any support for transmission of data other than plain text.

SOFTWARE HANDSHAKING

- **Spoof :** Is to deceive or to fake, especially with the intension of gaining unauthorised access to computer resources.
- **SPOOL :** Simultaneous peripheral Operations On Line.
- **Spoder :** A utility programme, often included with an operating system that routes printer commands to a file on disk or in RAM rather to a printer, and then doles out the printer commands when CPU is idle.
- **SRAM :** Static Random Access Memory. A type of RAM that holds its contents without constant refreshing from CPU.
- **SHTML :** Server-side Hyper Text Markup Language.
- **SMS :** Short Messaging Service.
- **SVGA :** Super Video Graphics Array. It is an enhancement of VGA (Visual Graphics Array) so as to obtain better picture.
- **System File :** A programme or data file that contains information that the operating system needs, distinguished from the programme or data files that the application programme uses.
- **Telephony Application Programme Interface (TAPI) :** It is a set of standard programming functions that can be implemented by application that interface with telecommunication equipment.
- **Tunnelling :** It is a mechanism of forwarding traffic from remote users to a corporate network through an existing public IP network. Data is encapsulated within an IP datagram and then decapsulated at the other endpoint of the tunnel.
- **Trunk :** It refers to aggregation of multiple telecom lines or virtual local area networks to increase a bandwidth.

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- **Terminator :** It is an electrical impedance attached to the open end of a transmission line to eliminate reflections. Electrical circuitry at the end of a cable are designed to match impedances for the purpose of preventing the reflection of electrical signals when they reach the end of the cable.
- **Telemedicine :** The provision of high quality, up-to-date medical information to medical practitioners. In rural and community health centres, doctors, who are out of touch with the latest knowledge may make faulty diagnosis or prescribe an out of date therapy. A telemedine system can provide there high quality information and thus could save lives.
- **TIF :** The file extension to a file containing graphics in Tagged Image File Format (TIFF). TIF files are often used to hold scanned photographic images.
- **TPI :** Tracks per inch. A measurement of the data storage density of magnetic disks, such as floppy disks.
- **Transducer :** A device that converts a detectable physical phenomenon such as sound, pressure, or light into electronic signals that can then be processed by computer.
- **Trojan Horse :** A programme that appears to perform a valid function but has some hidden instructions in its code that can cause severe damage to the system on which the programme runs. Unlike computer virus, Trojan horse cannot replicate themselves.
- **TELNET :** A terminal emulation protocol that lets a user lag in remotely to other computers on the Internet. It has a command line interface which will assume automatically that the resource is located in the same directory that contains RELURL.
- **UID :** User Identifier.
- **UHF :** Ultra High Frequency.
- **UPS :** Uninterruptible Power Supply/System. A battery system that can supply continuous power to a computer in the event of power failure for some time (approx. 10-15 minutes) after supply loss so that the user can save his work and shut down the computer safely.
- **URL :** Uniform Resource Locator. In the World Wide Web (WWW), it is one of the two basic kind of Uniform Resource Identifier (URL). It is string of character that precisely define an Internet resource's type and location.
- **URI (Uniform Resource Identifier) :** In the HTTP, a string of characters identifies an Internet resource of WWW including the type of resource and its location. There are two types of URIs. Uniform Resource Locators (URLs) and relative URLs (RELURL). In RELURL string of character gives only the file name and does not specify its location or type. Web Browser (as Parsers) resource.
- **USERID :** User Identification.
- **VAN :** Value Added Network. A public data network (PDN) that provides value added services for corporate customers including end-to-end dedicated lines with guaranteed security.
- **VDU :** Video Display Unit : Synonymous with Monitor,

- ***V Disk* :** Virtual Disk. It's a storage technique in which the complete storage disk (CD etc.) can be copied to hard disk. The virtual disk of storage disk acts similar to the original disk.
- ***VEGA* :** Video-7 Enhanced Graphite Adapter.
- ***VRAM (Video Ram)* :** Specially designed DRAM chips to maximise the performance of video adapters.
- ***VFAT* :** Virtual File Allocation Table. The file allocation table used in Windows 95 is called VFAT. It uses Protected Mode, an operational state that allows a PC to address all its memory.
- ***W3 (WWW)* :** World Wide Web. A global hypertext system that uses the Internet as its transport mechanism.
- ***W3C* :** World Wide Web Consortium. An independent standard body composed of university researchers and industry practitioners that is devoted to setting effective standards to promote the orderly growth of WWW.
- ***WAN* :** Wide Area Network : A commercial data network that provides data communications services for business and governmental agencies.
- ***WAV* :** (Waveform Audio) File name extension for audio-files.
- ***WORM* (Write Once Read Many) :** An optical disk drive with storage capacities of upto 1 TB. After once writing the data the disk drive becomes Read Only storage medium. WORM is used to keep large database.
- ***Win..XP* :** Windows The "Experience".
- ***WML* :** Wireless Mark–up Language.
- ***WMP* :** Windows Media Player.
- ***WRAM* :** Windows Read Only Memory.
- ***XDF* :** Extended Density Format.
- ***XHTML* :** Extensible Hypertext Mark–up Language.
- ***XML* :** Extensible Mark–up language. A language for creating mark–up languages.
- **.z :** Packed file (file name extension).
- **.Z (upper case) :** Compressed file (file name extension).
- **.ZIP :** Compressed file (File Name Extension).
- **Y-Modem :** It refers to error free file transfer protocol that can be used on error-corrected links and to transfer multiple files with a, single command.
- **Quantum Computers :** It is a device that harnesses physical phenomena unique to quantum mechanics to realise a fundamentally new mode of information processing. In it, the fundamental unit of information (qubit) is quarternary in nature.
- **Analog Transmission :** It refers to the signal transmission over wires or through the air. The information is sent and received by combining amplitude, frequency and phase signals.
- **Wap-enabled Phone :** These are telephones enabled with wireless access protocol (Wap), through which it can have access to Internet Content.

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- **Worm :** A worm is a virus that does not infect other programme. It makes copies of itself, and infects additional computers (typically by making use of network connections) but does not attach itself to additional programmes, however a worm might alter, install or destroy files and programmes.
- **Password :** A code used to gain access (login) to a locked system. Good passwords contain letters and non-letters and are not simple combination such as Virtue 7.
- **Piracy :** The illegal copying of software for distribution with the organisation or to friends, clubs or other groups or for commercial duplication and resale, which causes a huge loss to the software industry.
- **Roaming :** The ability to use a communications device such as a cellphone or personal digital assistants and be able to move from one cell or access point to another without losing the connection.
- **Swapping :** It is the process of replacing one segment of a programme in memory with another and restoring it back to the original when required.
- **Intranet :** A private network inside a company or organisation that uses the same kinds of software as are found on the public Internet but that is only for internal use.
- **Finger :** An Internet software tool for locating people on other Internet sites. Finger is also sometimes used to give access to non-personal information, but the most common use is to see if a person has an account at a particular Internet Site. Many sites do not allow finger requests, but many do.
- **Browser :** It is a client programme (software) that is used to log at various kinds of Internet resources.
- **Backbone :** A high speed line or series of connections that forms a major pathway within a network, is known as backbone. It is a relative termas a backbone in a small network will likely be much smaller than many non-backbone lines in a large network.
- **Cyber Space :** The virtual community created by the information society, which has removed all physical demarcations, geographical boundaries and political limitations is known as the Cyber space.
- **Netizens :** Citizens having access to Internet are called netizens. It gives an idea about computer penetration in the country and the world as a whole.
- **Ethernet :** A type of network that allow audio and video information to be carried along with computer data. It is based on Local Area Network (LAN) technology.
- **Voice Answer Back (VAB) :** It is an audio response device that can link a computer system to a telephone network, thus providing voice response to inquiries made from telephone terminals.
- Robotics : It is a technology which enables an electromechanical system which can be programmed to perform manual tasks.

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ART & CULTURE : INDIA

DANCE

FOLK, TRIBAL AND REGIONAL DANCES

Jammu & Kashmir :
- *Rauo* : by women during harvest,
- *Hikat* : expression of joy and love by boys and girls, Damali : by men in temple,
- *Lhapas & Manipas* : Ladakh,
- *Dandi Nacha* : bomboostic dance,
- *Dhumai* : by Wattal Tribe

Punjab :
- Giddha : by women at harvest,
- Bhangra : by both men & women

Rajasthan :
- Chakri serpent, Gangore, Ginad, Gopika Leela, Jhulan, Jhumar, Khayal, Susini.

Haryana :
- Daph, Dhamal, Gugga, Gagor, Jhumar, Koria, Loor, Phag.

Himachal Pradesh :
- Bhavi, Chharba, Dangi, Jadda, Jhainta, Kinnaur, Mahasu, Thoda, Thali.

Gujarat :
- Bhavi, Garba, Dandiya Rass, Tripani, Gomph, Zeriyun, Gheriya Raas.

Uttar Pradesh :
- Rass leela, Kajari, Jhora, Nautanki, Chappeli.

Bihar :
- Jatra, Natua, Jijhiya, Barlanga Dance, Karma, Kathaputli, Bakho, Samachakya.

Madhya Pradesh :
- Dagla, Ghera.

Orissa :
- Dandanatta, Chhau, Yatra, Ghumara, Bharat Leela, Dalkhai, Chaitri Ghorha, Jadur.

Maharashtra :
- Katha, Tamasha, Levani, Gafa, Karku, Mauni, Dahikala, Lezim.

Bengal :
- Kathi Dance, Baul dance, Chhau, Brita

Assam :
- Canoe Dance, Tabal Chongbi (Holi), Satriya, Rakhal Leela, Bihu, Khela, Gopala, Jata Jatin

Manipur :
- Ras Dances, Khamba Thoibi, Pung, Cholan

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Andhra Pradesh :
➢ Ghanta Mardala, Banjara

Karnataka :
➢ Huttari, Suggi, Yakshagana, Dholu Kunitha

Tamil Nadu :
➢ Kolattam, Kavadiattam, Karagam, Kummi

Kerala :
➢ Kudiyattam, Kaliyattam, Kaikottikali, Ottam Tullal, Sari, Tappatrikkali, Padayani

Uttaranchal :
➢ Jhumelia, Chaunfla, Harkia Baul, Chholiya

Lakhsadweep :
➢ Lava, Bhavada

Tripura :
➢ Hajagiri

Nagaland :
➢ Bamboo dance, Kabui

Classical Dances

Classical Daces	States	Exponents	Related Styles
Oddissi Originated in 2nd century B.C., based on the Natya Shastra, Originated in temple during King Khaarvela reign, woven around Tribhanga pose	Orissa	Kelucharan Mahaptara, Pankaj Charan Das, Hare Krishna Behera, Sonal Mansingh, Kabita Dwivedi, Kiran Sehgal, Madhvi Mudgal, Sharon Lewon, Myrta Barvil. Indarani Rahman, Priyambada Mohanty.	Mahars Devadasi, Gotipua, Tibhanga Mangalacharan Pallavi, Tarijhuma, Moksha, Majura
Bharata Natyam Popular in South eastern of India .It follows principle of Natyashastra. It is a solo dance by women.	Tamil Nadu	Rukmini Devi Arundale (of Kalakhestra Fame) T Balasarswathi, Yamini Krishna Murthy, Padma Subramaniyam, Mrinalin Sarabhai, Vaijayantimala Bali, Leela Samson.	Sadir, Devadasi, Padanallur, Teanjore Alarippu, Jatiswaram, Shabdam, Varnanritya, Thillana
Kuchipudi It is a variation of of Bharatnatyam It originated in a place called Kuchelapur. Performed by man attired like women.	Andhra Pradesh	T Balasarswathi, Esther Sherman, Indrani Rahman, Swapna Sundari, Sobha Naidu, Raja Reddy, Radha Reddy, Vempati Chinna Satyam, Satyanarayanan Sharma, Sudha Sekhara, Rajaram Rao, G Sarala	Bhagavatalu, Bhagavata Themes, Manduka, Shabdam Balagopala Tavrang, Tala Chitra Nritya

Kathakali *(Ballet of East) Originated in Courts of Kings in which a story is related to the dance.*	Kerala	Mukunda Raja (of Kalmandalam fame), Koppan Nair, Shanta Rao, Kanak Rele, Geeta Ganguly, V Kunju Kurupu, Gopinathan Krishnan, VN Menon.	Open air stage, facial make up, Thiranottam
Mohinalattam *In the 19th century the King of Travancore Swatitirunal enouraged this dance.*	Kerala	Vitho Narayan Menon, Kalyani Amma Shanta Rao, Roshan Vajifdar, Bharati Shivaji, Kanak Rele.	It has elements of both Kathakali & Bharatnattyam
Manipuri	Manipur	Jhaveri Sisters, Charu Mathur, Sadhona Bose, Bipin Singh, Rita Devi, Savita Mehta, Tandor Devi.	Kamba Thoibi Pung drum,Choloms like Pung Cholom, Kartal Cholom, Dhol Cholom, Raseela, Tandava, gorgeous costumes. Rasaleela, Nautch,four Gharanas, Salami. Vandana, Aamad, Gatnikaas, Padhant. Karmalya, Ballets.
Kathak *Flourished in North Indian princely states Jaipur, Lucknow and Banaras. It is a dance based on story from epic about Radha and Krishna*	U.P.	Birju Maharaj,Kalka–Binda Gharana, Kumdini Lakhia, Damayanti Joshi,Rani Karna, Saswati Sen, Roshan Kumari, Gopi Krishna, Sitara Devi, Sambhu Maharaj, Ananda Shankar,Shovna Narayan, Bhandana Mangal, Kulgrani Bhatt, Gitanjali Lal.	

PUPPET DANCES

Kathaputli : Rajasthan
Sakhi Kundhei : Orissa
Pudda Nach : Assam
Malasutri Bahuly : Maharashtra
Bommalattam : Tamil Nadu
Tolpavakootu : Kerala
Kundeinachhha : Orissa
Pava Kathakali : Kerala
Kathikundhei : Orissa
Gombeyatta : Karnataka

MARTIAL DANCES

Gatka	:	Punjab
Paika	:	Orissa
Thag Ta	:	Manipur
Kalaripayattu	:	Kerala
Choliya	:	Uttaranchal
Pang Lhabosol	:	Sikkim

DRAMA

Modern Drama In India

➢ Geratin Lebedev - began drama (1795)
➢ Krishnaji Prabhakar Khadilkar - Kichaka Vadha

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- Aga Harsha Kashmir - Urdu Theatere (Shakespeare of India)
- Bhartendu Harish Chandra - Bharat Durdasa
- Mohan Rakesh - Ashadha Ka Ek Din, Adhe Adhure, Lahraon Ka Rajhansa
- Dharmaveer Bharati - Andha Yuga
- Vijay Tendulkar - Ghasiram Kotwale
- Habib Tanvir - Mitti Ki Gadis, Charandas Chor
- Girish Kannad - Yajati, Tughlaq, Hayavadan
- Babban Khan - Adrak Ke Panje
- Sanjana Kapoor - Prithvi Theatre.

Folk Theatres

Theatre	State	Importance
Mudiyettu	Kerala	performed as a ritual in Kali temples
Krishnattam	Tamil Nadu	depiction of life of Lord Krishna
Kudiyattam	Kerala	elaborate presentation of Sanskrit dramas
Theyyam	Kerala	a form of ancestor worship
Ankianat	Assam	an one act play about religious themes
Bhavai	Rajasthan	rituals to propitiate the mother Goddess
Saang	Haryana	legend.dancing & singing interwoven with comic scenes
Jashin	J & K	honouring Goods & have end with comedy. Actors mingle with people
Keryala	Himachal Pradesh	about questions of life & death
Khyal	Rajasthan	cultural & social education through singing & musical instruments
Tamasha	Maharashtra	a singing & dancing party about political & social themes
Therukkoothu	Tamil Nadu	a street theatre of dance & music
Yatra	Orissa	about social & religious themes
Zaratra (Zatuas)	Goa	annual celebration of a particular deity of a particular temples
Nautanki	Uttar Pradesh	a music theatre
Macha	Madhya Pradesh	stage shows on the day of Holi about mythological stories
Rasleela	Uttar Pradesh	about life of Lord Krishna

- Folk theatres of Ancient and Medieval India have been described in the uparupakas by Sanskrit dramaturgists.
- It was Tulsidas who first started the tradition of performing plays narrating the story of Lord Rama at Kasi.

MODERN THEATRE

- The year 1801 marked the begining of Modern Indian theatre, when Prassanna Kumar Thakur established Hindi Rang Mancha at Calcutta.
- Girish Chandra Ghosh is related with Brocial dramas.
- D.L.Roy is related with historical plays.
- The drama 'Navanna' is written by Bijon Bhattacharya and directed by Sambhu Mitra.
- Bahuroopi is a Sambhu Mitra's drama group which is popular in Bengal.
- The popular play Sita Swayamver was directed by Vishnu Das Bhave.
- Popular plays Giddha, Kamala and Shakkaram Binder are written by Vijay Tendulkar.

MUSIC

- Earliest text was Bharat Muni's Natya Shastra
- Science of Music : Gandharva Veda
- Sama veda contains : The method of recital of music
- Brihaddesi by Matanga defines & classified the Ragas
- Balju Babra is father of Hindustani Music.
- Haridas Swami, Guru of Tansen, modified ancient style of Dhrupad.
- Wazid Ali Shah is considered as the innovator of the Thumari form.
- The Nawab of Rampur devised a system of notation and classification of Ragas under 'Thats'.
- Mustak Hussain Khan, Haffeez Ahmad Khan and Ustad Fida Hussain Khan popularised Hindustani vocal music in the west.
- The origin of Khayal is attributed to Amir Khusro.
- Quawali is an innovation of Amir Khusro.
- Mirza Galib is regarded as the father of Ghazals.
- Dhun is free from formal ragas desciplines composed on the basis of folk music.
- Gat is a well-defined composition and it is preceded by the Alap.
- Dhamur Veena the bow shaped harp is considered the oldest insturment.
- Tamil and Dravidian music derived inspiration from Thevaram and Silpadikaram.
- The Golden age of the carnatic music was the period of Venkatamakhin.

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- Carnatic music reached its Zenith when Shyama Shastri, Muthuswami Dikshithar, Thyagaraja, and Swathi Tirunal elevated the standard with their exuberant compositions.
- Kirtis a new component of carnatic music was created by Thallappakkam Annammacharya between 1425 and 1530 A.D.
- Purandaradasa (1460-1564) encouraged kirtis.
- The 17th century saw the glory of 'Padmas' songs composed by the great musician kshetrangna.
- New forms that came in existence in 18th century are -Pada varnas, Tana Varnas, Swarajati, Jatiswara, Ragwhalika, Tillanas, Javalis etc.
- Subbarama Dikshitar (1859-1906) produced the "Sangeetha Sampradaya Pradashani" which consisted of his collection of Rag Lakshmas, Gamakas, songs, Varnas,Ragamalikas etc.
- In the 19th and 20th century musician like Veenai Dhanammal, Maha Vaidyanatha Iyer, and Ariyakudi Ramanuja Iyengar contributed to the Carnatic Music.
- Nadopasakas of the 20th century, with their excellent renderings and compositions enlarged the dimensions of music further.

HINDUSTANI MUSIC

- Developed in North India.
- It has six primary ragas i.e. Bhairava, Kaushika, Hindola, Dipak, Sri raga, & Megh.

Six Ragas

Ragas	Timing	Moods
Bhairava	Dawn	awe & fear
Kaushika	Night	joy
Hindola	Night	laughter
Dipak	Afternoon	love
Megh	Morning	calm
Sriraga	Evening	peace

GHARANAS

These are musical dialects baseed on individual temperaments, vocal capacity and musical aptitude.

Name	Place	Founder
Gwalior Gharana	Gwalior	Nanthan Khan
Agra Gharana	Agra	Haji Sujan Khan
Rangeela Gharana	Agra	Faiyyaz Khan
Jaipur Atroli	Jaipur	Alladiya Khan
Kiran Gharana	Avadh	Abdul Wahid Khan

singer	Gharanas	Singer	Gharanas
Bhimsen Joshi	Kirana	Pandit Jasraj	Mewati
Kishori Amolkar	Jaipur	Gangubhai Hangal	Kirana
Mallikarjun Mansur	Gwalior	Sharafat Hussein Khan	Agra
Ghulam Ali	Agra		

Karnataka Music

Types	Meaning
Ragam-Tanam-Pallavi	Elaborate rhythmic and melodic variation in unmeasured sense.
Kritti-Kirtnai	Most popular. It refers to devotional music laced with poetic beauty.
Varnam	Performed at the beginning of a concert. It is a completely composed piece, designed to show the characteristic phrases.
Padam	Slower tempoed love songs referring to the human yearning for the adored God head.
Javalis	Faster tempoed love songs with direct description of human love.
Tillana	Meaningful phrases are interspersed with a variety of meaningless syllables.

FAMOUS PERSONALITIES

- Rabinadranath Tagore : Composed unique songs under the tile of Rabindra Sangeet.
- Kazi Nazrul Islam : The famous patriotic poet of Bengal.
- Subramaniam Bharati : Famous patriotic poet of Tamil literature.
- Amir Khusrau : At the court of Alauddin Khilji. He invented Sitar, Khayal & Qawwali. He invented Rekht, the precursor of Urdu language.
- Sadarang School : A school of Hindustani Music founded by Nyamat Khan. Took Khayal singing to its peak.
- Adarang School : A school of Hindustani Music founded by Firoz Khan. It was known for its exquisite beauty & philosophical content in Khayal singing.
- Vishnu Narayan Bhatkhande : Founded Morris College of Music at Lucknow. His pen name was Chatura. His works are Hindustani Sangeet Padhati, Abhinava Raga Manjari, A short Historical Survey of Music of Upper India. Lakhya Sangeeta etc.
- Vishnu Digambar Paluskar : A great musician, he founded Gandharva Mahavidyalaya & Prayag Samiti. His Ram-dhun music, i.e. Raghupati Raghaba was sung during the Dandi March.
- Tansen : Adorned the court of Akbar. He authored Sangeeta Sara & Ragmala. He established Senia Gharana.

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- Parandaradasa : Father of the Karnataka music. He was the first to standardized teaching methods of music in India. He wrote Maya Malavagaula.
- Muthuswami Dikhsitar : A well–known exponent of Karnataka music. He composed various ragas of Karnataka music. He invented techniques with certain complex use of varying tempo. He innovated Violin in India.
- Thyagaraj : He was one of Trinity of Karnataka music-two others being Shyama Shastri & Swati Tirunal. His famous work is Bhakti Vijayam.
- Vidyaratna : He put Karnataka music on scientific lines. He wrote Sangitasastra.

MUSICAL INSTRUMENTS & PERSONS

- **Flute** : Hari Prasad Chaurasia, Rajendra Prasada, Subhash Kamat, Narayan Ghosh, T Mahalingam
- **Tabla** : Ala Rakha Khan, Zakir Hussein, Ustad Shafat Ahmad Khan, Latif Khan, Sheikh Dawood, Fazl Quereshi, Swapna Choudhuri
- **Violin** : L Subramanyam, T.N Krishnan, Lalgudi Jayaraman, L Shankar, N Rajan, B Sunderrajan
- **Veena** : S Balachander, Doraiswamy Iyenger, Kalyan Krishna
- **Sitar** : Pt. Ravishankar, Nishat Khan, Debu Choudhary, Shujjat Akhan, Imrat Khan, Shamim Ahmed Khan
- **Veena** : Vishvamohan Bhatta, Arsad Ali Khan
- Shehnai : Bismillah Khan
- **Sarangi** : Ramvatar Shashtri, Sabri Khan, Hanuman Mishra, Ram Narain
- **Santoor** : Shiv Kumar Sharma, Nandu Mule, Bhajan Sapori, Viraswami Pillai
- **Harmonium** : Purushottam Walawalker, Appa Jalgaonkar
- **Pakhaj** : Pagal Das, Chatrapati Singh
- **Mridangam** : Mani Ayyar, U Shivaraman
- **Sarod** : Debashish Bhattacharya, Zarin Daroowala, Brij Narayan, Amjad Ali Khan Bangash

PAINTINGS

Prehistroic Paintings

- Bhimbetka, Jogimara, Adamgarh, Mirzapur, Kupagallu
- Rock Painting
- Depiction of hunting & animal scenes. Also have some social scenes.

Cave Painting

- Ajanta, Bagh, Sittanavasal
- Fresco paintings dating back to Gupta age.
- Buddhist & Hindu religious & mythology were themes. Important among them are Dieing Princes, Mother & Child (all at Ajanta)
- At Sittanavasal, the theme is Jaina religion

Pala School

- In Bengal
- Illustrations on palm leaf and paper manuscripts and on the wooden covers.
- Inspired by Vajrayana School of Buddhism.

Lepakshi School

- In Vijayanagar
- On temple ceilings
- Characterised by earth tones and absence of blue colour.

Mewar School

- In Mewar of Rajasthan
- Known as Ragamala paintings. Mainly on life of Krishna & his frolic with gopis.

Marwar School

- In Jodhpur and Nagaur
- Influenced by Mughal School
- Bold expression with broad fish eyes & highly stylized trees.

Kishangarh

- A type of Rajasthani painting
- Lyrical beauty in its content
- Love scences of Radha and Krishna.

Bundi

- In Kotah and Bundi regions
- About court scenes, nobles & lovers

Pahari Painting

- In hill areas of Punjab and Himachal Pradesh. Main theme is love.
- Basohli - famous for primitive vigour and fierce vitality, bold lines and brilliant hot colours.
- Guler - lyrical and cool depiction of women in the absence of their lovers
- Kangra - fine and melodious - lines with female figures depicting delicate graces of feminism.

Hyderabadi Style

- Consists of Bijapuri and Golconda court paintings.
- Inspired by Mughal School
- Potrays royal taste in fruits, scented flowrs and pets.

Thanjavur Style

- Famous for its Glass painting
- Themes related to Vishnu, Shiva & Krishana
- Paintings made on Jackwood pasted with unbleached cloth.

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Madhubani Style

➢ Mithila region. Work on plastered wall

Raghurajpur(Orissa) Style

➢ Chitrapata painting on the walls

Pithoro Style

➢ Gujarat tribal paintings

Apabhramsa School

➢ This School of painting originated either in Mewar of Gujarat. It is debated.

➢ The charateristics of this school are :
o Bulging eyes (fish–shaped) o Pointed nose o Double Chin o Pre dominant Chests o Distorted hands and stiff figure o Use of bright and gold colours o Animals and birds represented like toys o Lack of natural scenes o Decorated margins

Mughal School

➢ Although painting is treated as against Islam, it spread and developed under the Mughals and a new combination of Indo-Persian style developed under them. These paintings also had Buddhist and Central Asian and Mongoloid influences.

➢ The characterestics of this school are :
o Use of brilliant colours o Variety of themes o Ornamentation o Realism o Accuracy in line drawing o Details and intricacies o Perspective

Tanjore Glass Paintings

➢ Its origin can be traced to the downfall of the Vijayanagar when a group of artist migrated to Mysore and Tanjore. It consists of pictures of child Krishna and other favourite divinities. It uses vivid colours on glass.

ART, ARCHITECTURE AND SCULPTURE

Important Caves

Caves	Place/State	Importance
Barabara & Nagarjuni	Gaya/Bihar	donated to Ajivika sects
Elephanta	Mumbai	Brahmanical temples flanked by elephant statues
Kanheri	Konkan	Buddhist Chaitya
Jogeswari	Salsette/ Maharashtra	Mahayan Architecture
Montpezir	Maharashtra	Portuguese settlement ruins
Karle	Maharashtra	Hinayana Chaitya
Bhaja	Maharashtra	18 Buddhist caves built for nuns
Bedsa	Maharashtra	Chaitya supported by Elephant carved pillars
Ellora	Aurangabad	Rashtrakuta & Chalukya temples
Ajanta	Aurangabad	Fresco Paintings
Aihole & Badami	Karnataka	Consists of 70 temples of Nagar style of different religions
Nasik	Maharashtra	23 Buddhist caves
Junagarh	Gujarat	Buddhist caves
Bagh	Madhya Pradesh (Malwa)	frescos & stone Sculpture
Undavalli	Andhra Pradesh	Granite Vishnu Statue
Udayagiri & Khandagiri	Orissa	Built by Kharavela for Jaina monks

Important Monument/Structure

Monument/Structure	Ruler	Location
Quwat-ul-Islam	Qutubuddin Aibak	Delhi
Arhai Din ka Jhonpra	Qutubuddin Aibak	Ajmer
Qutub Minar	Qutubbudin Aibak, Iltutmish	Delhi
Tomb of Iltutmish	Iltutmish	Delhi
Sultan Garhi	Iltutmish	Delhi
Balban's Tomb	Balban	Delhi
Alai Darwaja	Alauddin Khalji	Delhi
Siri	Alauddin Khalji	Delhi
Hauz Khas	Alauddin Khalji	Delhi
Mahal Hazaar Sitoon	Alauddin Khalji	Delhi
Jamait Khana Mosque	Alauddin Khalji	Delhi
Tughlaqabad Fort	Ghiyasuddin Tughlaq	Delhi
Tomb of Khan-i-Jahan	Jauna Shah	Delhi
Maqbul		
Tomb of Sikander Lodhi	Ibrahim Lodhi	Delhi
Jhanjhr Mosque	Ibrahim Shah Sharqi	Jaunpur
Lal Darwaza Mosque	Hussain Shah Sharqi	Jaunpur
Atala Devi Masjid	Ibrahim Shah Sharqi	Jaunpur
Jami Masjid	Ahmedshah	Gujarat
Tomb of Ahmedshah	Muhammad Shah	Gujarat
Nagina Mosque	Mahmud Begarah	Gujarat
Jami Masjid	Husang Shah	Malwa
Hindola Mahal	Husang Shah	Malwa
Jahaz Mahal	Mahmud-I	Malwa
Tomb of Husang Shah	Mahmud-I	Malwa
Palaces of Baaz Bahadur and Rupamati	Nasiruddin Shah	Malwa

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Monument/Structure	Ruler	Location
Adina Mosque	Sikandar Shah	Bengal
Bara Sona Masjid	Nusrat Shah	Bengal
Qadam Rasool Masjid	Nusrat Shah	Bengal
Char Minar	Quli Qutubshah	Deccan
Jami Masjid (Gulbarga)	Alauddin Bahman Shah	Deccan
Gole Gumbad	Muhammad Adil Shah	Deccan
Kabulibagh Mosque	Babur	Panipat
Jam-i-Masjid	Ruhelkhand	Sambhal
Fatehabad Mosque	Humayun	Punjab
Dinpanah city	Humayun	Delhi
Tomb of Sher Shah Suri	Sher Shah	Sasaram (Bihar)
Qila-i-khuna Mosque	Sher Shah	Delhi
Purana Qila	Sher-shah	Delhi
Humayun's Tomb	Hamida Begum	Delhi
Agra fort	Akbar	Agra
Jahangiri Mahal	Akbar	Agra
Lahore fort	Akbar	Lahore
Fatehpur Sikri	Akbar	Sikri near Agra
Diwan-i-Am	Akbar	Fatehpur Sikri
Diwan-i-Khas	Akbar	Fatehpur Sikri
Buland Darwaza	Akbar	Fatehpur Sikri
Jodha Bai Palace	Akbar	Fatehpur Sikri
Panch Mahal	Akbar	Fatehpur Sikri
Jami Masjid	Akbar	Fatehpur Sikri
Salim Chishti's Tomb	Akbar	Fatehpur Sikri
Akbar's Tomb	Sikandra	Jahangir
Tomb of Itimadud Daula	Nur Jahan	Agra
Jahangir's Tomb	Nur Jahan	Lahore
Diwan-i-Am	Shah Jahan	Agra
Diwan-i-Khas	Shah Jahan	Agra
Rang Mahal	Shah Jahan	Agra
Moti Masjid	Shah Jahan	Agra
Red Fort	Shah Jahan	Delhi
Jama Masjid	Shah Jahan	Delhi
Taj Mahal	Shah Jahan	Agra
Shahjahanabad	Shah Jahan	Delhi
Shah Burj	Shah Jahan	Lahore
Rabia ud Dawan's Tomb	Aurangzeb	Aurangabad
Badshahi Mosque	Aurangzeb	Lahore
Moti Masjid	Aurangzeb	Delhi

IMPORTANT SCULUPTURES

Sculupture	Features	Place
Caves	Ancient most, Influenced by religious practices.	Rampurva, Sarnatha
Pillar	Adornes Ashokan Edicts	Sanchi, Amaravati,
Stupa	Buddhist religious architecture	Barhut, Nagarjuna-konda
Carved Railings	Adornes Stupas	Amaravati
Gandhara Art	First statue of Buddha- a mixture of India & Greek method	Peshawar region & Afghanistan
Mathura School	Richly decorated deities of all religion	Mathura
Hindu Art	Hindu temples of Nagara & Sikhara Styles	Vidisa, Deogarh, Tigawa, Eran, Aihole, Rajgriha
Pala School	Fine Hindu & Buddhist Statues	Nalanda, Bodh Gaya
Hoyasala Art	Mature plan & general arrangement	Mysore, Talakad, Halebid
Orissa School	Development of Shikharas	Bhubaneswar, Puri, Konark.
Chandela School	Erotic sculpture	Khajuraho
Vijaya Nagar School	Decorated pillared halls	Hampi
Nayak School	Temple complex	Madurai
Rajasthan School	High platforms & miniature towers	Mt. Abu
Chalukyan School (Vesara)	Mixture of Nagar & Dravida styles, Chittor	Aihole, Pattdakal
Pallava School	Monolithic temples	Mahabalipuram
Chola School (Dravid)	Gopurams or Gates	Tanjore
Indo-Islamic	Arch, domes, vaultes, gardens, marble use pietradura	Delhi, Agra, Jaunpur, Bengal, Hyderabad.

INDIAN CINEMA : MILESTONES

- The first cinema show in India was arranged by Maurice Sestier, the cameraman of Lumiere brothers (France) at the Watson Hotel Bombay on july 7, 1896.
- Prof. Stevenson brings first 'Bioscope' to Calcutta at the Star theatre in 1898.
- Harischandra Sakharama Bhatwadekar (Save Dada is the first Indian to import a cine camera from London turns exhibitor and film maker.

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- 'Return of Wrangler Paranjpe'- the first Indian film actuality shot by H.S. Bhatwadekar in 1901. J.F. Madan launches his Bioscope show at Calcutta in 1902.
- J.F. Madan opens the first cinema hall in India, Elphinstone Picture palace, Calcutta in 1907.
- Bombay becomes the first city in India to start film production in 1912.
- Release of 'Raja Harishchandra' the first silent feature film produced and directed by Dhundiraj Govind Phalke at Coronation Cinematograph Bombay on 3rd May, 1913.
- Indian 'Cinematorgraph Act, is passed for providing censorship of films and licencing of cinema. Abdulla Esoophally, an enterprising showman builds Majestic theatre in Bombay in 1918.
- Boards of film censors were set up in Bombay, Calcutta and Madras in 1920.
- Dhiren Ganguly makes 'England Returned, the first social satire film in 1921.
- Entertainment tax was levied for the first time in Bengal. Dhiren Ganguly starts Lotus film Company in Hyderabad in 1922.
- The first independent film processing laboratory was set up in Bombay by Dhanjibhai K. Desai (Atmanand Laboratory) in 1927.
- The first talkie film shown in India at Elphinstone Picture Palace, Calcutta (Melody of Love) in 1929.
- In 1930 B.N. Sircar established New Theatres Ltd. In Calcutta.
- Release of the first full length talkie feature film in India- 'Alam Ara' (Light of the world) by Ardeshir Merwan Irani at the Majestic Theatre, Bombay on 14th March 1931.
- Recording of the first song of 'Alam Ara' by W.M. Khan (De de Khuda naam par pyara.....).
- Release of the first talkie in Bengali - 'Tamai Shashti' produced by Madan Theatres on 11th April.
- Release of the first talkie in Telugu 'Bhaktha Prahalad' directed by H.M. Reddy.
- Release of the first talkie in Tamil - 'Kalidass' produced by Sagar Movie tone.
- Release of the first talkie in Marathi Ayodhiyecha Raja (King of Ayodhya) directed by V. Shantaram.
- Release of the first talkie in Gujarathi 'Narasinh Mehta' by Nanubhai Vakil on 9th April 1932 at Westend Cinema.
- Release of Himansu Rai's 'Karma' was First India talkie film in English shot in England in 1933.
  Production of Prabhat's Sairandhri by V. Shantaram- the first Indian talkie in multi - colour processed in Germany.
- Release of the first talkie in Oriya 'Sita Bibaha' by Mohan Sunder Deb Goswami in 1934.
- Release of the talkie film in Kannada-Bhakhta Dhruva (Dhruvakumara) produced by Jayawani Talkies in 1934.

- Release of Sita Kalyanam, the first Teulgu talkie to be produced in Madras, by P.V. Das in 1934.
- Playback songs in Indian films was introduced in 1935.
- New Theatre's Bhagya Chakra (Dhoop Chaon) was the first talkie with palyback songs.
- Bombay talkies was founded by Himansu Rai and Devika Rani in 1935.
- Release of the first talkie in Assamese - Joymati directed by Jyothi Prasad Agarwala on 10th March 1935.
- Release of the first talkie in Punjabi - Sheila directed by K.D. Mehra.
- Formation of Indian Motion Picture Producer's Association in Bombay in 1937.
- Release of Imperial's Kisan Kanya. India's first indigenous colour film by Ardeshir M. Irani.
- Release of the first talkie in Malayalam, 'Balan' directed by S. Notani for producer T.R. Sundaram of Modern Theatres. Salem in 1938.
- Production of Prem Sagar by K. Subramaniam, the first Hindi talkie produced in South India.
- Release of Wadia Movietones 'The Court Dancer the first Indian film in English in USA in 1941.
- Dada Saheb Phalke, father of Indian cinema, passed away in 1944.
- Closure of the information films in India in 1948.
- Censor codes formulated in Bombay and Madras in 1946.
- Production of documentaries and newsreels by the Government under the Films Division was recived in 1948.
- Uday Shankar's 'Kalpana' -the first ballet film in India was released in 1948.
- S.K. Patil's Film Enquiry Committee was appointed in 1949.
- Conference of film trade organisations for the formation of Film Federation of India held in 1950.
- Release of the first talkie in Konkani - Mosacho Aundo (Loves Craving) directed by Jerry Braganza.
- Central Board of Film Censors with B.N. Sircar on the Board was founded in 1951.
- Film Federation of India under the presidentship of Chandulal J. Shah was launched in 1951.
- India's first International Film Festival in Bombay from 24th January was oraganised in 1952.
- 'Cinematograph Act' passed in 1952.
- National Awards for films were introduced in 1954.
- P.K. Atre's 'Shyamchi Aayee, (Marathi) wins President's Gold Medal as best film of 1953.
- Children's Film Society of India at the behest of late Prime Minister Jawaharlal Nehru was formed in 1955.
- Pather Panchali winds a coveted Prize at the Cannes International Film Festival as the 'best human document in 1956'.

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- Film, 'Kabuliwalla' won Silver Bear for music at Berlin film festival in 1957.
- Satyajit Ray's 'Aparajito' (Bengali) won Golden Lion of St. Mark at the Venice Festival in 1957.
- K.A. Abbas makes Pardesi a co-production with Mosfilm studeios of USSR in 1957.
- Satyajit Ray's 'Jalsagar' won Silver Medal at the Moscow film festival in 1959.
- Release of Guru Dutt's 'Kagaz Ke Phool' (Hindi)-India's first cinemascope film shot in black and white in 1959.
- Film Finance Corporation was formed in 1960.
- Film Indtitute of India set up at Prabhat Studio, Poona in 1960.
- Release of first talkie in Bhojpuri - Ganga Maiye Tohe Piyari Charhaibo directed by Viswanathan Shahabadi in 1960.
- Anupam Chitra porduces 'Pyar ki Pyass,' the first Cinemascope film in colour in 1961.
- 1962 : Launching of Merchant -ivory production. Their first film House holder in English/Hindi won for Leela Naidu, the Made-moiselle Award.
- Indian Motion Picture Export Corporation was formed in 1963.
- National Film Archive of India at Poona was established in 1964.
- Sunil Dutt's 'Yaadein' (Hindi)-first film in India which had only one actor was released in 1964.
- Dev Anand makes 'Guide' in English jointly with writer Pearl's Buck and director Ted Danielowski.
- Pachhi's Around the World- first 70mm film in Techn–icolour with stereophonic sound was released in 1967.
- The Khosla Committee of Film Censorship submitted its report in 1969.
- Dada Saheb Phalke award was instituted in 1970.
- Devika Rani was the first recipient of this award.
- Matangi Manipur-the first talkie film in Manipuri language was relased in 1972.
- Satyajit Ray's 'Ashani Sanket' won Golden Bear at Berlin film festival in 1973.
- Satyajit Ray was honoured by British Film Institute as the most distinguished Film Director in the last half century in 1975.
- First International Festival of Children's Films of India held in 1979.
- Establishment of Natinal Film Developement Corporation (NFDC) with the merger of FFC and IMPEC in 1980.
- Indian Academy of Motion Picture Arts and Science in Bombay was launched in 1981.
- Richard Attenborough's 'Gandhi' co-produced by NFDC won 8 Academy awards in 1984.
- Bhanu Athyya wins Oscar award for Best Costume Design (Gandhi).

- G.V. Iyer's Adi Sankaracharya- India's first Sanskrit film won President's Gold Medal in 1964.
- India's first 3D film, directed by Jijo.
- Film Certification Appellate Tribunal (TCA) was established in 1984.
- Mira Nair's 'Salaam Bombay' nominated for 'Oscar' awards in Best Foreign film category and also nominated for 'Golden Globe' awards in 1989.
- Government abolishes the name 'Filmotsav' for International Film Festivals in 1990.
- Bombay International Festival for Documentations and Short films commenced in 1990.
- Bharat Ratna to late Satyajit Ray (Posthumous) was awarded in 1992.
- Children's Film Society of India renamed as National Centre of Films for Children and Young People (NCYP) with head office at Bombay in 1992.
- Marana Simhasanam (Malayalam) directed by Murali Nair won Golden Camera award at Cannes Film Festival in 1999.
- Jayaraj's Karunam (Malayalam) won Golden Peacock for the Best Film at IFFI-2000.
- Best Director Award to Buddadeb Das Gupta at Venice Film Festival for 'The Wreestlers' was awarded in 2000.
- Asif Kapadia's 'The Warrior' wins BAFTA Award and the Sutherland Award at London festival in 2002.
- Mrinal Sen won Best Director Award for Amaar Bhuban (Bengali) at Cairo International film festival in 2002.
- Nandita Das won Best Actress Award also for Amaar Bhuban at Cairo festival.
- French Govt. confered Commander of the Order of Arts and Letters on Adoor Gopalakrishnan in 2003.
- Om puri received Britain's OBE. Partho Sengupta's 'Hawa Ane De' was best Film at Durban Film Festival in 2004.
- The bollywood actress Aishwarya Rai and U.S. director Alexander Payne officially opened Cannes Film Festival on 12th May, 2005.
- Madhur Bhandarkar won Best Film Award for 'Page 3' of National Film Award, 2005.
- Shyam Benagal won Dada Saheb Phalke Award for 2007.

CULTURAL INSTITUTIONS

- **Lalit Kala Akademi (National Academy of Fine Arts') :** It was estabalished at New Delhi in 1954 to promote and propagate understanding of Indian Art (i.e., painting, sculpu-ture, architecture and applied arts) both within and outside the country.

The Akademi has regional centres called Rashtriya Lalit Kala Kendras at Lucknow, Kolkata, Chennai and Bhubaneshwar.

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➢ **Sangeet Natak Akademi (National Academy of Music, Dance & Drama) :** It was established in 1953 to promote the performing Indian arts (i.e., dance, drama and music) in collaboration with states and voluntary organisations.

➢ **National School of Drama (NSD) :** It was established in 1959 by the Sangeet Natak Akademi as a premier theatre institution. In 1975, it was registered as an autonomous institution, fully financed by the Department of Culture. The Diploma of NSD is recognised by the Association of Indian Universities as equivalent to M.A. Degree.

➢ **Sahitya Akademi :** It was established in March 1954 with the following objectives : (i) To develop Indian literature.

(ii) To set high literacy standards.

(iii) To foster and coordinate literacy activities in all the Indian languages.

(iv) To promote through them the cultural unity of the country.

➢ **Archaeological Survey of India (ASI) :** It was established in 1861 with the following objectives : (i) To conserve and preserve archaeological monuments and sites located in different parts of the country and maintain sites and remains.

(ii) To undertake explorations and excavations, epigraphic research, study of architecture and scientific studies and investigations.

At present there are 3,606 centrally protected monuments of national importance which include 25 monuments on the list of world heritage.

➢ **National Archives of India (NAI) :** It was established on March 11, 1891 in Kolkata and known as Imperial Record Department till Independence. It is the official custodian of all non-current records of permanent value of the Government of India and its predecessor bodies.

➢ **Asiatic Society :** It was establsihed in 1784 at Kolkata by Sir William Jones, an eminent-Indologist with the objective of inquiring into history, antiquities, arts, science and literature of Asia.

➢ **Anthropological Survey of India :** It was established in December, 1945 at Kolkata for the advancement of scientific research in Anthropology and allied disciplines. It collects authentic empirical data covering the entire range of human variation and culture.

➢ **Zonal Cultural Centres :** They have been setup for projecting, preserving and sustaining cultural kinship that transcends territorial limits.

There are seven such centres in the country :

1. North-Zone Cultural Centre, Patiala
2. East-Zone Cultural Centre, Kolkata (Shantiniketan)
3. South-Zone Cultrual Centre, Thanjavur
4. West-Zone Cultural Centre, Udaipur
5. North-Central Zone Cultural Centre, Allahabad
6. North-East Zone Cultural Centre, Dimapur
7. South-Central Zone Cultural Centre, Nagpur

➢ **Indira Gandhi National Centre for Arts :** It was established in 1985 at New Delhi as a resource centre and database. It is visualised as a centre encompassing the study and experience of all the arts.

FAIRS AND FESTIVALS OF INDIA

➢ **Hindu Festivals :** Maha Kumbh Mela (held 4 times in 12 years at Hardwar, Ujjain, Nasik and Prayag i.e. (Allahabad). Vasanta Panchami, Shivaratri, Holi, Rama Navami, Vaisakhi, Ganga Dussehra, Deva Shayani Ekadeshi, Naga Panchami, Raksha Bandhan, Ganesh Chaturthi, Krishna Janmashtami, Pitrapaksh, Navaratri, Dussehra, Diwali (or Deepawali), Kartiki Purnima, Deva Prabodhani Ekadeshi.

➢ **Muslim Festivals :** Muharram, Shab-i-Barat, Ramzan (or Ramadan), Id-ul-Fitr, Id-ul-Zuha (or Azha or Bakra-Id), Barawafat (or Id-i-Milad), Giarahvin Sharif, Urs.

➢ **Christian Festivals :** Christmas, Good Friday, Easter

➢ **Sikh Festivals :** Vaishakhi, Guruparb, Jaistha, Lohri

➢ **Buddhist Festivals :** Buddha Jayanti

➢ **Jain Festivals :** Mahavira Jayanti, Paryushan, Ashtanika, Arathyatra

➢ **Parsi Festivals :** Jamshed-i-Navroz, Khordad Sal, Papeti.

➢ **Secular Festivals** Republic Day, Independence Day, Gandhi Jayanti, Children Day.

REGIONAL FESTIVALS

➢ **Andhra Pradesh and Tamil Nadu :** Pongal, Tyagaraja Festival, Brahmotsavam, Teppem, Tamil and Telugu New Year Day, Madurai River Festival, Kaveri River Festival, Festival at Velanganni, Karthika Festival, Vaikuntha Ekadeshi, St. Thomas' Day, Fire-Walking Festival.

➢ **Assam and Manipur :** Bhageli Bihu, Bohag Bihu (or Rangali Bihu), Kati Bihu (or Rangati Bihu), Spring Festival of Konyak Nagas, Manipur Ras Lila Festival

➢ **Bengal :** Gangasagar Mela, Ramakrishna Utsav, Dol Purnima, Naba Barsha.

➢ **Bihar :** Chhath, Sarhul

➢ **Goa :** Zatra at Cansaulim, Feast of St. Francis Xavier, Carnival.

➢ **Himachal Pradesh :** Minjar Mela, Jwalamukhi Fair

➢ **Karnataka :** Makara Sankranti, Ugadi, Karago, Feast of St. Philomena, Dasahra, Urs of Hazrat Khwaja Bande Nawaz Chisti, Headannointing ceremony (At Sravanbelagola)

➢ **Kashmir :** Nav Warih, Sont, Vaisakhi, Jeth Ashtami, Mela Hemis Gompa, Har Navami, Pilgrimage to Amarnath Cave (Chhari Festival), Urs Shah Hamadan, Kichri Amavasya.

➢ **Kerala :** Thye Pongal, Vishu, Poorum, Onam.

➢ **Maharashtra and Gujarat :** Gudi Padva, Dev Divali, Navratri, Ganpati Festival

➢ **Orissa :** Car Festival (at Puri)

➢ **Rajasthan and Madhya Pradesh :** Gangaur, Teej, Pushkar Fair, Urs at Ajmer Sharif.

➢ **Tripura :** Karchi Puja, Ker Puja, Tripureshvari Temple Festival.

➢ **Uttar Pradesh :** Brahmotsav, Ram Navami, Sravana Festival, Ban Yatra, Dussehra, Kans Ka Mela.

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TEMPLES OF INDIA

Temples	Places
Dharmaraya Ratha	Mahabalipuram
Kailasa Vimana	Ellora
Vaikunthaperumal Temple	Kanchipuram
Valisvara Temple	Tiruvalisvaram
Vijayalaya Cholesvaram	Nartamali
Chamundaraya Basti	Sravana Belagola
Panchakuta Basti	Kambadahalli
Bhoja Mandisvara Temple	Nandi
Malegitti Shivalaya	Badami
Brihadesvara Vimana	Thanjavur
Airavatesvara Vimana	Darasuram
Nataraja Temple	Chidambaram
Kasi Visvesara Temple	Lakkundi
Arunachala Temple	Tiruvannamali
Vitthala Temple	Hampi
Jalakanthesvara	Vellore
Ranganatha Temple	Srirangam
Vatapatrasyi Temple	Srivilliputur
Subrahmanya Temple	Thanjavur
Aghoresvara Temple	Ikkeri
Visa Brahma Temple	Alampur
Vadakkunatnan Temple	Trichur
Pandava Ratha (Rockcut Chariot)	Mahabalipuram
Shore Temple (Shiva)	Mahabalipuram
Meenakshi Temple	Madurai
Manjunath Temple	Mangalore
Rameshvaram Temple	Rameshvaram
Halebid Temple	Halebid
Gupta Temple	Sanchi
Parvati Temple	Nachna
Bhitargaon Temple	Bitargaon
Mahabodhi Temple	Bodh Gaya
Lakshmana Temple	Sripur
Vishva-Brahma Temple	Alampur
Badoli Temple	Badoli
Ambikamata Temple	Jagata
Vimala Vasahi	Mount Abu
Temple No. III	Roda
Ranakadevi Temple	Wadhwaran
Sun Temple	Konark
Sas Bahu Temple	Gwalior
Kashi Vishvanatha Temple	Varanasi
Kandariya Mahadeva Temple	Khajuraho
Jagannath Temple	Puri
Lakshmana Temple	Khajuraho
Lingaraja Temple	Bhubaneshwar
Udayeshwara Temple	Udaipur
Parashurameshwara Temple	Bhubaneshwar
Vaital Deu	Bhubaneshwar
Muktemhwara Temple	Bhubaneshwar
Keshva Temple	Somanathapur

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INTERNATIONAL ORGANISATION

UNITED NATIONS

- *The UN and its 17 independent specialised agencies and 14 major Programmes and Funds embrace almost every man in every corner of the Globe.*
- *The United Nations Organisation is an association of sovereign states bound by a Charter to maintain international peace and security and to co-operate in promoting political, social and economic conditions for the betterment of human life.*
- *The proposal for such an organisation was mooted at Dumbarton Oaks Conference (Washington DC) between the erstwhile USSR, the USA and the UK between August 21 to September 28, and between the USA, China and UK from September 28 to October 7, 1944.*
- *The Charter of the UN was signed by the delegates from 50 countries on June 26, 1945 at San Francisco.*
- *The UN was formally inaugurated on October 24, 1945. This date is taken as the official birthday of the UN and is celebrated every year as the UN Day.*
- *The Charter of UN provides for :*
  1. Maintaining international peace and security.
  2. Working towards improved relations among nations based on respect for the principle of equal rights and self-determination of peoples.
  3. Co-operation in finding a solution for international social, economic, cultural and humanitarian problems and in advising respect for human rights and basic freedoms.
  4. Serving as a base for co-ordinating the actions of nations to attain these common goals.

List of Secretaries General

Name	Years
1. Trygve Lie (Norway)	1946-1953
2. Dag Hammarskjold (Sweden)	1953-1961 Killed in an air crash
3. U. That (Burma)	1961-1971
4. Kurt Waldheim (Austria)	1972-1981
5. Javier Peres de Cuellar (Peru)	1982-1991
6. Dr. Boutros-Boutros Ghali (Egypt)	1992-1997
7. Kofi Annan (Ghana)	1997-2007
8. Ban Ki-Moon (South Korea)	2007 - till date

The Secretary-General is assisted by Under Secretaries-General and Assistant Secretaries-General. The normal term of the office of the UN Secretary-General is 5 years.

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GENERAL ASSEMBLY

- The Assembly consists of the representatives of all the member of states.
- Each member country has one vote.
- The General Assembly meets at least once in a year, the session commencing on the third Tuesday of September and continuing normally till the middle of December.
- The Assembly can also meet for special emergency sessions.
- The sessions are presided over by the President who is elected annually by the members of the Assembly.
- The General Assembly passes the annual budget of the UN and determines the contribution payable by each member.
- It receives and considers the reports of the special committees including the Security Council.
- The General Assembly elects the non–permanent members of the Security Council, the members of the Economic and Social Council and the elected members of the Trusteeship Council.
- The Judges of the International Court of Justice are elected by the General Assembly, in conjunction with the Security Council.
- The Assembly elects its own President and Vice-Presidents every year.

SECURITY COUNCIL

- It consists of 15 members each with a single vote.
- Of these, 5 are permanent members and 10 non–permanent members elected for a term of 2 years by a two-third majority of the General Assembly.
- The permanent members have the power to veto any move.
- The Security Council bears the primary responsibility of maintaining peace and security.
- It is also responsible for the functioning of the UN trust-territories known as "strategic areas".
- Decisions on procedural matters are taken by an affirmative vote of 9 members (7 to 9 in 1968 under article 109).
- On substantive matters involving action by member–nations, all permanent members must vote in the affirmative.
- A single negative vote VETO can prevent the proposals from being accepted.
- Permanent members – China, France, Russia, UK and USA.

ECONOMIC AND SOCIAL COUNCIL

- It is responsible under the General Assembly for carrying out the function of the UN with regard to international economic, social, cultural, educational, health and related matters.
- It consists of 54 member States (27 to 54 in 1973 under article 61) elected by a two-third majority of the General Assembly.
- Nine are elected every year for a three-year term.

- Retiring members are eligible for immediate re–election.
- Each member-nation has one vote and decisions are taken by a majority of members present and voting.
- The President of the Council is elected every year.
- The Council has the following regional Economic Commissions :
- Economic Commission for Europe, ECE-Geneva
- Economic and Social Commission for Asia and the Pacific, ESCAP-Bangkok.
- Economic Commission for Latin America, ECLA-Santiago, Chile.
- Economic Commission for Western Asia, ECWA-Baghdad.

TRUSTEESHIP COUNCIL

- The Charter provides for an international trusteeship system to safeguard the interests of the inhabitants of territories which are not yet fully self-governing and which may be placed thereunder by individual trusteeship agreements. These are called trust territories.
- It consists of the permanent members of the Security Council.
- It meets once a year and can meet on more occasions, if so required.
- Each member has one vote and decisions are taken by a majority vote.

INTERNATIONAL COURT OF JUSTICE

- It was created by an international treaty, the Statute of the Court, which forms an integral part of the UN Charter.
- All members of the UN are *ipso facto* parties to the Statute of the Court.
- It comprises 15 Judges.
- Two judges of the same nationality cannot serve simultaneously.
- These judges are elected by the General Assembly in conjunction with the Security Council for a term of 9 years.
- Retiring judges are eligible for immediate re–election. The Court elects its own President and Vice-President for a term of 3 years and remains permanently in session except for judicial vacations.
- The jurisdiction of the Court applies in :
  - (i) international conventions
  - (ii) international custom
  - (iii) the general principle of law recognised by civilised nations
  - (iv) as subsidiary means for the determination of the law, judicial decisions
  - (v) it may also give an advisory opinion on any legal question to any organ of the UN or its agencies
- The Court has its seat at the Hague, but may sit elsewhere whenever it considers this desirable.

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SECRETARIAT

- It comprises the Secretary-General, who is the chief administrative officer of the UN and an international staff appointed by him under regulations established by the General Assembly.
- However, the Secretary-General, the High Commissioner for Refugees and the Managing Director of the Fund are appointed by the General Assembly itself.

Head Quarters : New York

SPECIALISED AGENCIES OF THE UN

CHILDREN'S EMERGENCY FUND (UNICEF)

- It was established in 1946 at New York as United Nations International Children's Emergency Fund to deliver post–war relief to children.
- Now concentrates its assistance on development activities aimed at improving the quality of life for children and mothers in developing countries.

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

- It is the world's largest agency for multilateral technical and pre-investment co–operation. It is the funding source for most of the technical assistance provided by the UN.
- It helps developing countries exploit their human and natural resources by providing expert assistance and training local personnel.

Headquarters : New York

UN FUND FOR POPULATION ACTIVITIES (UNFPA)

- It was set up in 1967 at New York to build up capacity to respond to needs in population and family planning.
- To promote awareness of population problems and possible strategies to deal with them to assist developing countries at their request in dealing with population problems.

UN INDUSTRIAL DEVELOPMENT ORGANISATION (UNIDO)

- It was established on November 17, 1966 and was upgraded as a specialised agency of the UN in 1985.
- It provides assistance to developing countries for the development, expansion and modernisation of industry.

Headquarters : Austria

UN EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANISATION (UNESCO)

- UNESCO came into being on November 4, 1946.
- It is based at Paris.

- Its purpose is to contribute to peace and security by promoting collaboration among nations through education, science and culture in order to facilitate justice, rule of law and human rights and freedom without distinction of race, sex, language and religion.

Head Quarters : Paris

UN ENVIRONMENT PROGRAMME (UNEP)

- Initiated in 1972.
- The Programme co–ordinates international co–operation in matters relating to the human environment.

Headquarters : Nairobi

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)

- Came into existence on July 29, 1957.
- Its statute had been approved on October 26, 1956, at an international conference held at UN headquarters, New York.
- A relationship agreement links it with the UN.
- It aims to promote peaceful use of nuclear energy and discourage its use for military purposes.

Headquarters : Vienna, (Austria)

INTERNATIONAL CIVIL AVIATION ORGANISATION (ICAO)

- The convention providing for the establishment of the ICAO was drawn up by the International Civil Aviation Conference held in Chicago from November 1 to December 7, 1944.
- A provisional ICAO operated for 20 months until the formal establishment of ICAO on April, 4 1947.
- Its purpose is to establish international standards and regulations in relation to civil aviation. It promotes safety of civil aviation.

Headquarters : Montreal, Qubec, Canada

INTERNATIONAL MARITIME ORGANISATION (IMO)

- It was established on March 17, 1958, with its base at London.
- Its objective is to promote co–operation in international shipping and remove discriminatory and restrictive practices.

INTERNATIONAL TELECOMMUNICATION UNION (ITU)

- The International Telecommunication Union was set up in January 1, 1934.
- It came into being on January 1, 1934.
- ITU frames international regulations for radio, telegraph, telephone and space radio communication.

Headquarters : Geneva, Switzerland

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UNIVERSAL POSTAL UNION (UPU)

- It was established on July 1, 1875, when the Universal Postal Convention, adopted by the Postal Congress of Berne on October 9, 1874, came into force.
- The UPU was known at first at the General Postal Union.
- Its name was changed at the Congress of Paris in 1878.

Headquarters : Berne, Switzerland

WORLD METEOROLOGICAL ORGANISATION (WMO)

- Conference of Directors of the International Meteorological Organisation (Set up in 1873), meeting in Washington in 1947, adopted a convention creating the World Meteorological Organisation.
- The WMO was formally established on March 19, 1951, when the first session of its Congress was convened in Paris. It aims at promoting international exchange of weather reports and maximum standardisation of observations. It also tries to help developing countries establish weather services.

Headquarters : CH-1211, Geneva-2, Switzerland

WORLD HEALTH ORGANISATION (WHO)

- An International Conference, convened by the UN Economic and Social Council, to consider a single health organisation resulted in the adoption on July 22, 1946 of the constitution of the WHO. This constitution came into force on April 7, 1948.
- It aims at promoting better health facilities all over the world.

Headquarters : Geneva, Switzerland

Regional Offices : Alexandria, Brazzaville, Copenhagen, Manila, New Delhi and Washington.

INTERNATIONAL LABOUR ORGANISATION (ILO)

- Established in 1919 as an autonomous part of the League of Nations,
- It is an intergovernmental agency with a tripartite structure representing the workers, employers and governments.
- To promote better living conditions, economic stability and social justice among workers.
- The ILO consists of the International Labour Conference, the governing body and the International Labour Office.

Headquarters : Geneva

FOOD AND AGRICULTURAL ORGANISATION (FAO)

- The UN Conference on Food and Agriculture in May 1943, at Hot Springs, Virginia, set up an Interim Commission in Washington in July 1943 to plan the Organisation.

- It came into being on October 16, 1945.
- It aims at improvement in production and distribution of food and agricultural products to eliminate hunger and to improve the nutrition level and living conditions of the rural population all over the world.
- FAO sponsors the World Food Programme with The UN.

Headquarters : Rome, Italy

INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD)

- Proposed by the 1974 World Food Conference, the agreement for IFAD came into force on November 30, 1977 following attainment of initial pledges of $1,000 m and the agency began its operations the following month.

Headquarters : Rome, Italy

WORLD INTELLECTUAL PROPERTY ORGANISATION (WIPO)

- The Conventions establishing WIPO. was signed at Stockholm in 1967 by 51 countries.
- It came into force in April 1970.
- In December 1974 WIPO became a specialised agency of the UN.

Headquarters : Geneva, Switzerland

INTERNATIONAL BANK FOR RECONSTRUCTIONS AND DEVELOPMENT (IBRD)

- Conceived at the Bretton Woods Conference, July 1944.
- The IBRD was established on December 25, 1945, which began operations on June 25, 1946.
- IBRD is a world wide effort to guide international investment into productive channels. Its purposes are :
  - (i) to assist in the reconstruction and development of territories of members who had suffered during war.
  - (ii) to promote private investment.
  - (iii) to promote the long-range balanced growth of international trade and the maintenance of BOPs.
  - (iv) to promote long term foreign investments.

Headquarters : Washington DC

INTERNATIONAL MONETARY FUND (IMF)

- It was established on December 27, 1945 as an independent international organisation.
- It began operations on March 1, 1947.
- Its relationship with the UN is defined in a agreement of mutual co-operation, which came into force on November 15, 1947.

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- Its purposes are :
  (i) to promote exchange stability and prevent unnecessary ex. change depreciations.
  (ii) to assist in the establishment of multilateral system of pay. ments.
  (iii) to facilitate growth of international trade.
  (iv) to ultimately eliminate foreign exchange restrictions.
- The first amendment to the Fund's articles creating the Special Drawing Rights (SDR) took effect on July 28, 1969 and the sec. ond amendment on April 1, 1978.

Headquarters : Washington D.C.
Offices in : Paris and Geneva

INTERNATIONAL DEVELOPMENT ASSOCIATION (IDA)

- It is an affiliated agency of the World Bank.
- It was established on September 24, 1960 at Washington DC.
- Its main object is to help the underdeveloped countries in raising their living standards by providing soft loans for long periods.
- Such loans are for creating Social Capital–construction of roads and bridges, slum clearance, and urban development, sanitation etc.
- All IDA loans are-repayable over 50 years, interest free but bear a service charge of 0.75 per cent per annum.

INTERNATIONAL FINANCE CORPORATION (IFC)

- An affiliate of the World Bank, was established on July 20, 1956 at Washington DC.
- It assists private enterprises in underdeveloped countries without any Government guarantee.

WORLD TRADE ORGANISATION (WTO)

- It is a permanent international trade body which replaced GATT in January 1995.

Headquarters : Geneva, Switzerland

MAJOR INTERNATIONAL ORGANISATIONS

ASIAN DEVELOPMENT BANK (ADB)

- It was initially sponsored by the ECAFE and started functioning in 1966.
- In June 1974, ADB launched the ASIAN DEVELOPMENT FUND (ADF) with a view to providing concessional credits to needy members.

Headquarters : Manila (Philippines)

AMNESTY INTERNATIONAL

- A world-wide human rights organisation with headquarters in London.
- The organisation began on May 28, 1961 with a newspaper appeal by the British lawyer Peter Berenson to fight for the basic human rights of people all over the world.
- Its objectives are officially stated to include the following :
- "To secure the immediate and unconditional release of all prisoners of conscilince, ensure fair and prompt trial for all political prisoners and abolish torture and execution."
- The organisation enjoys the support of the UN and has more than 5,00,000 members in more than 150 countries.
- It won Nobel Prize for Peace in 1977.

AFRICA FUND

- Formed under the auspices of the NAM to fight apartheid in South Africa.
- The campaign was launched by NAM at a summit attended by the leaders from 9 countries held at New Delhi on January 25, 1987.
- A fund of 70 million Dollars was earmaked for the purpose to which India contributed 40m Dollars. The other member countries are Argentina, Algeria, Congo, Nigeria, Peru, Ugoslavia, Zambia and Zimbabwe.

ARAB LEAGUE

- It is the outcome of a national awakening of the Arabs, following the fall of the Ottoman Empire in the First World War.
- It was formally instituted on March 22, 1945.
- The Arab League consists of a Council, a Secretary-General and a few permanent committees.
- The League considers itself a regional organisation within the framework of the UN at which its Secretary-General is an observer.
- **Member Countries :** Algeria, Bahrain, Djibouti, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisla, UAE, Yamen (PDR of Yamen + Yamen Arab Republic).
- **Secretariat :** After the Iraq's invasion of Kuwait in August 1990, the venue was shifted to Cairo.

ASEAN

- The Association of South-East Asian Nations was formed by the Governments of Indonesia, Malaysia, the Philippines, Singapore and Thailand through the Bangkok Declaration.
- It was signed by the Foreign Ministers of ASEAN countries on August 8, 1967.
- Brunei joined in 1984.
- It aims to promote active collaboration in matters of common interests in economic, social, cultural, technical, scientific and administrative fields.

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- Each ASEAN capital has an ASEAN National Secretarial.
- The central secretariat for ASEAN is located in Jakarta, Indonesia, and is headed by the Secretary-General, a post that revolves among the member states in alphabetical order every three years.
- Bureau Directors and other officers of the ASEAN Secretariat remain in office for 3 years.
- Vietnam became the seventh ASEAN member on July 28, 1995.

COUNCIL OF EUROPE

- The statute of the Council was signed at London on May 5, 1949 and came into force 2 months later.
- The founder members were Belgium, Denmark, France, Ireland, Italy, Luxembourg, the Netherlands, Norway, Sweden and the UK.
- Turkey and Greece Republic of Germany in 1951, the Federal Republic of Germany in 1951 (having been an associate since 1950), Austria in 1956, Cyprus in 1961, Switzerland in 1963, Malta in 1965, Portughal in 1976, Spain in 1977, Liechtenstein in 1978, San Marino in 1988, Finland in 1989 and Hungary in 1990.

Headquarters : Cedex, France

THE INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA)

- It was founded in 1945 to promote safe, regular and economical air transport and to provide a forum for collaboration.
- At present there are 40 international airlines (active members) and 19 domestic airlines (associate members).
- The Annual General Meeting is the ultimate authority in the Association.
- The Executive Committee consists of 18 elected members.

Headquarters : Montreal, Canada and Geneva, Switzerland.

INTERPOL

- 147-Nation Police Commission, established in 1923.
- To co–ordinate police activities of participating nations with headquarters in Paris.
- After a terrorist bomb blast in May, 1986, the HQs. was shifted to Lyons.

NORTH ATLANTIC TREATY ORGANISATION (NATO)

- It sought to establish a military counter weight to a Soviet military presence in Europe.
- In 1949 the foreign ministers of Belgium, France, Luxembourg, the Netherlands, UK, Canada, Denmark, Iceland, Italy, Norway, Portughal and USA met in Washington and signed the North Atlantic Treaty.
- Greece and Turkey joined the Treaty in 1952.
- The Federal Republic of Germany in 1955 and Spain in 1982.

- NATO is an organisation made up of 13 European states, two American states (Canada and USA) and an Asiatic state (Turkey).
- The Council is the supreme body of the NATO.
- It consists of the ministers of member states.
- The Secretary-General is appointed by and responsible to the council.
- The Military Committee is the supreme military body of NATO.
- It consists of the Chiefs of Staff of member states.
- In 1966 France withdrew from the Military Committee while remaining a member of the Council.
- The task for NATO is now three-fold :
  - (i) To safeguard against excessive zeal in smoothing the reunification process by making unilateral military concessions or by acquiescing to political limitations on Germany sovereignty.
  - (ii) To resist the notion of "parallelism" between the Soviet military presence in Eastern Europe and the US military presence in Western Europe.
  - (iii) To avoid, in the process of lowering allied force levels emasculation of the triad of NATO's deterrent-conventional theatre nuclear and strategic nuclear forces.
- In a bid to expand its fold, the 16-member western military alliance NATO offered East Europeans, former Soviet and neutral states military co–operation under a partnership for peace programme during its summit in Brussels on January 10, 1994. Under the proposal, NATO would co–operate with East European nations in peacekeeping activities, joint military exercises and crisis management.

Headquarters : Brussels, Belgium

Russia Signs Nato Pact

- The Russian President, Mr. Boris Yeltsin signed a historic security agreement on May 27, 1997 at the Elysee Palace in Paris with sixteen NATO leaders.

ORGANISATION OF AMERICAN STATES (OAS)

- The Charter of the OAS was adopted in April 1948, at the ninth international conference of American States at Bogota, Colombia.
- Thirty-five American countries are members of the organisation, with equal rights, each country possessing one vote.

Headquarters : Washington D.C. USA

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ORGANISATION OF ARAB PETROLEUM EXPORTING COUNTRIES (OAPEC)

- The organisation has 10 members including Egypt which was re-admitted in 1989. Other members; Algeria, Bahrain, Qatar, Libya, Iraq, Kuwait, UAE, Syria, Saudi Arabia.

ORGANISATION OF AFRICAN UNITY (OAU)

- It came into being in May 1963, when the heads of 32 African States met at Addis Ababa and signed a charter establishing a common organisation for all African States.
- It chief objects unity and solidarity among African States elimination of colonialism and defence of the independence of member states.
- The supreme body in the OAU is the Conference of Heads of States or Governments.
- The official languages of the organisation are French and English in addition to all the native African languages.
- The organisation has 53 member-states.

Headquarters : African Unity House, Addis Ababa, Ethiopia.

ORGANISATION FOR ECONOMIC CO-OPERATON AND DEVELOPMENT (OECD)

- OECD was formed in 1961 to replace the Organisation for European Economic Co-operation (OEEC) which was started immediately after the Second World War for the reconstruction of war-ravaged European states.
- The OEEC was formed in response to an offer of aid from the US Secretary of State Marshall.
- This aid since called the Marshall Aid, was to be used to rehabilitate the economies of European states ruined by the war.
- A conference of European state was held in Paris in 1948 to accept the proposal.
- The OEEC changed its name in 1961 as OECD.

Headquarters : Paris, France

G-15 (GROUP OF FIFTEEN)

- The G-15 or the Group of 15 developing Afro-Asian and Latin American (7 Latin American, 5 African and 3 Asian) or Third World Nations was launched in September, 1989 at the concluding session of NAM Summit in Belgrade to enhance South-South Co-operation.
- The objective of G-15 is two fold. One is to develop common perception and strategies on major issues relating to world economic situation and the other is to formulate and carry out concrete schemes for South-South Co-operation.

- **Members :** Algeria, Brazil, Egypt, India, Indonesia, Jamaica, Malaysia, Argentina, Mexico, Nigeria, Peru, Senegal, Venezuela, Yugoslavia and Zimbabwe.
- Kenya was admitted to G-15 in 1998, making it the group of 16-members, though there is no change in the nomenclature of Group. Sri Lanka is its new member.
- **Headquarters :** Geneva, Switzerland

SAARC (SOUTH ASIAN ASSOCIATION FOR REGIONAL CO-OPERATION)

- SAARC came into being at the initiative of the then Bangladesh President Zia-ur-Rahman in 1985.
- Its members are Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Afghanistan. Its headquarters is in Kathmandu, Nepal.
- **Objectives :** To involve co-operation in solving the problems specific to the region, strengthen collective self-reliance and accelerate economic, social and cultural development of the countries of the region.
- *Important institutions of SAARC are :*
  - (i) Human Resources Development Centre-Islamabad.
  - (ii) Regional Tuberculosis Centre-Kathmandu.
  - (iii) Regional Documentation Centre-New Delhi.
  - (iv) Agriculture Information Centre-New Delhi.

NAM (NON-ALIGNED MOVEMENT)

- It is group of 118 countries, mostly developing.
- The principles of non–alignment were defined in the Bandung (Indonesia) Declaration of 1955 and reiterated in the Brioni (Yogoslavia) Declaration of 1956 by Jawaharlal Nehru, Josip Broz Tito, the then Yugoslavian President and Gamel Abdil Nasser of Indonesia.
- The first non-aligned conference was held at Belgrade in 1961 in which 25 countries participated.
- This movement was based on the ideology of 'Panchsheel', viz. the principle of mutual respect for each other's territorial integrity, non-aggression, non-interference in each other's international affairs, equality and peaceful co-existence.
- The basic thrust of the movement is in favour of peace, disarmament, development, independence, eradication of poverty and illiteracy.

G-7 (GROUP OF SEVEN)

- It is an organisation of seven (now eight) major industrial democracies who meet periodically to discuss world economic and other issues.

Members : Canada, France, Germany, Italy, Japan, United Kingdom and United States.

- Russia is now a full-fledged member of this elite club.

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ASIA-PACIFIC ECONOMIC CO-OPERATION (APEC)

- APEC was founded in November 1989, its members aimed to devise programme of co-operation to be discussed at meetings between their trade and foreign ministers.
- Institutionalised in June 1991, after a meeting in Bangkok, it was at the Bogor (Indonesia) summit of November, 1994 that the group resolved to work towards establishment of a free trade zone by 2020.
- **Member states :** Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, the Philippines, Singapore, Taiwan, Thialand and the US.

THE ASEAN FREE TRADE AREA (AFTA)

- The Association of South East Asian Nations (ASEAN) is a regional organisation formed by the governments of Indonesia, Malaysia, the Philippines, Singpore and Thailand by the Bangkok Declaration, signed by their ministers in August, 1967.
- Brunei, Vietnam, Cambodia, Loas, Papua New Guinea were later given observer status.
- Subsequently in 1991, AFTA was set up by member states with the aim of creating, a common market in 15 years. 'with a common tariff regime' for manufactured and processed agricultural goods.

MERCA DO COMU DEL SUR (MERCOSUR) :

- A customs union founded in March, 1991, by the Treaty of Asuncion between Argentina, Brazil, Paraguay and Uruguay.
- The treaty committed the signatories to progressive reduction of effects culminating in the formation of a common market by 1995.
- This duly came in to effect as a free trade zone affecting 90 per cent of commodities.
- A common external tariff is also applicable.

THE CENTRAL AMERICAN COMMON MARKET (CACM)

- Initiated in 1960, the group reaffirmed its commitment to regional integration in 1993 with a common external tariff of 20 per cent.
- Its members are Costa Rice, El Salvador, Guatemala, Honduras, Nicargagua and Panama.

THE ANDEAN GROUP

- It came into being after a May, 1969 agreement was signed by Bolivia, Chile, Columbia, Ecuador and Peru.
- Later Venezuela also joined it.
- In may 1991 the group established a free trade zone, with a common external tariff in four bands from the 5 per cent to 20.

CARIBBEAN COMMUNITY (CARICOM)

- Barbados, Guyana, Jamaica, Trinidad and Tabago formed this block at Trinidad in 1973.
- The aim was to achieve economic co-operation through a common market along with an external tariff.

INTERNATIONAL DECADES

	:	UN Decade for Women
1976-1985	:	First International Decade of the World's Indigenous People
1994-2004	:	First UN Decade for the Eradication of Poverty
1997-2006	:	Second International Decade for the Eradication of Colonialism
2000-2010	:	International Decade for a Culture of Peace and Non-violence for the children of the World.
2001-2010	:	UN Literacy Decade
2003-2012	:	UN Decade on Education for Sustainable Development
2005-2014	:	Second International Decade of the World's Indigenous People
2005-2014	:	Water for Life Decade
2005-2015	:	

INTERNATIONAL YEARS OF THE UNITED NATIONS

	:	International Year of Tourism
1967	:	International Year of Human Rights
1968	:	International Year of Education
1970	:	International Year of Book
1972	:	International Year of Copernicus
1973	:	International Year of Population
1974	:	International Year of Women
1975	:	International Year of Children
1979	:	International Year of the Disabled Persons
1981	:	International Year of Transport and Communication
1983	:	International Year of Youth
1985	:	International Year of Peace
1986	:	International Year of Shelter for Homeless
1987	:	International Year of Literacy
1990	:	International Year of Space
1992	:	International Year of Indigenous People
1993	:	o International Year of Family
1994	:	o International Year of Sports
	:	International Year of Tolerance
1995	:	International Year of Ocean
1998	:	International Year of Older Persons
1999	:	International Year of Peace
2000	:	International Year of Fresh Water
2003	:	International Year of Rice
2004	:	o International Year of Sports and Physical Education
2005	:	o International Year of Physics
	:	International Year of Desert
2006	:	International Year of Pole
2007	:	International Year of Potato
2008	:	International Year of Natural Fibre
2009	:	International Year of Bio-diversity
2010	:	International Year of Forests
2011	:	

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IMPORTANT AWARDS/HONOURS

Awards/ Honours	Conferring Agency	Particulars	Instituted In the year	Amount
Bharat Ratna	Government of India	Given for exceptional services towards the advancement of art, science and literature and in recognition of public services of the highest order in any field. (Highest National Award)	1954	—
Padma Vibhushan	Government of India	2nd Highest Civilian Honour Given for exceptional and distinguished services in any field including services rendered by Government employees.	—	—
Padma Bhushan	Government of India	Third highest national award given for distinguished services in any field	—	—
Padma Shri	Government of India	Fourth highest national award given for distinguished services in any field.	—	—
Bharatiya Jnanpith Award	Bharatiya Jnanpith	Given to distinguished writer of various modern Indian languages.	1964-65	Rs.7 lakhs
Moortidevi Award	Bharatiya Jnanpith	Given for depiction of value of human life in various modern Indian languages and in English	1984	Rs. 2 lakh
Sahitya Akedemi Award	Sahitya Akademi	For distinguished and outstanding literary contribution in 22 Indian languages including English in past 5 years.	1955	Rs.1 lakh
Saraswati Samman	K.K. Birla Foundation	For an outstanding literary work in any language included in the Eighth Schedule of the Constitution of India in the past 10 years. Recognised as most prestigious literary honour in the country.	1991	Rs. 5 lakhs
Vachaspati Award	K.K.Birla Foundation	For distinguished and creative writing in Sanskrit	1992	Rs. 1.5 lakh

Bharat Bharati Award	Uttar Pradesh Hindi Sansthan	For creative writing and continued service in Hindi literature	1986	Rs. 2.5 lakhs
Booker Prize	Booker Company & British Publishers Association	Highest literary award for distinguished literary contribution by Irish or other writers of Commonwealth Nations	1968	Pound 60,000
David Cohen Award	British Art Council	Highest literary award of Britain	—	Pound 42,000
Commonwealth Writer's Award	—	Given to distinguished writers of Commonwealth Nations of Eurasia	1987	Pound 10,000
Gaunkoo Pre Award	Gaunkoo Academy (France)	Highest literary award of France	1993	Franc 50
Arjuna Award	Human Resource Development Ministry (Government of India) Sports Deptt.	Outstanding contribution in the field of sports	1961	Rs. 5 lakh
Dronacharya Award	Human Resource Development Ministry (Government of India) Sports Deptt.	For distinguished services by coaches of different games	1985	Rs. 5,00,000
Rajiv Gandhi Khel Ratna	—	For outstanding performance in the field of sports / games	1991	Rs. 7.5 lakh
C.K. Naidu Award (Lifetime)	Board of Control for Cricket of India	For extraordinary performance in cricket (outside or inside ground)	1994	Rs. 15 lakhs
Olympic Gold Order	International Olympic Committee	For distinguished contribution for promotion and enrichment of Olympic revolution	—	—

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Nobel Prizes	**Conferring Agencies :** Nobel Foundation, Sweden (Peace); Parliamentary Committee of Norway Swedish Academy (Literature); Bank of Sweden (Economics); Nobel Assembly of Carolinska Institute (Medicine); Royal Sweden Academy of Sciences (Physics & Chemistry) **Particulars :** Given annually on December 10 for outstanding works in the fields of Physics, Chemistry, Physiology & Medicine, Literature, Peace and Economics (established in 1967); Most prestigious award in the world.		1901	10 million Swedish Kronar
Magsaysay Award	Ramon Magsaysay (Philippines) Foundation	Given annually on August 31, the birth anniversary of Magsaysay, for outstanding contribution to public service, community leadership, journalism, literature and creative arts and international understanding. It is equivalent to the Nobel Prize in Asia	1957	Dollar 50,000 Dollar
Right Livelihood Award	Right Livelihood Society based in British's Isle of Man but with a Staff in Stockholm	Given annually for practical and exemplary solutions to real problem of today. Also called "Alternate Nobel Prize".	1980	Dollar 2.5 lakhs
Jawaharlal Nehru Award for International Understanding	Council of Cultural Relations of India	Given to persons for outstanding contributions to the promotion of international understanding, goodwill and friendship	1965	Rs. 15 lakhs
Indira Gandhi Award for International Peace, Disarmament and Development	Indira Gandhi Memorial Fund	Given for outstanding contribution to disarmament and development	1986	Rs. 33 lakhs
UNESCO Peace Award	UNESCO	Often called the "Little Nobel Award", given to individuals or groups for their contribution to peace	1989	$ 25,000

UN Human Rights Award	UN	Given every five years for individual contribution to the establishment of Human Rights.	1966	—
Ambedkar International Award	Government of India	Given for outstanding contribution in the social & economic fields, particularly for the upliftment of downtrodden	1993	Rs. 50,000
Rajiv Gandhi Sadbhavana Award	Rajiv Gandhi Memorial Fund	Given for outstanding contribution for promotion of peace and cordial relations.	—	Rs. 2.5 lakhs
Mahatma Gandhi Peace Prize	Government of India (Highest Award of India)	Instituted to mark the 125th anniversary of Mahatma Gandhi, to be conferred on an individual who contributes important literary and artistic work to the cause. It is on the lines of Nobel Prize.	1995	US $ 10,000
Owen Global Prize	—	Given biennally to an individual who has made significant and lasting contributions of enduring quality to society from the background of sports.	1993	—
Templeton Prize	—	Named after John M. Templeton, a presbyterian of Nassau, Bahamas. Conferred for progress in religion	1972	—
Pulitzer Prize	—	Named after the US Publisher Joseph Pulitzer. Conferred annually in the USA for outstanding works in journalism, literature and music	1970	—
Dada Saheb Phalke Award	Ministry of Information & Broadcasting, Government of India	Highest award in the field of films, is given to a film personality for his/her outstanding contribution to the growth and development of Indian Cinema	1969	Rs. 2 lakh
Dada Kondke Award	The Maharashtra Government	Award for the best rural film in memory of Marathi actor and film maker, Dada Kondke	1998	Rs. 25,000
Kalidas Samman	The Madhya Pradesh Government	It is given annually for excellence in four different art forms alternatively : Classical Music, Dance, Theatre and Plastic arts	—	Rs. 1 lakh

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Saraswati Award	Sri Kailashnath Trust, Nasik	Conferred on individuals related to various fields-social service, arts and ancient learnings.	—	—
Kalinga Award	Kalinga Foundation Trust, Orissa	It is conferred for popularisation of science by UNESCO	1952	—
Maulana Abul Kalam Trophy	Government of India, Sports Department	—	1956-57	Rs. 1 lakh
Tulsi Samman	Government of Madhya Pradesh, Department of Culture	For Folk performance	—	Rs. 1 lakh
Lata Mangeshkar Samman		For composing light music	—	Rs.1 lakh
Indira Gandhi Paryavaran Puraskar	Ministry of Environment and Forests, Government of India	An award for significant scientific or field work for the protection of Environment	—	Rs. 1 lakh

Recipients of Bharatiya Jnanpith Awards

S.N.	Year	Recipient	Language	Book
1.	1965	G. Shankara Kurup	Malayalam	Odakkuzhal
2.	1966	T.S. Bandopadhyaya	Bengali	Ganadevta
3.	1967	Uma Shankar Joshi	Gujarati	Nishith
		V. Puttappa	Kannada	Ramayana darshanam
4.	1968	Sumitra Nandan Pant	Hindi	Chidambara
5.	1969	Firaq Gorakhpuri (Raghupati Sahay)	Urdu	Gul-e- Naghma
6.	1970	Satyanarayan, Vishwanath	Telugu	Srimadramayana Kalpavrikshamu
7.	1971	Bishnu Dey	Bengali	Smriti Satta Bhavishyat
8.	1972	Ramdhari Singh Dinkar	Hindi	Urvarshi
9.	1973	Dr. Dattatreya R. Bendre	Kannada	Nakutanti
		Gopinath Mohant	Oriya	MatiMatal
10.	1974	Vishnu Sakharam Khandekar	Marathi	Yayati

11.	1975	P.V. Akilandam	Tamil	Chittirappavai
12.	1976	Smt. Ashapurna Devi	Bengali	Pratham Pratisruti
13.	1977	K. Shivarama Karanth	Kannada	Mukajjiya kanasugalu
14.	1978	S.H. Vatsyayan 'Ageya'	Hindi	Kitni Navon Mein Kitni Bar
15.	1979	Dr. Birendra Kr. Bhattacharya	Assamese	Mrityunjaya
		S.K. Pottekkatt	Malayalam	Oru Desattinte Katha
16.	1980	Mrs. Amrita Pritam	Punjabi	Kagaz de Kanvas
17.	1981	Mahadevi Verma	Hindi	Vama
18.	1982	Masti Venkatesh Ayengar	Telugu	Chikaveera Rajendra
19.	1983	Takazhi Sivashankara Pillai	Malayalam	Cnemmeen
20.	1984	PannaLal Patel	Gujarati	Manvini Bhavai
21.	1985			

Onwards not on particular book but on overall contribution

22.	1986	Sachidanand Rout Roy 'Sachi'	Oriya
23.	1987	V.V. Shirwadkar	Marathi
24.	1988	Dr. C.N. Reddy	Telugu
25.	1989	Qurratul-Ain-Hyder	Urdu
26.	1990	Vinayak Krishna Gokak	Kannada
27.	1991	Subhash Mukhopadhyaya	Bengali
28.	1992	Naresh Mehta	Hindi
29.	1993	Dr. Sitakant Mahapatra	Oriya
30.	1994	U.R. Anantha Murthy	Kannada
31.	1995	M.T. Vasudevan Nair	Malayalam
32.	1996	Smt. Mahasweta Devi	Bengali
33.	1997	Ali Sardar Jafri	Urdu
34.	1998	Girish Karnad	Kannada
35.	1999	Nirmal Verma & Gurdial Singh	Hindi & Punjabi respectively
36.	2000	Indira Goswami	Assamee
37.	2001	Rajendra Keshavlal Shah	Gujarati
38.	2002	B. Jayakantan	Tamil
39.	2003	Vinda Karindakar	Marathi
40.	2004	Rahman Rahi	Kashmiri
41.	2005	Kunwar Narayan	Hindi
42.	2006	Ravindra Kelkar	Konkari
		Satyabrat Shastri	Sanskrit
43.	2007	ONV Kuroop	Malayalam
44.	2008	Akhlaq Khan Shahryar	Urdu
45.	2009	Shrilal Shukla and Amar Kant	Hindi
46.	2010	Chandrashekhara Kambara	Kannada

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Recipients of Bharat Ratna

Sl. No.	Name	Year
1.	C. Rajagopalachari	1954
2.	Dr. S. Radhakrishnan	1954
3.	Dr. C.V. Raman	1954
4.	Pt. Jawaharlal Nehru	1955
5.	Dr. Bhagwan Das	1955
6.	Dr. M. Visvesvaraya	1955
7.	Govind Ballabh Pant	1958
8.	Dr. D.K. Karve	1958
9.	Dr. B.C.Roy	1961
10.	Purushottam Das Tandon	1961
11.	Dr. Rajendra Prasad	1962
12.	Dr. Zakir Hussain	1963
13.	Dr. P. V. Kane	1963
14.	Lal Bahadur Shastri*	1966
15.	Mrs. Indira Gandhi	1971
16.	V.V. Giri	1975
17.	K. Kamraj*	1976
18.	Mother Teresa	1980
19.	Acharya Binoba Bhave*	1983
20.	Khan Abdul Ghaffar Khan	1987
21.	M.G. Ramachandran*	1988
22.	Dr. B.R. Ambedkar*	1990
23.	Dr. Nelson Mandela	1990
24.	Morarji Desai	1991
25.	Rajiv Gandhi*	1991
26.	Sardar Vallabhbhai Patel*	1991
27.	Maulana Abul Kalam Azad*	1992
28.	Morarji Deshai	1992
29.	J. R. D. Tata	1992
30.	Satyajit Roy	1997
31.	Gulzari Lal Nanda	1997
32.	Smt. Aruna Asaf Ali*	1997
33.	Dr. A.P. J. Abdul Kalam	1998
34.	M.S. Subbalakshmi	1998
35.	C. Subramaniam	1999
36.	Jai Prakash Narayan*	1999
37.	Amartya Sen	1999
38.	Pt. Ravi Shankar	1999
39.	Late Gopinath Bardoloi*	2001
40.	Ustad Bismillah Khan	2001
41.	Lata Mangeshkar	2008
42.	Pandit Bhimsen Joshi	2008

No one was nominated for the country's highest Civilian Award, Bharat Ratna, in 2002, 2003, 2004, 2005, 2006, 2007, 2009, 2010

***Posthumously**

Recipients of Dada Saheb Phalke Award

Recipient	Year
1. Mrs. Devika Rani Roerich	1969
2. B.N. Sirkar	1970
3. Prithviraj Kapoor (Posthumously)	1971
4. Pankaj Mallick	1972
5. Mrs. Sulochna [Ruby Meyers]	1973
6. B.N. Reddy	1974
7. Dhiren Ganguly	1975
8. Mrs. Kanan Devi	1976
9. Nitin Bose	1977
10. R.C. Boral	1978
11. Sohrab Modi	1979
12. P Jairaj	1980
13. Naushad Ali	1981
14. L.V. Prasad	1982
15. Durga Khote	1983
16. Satyajit Roy	1984
17. V. Shantaram	1985
18. B. Nagi Reddy	1986
19. Raj Kapoor	1987
20. Ashok Kumar	1988
21. Lata Mangeshkar	1989
22. A. Nageshwar Rao	1990
23. Bhalji Pendharkar	1991
24. Bhupen Hazarika	1992
25. Mazrooh Sultanpuri	1993
26. Dilip Kumar	1994
27. Dr. Raj Kumar	1995
28. Shivaji Ganeshan	1996
29. Pradeep (Ramchandra Narayanji Dwivedi)	1997
30. B. R. Chopra	1998
31. Hrishikesh Mukherjee	1999
32. Asha Bhonsle	2000
33. Yash Chopra	2001
34. Dev Anand	2002
35. Mrinal Sen	2003
36. Adoor Gopala Kaishanan	2004
37. Shyam Banegal	2005
38. Tapan Sinha	2006
39. Manna Dey	2007
40. V K Murthy	2008
41. Daggubati Ramanaidu	2009
42. K. Balachandar	2010

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NOBEL PRIZE : IMPORTANT FACTS

The Nobel Prize is an international award given every year since 1902 for achievements in physics, chemistry, medicine, literature and for peace. In 1968, the Bank of Sweden instituted the Prize in Economic Sciences in Memory of Alfred Nobel, founder of the Nobel Prize.

The prizes, which include an amount (SEK 10 million, around euro 1.1 million on US$ 1.3 million per prize category shared equally among the Laureates), a gold medal and a diploma, are presented on December 10, the anniversary of Nobel's death in 1896.

Year of institution : 1901

Founder : Alfred Bernhard Nobel

No. of disciplines awarded : Six

1. Physics 2. Chemistry 3. Physiology or Medicine 4. Literature 5. Peace and 6. Economics (Established in 1967).

Date on which it is awarded : December 10.

First Couple to Receive the Nobel Prize : Madame Marie Curie shared the 1903 Nobel Prize for Physics with her husband Pierre Curie. She later won the Nobel Prize for Chemistry in 1911.

Three Nobel Prizes : The International Committee of the Red Cross was awarded the Nobel Prize for Peace three times : 1917, 1944 and 1963.

Twice Recipients of the Nobel Prize

Different Subjects

Marie Curie Sklodowska : Physics (1903) & Chemistry (1911)

Linus Pauling : Chemistry (1954) & Peace (1962)

Same Subjects

John Bardeen : Physics (1956 & 1972)

Frederic Sanger : Chemistry (1958 & 1980)

First Indian to receive the Nobel Prize : Rabindranath Tagore was awarded the Prize for Literature in 1913 for his love lyrics 'Gitanjali'.

First Indian Women to receive the Nobel Prize : Mother Teresa won the Nobel Prize for Peace in 1979.

Woman Nobel Prize winner in Liteature

S.No.	Winner	Year	Country
1.	Selma Lagerlof	1909	Sweden
2.	Grazia Deledda	1926	Italy
3.	Sigrid Undset	1928	Norway
4.	Pearl S. Buck	1938	USA
5.	Gabriela Mistral	1945	Chili
6.	Shmuel Yosef Agnon & Nelly Sachs	1966	Israil, Sweden
7.	Nadine Gordimer	1991	S. Africa
8.	Toni Morrison	1993	USA
9.	Wislawa Szymorska	1996	Poland
10.	Elfriede Jelinek	2004	Austria
11.	Herold Pinter	2005	England
12.	Orhan Pamuk	2006	Turki
13.	Doris Lessing	2007	Britain

NOBEL LAUREATES OF INDIA

AMARTYA SEN (B-1933)

Prof. Amartya Sen is the recipient of the Nobel Prize for Economics for the year 1998, becoming the first Asian to have been honoured with the award. The Santiniketan-born economist who is a pioneer in Welfare Economics has to his credit several books and papers on aspects of welfare and development.

SUBRAMANIAN CHANDRASHEKAR (1910-1955)

The Nobel Prize for Physics in 1983 was awarded to Dr. S. Chandrashekar, an Indian-born astrophysicist. Educated in Presidency College, Chennai, Dr. Chandrashekar happened to be the nephew of his Nobel forbear, Sir C.V. Raman.He developed a theory on while dwarf stars which posts a limit of mass of dwarf stars known also as Chandrashekar Limit. His theory explains the final stages of stellar evolution.

MOTHER TERESA (1910-1997)

The Nobel Peace Prize was awarded to Mother Teresa in 1979 Albanian parentage, Agnes Gonxha Bojaxhiu was born at Skopje, now in Yugoslavia. She joined the Irish order of the Sisters of Lorettor at Dublin in 1928 and came to Kolkata in 1929 as a missionary, only to find the misery of the abandoned and the destitute. Concern for the poor and the sick prompted her to found a new congregation, Missionaries of Charity. Having become an Indian Citizen, Mother Teresa served the cause of dying destitutes, lepers and drug addicts, through Nirmal Hriday (meaning Pure Heart).

HARGOBIND KHORANA (B. 1922)

Hargobind Khorana was awarded the Noble Prize for Medicine in 1968. Of Indian origin, Dr. Khorana was born in Raipur, Punjab (now in Pakistan). He took his doctoral degree in Chemistry from Liverpool University and joined the University of Wisconsin as a Faculty Member in 1960. His major breakthrough in the field of Medicine – interpreting the genetic code and analysing its function in protein synthesis – fetched him the Noble Prize.

CHANDRASHEKAR VENKATARAMAN (1888-1970)

India's first Noble Prize for Physics was claimed in 1930 by the renowned physicist Sir C.V. Raman. Born at Thiruvanaikkaval near Tiruchirapalli in Tamil Nadu, Sir C.V. Raman received the Noble Prize for an important optics research, in which he discovered that diffused light contained rays of other wavelengths – what is now popularly known as Raman Effect.

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RABINDRANATH TAGORE (1861-1941)

Rabindranath Tagore was the first Indian ever to receive a Noble Prize. Popularly known as Gurudev, India's Poet Laureate Tagore was born on 7 May 1861 in Kolkata. He was awarded the Noble Prize for Literature in recognition of his work Geetanjali, a collection of poems, in 1913. Tagore wrote many love lyrics. Geetanjali and Sadhana are among his important works. The poet, dramatist and novelist is also the author of India's National Anthem. In 1901 he founded the famous Santiniketan which later came to be known as Vishwabharati University.

RECIPIENTS OF BOOKER PRIZES

Year	Recipients	Book
1969	P.H. Newby	*Something to Answer For*
1970	Bernice Rubens	*The Elected Member*
1971	V.S. Naipaul	*In a Free State*
1972	John Berger	*G*
1973	J.G. Farrell	*The Siege Of Krishnapur*
1974*	Nadine Gordimer	*The Conservationist*
	Stanley Middleton	*Holiday*
1975	Ruth Prawer Jhabwala	*Heat and Dust*
1976	David Storey	*Saville Saville*
1977	paul Scott	*Staing On*
1978	Iris Murdoch	*The Sea, The Sea*
1979	Penelope Fitzgerald	*Offshore*
1980	William Golding	*Rites Of passage*
1981	Salman Rushdie	*Midnight's Children*
1982	Thomas Keneally	*Schindler's Ark*
1983	J.M. Coetzee	*Life and Times Of Michael K*
1984	Anita Brookner	*Hotel du Lac*
1985	Keri Hulme	*The Bone People*
1986	Kingsley Amis	*The Old Devils*
1987	Penelope Lively	*Moon Tiger*
1988	Peter Carey	*Oscar And Lucinda*
1989	Kazuo Ishiguro	*The Remains Of the Day*
1990	A.S. Byatt	*Possession*
1991	Ben Okri	*The Famished Road*
1992*	Michael Ondaatjee	*The English Patient*
	Barry Unsworth	*Sacred Hunger*
1993	Roddey Doyle	*Paddy Clarke Ha Ha Ha*
1994	James Kelman	*How Late It Was, How Late*
1995	Pat Barker	*The Ghost Road*
1996	Graham Swift	*Last Orders*
1997	Arundhathi Roy	*The God of Small Things*
1998	Ian McEwan	*Amsterdam*
1999	J.M. Coetzee	*Disgrace Disgrace*
2000	Margaret Atwood	*The Blind Assassin*
2001	Peter Carey	*True History of the Kelly Gang*
2002	Yann Martel	*Life of Pi*
2003	D.B. Pierre	*Vernon God Little*
2004	Allan Hollinghurst	*The Line Of Beauty*
2005	John Banville	*The Sea*
2006	Kiran Desai	*The Inheritance of Loss*
2007	Anne Enright	*The Gathering*
2008	Arvind Adiga	*The White Tiger*
2009	Hilary Mantel	*Wolf Hall*
2010	Howard Jacobson	*The Frinkler Question*

WINNERS OF PARAM VIR CHAKRA

Major Somnath Sharma, Kumaon Regiment
posthumous-November 1947 (Kashmir Operations 1947-48)

2nd Lt. R.R. Rane, Corps of Engineers
April 1948 (Kashmir Operations 1947-48)

Company Havildar Major Piru Singh, 6 Rajputana Rifles
Posthumousuly 1948 (Kashmir Operations 1947-48)

L/NK Karam Singh, Sikh Regiment
October 1948 (Kashmir Operations 1947-48)

Lance Naik Jadunath Singh, Rajput Regiment
Posthumous-December 1948 (Kashmir Operations 1947-48)

Captain Gurbachan Singh Salaria, Gorkha Rifles
Posthumous-December 1961 (Congo)

Major Dhan Singh Thapa, Gorkha Rifles
October 1962 (Ladakh)

Subedar Joginder Singh, Sikh Regiment
Posthumous-October 1962 (NEFA)

Major Shaitan Singh, Kumaon Regiment
Posthumous-November 1962 (Ladakh)

CQMH Abdul Hamid, Grenadiers
Posthumous-September 1965 (Operation against Pakistan)

Lt. Col. A.B. Tarapore, Poona Horse
Posthumous-September 1965 (Operation against Pakistan)

Flg. Officer Nirmal Jit Singh Sekhon, Flg. Pilot
Posthumous-December 1971 (Indo-Pakistan conflict)

Major Hoshiar Singh, Grenadiers
December 1971 (Indo-Pakistan conflict)

2nd Lt. Arun Khetarpal, 17 Poona Horse
Posthumous-December 1971 (Indo-Pakistan conflict)

L/NK Albert Ekka, Brigade of Guards Posthurmous-December 1971
(Indo-Pakistan conflict)

Naib Subedar Bana Singh, J & K Light Infantry
June 1987 (Operations in Siachen Glacier)

Major Ramaswamy Parameswaran, Mahar Regiment,
Posthumous-November 1987 (IPKF Operations in Sri Lanka)

Capt Vikram Batra, 13 JAK Rif
Posthumous-June 1999 (OP Vijay in Kargil)

Lt. Manoj Kumar Pandey, 1/11 GR
Posthumous-June 1999 (OP Vijay in Kargil)

Rifleman Sanjay Kumar, 13 JAK Rif
June 1999 (OP Vijay in Kargil)

Gdr Yogender Singh Yadav, 18 GDRS
June 1999 (OP Vijay in Kargil)

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IMPORTANT DATES

JANUARY

Jan 1 : Army Medical Corps Establishment Day
Jan 8 : African National Congress Foundation Day
Jan 10 : World Laughter Day
Jan 11 : Death anniversary of Lal Bahadur Shastri
Jan 12 : National Youth Day (Birth day of Swami Vivekanand)
Jan 15 : Army Day
Jan 23 : Netaji Subhash Chandra Bose's birth anniversary
Jan 25 : International Custom Duty Day, Indian Tourism Day
Jan 26 : Republic Day
Jan 28 : Birth anniversary of Lala Lajpat Rai
Jan 30 : (Martyr's Day) Mahatma Gandhi's Martyrdom Day; World Leprosy Eradication Day

FEBRUARY

Feb 2 : World Wetlands Day
Feb 5 : Kashmir Day (Organised by Pakistan)
Feb 13 : Sarojini Naidu's Birth Anniversary
Feb 14 : St. Valentine's Day
Feb 16 : Delhi Police Day
Feb 20 : Arunachal Pradesh, Mizoram Day
Feb 28 : National Science Day
Feb 29 : National Narcotics Day, Birth anniversary of Morarji Desai

MARCH

March 3 : National Defence Day
March 4 : National Security Day, National Safety Day
March 8 : International Women Day
March 9 : CISF Raising Day
March 11 : Andaman & Nicobar Day
March 12 : Mauritius Day; Central Industrial Security Force Day
March 15 : World Consumer Day
March 16 : National Vaccination Day
March 18 : Bi-centenary of Indian Ordinance Factory
March 19 : World Disabled Day
March 20 : Social Empowerment Memorial Day
March 21 : World Forestry Day
March 22 : World Day for Water
March 23 : World Meteorological Day
March 24 : World TB Day
March 26 : Bangladesh Liberation Day
March 28 : National Shipping Day
March 30 : Rajasthan Day

APRIL

April 1 : Orissa Day
April 5 : National Maritime Day

April 7 : World Health Day
April 10 : Water Resources Day/National Survey Day
April 11 : National Janani Suraksha Day
April 13 : Jallianwallah Bagh Massacre Day (1919)
April 14 : B.R. Ambedkar Remembrance Day, Fire Extinguishing Day
April 15 : Himachal Pradesh Day
April 17 : World Haemophilia Day
April 18 : World Heritage Day
April 20 : Birth anniversary of Hanniman (Father of Homeopathy)
April 22 : World Earth Day
April 23 : World Books Day
April 26 : World Chernobyl Day

MAY

May 1 : International Labour Day (May Day)
May 3 : International Energy Day; Sun Day
May 4 : World Press Freedom Day
May 8 : International Red Cross Day
May 10 : Mother's Day
May 11 : National Technology Day
May 15 : International Family Day
May 17 : World Telecom Day
May 21 : Anti Terrorism Day
May 22 : World Biodiversity Day
May 24 : Commonwealth Day
May 30 : Journalism Day
May 31 : World No Tobacco Day

JUNE

June 1 : Pulse Polio Vaccination Day
June 5 : World Environment Day
June 9 : Death anniversary of Birsa Munda
June 12 : World Day Against Child Labour
June 17 : World day to combat Desertification & Drought
June 20 : Father's Day
June 21 : Antarctic Day
June 26 : International Day Against Drug Abuse
June 27 : World Diabetes Day

JULY

July 1 : Doctors Day
July 4 : American Independence Day
July 11 : World Population Day
July 26 : Kargil Victory Day
July 28 : Van Mahotsva Day

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AUGUST

August 1 : World Breast Feeding Day
August 3 : Friendship Day (first Sunday of August)
August 4 : Heart Transplantation Day
August 6 : Hiroshima Day
August 8 : Sanskrit Day
August 9 : Quit India Movement Day; International Day of Indegenous People
August 12 : International Youth Day
August 14 : Pakistan's Independence Day
August 15 : India's Independence Day
August 20 : Sadbhavna Divas
August 29 : Sports Day

SEPTEMBER

Sept 1 : Non-Aligned Day
Sept 5 : Teacher's Day
Sept 8 : International Literacy Day
Sept 14 : Hindi Day, World first Aid Day
Sept 15 : All India Flag Day
Sept 16 : World Ozone Day
Sept 21 : International Day of Peace; World Alzheimer's Day
Sept 22 : National Rose Day, Welfare Day for Cancer Patients
Sept 24 : World Heart Day
Sept 25 : Social Justice Day
Sept 27 : World Tourism Day

OCTOBER

Oct 1 : Internatioinal Day for the Elderly (UN)
Oct 2 : Gandhi Jayanti
Oct 3 : World Nature Day
Oct 4 : World Animal Day
Oct 5 : World Habitat Day, World Teachers Day
Oct 6 : World Wildlife Day
Oct 8 : Indian Airforce Day
Oct 9 : World Postal Day
Oct 10 : World Mental Health Day, National Post Day
Oct 14 : World Standards Day
Oct 16 : World Food Day
Oct 17 : International Poverty Eradication Day
Oct 20 : National Solidarity Day (China attacked India on that day). It was decided to observe 29th October as the National Solidarity Day
Oct 24 : United Nations Day
Oct 30 : World Thrift Day
Oct 31 : National Integration Day (in memory of Indira Gandhi)

NOVEMBER

Nov 1 : Andhra Pradesh, Karnataka, Kerala, Madya Pradesh, Panjab, Haryana Day
Nov 7 : Infant Protection Day, World Cancer Awareness Day
Nov 9 : Pravasi Bharatiya Divas/Legal Services Day
Nov 10 : Transport Day
Nov 11 : Birthday of Abul Kalam Azad
Nov 12 : National Public Transmission Day
Nov 14 : Children's Day/World Diabetes Day
Nov 17 : Guru Nank Dev's Birth Anniversary
Nov 19 : Citizen's Day
Nov 25 : World Environment Conservation Day, Birth Day of Guru Nanak Dev
Nov 30 : Flag Day
Nov 26 : Law Day
Nov 29 : International Day of Solidarity with Palestinian People

DECEMBER

Dec 1 : World Aids Day
Dec 3 : International Day for Handicapped People. Birth Day of Dr. Rajendra Prasad
Dec 4 : Navy Day
Dec 5 : Navy Day, Constitution Day
Dec 7 : Armed Forces Flag Day
Dec 8 : SAARC Day
Dec 9 : International Anti-Corruption Day (UN)
Dec 10 : Human Rights Day
Dec 11 : UNICEF Day
Dec 14 : National Energy Conservation Day
Dec 18 : Minorities Rights Day (India)
Dec 19 : Goa's Liberation Day
Dec 20 : Arunachal Pradesh Day
Dec 23 : Kisan Divas (Farmer's Day)
Dec 24 : National Consumer Right Day

IMPORTANT ACTS AND ASSOCIATED PERSONALITIES

Acts		Personality
Foundation of Buddhism	:	Gautma Buddha
Foundation of Jainism	:	Vardhmana Mahavira
Foundation of Mughal Dynasty	:	Babar
Paramdhan Ashram	:	Vinoba Bhave
Forward Block	:	Subhash Chandra Bose
Brihadesvara Temple	:	Rajaraja Chola
Arya Samaj Movement	:	Dayanand Saraswati
Servants of India Socity	:	G.K. Gokhale
Operation Flood	:	Dr. Verghesh Kurien
Banaras Hindu University	:	Madan Mohan Malviya
Bhartiya Vidya Bhawan	:	K.M. Munshi

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Sikh Religion	: Guru Nanak
Swarajya Party	: Motilal Nehru and C.R. Das
Swatantra Party	: C. Rajagopalachari
All India Anna Dravida Munnetra Kazgham	: M.G. Ramchandran
Raman effect	: C.V. Raman
Eiffel Tower	: Alexanderre Eiffel
Modern Geometry	: Euclid
Gregorian Calender	: Gregory XIII
Brahmo Samaj	: Raja Ram Mohan Roy
"Jaipur Foot"	: Dr. Pramod Karan Sethi
Mathematical Wizard	: Ms. Shakuntala Devi
Bhoodan Movement	: Vinoba Bhave
Scouts and Guides	: Lord Baden Powell
Telephone	: Alexander Graham Bell.
Utilitarian Philosophy	: Jereny Benthan
Unification of Germany	: Bismarck
Modern Astronomy	: Nichalas Copernicus
Natural Selection Theory	: Charles Darwin
Leader of October Revolution (1917)	: Vladimir Lenin
Abolition of Slavery in America	: Abraham Lincoln
Foundation of Protestantism	: Martin Luther
Foundation of Islam	: Mohammed Saheb
Foundation of St. Petersburg	: Peter The Great
Bharat Mata Society	: Ajit Singh
Samaj Samata Sangha	: Dr. B. R. Ambedkar
Jamia Millia Islamiya	: M.A. Ansari
Gandhi Seva Sangha	: Jamnalal Bajaj
National Conference	: Surendranath Banerjee
Central Hidu College	: Annie Besant
Nav Jawan Bharat Sabha	: Bhagat Singh
Hind Association	: Sohan Singh Bhakna
National Conference	: Anand Mohan Bose
Foundation of Anand Math	: Satyendranath Bose
Madras Mahajan Sabha	: P. Ananda Charlu
National Council of Education	: Ashutosh Chaudhari
Young Bengal	: Henry Vivian Derozio
Punarvivah Mandal	: Gopal Hari Deshmukh
Maniktala Party	: Barindra Kumar Ghosh
Krishak Praja Party	: A. K. Fazlul Haque
Widow Remarriage	: Ishwar Chandra Vidya Sagar
Windows Home	: D. K. Karve
Khudai Khidmatgar	: Khan Abdul Gaffar Khan (Frontier Gandhi)
Mohammadan Anglo Oriental College	: Saiyyad Ahmed Khan
Seva Sadan	: Behramji Malabari

London India Society	: Dadabhai Nauroji
Mitra Mela	: V. D. Savarkar
Temple Entry Movement	: Shri Narayan Guru
Red Shirts	: Garibald
Communist Party of India	: M. N. Roy
Asiatic Society	: Willian Jones
Theosophical Society	: Madam Blavatsky
Indian Association	: Surendranath Banerjee
Muslim League	: Salimullah Khan and Agah Khan
Home Rule League	: Bal Gangadhar Tilak
Scientific Society	: Sir Saiyyad Ahmed Khan
Bhakti Movement	: Chaitanya
Din-i-Illahi	: Akbar
Prarthana Samaj	: Keshav Chandra Sen
Saka era	: Kanishka (78 A.D.)
Nyaya Philosophy	: Maharshi Gautama
Samkhya Philosophy	: Maharshi Kapil
Yoga Philosophy	: Patanjali
Ramkrishna Mission	: Swami Vivekanada
Abolition of Sati	: William Bentick
Khalsa	: Guru Gobind Singh
Ghadar Party	: Lala Hardayal
Indian National Congress	: A.O. Hume

EMINENT PERSONALITIES AND THEIR BIRTHDAYS

Personality	Birthday
Satyendranath Bose (1894-1974)	: 1 January
Swami Vivekanada (1863-1902)	: 12 January
Subhash Chandra Bose (1897-1945)	: 23 January
Lala Lajpat Rai (1865-1928)	: 28 February
Dr. Zakir Hussain (1897-1969)	: 8 February
Sarojini Naidu (1879-1949)	: 13 February
Ramkrishna Paramhansa (1836-1886)	: 20 February
Guru Ravidas	: 15 February
Swami Dayananda Saraswati (1824-1883)	: 24 February
C. V. Raman (1888-1970)	: 28 February
Morarji Desai (1896-1995)	: 29 February
Manvendra Desai (1896-1995)	: 21 March
Ram Manohar Lohiya (1910-1967)	: 23 March
Jagjivan Ram (1908-1986)	: 5 April
Rahul Sankrityayan (1893-1956)	: 14 April
Dr. B.R. Ambedkar (1891-1956)	: 14 April
Sir Saiyyad Ahmed Khan (1817-1898)	: 17 April
Satyajit Ray (1921-1992)	: 2 May

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Moti Lal Nehru (1861-1931)	: 6 May
Rabindra Nath Tagore (1861-1941)	: 7 May
Gopal Krishna Gokhale (1866-1915)	: 8 May
Chhatrapati Shivaji (1627-1680)	: 12 May
Fakhruddin Ali Ahmed (1905-1977)	: 13 May
Neelam Sanjeeva Reddy (1913-1994)	: 19 May
V. D. Savarkar (1883-1966)	: 28 May
Shyama Prasad Mukherjee (1901-1953)	: 6 June
K. M. Pannikar (1894-1963)	: 21 June
Dr. V. C. Roy (1882-1963)	: 1 July (Doctor's Day)
Bal Gangadhar Tilak (1856-1920)	: 23 July
Munshi Premchand (1880-1937)	: 31 July
Aurobindo Ghosh (1872-1950)	: 15 August
V. V. Giri (1898-1980)	: 19 August
Rajiv Gandhi (1944-1991)	: 20 August
Dhyanchand (1905-1979)	: 29 August
Dadabhai Nauroji (1825-1917)	: 4 September
Dr. S. Radhakrishnan (1888-1967)	: 5 September (Teacher's Day)
Govind Ballabh Pant (1887-1961)	: 10 September
Vinoba Bhave (1895-1982)	: 11 September
Deendayal Upadhyaya (1916-1968)	: 25 September
Vitthal Bhai Patel (1873-1933)	: 27 September
Mahatma Gandhi (1869-1948)	: 2 October
Meghnath Saha (1893-1956)	: 6 October
Jai Prakash Naryan (1902-1980)	: 11 October
Lala Hardayal	: 14 Ocotber
Vallabhbhai Patel (1875-1950)	: 31 October
Chitranjan Das (1870-1925)	: 5 November
Abul Kalam Azad (1888-1958)	: 11 November
Jawahar Lal Nehru (1889-1964)	: 14 November (Childrens day)
Indira Gandhi (1919-1984)	: 19 November
Dr. Rajendra Prasad	: 3 December
C. Rajgopalchari (1878-1972)	: 10 December
Subrhamaniyam Bharti	: 11 December
S. Ramanujam (1887-1920)	: 22 December
Charan Singh (1902-1987)	: 23 December
Madan Mohan Malviya (1861-1946)	: 25 December
Gautama Buddha (563-483 B.C.)	: Baisakh Purnima
Vardhamana Mahavira (599-527 B.C.)	: Chaitra Shukla Triyodesi
Lord Rama	: Chaitra Shukla Navami
Lord Krishna	: Bhadrpad Krishnashtami
Guru Nanak (1469-1538)	: Kartik Purnima
Guru Govind Singh (1666-1708)	: Paus Shukla Saptami

Kalidas	: Kartik Shukla Ekadasi
Kabirdas	: Jyesth Purnima
Surdas	: Vaisakh Shukla Panchami
Tulsidas	: Shravan Shukla Saptami

PLACES ASSOICATED WITH IMPORTANT PERSONALITIES

Place	Personality
Shanti Niketan	: Rabindranath Tagore
Talwandi	: Guru Nanak
Vijayghat	: Lal Bahadur Shastri
Kisan Ghat	: Ch. Charan Singh
Corsica/St. Helena	: Napoleon
Jerusalem	: Jesus Christ
Kapilvastu/Bodhgaya/Lumbini	: Gautam Buddha
Shanti Van/Teen Murti Bhavan	: Jawaharlal Nehru
Shakti Sthal	: Indira Gandhi
Vir Bhoomi	: Rajiv Gandhi
Macedonia	: Alexander the Great
Mecca/Medina	: Mohammad Saheb
Waterloo	: Napoleon
Bardoli	: Sardar Patel
Chittorgarh/Haldighati	: Maharana Pratap
Fatehpur Sikri	: Akbar
Porbander/Sabarmati	: Mahatma Gandhi
Jalianwala Bagh	: General Dyer
Bellur	: Ramkrishna Paramhansa
Anand Van	: Baba Amte
Phoenix Ashram	: Mahatma Gandhi
Alfred Park	: Chandra Shekhar Azad
Jhansi/Gwalior	: Rani Laxmibai
Fyzabad	: Maulvi Ahmedullah
Jagdishpur	: Kunwar Singh
Kanpur	: Nana Saheb
Hindu College	: Henri Vivian Derozio
India House	: Shyamaji Krishna Verma
Peshawar	: Khan Abdul Gaffar Khan
Aligarh Muslim Univesity	: Sir Saiyyad Ahmed Khan
Kabul	: Raja Mahendra Pratap
Almora	: Govind Ballabh Pant
Sharda Sadan	: Pandita Ramabai
Genoa	: Mazzini
Sardinia	: Cavour

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Nice	:	Garibaldi
Prussia	:	Bismarck
Georgia	:	Stalin
Austria	:	Hitler
Treves (Germany)	:	Karl Marx
Chittagong	:	Surya Sen
Kolhapur	:	Chhatrapati Shahu
Pahartali	:	Preetilate Waddedar
Nadia	:	Chaitanya
Ujjain	:	Kalidas
Kashmir	:	Kalhana
Nankana Sahib	:	Guru Nanak
Sasaram/Purana Qila	:	Sher Shah Suri
Mysore	:	Tipu Sultan
Missionaries of Charity	:	Mother Teresa
Tughlaqabad	:	Ghiyassuddin Tughluq
Jahanpanah Nagar	:	Muhammad Bin Tughluq
Ajmer	:	Muinuddin Chishti
Rajapur	:	Tulsidas
Paithan	:	Eknath
Fargana	:	Babar
Amarkot	:	Akbar
Shahjahanabad	:	Shahjahan
Shivner	:	Shivaji
Dwarka	:	Lord Krishna
Auroville	:	Aurobindo Ghosh
Anandpur Sahib	:	Guru Tegh Bahadur
Golden Temple	:	Guru Ram Das
Kalakshetra	:	Rukmini Devi
Sanchi Stupa	:	Ashoka
Alai Darwaja	:	Alauddin Khalji
Deer Park (Sarnath)	:	Gautam Buddha
Sher Mandal	:	Humayun

FAMOUS PERSONALITIES (INDIA & WORLD)

Abul Fazal : was the celebrated Mughal court poet and councillor of Akbar. Works : *Akbar-nama; Ain-i-Akbari.*

Ahialyabai : was the famous Holkar queen. She was widowed daughter-in-law of Malhar Rao Holkar, the virtual ruler of Malwa. After the death of Malhar Rao, Ahialyabai ruled the state with great skill and understanding.

Akbar : (1556-1605) He was the greatest of the Mughal Emperors in India. He founded a new religion *Din-i-Elahi.* He is known for reforms in land revenue administration, religious toleration, abolition of pilgrim tax and *Jazia.*

Alberuni : was a celebrated historian who visited India in company with the armies of Mahmud Ghazni.

Albuquerque : was the real founder of the Portuguese Empire in the East. He conquered Goa in 1510 and made it his capital. He died in 1515.

Alexander the Great : (356-323 B.C.) was king of Macedon (Greece) who set out for mighty military exploits and invaded India in 327 B.C. He reached up to the Beas from where he retreated as his home-sick army refused to proceed further.

Asvaghosh : Buddhist Philosopher and musician. He was the spiritual adviser of the Kushan emperor Kanishka.

Aurangzeb (1658-1707) : The Mughal emperor of India, he was son of Shahjahan. He got power by acting against his father and brothers. After his death, the Mughal empire broke up.

Aurobindo Ghosh (1872-1950) : Politician, philosopher, poet and yogi; passed I.C.S. 1890 first editor of *Bande Mataram* established an ashram; in Pondicherry.

Alexander Eiffel (1832-1932) : French Engineer who built the Eiffel Tower and the locks on the Panama Canal.

Albert Einstein (1879-1955) : German mathematical physicist and one of the greatest of all men of science.

Aristotle (384-322 B.C.) : was a Greek philosopher, artist, poet, and thinker. He was the founder of a famous school of philosophy.

Aryabhatta (476-520 A.D.) after whom India's first scientific satellite has been named, was a great Indian astronomer and mathematician. Among his important contributions are the recognition of the importance of the movement of the earth round the sun, determination of the physical parameters of various celestial bodies, such as diameter of the earth and the moon. He laid the foundation of algebra and was responsible for pointing out the importance of "zero".

Ashoka, the Great (273-236 B.C.) : Indian Emperor, grandson of Chandra Gupta. He denounced war, embraced and preache Buddhism after the battle of Kalinga.

Adolf Hitler (1889-1945) : Leader of the NAZI party, he led Germany into conquering much of Europe in 2nd World War, responsible for the genocide of 6 million Jews. In 1945, he committed suicide as Russians took Berlin.

Archimedes (287-212 B.C.) : Greek mathematician, physicist and inventor made many discoveries in mechanics and invented the Archimedean screw. Killed during siege of Syracuse by Romans.

Aristophanes (450-385 B.C.) : Greek comic dramatist.

Mrs. Annie Besant (1847-1933) : President of the Theosophical Society, founder of the Home Rule League (1915-16) in India, was elected President of Indian National Congress.

Amir Khusro : Urdu poet who laid the foundation of Urdu poetry, a contemporary of Ala-Ud-Din Khilji, his 750th birth anniversary was celebrated in 1975.

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Amrita Pritam : The noted Punjabi poetess and novelist is the recipient of the Bharatiya Janapith Award for 1981.

Dr. Alfred Nobel (1833-96), Swedish inventor of dynamite ; In his will he left money for the annual prizes named after him (for work done the benefit of marking in physics, chemistry, physiology and medicine, literature and peace).

B.R. Ambedkar (1893-1956) : A well known Indian jurist, statesman, social reformer and scheduled castes leader. He was the chairman of the Constitution Drafting Committee and played a significant role; in drafting the Indian Constitution after India attained Independence. He was honoured posthumously with the highest civilian award of Bahrat Ratna on April 14, 1990.

Babar : He was founder of the Mughal Empire in India. He conquered the throne of Delhi after the first battle of Panipat (1526) and ruled for four years (1526-1530).

Baden Powell (1857-1941) : was founder of the Boy Scout movement in 1908 and Girl Guides in 1910.

Bahadur Shah II : was the last king of Mughal Empire who took part in the Firs War of Indian Independence (so-called Sepoy Mutiny) in 1857. He was sent as a state prisoner to Rangoon (Burma) where he died in 1862.

Bairam Khan : was the tutor and guardian of Akbar, the Great. Akbar acquired the throne of Delhi mainly through his efforts. He was known as *Khan-i-Khana.*

Banabhatta : was the most celebrated of the learned men and court poet of Harshavardhana; author of *Harshacharita* and *Kadambari.* He was the greatest master of Sanskrit prose in his time.

Banda Bairagi : (Also called Banda Bahadur)–was a Rajput by caste and a native of Rajauri (Poonch). He became *bairagi* in his youth but took up arms against the Mughals on the advice of Guru Gobind Singh; captured in 1716 along with 800 companions and was tortured to death.

Beethoven : one of the world's greatest musicians and composers. He became deaf at the age of 40 and despite this handicap, he wrote many memorable symphonies, songs, sonatas and concertos. Died at the age of 56.

Bhaskara I : He was the astronomer of the 7th century and was a contemporary of Brahmagupta, another famous astronomer. India's second satellite for earth observation, Bhaskara, is associated with his name.

Bankim Chandra Chatterjee : Bengali novelist; wrote Anand Math and composed *Bande Mataram, Durgesh Nandini* and *Kapal Kundala.*

Benjamin Franklin (1706-1990): American Statesman, philosopher and scientist; played an important part in framing the constitution of the U.S.A. invented the lightning conductor.

Bhava bhuti : The greatest writer of Sanskrit drama after Kalidas. His three plays *Mahavir-Charita. Malti Madhav* and *Uttar Ram Charita* are famous.

Benito Mussolini, (1883-1945), Fascist dictator of Italy, 1922-1943.

Changez Khan : born in 1155 A.D. was a Mongol Chief. He is said to be one of the mightiest conquerors the world has ever produced; notoriously known as the 'Scourge of God'. He was a military genius of the highest order.

Cleopatra ; (69-30 B.C.) famous Egyptian Queen whose beauty fascinated Julius Caesar whom she accompanied to Rome. She is known for her romance with Antony dramatised by ShakesPeare in his love tragedy.

Lord Clive, (1725-1774) came to India as a clerk in the East India Company. He showed such remarkable military genius that he became Commander-in-Chief. He defeated Siraj-ud-Daulah supported by the French in the Battle of Plassey in 1757. Returned to England in 1760; his later years were marked by mental disturbance and ultimately he committed suicide.

Chaitanya (1445-1533) : born at Nadia in Bengal. He was a pioneer of Bhakti movement. He was devoted to Lord Krishna and preached the doctrine of love.

Chanakya : He was the Prime Minister of Chandragupta Maurya who founded the Maurya dynasty. He is the author of *Artha Shastra,* an authentic book on statecraft. He is also known by the name of Kautilya.

Chand Bibi : Daughter of the King of Ahmad Nagar. She was married to Ali Shah, kind of Bijapur. She bravely fought against the soldiers of Aurangzeb but lost her life in the battle.

Charles Spencor Chaplin (1889-1977) : The most famous of all film comedians.

Charlemage (1742-1814). Emperor of the Holy Roman Empire, his dominions stretched from the Atlantic to the Danube and Tibet.

Charles V (1510-1558). Holy Roman Emperor who ruled Austria, the Netherlands and Spain.

Claudius Ptolemy, (c.90-168). Greek astronomer and geographer, born in Alexandria; according to the Ptolemaic system, the earth was the center of the universe and the heavenly bodies revolved around it.

Christopher Columbus, (1451-1506). Italian explorer in Spanish Service; landed on main land of South America in 1498 and discovered Trinidad in 1502.

Confucius (c. 551-479). The most celebrated of the Chinese philosophers.

Chandragupta II (Vikramaditya) : He was a brave emperor of Gupta dynasty. In his time Hindustan was rejuvenated, and art and

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literature flourished unobstructed. Fa-hien, the first Chinese pilgrim visited India during his region.

Charak : (Ist Century A.D.). Famous physician acquainted with all branches of medicine including surgery during the reign of King Kanishka.

C.R. Das : Lawyer, poet, journalist and politician, co-founder of Swarajya Party.

C. Rajagopalachari, (1878-1972) : Popularly known as Rajaji, he was the first and last Indian who became Governor-General. Earlier, he was Chief Minister of Madras, a Union Minister and Governor of West Bengal. He was founder of the Swatantra Party.

Count Leo Tolstoy, (1828-1910). Great Russian novelist; author of *War and Peace*, generally regarded as the greatest novel ever written.

Charles Darwin, (1809-82). English naturalist whose Origin of the Species first set out the theory of evolution by means of natural selection.

Calvin, (1509-64). French religious reformer who preached his severe doctrine (Calvinism). In Geneva, where he created a Protestant republic.

Dante : (1265-1321) the greatest of Italian poets. Author of *Divina Commedia*.

Dara Shikoh : eldest son of ShahJahan who was hostile to Aruangzeb. Aurangzeb, the second son of ShahJahan, captured the throne by killing Dara Shikoh in a battle.

Dalhousie, Lord : was the British Governor–General of India from 1848 to 1856. His period of office was known for extensive annexations and as far as the consolidation of British power in India is concerned, he ranks with Wellesley and Hastings.

Dayanand Sarawati : Great Hindu reformer of the 19th century and founder of the *Arya Samaj*.

Darius I (548-485 B.C.) : King of Persia, landed a force in Greece in 490 but was beaten at Marathon.

Disraeli : (1804-1881) English statesman and novelist. Became Prime Minister in 1868. He contributed greatly to the building up of a great Empire.

David (1038-970 B.C.). King who united Israelites in Canaan.

Dhanvantari : A renowned Indian physician who adorned the court of Chandragupta Vikramaditya.

Dhyan Chand : The grand old man of Indian Hockey.

Edisn : American inventor. Born in Ohio, he became first a newsboy and then a telegraph operator. He invented an automatic repeater for telegraphic messages, phonograph, incandescent lamp.

Einstein (1879-1955) : German-Swiss world famous scientist known for his theory of relativity. In 1933, he was driven by the Nazis and took asylum in the U.S.A.

Eisenhower : (1890-1969) : 34th President of the U.S.A. Supreme Commander of all the Allied armies in the west during the second world war. He introduced "Eisenhower Doctrine" in 1957, a policy of giving aid to Middle Eastern countries against international communist aggression.

Elizabeth I (1533-1603) : Queen of England; daughter of Henry VIII and Anne Boleyn. Spanish Armaj was defeated during her reign. Her reign is famous for development in literature, colonisation and naval power. Shakespeare lived in her time.

Epicurus : (342-270 B.C.) Greek philosopher; founder of Epicurean philosophy which taught that virtues should be followed because they led to happiness.

Erasmus (1466-1536) : Dutch scholar and philosopher, one of the great figures of the Renaissance.

Euclid (330-260 B.C.), Greek mathematician who laid the foundations of modern geometry.

Euripides (480-406 B.C.) : Great Athenian tragic dramatist.

Fa-hien : The first Chinese pilgrim who came to India during the reign of Chandragupta Vikramaditya.

Fabius Maximus ('Conctator') (d.203 B.C.). The Roman dictator who saved Rome from Hannibal by deliberately avoiding battle. From this policy comes the term 'Fabian tactics'.

Fahrenheit (1686-1736) : German physicist, inventor of the method of reading a thermometer which bears his name.

Faraday (1791-1867) : English physicist and chemist, founder of the science of electro-magnetism.

St. Gregroy (257-336) : Founder of the Armenian Church; his festival is 9th March.

Gregory XIII (1502-1585), Pope who introduced the Gregorian calendar.

Grenville, (1541-1591), Elizabethan sea-captain who, with his one ship, the Revenge, fought a fleet of Spanish warships in 1591 and died on the deck of the San Pablo.

Gautam Buddha : The founder of Buddhism, was born as a Kshatriya prince to Suddhodana, king of Kapilvastu in Nepal. His birth place is stated to be Lumbini village. He renounced his royal heritage, and turned away from his pretty wife and infant son to ponder of the problems of birth, death and disease. He attained enlightenment under a Bodhi tree in Bodha Gaya in Bihar.

Gagarin : Yuri Gagarin was the Russian cosmonaut and the first Spaceman of the world. He was launched into space in Vostok-1 on April 12, 1961 and brought back safely after a flight in space. Died in plane crash on March 27, 1968.

Galileo (1564-1642) : Italian scientist. He was professor of mathematics. He is known for invention of telescope.

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Guru Gobind Singh : the tenth and the last Guru of the Sikhs real founder of Sikh power whose major part of life was spent in fight ing with the Mughals.

Gokhale Gopal Krishna : The doyen of Indian statesmen and the chief leader of the moderate section of Indian National Congress, Gopal Krishna Gokhale was the greatest parliamentarian known to India.

Garibaldi : (1807-1882) the famous Italian soldier and patriot who was condemned to death in 1834 for being concerned in a plot to seize a Government vessel, but escaped to South America. Later he returned to Italy and became head of a great volunteer army, intent upon liberating Italy.

Herod the Great (73-4 B.C.) : King of Judea under the Romans; to him is attributed the massacre of the innocents.

Herodotus (485-425 B.C.) : Greek historian, called **"the father of history".**

Herschel, (1738-1822), Discoverer of the planet Uranus and the satellites of Saturn.

Hippocrates (460–370 B.C.) : Greek physician; **'The father of medicine'.** Rules of conduct for doctors are still based on his Hippocratic Oath.

Harshavardhana (606-647 A.D.) : was the last great Hindu King of northern India.

Heiun-Tsang : Chinese pilgrim who visited India during the reign of King Harsha (606-647 A.D.). He has left interesting records of the conditions in India at that time.

Homer (850 B.C.) : famous Greek epic poet. Author of the classics the *Iliad* and the *Odyssey*.

Hannibal (247-183 B.C.) : Carthaginian general crossed the Alps into Italy where he is unbeaten for 15 years.

Hardicanute (1019-42) : son of Canute the Great, and the last Danish king of England; imposed the tax known as Danegeld.

Haroun-al-Rashid (763-809) : the most famous Khalipha of Baghdad; hero of the *Arabian Nights*.

Ibnbatuta : A South African scholar and traveller who visited India during 1333 AD. He spent 8 years in India and has written about the reign of Mohammad Tughlaq.

Ilango Adigal : A Chera Prince who is the author of the 7th century Tamil epic called Silappadigaram-or the jewel anklet.

Innocent III (1160-116), Powerful Pope who initiated the 4th Crusade.

Ivan the Terrible (1530-84), First Czar of Russia, who earned his name by his cruel treatment of his subjects.

Jesus Christ (c.4B.C.-A.D. 30 or 33), the founder of Christianity: born at Bethlehem, the first-born of His mother Mary. According to Mathew, His birth was miraculous and Josepli was His foster-father. He learned his father's trade of carpentry at Nazareth, and began His mission when he was about thirty. A summary of His teaching is found in the Semmon on the Mount.

Joan of Arc : (1412-31) the girl whose heroism inspired the French to drive the English out of Oreleans and enabled Charles to be proclaimed king. She was burnt as a heretic at Rouen.

Julius Caesar : (100-44 B.C.) Roman general known for invasion of Gaul and Britain. Defeated Pompey in the Civil Gaul War. His assassination by his trusted friend Bruttus is considered the most famous classic betrayal.

Jayadeva : He wrote **Gita Govinda** in the 12th century. The book is noble specimen of lyrical poetry and describes the love of Lord Krishna and his beloved Radha, their separation and final union.

Jayprakash Narayan : Socialist leader and thinker, devoted himself to Sarvodaya movement. Arrested during Emergency in June 1975. His death in October 1979 created a moral vacuum.

J.L. Nehru (1889-1964) : The great Indian leader and maker of modern India. He was the first Prime Minister of free India from 1947 and remained in the office till his death.

J.F. Kennedy (1917-1963) : President of the United States from 1961 until his assassination at Dallas, Texas, in November 1963.

Kabir : was one of the greatest exponents of Bhakti Movement– a socio religious movement spread in the Middle Ages which aimed at stopping conversions to Islam and fighting the tyranny of the Brahmins in the social set-up of the Hindus. He believed in the unity of God and equality of all religions.

Kalhana : was poet and historian of Kashmir. He lived in the 11th century A.D. He is author of Rajatarangini, his masterpiece.

Kalidasa : (between (3rd c. B.C. and and 450 A.D.) the greatest epic Snaksrit poet and dramatist. Works : *Shakuntala; Raghuvansham; Kumar Samhava; Meghdut; Ritusamhara.*

Kamal Ataturk : builder of modern Turkey. He was a fine soldier. He defended the Dardanelles against the British in 1915 and drove the Greeks out of Turkey in 1922. He was President of the Turkish Republic and virtual dictator 1923-1938.

Kanishka : was the third and the greatest king of Kushan dynasty (120 A.D. to 162 A.D.) He was a great conqueror, became a patron of Buddhism and was the only ruler of India who had his territory even in Central Asia beyond the Pamirs.

Kharavela : was the ruler of Kalinga. He reigned during the first century B.C. and Kalinga rose to great fame under his rule. He was a Jain.

Kepler (1571-1630) : German astronomer who worked out the laws of planetary motion.

Krishnadeva Raya : The most famous Raja of Vijayanagar kingdom, the last *great Hindu ruler of Southern India* (1509-1529). He was a very learned man, capable ruler and a great warrior, who often defeated the Muslims.

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Kumaril Bhatta : was a well-known preacher of Hinduism during the eighth century.

Lamarck (1744-1829) : French naturalist, author of a theory of the evolution of animals, known as Lamarckism.

Lavoisier (1743-1794). French chemist who gave oxygen its name and was the first to establish that combustion is a form of chemical action; guillotined during the French Revolution.

Lloyd George : He was Prime Minister of Britain (1916-1922). His resource-fulness; and diving power brought about the defeat of Germany. He was one of those primarily responsible for the Versailles peace settlement.

Louis XVI (1754-1793) : The king of France who was executed in 1793 after the French Revolution which had taken place in 1789.

Leonardo da Vinci : one of the greatest all-round geniuses the world has known; painter, architect, sculptor, scientist, engineer and musician. Famed as painter of the Last Supper, Mona Lisa and other great works.

Lenin : (Russian) Nikolai Lenin (1870-1924) was founder of Bolshevik communism and by far the greatest single driving force behind the Soviet revolution of October-November 1917. His father was a schoolmaster.

Marconi (1874-1937). Inventor of the first practical method of wireless telegraphy.

Maria Theresa (1717-1780) : Empress of Austria. Queen of Bohemia and Hungary.

Marie Antoniette (1755-93), Daughter of Maria Theresa, and wife of Louis XVI of France.

Mazzini (1805-1872) : Italian patriot who was compelled to leave the country while endeavouring to secure independence of Italy. He was back in Rome in 1848 and was elected dictator of the Roman Republic. He could not hold the position for long and when France occupied Rome he was again driven to England. He, however, lived to see a unified Italy.

Megasthenes : was an ambassador to Chandragupta Maurya's court sent by Seleucus. He lived in Patilputra for five years (302 B.C. to 298 B.C.). The account written by him of India is a source of our knowledge of that period.

Michaelangelo : the renowned Italian artist, painter, sculptor, architect and poet; one of the greatest geniuses.

Mohammad, the Prophet : Born in 570 A.D. was the founder of Islam.

Mohammad Bin Tughlaq (1325-1351) : a very learned man who possessed an uncommon intelligence and remarkable memory but was an unsuccessful and unpopular emperor.

Montessori Madam (1970-1952) : Italian educator and originator of the method of education known as Montessori system.

Machiavelli : (1469-1527) : a Florentine historian and diplomat. Author of *"The Prince"*.

Magellan : Commanded the first expedition in 1519 to soil round the world. Discovered passages to the Pacific from the Atlantic through Straits later on named after him.

Mahavira (599-527 B.C.) : founder of Jainism-a religious sect of the Hindus.

Malviya, Madan Mohan : a great Indian nationalist. He had been long associated with Congress Party and was thrice elected its President. Leader of the Hindu Mahasabha; founder of the Banaras Hindu University.

Man Singh : was the adopted son of Raja Bhagwan Das. He fought against Rana Pratap; in 1576 and won the battle of Gogunda. He was appointed by Akbar to govern Kabul. He died in the ninth year of Jehangir's reign.

Manu : famous Hindu law-giver; author of *Manu Simriti.*

Mao Tse-Tung : Chairman of Communist China (People's Republic of China) who died at the age of 82 was inspiration behind the great communist revolution that transformed China and sent shock waves throughout the world.

Marco Polo : (1256-1323) : famous Venetian traveller and explorer; **the first European to visit China;** made journeys through China, India and other Eastern countries and published a record of his wanderings.

Martin Luthar : (1483–1546), great German religious reformer who lived to see the principles of Reformation widely established.

Newton : Sir Issac Newton (1642-1727) English physical scientist and mathematician is generally known as world's greatest man of science. He achieved immortal fame for his work on the nature of white light, the calculus and the law of gravitation.

Nek Chand : The creator of the world famous Rock Garden in Chandigarh has been bestowed official recognition by the Punjab Government and Chandigarh Administration. He has also been honoured by French, the Japanese and the people of the United States.

Napoleon Bonaparte (1766-1821) : great French statesman and soldier who rose to be the Emperor of post-Revolution France. He won series of splendid victories against England, Russia and Austria in 1805 but was completely defeated in the battle of Waterloo in June, 1815 and exiled to St. Helena where he died six years later.

Pythagoras (582–507 B.C.) : Greek scientist and mathematician : to him is attributed the discovery of the multiplication table, the decimal system and the square on the hypotenuse.

Phidias : specially famous for his works in gold, ivory and bronze. Known for the sculptures in the British Museum : **The Elgin Marbles.**

Philip of Macedonia (382-336 B.C.) : father of Alexander the Great and king of Macedonia.

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Picasso (1881-1973) : Spanish painter. His work is to be found in public galleries and private collections all over the world.

Plato (427-347 B.C.) : the renowned Greek philosopher. His Dialogues and *Republic* are among the greatest ancient works. He was Socrates disciple and Aristotle's teacher.

Prithvi Raj Chauhan : a legendary figure in Indian history. A great warrior of his time, valiant soldier and able ruler. He waged many wars against his neighbours. In 1191 he defeated Mohammad Ghori but next year in 1192 was defeated by the latter and put to death.

Pulakesin II (608-642) : The most powerful ruler of Chalukya dynasty in the Deccan. He extended his territory in all directions and in doing so came into conflict with both Harsha in the north and with the Pallavas in the south. He was successful during most of his reign but was finally defeated and slain in conflict with the Pallavas.

Pushyamitra Shunga (183-161 B.C.) : was the Commander-in-Chief of the Maurya armies in the last days of the Mauryas. In approximately 185 B.C. he murdered his master and founded the Sunga dynasty (185-72 B.C.), Pushyamitra's reign was marked by a Brahminical revival as a reaction against Ashoka's patronage of Buddhism.

Premachand (1880-1937) : A well-known Indian writer and novelist. His Urdu and Hindi novels an short stories have earned international recognition.

Rajaraja I the Great (985-1014) : was a king of the Chola dynasty in the south of India. He was a great conqueror. His conquests included the territories the Cheras, Pandyas, Vengi Kalinga, and even Ceylon and the Laccadive and Maldive Islands. Under him, the Chola power reached its zenith. He was responsible for the creation of the great Siva temple at Tanjore.

Rajendra Prasad, Dr. (1884-1963) : He was the first President of the Indian Republic (1950-1962). In early life, he was a prominent member of the Youth Movement in Bihar. In 1917, he joined the Congress and took active part in the Non-co-operation Movement of 1920. He was Minister for food in 1947; President of the Indian Constituent Assembly (1946-1949).

Ramakrishna Paramhansa : Great religious saint and teacher of Bengal whose teachings led Swami Vivekananda of found the Rama Krishna Mission.

Raman, C.V. (1988-1970) : was an eminent Indian scientist F.R.S. National Professor of physics and founder Director of Raman Research Institute, Bangalore. He was awarded Nobel Prize of his discovery of **'Raman Effect'** (1930). His work on study of crystal structure is of unique importance. He died on November 20, 1970.

Ramanujacharya : the great Vaishnava teacher of Tamil Nadu; founder of Bhakti Movement.

Rana Pratap : the bravest and the most illustrious figure in the history of Rajputs. A great patriot who refused to submit to Akbar-the great Mughal Emperor.

Rana Sanga : Rajput ruler of Mewar; a veteran warrior who had lost one eye, one hand, one leg and had scars of eighty wounds on his body. Defeated by Babar in 1527 at the battle of Kanwaha.

Rabindra Nath Tagore : Great Indian poet, novelist, philosopher and thinker. Awarded Nobel Prize for Literature in 1913. Works : *Gitanjali : the Crescent Moon: Fruit Gathering; Gora; The Wreck; Gardener; Sadhana; Mashi; The Post Office (Dakghar); Hungry Stones.*

Razia Begum : daughter of Eltutmish; she was the first and the only Muslim lady who ever sat on the throne of Delhi.

Lord Rippon : Governor-General of India (1880-1884); famous for repeal of Vernacular Press Act; the first Census of India in 1881 was taken in his time; Factory Act; policy of free trade.

Robespierre (1758-1794) : enthusiastic leader of the Jacobian party who took active part in the French Revolution.

Roger Bacon (1214-1294) : inventor of Gun Powder and founder of experimental science; man of remarkable gifts and inventive power.

Roosevelt : Franklin D. Roosevelt (1882-1945) was the 32nd President of the U.S.A. He was a great American statesman who served as President from 1933 till his death, being the first President to be elected for more than two terms. "His war-time meetings with Churchill and Stalin, and his energetic prosecution of the second World War were considered as the most important features of his foreign policy.

Rousseau : (1712-1778) famous for his two remarkable works **Confessions** and **Le Contrat Social** which gave French a new field of thought and laid down principles of government and conduct which bore fruit in the French Revolution.

Raja Ram Mohan Roy (1774-1833) : Raja Ram Mohan Roy was one of the greatest reformers that India has produced. He was instrumental in eradicating social evils like *Sati, Purdah* and child marriage, from the Indian soil. He advocated widow remarriage and stood for women's education. He was a profound scholar of Arabic, Persian and Sanskrit. He was also the founder of *Brahmo Samaj*.

Sigmund Freud, (1856-1939) : was originator of psychoanalysis. He was born of Jewish parents and from 1860 lived at Vienna until, following the Nazi occupation in 1938, he migrated to London. Some of his famous works are : *The Interpretation by Dreams, The Psychopathology of Everyday Life, The Ego and the Id.*

Socrates (470-399 B.C.) : Greek philosopher, whose teachings are known from the writings of his pupils, Xenophon and Plato. He taught people to think carefully and logically. Charged with corrupting the morals of the young, he was condemned to die by drinking hemlock.

Solomon (10th c.B.C.) : son of David, ruler of Israel and Judah.

Solon : (638-558 B.C.). Great Athenian law-giver.

Sophocles (495-406 B.C.) : Popular Anthenian dramatist author of Antigone. Electra, Oedipus.

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Shivaji (1627-1680) : The great Maratha leader who fought the Mughal emperor Aurangzeb tooth and nail. Shivaji drew his inspiration from his mother Jijabai and Guru Ramdas. He vanquished the general sent by Aurangzeb and succeeded in establishing a Hindu State in Deccan.

Surdas : A blind poet who worshipped Krishna and spread Krishna Bhakti cult. *Sur Sagar* and *Shaitya Lahari* are the collections of his poems.

Samudragupta (330-375 A.D.) : son and successor of Chandra Gupta I; one of the most powerful and the ablest of the Hindu kings; a great military genius, a great scholar, poet and musician; known as the Indian Napoleon on account of his great conquests.

Stalin (1879-1953) : Soviet statesman. He was leader of the Russian People for nearly thirty years. He was an active revolutionary from the age of 17 and took an important part in civil war 1917 and became an outstanding figure in Russia after the death of Lenin. He assumed military leadership against the German invasion, June 1941. After his death, he was severely criticised by the Russian leaders.

Sun Yat-sen : the founder and the first President of the Chinese Republic, 1912. In 1905, founded the China Revolutionary League in Europe and Japan and played a prominent part in the 1911 revolution.

Saiyyad Ahmed, Sir (1817-1898) : an educationist and reformer of the Muslim community in India. He established the M.A.O. College at Aligarh in 1875 which later became Aligarh Muslim University.

Shri Narayana Guru : was great social reformer, saint and philosopher of Kerala who has a place next to Adi Sankara. He flourished in the first half of the twentieth century and worked for eradication of untouchability and social equality based on caste. He was the first to propagate the idea of **"one caste, one religion** and **one God"** for man.

Simuka : was the founder of Satavahana dynasty. He is said to have destroyed the power of the Kanvas and the remnants of the Sungas.

Timur : A notorious Muslim warrior from Central Asia. He is remembered for his invasion and sack of Delhi where he ordered indiscriminate massacre and plunder. His invasion had caused the end of Tughlaq dynasty.

Tipu Sultan : Ruler of Mysore, who succeeded his father Haider Ali. He allied himself with the French and declared war on the English. When the Marathas and the Nizam combined together, he was defeated and killed in the battle of Srirangapttam.

Tegh Bahadur, Guru : Son of Hargobind whose tercentenary of martyrdom was celebrated throughout the country on the December 6, 1975 was the ninth Guru of Sikhs. He was ordered by Emperor Aurangzeb to embrace Islam; he refused and was executed.

Tansen (1506-1589) : Celebrated musician and one of the *Nav Ratnas* in the court of Akbar. He was a great exponent of Indian classical music.

Todaronal : One of the *Nav Ratnas* and Revenue Minister in the Court of Akbar. Famous for reforms in Land Revenue Administration.

Tolstoy, Leo : was a great Russian writer, Mahatma Gandhi was greatly influenced by his works.

Trotsky : Russian Revolutionary; one of the leaders of Bolshevist revolution; assassinated in exile in Mexico.

Varahmihira (505-587) : was a distinguished Indian astronomer, mathematician and philosopher. He was one of the nine gems of the court of king Vikramaditya.

Vasco da Gama : a Portuguese sailor who, in 1498, rounded the Cape of Good Hope and succeeded in reaching the port of Calicut.

Vivekananda (1863-1902) : a great Hindu saint and religious leader; founder of the Ramakrishna Mission. He was born in Calcutta on January 12, 1863 and his original name was Narendranath Dutta. He led the Vedanta movement. His message influenced many of India's leaders in national awakening in the 20th century. He asked his countrymen to cultivate faith in themselves. He died on January 4, 1902, at the age of 39.

Voltaire (1694-1778) : one of the greatest of French philosophers and writers. Author of Essays on the Morals; Spirit of Nations.

V.D. Savarkar, : was an ardent Indian nationalist who was in the front ranks of the freedom fighters in the twenties. He was sentenced by the British to transportation for life his part in a conspiracy case. He remained President of the Hindu Mahasabha for a long time. He wrote an account of the happenings of 1857 under the title *first Indian War of Independence*. He died in 1966.

Warren Hastings : He was the first Governor-General (1774-1785) in India during the British reign. His period is known for Regulating Act, 1773; First Marhatta War (1775-1782) and Pitt's India Act, 1784 to improve the Indian administration.

Walt Disney : American cartoonist; creater of Mickey Mouse and other cartoons shown on the screen and '*True Life Adventures*'.

Woodrow Wilson (1856-1924) : American President 1913-1921; famous for his fourteen points and largely responsible for the setting up of the League of Nations.

William Wilberforce : A distinguished agitator and orator against slave trade during the reign of George III.

Xenophon (430-355 B.C.) : Greek historian and general pupil of Socrates.

Xerxes (519-465 B.C.) : King of Persia.

Zoroaster : Persian prophet; lived about the seventh century B.C. Parsis of India are his followers.

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NATIONAL INSIGNIA

NATIONAL FLAG

The National Flag is a horizontal tricolour of deep saffron (*Kesaria*) at the top, white in the middle and dark green at the bottom in equal proportion. The ratio of width of the flag to its length is two to three. In the centre of the white band is a navy-blue wheel which represents the *Chakra*. Its design is that of the wheel which appears on the abacus of the Sarnath Lion Capital of Ashoka. Its diameter approximates to the width of the white band and it has 24 spokes. The design of the National Flag was adopted by the Constituent Assembly of India on 22 July, 1947.



The tricolour was first born in the All India Congress Committee (AICC) meeting at Bezwada in 1912, when a flag was shown by an Andhra youth and improved by Mahatma Gandhi with the addition of a white band and chakra. The ratio of the width (proportion) of the flag to its length is 2 : 3. All the three bands are of equal width with deep saffron at the top, white in the middle and dark green at the bottom. The wheel in the middle, symbolises India's ancient culture, dynamism and peaceful change.

White: Signifies Truth and Peace

Green : Signifies Faith and Chivalry

Apart from non-statutory instructions issued by the Government from time to time, display of the National Flag is governed by the provisions of the Emblems and Names (Prevention of Improper Use) Act. 1950 (No. 12 of 1950) and the Prevention of Insults to National Honour Act, 1971 (No. 69 of 1971). The Flag Code of India 2002 is an attempt to bring together all such laws, conventions, practices and instructions for the guidance and benefit of all concerned.

The Flag Code of India, 2002, took effect from 26 January, 2002, and superseded the 'Flag Code of India' as it existed. As per the provisions of the Flag Code of India, 2002, there shall be no restriction on the display of the National Flag by members of general public, private organisations, educational institutions, etc., except to the extent provided in the Emblems and Names (Prevention of Improper Use) Act, 1950 and the Prevention of Insults of National Honour Act, 1971 and any other law enacted on the subject.

STATE EMBLEM

The state emblem is an adaptation from the Sarnath Lion Capital of Ashoka. In the original, there are four lions, standing back to back, mounted on an abacus with a frieze carrying sculptures in high relief of an elephant, a galloping horse, a bull and a lion separated by intervening wheels over a bell shaped lotus. Carved out of a single block of polished sandstone, the Capital is crowned by the Wheel of the Law (Dharma Chakra).



In the state emblem, adopted by the Government of India on 26 January, 1950, only three lions are visible, the fourth being hidden from view. The wheel appears in relief in the centre of the abacus with a bull on right and a horse on left and the outlines of other wheels on extreme right and left. The bell-shaped lotus has been omitted. The words 'Satyameva Jayate' from 'Mundaka Upanishad', meaning 'Truth Alone Triumphs', are inscribed below the abacus in Devanagari script.

NATIONAL ANTHEM

The song *Jana-gana-mana*, composed originally in Bengali by Rabindranath Tagore, was adopted in its Hindi version by the Constituent Assembly as the National Anthem of India on 24 January, 1950. It was first sung on 27 December, 1911, at the Calcutta Session of the Indian National Congress. The complete song consists of five stanzas. The first stanza contains the full version of the National Anthem :

Jana-gana-mana-adhinayaka, jaya he
Bharata-bhagya-vidhata
Punjab-Sindh-Gujarat-Maratha
Dravida-Utkala-Banga
Vindhya-Himachala-Yamuna-Ganga
Uchchala-Jaladhi-taranga
Tava shubha name jage,
Tava shubha asisa mage,
Gahe tava jaya gatha,
Jana-gana-mangala-dayaka jaya he
Bharata-bhagya-vidhata
Jaya he, jaya he, jaya he,
Jaya jaya jaya, jaya he!

Playing time of the full version of the National Anthem is approximately 52 seconds. A short version consisting of first and last lines of the stanza (playing time approximately 20 seconds) is also played on certain occasions.

NATIONAL SONG

The song *Vande Mataram*, composed in Sanskrit by Bankimchandra Chatterji, was a source of inspiration to the people in their struggle for freedom. It has an equal status with *Jana-gana-mana*. The first political occasion when it was sung was the 1896 session of the Indian National Congress. The following is the text of its first stanza :

Vande Mataram!
Sujalam, suphalam, malayaja shitalam,
Shasyashyamalam, Mataram!
Shubhrajyothsna pulakitayaminim,
Phullakusumita drumadala shobhinim,
Suhasinim sumadhura bhashinim,
Sukhadam varadam, Mataram!

NATIONAL ANIMAL

The magnificent tiger, *Panthera tigris*, is a striped animal. It has a thick yellow coat of fur with dark stripes. The combination of grace, strength, agility and enormous power has earned the tiger its pride of place as the national animal of India. Out of eight races of the species known, the Indian race, the Royal Bengal Tiger, is found throughout the country except in the north-western region and also in the neighbouring countries, Nepal, Bhutan and Bangladesh. To check the dwindling population of tigers in India, Project Tiger was launched in April 1973. So far, 27 tiger reserves have been established in the country under this project, covering an area of 37,761 sq. kms.



NATIONAL BIRD

The Indian Peacock, (*Pavo cristatus*), the national bird of India, is a colourful, swan-sized bird, with a fan-shaped



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crest of feathers, a white patch under the eye and a long, slender neck. The male of the species is more colourful than the female, with a glistening blue breast and neck and a spectacular bronze-green train of around 200 elongated feathers. The female is brownish, slightly smaller than the male and lacks the train. The elaborate courtship dance of the male, fanning out the tail and preening its feathers is a gorgeous sight.

The peacock is widely found in the Indian sub-continent from the south and east of the Indus river, Jammu and Kashmir, east Assam, south Mizoram and the whole of the Indian peninsula. The Peacock enjoys protection from the people as it is never molested for religious and sentimental reasons. It is fully protected under the Indian Wildlife (Protection) Act, 1972.

NATIONAL FLOWER

Lotus (*Nelumbo nucifera*) is the National Flower of India. It is a sacred flower and occupies a unique position in the art and mythology of ancient India and has been auspicious symbol of Indian culture since time immemorial.



DOLPHIN : NATIONAL AQUATIC ANIMAL

The Centre on October 6, 2009 declared the dolphin (Platanista gangetica) a National Aquatic Animal to save the rare freshwater species from disappearing from the India's aqua map.



NATIONAL FRUIT — Mango



NATIONAL TREE — Banyan Tree



NATIONAL CALENDAR

The national calendar based on the Saka Era, with *Chaitra* as its first month and a normal year of 365 days was adopted from 22 March, 1957 along with the Gregorian calendar for the following official purposes: (i) Gazette of India, (ii) news broadcast by All India Radio, (iii) calendars issued by the Government of India and (iv) Government communications addressed to the members of the public.

Dates of the national calendar have a permanent correspondence with dates of the Gregorian calendar, 1 Chaitra falling on 22 March normally and on 21 March in leap year.

Saka Months	Numbers of Day	Corresponding Gregorian Dates
1 *Chaitra*	30 (31 in leap year	March 22 (21 in leap year)
1 *Vaishaka*	31	April 21
1 *Jyaistha*	31	May 22
1 *Asadha*	31	June 22
1 *Sravana*	31	July 23
1 *Bhadra*	31	August 23
1 *Asvin*	30	September 23
1 *Kartika*	30	October 23
1 *Agrahayana*	30	November 22
1 *Pausa*	30	December 22
1 *Maha*	30	January 21
1 *Phaguna*	30	February 20

Chiefs of Army Staff

Name	Tenure
General Maharaj Rajendra Singhji	1 April 1955-14 May 1955
General S.M. Srinagesh	15 May 1955-7 May 1957
General K.S. Thimayya	8 May 1957-7 May 1961
General R.N. Thapar	8 May 1961-19 November 1962
General J.N Choudhuri	20 November 1962-7 June 1966
General P.P. Kumaramangalam	8 June 1966-7 June 1969
General S.H.F.J. Manekshaw	8 June 1969-31 December 1972
Field Marshal S.H.F.J. Manekshaw	1 January 1973-14 January 1973
General G.G. Bewoor	15 January 1973-31 May 1975
General T.N. Raina	1 June 1975-31 May 1978
General O.P Malhotra	1 June 1978-31 May 1983
General K.V. Krishna Rao	1 June 1981-31 July 1983
General A.S. Vaidya	1 August 1983-31 January 1986
General K. Sunderji	1 February 1986-30 April 1988
General V.N. Sharma	1 May 1988-30 June 1990
General S.F. Rodrigues	1 July 1990-30 June 1993
General B.C. Joshi	1 July 1993-18 November 1994
General S. Roychowdhury	22 November 1994-30 September 1997
General V.P. Malik	1 October 1997-30 September 2000
General S. Padmanabhan	30 September 2000-31 December 2002
General N.C. Vij	1 January 2003-Feb 1, 2005
General J.J. Singh	Feb 1, 2005- 1 October, 2007
General Deepak Kapoor	1 October, 2007 - 31 March, 2010
General V K Singh	31 March, 2010 - till date

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PRATIYOGITA KIRAN
(Hindi & English Medium)

Read Every Month
RENU GENERAL KNOWLEDGE & WORLD VISION
(Hindi & English Medium)

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CHIEFS OF NAVAL STAFF

Name	Tenure
Rear Admiral J.T.S. Hall	15 August 1947-14 August 1948
Admiral Sir Edward Parry	15 August 1948-13 October 1951
Admiral Sir Mark Pizey	14 October 1951-21 July 1955
Vice Admiral Sir Stephen Carlill	22 July 1955-21 April 1958
Vice Admiral R.D. Katari	22 April 1958-4 June 1962
Vice Admiral B.S. Soman	5 June 1962-3 March 1966
Admiral A.K. Chatterjee	4 March 1966-27 February 1970
Admiral S.M. Nanda	28 February 1970-28 February 1973
Admiral S.N. Kohli	1 March 1973-28 February 1976
Admiral J.L. Cursetji	1 March 1976-28 February 1979
Admiral R.L. Pereira	1 March 1979-28 February 1982
Admiral O.S. Dawson	1 Marcb 1982-30 November 1984
Admiral R.H. Tahiliani	1 December 1984-30 November 1987
Admiral J.G. Nadkarni	1 December 1987-30 November 1990
Admiral Ramdas	1 December 1990-30 September 1993
Admiral V.S. Shekhawat	1 October 1993-30 September 1996
Admiral Vishnu Bhagwat	1 October 1996-30 December 1998
Admiral Sushil Kumar	31 December 1998-29 December 2001
Admiral Madhvendra Singh	29 December 2001-31 July 2004
Admiral Arun Prakash	31 July 2004-1 November, 2006
Admiral Sureesh Mehta	1 November, 2006 - 31 Aug. 2009
Admiral Nirmal Kumar Verma	31 August, 2009 - till date

CHIEFS OF AIR STAFF

Name	Tenure
Air Marshal Sir Thomas Elmhirst	15 August 1947-21 February 1950
Air Marshal Sir Ronald Chapman	22 February 1950-9 December 1951
Air Marshal Sir Gerald Gibbs	10 December 1951-31 March 1954
Air Marshal S. Mukherjee	1 April 1954-8 November 1960
Air Marshal A.M. Engineer	1 December 1960-31 July 1964
Air Chief Marshal Arjan Singh	1 August 1964-15 July 1969
Air Chief Marshal P.C. Lal	16 July 1969-15 January 1973
Air Chief Marshal O.P. Mehra	16 January 1973-31 January 1976
Air Chief Marshal H. Moolgavkar	1 February 1976-31 August 1978

Air Chief Marshal I.H. Latif	1 September 1978-31 August 1981
Air Chief Marshal Dilbagh Singh	1 September 1981-4 September 1984
Air Chief Marshal L.M. Katre	5 September 1984-1 July 1985
Air Chief Marshal D.A. La Fontaine	3 July 1985-31 July 1988
Air Chief Marshal S.K. Mehra	1 August 1988-31 July 1991
Air Chief Marshal N.C. Suri	1 August 1991-31 July 1993
Air Chief Marshal S.K. Kaul	1 August 1993-31 December 1995
Air Chief Marshal S.K. Sareen	1 january 1996-31 December 1998
Air Chief Marshal A.Y. Tipnis	1 January 1999-31 December 2001
Air Chief Marshal S. Krishnaswamy	1 January 2002-December 31, 2004
Air Chief Marshal S.P. Tyagi	December 31, 2004-March 31, 2007
Air Chief Marshal Fali H. Major	March 31, 2007-May 31, 2009
Air Chief Marshal PV Nayak	May 31, 2009-July 31, 2011
Air Chief Marshal N K Brown	July 31, 2011-till date

OLDEST, HIGHEST, LARGEST IN INDIA

Airfield : Highest	Daulatbeg Oldhi (Ladakh) (5, 183 m)
Airport : Highest	Leh (Ladakh) (3, 256 m)
Auditorium : Largest	Sri Shanmukhananda Hall, Mumbai
Atomic Power Station : First	Tarapore Power Plant near Mumbai
Award Civilian : Highest	Bharat Ratna
Award for gallantry : Highest	Param Vir Chakra
Battleground : Highest	Siachen Glacier
Beach : Longest	Marina Beach, Chennai
Botanical Garden : Oldest	Farahat Bukhs Botanical Garden, Saharanpur (U.P.)
Botanical Garden : Largest	National Botanical Gardens, Kolkata
Building : Largest Residential	Rashtrapati Bhavan, New Delhi
Canal : Longest	Indira Gandhi Canal or Rajasthan Canal
Cantilever Span Bridge : Largest	Howrah Bridge (Rabindra Setu), Kolkata
Cave Temple : Largest	Ellora, Maharashtra
City : Most Populous	Mumbai Metropolis
Corridor : Longest	Rameswaram Temple (1220 m) (Tamil Nadu)
Coastline : Longest	Gujarat (About 1600 km)
Dam : Highest	Bhakra Dam
Dam : Largest	Hirakud Dam
Delta : Largest	Sunderbans

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Desert : Largest	Thar
Dome : Largest	Gol Gumbaz, Bijapur
Glacier : Longest	Siachen on the Indo-Pak border (75.6 km)
Gurdwara : Largest	Golden Temple at Amritsar
Hospital : First	At Fort St. George, Chennai
: First Eye	Govt. Opthalmic Hospital, Chennai
: First (all women)	Muslim Maternity and Zanana Hospital, Hyderabad (A.P.)
Lake : Largest	Wular Lake, Kashmir
Minaret : Tallest	Qutub Minar, Delhi
Mosque : Largest	Jama Masjid, Delhi
Bridge : Motorable Highest	Khardungla, Ladakh (Ht : 5, 602m)
Museum : Largest	Indian Museum, Kolkata
Nuclear Reactor : First	Apsara
Observatory : Oldest	Jantar Mantar, Delhi
Observatory : World's Highest	Hanle, Ladakh (4,500 m)
Planetorium : Largest	Birla Planetorium, Kolkata
Plateau : Largest	Deccan
Rail Bridge : Longest	Sone Bridge, Bihar
Rail Bridge : Highest	Pavai Nadi Viaduct near Ratnagiri (on the Konkan Railway) Highest in **Asia**
Railway Platform : Longest	Kharagpur (833 m)
Railway Train : First	Mumbai to Thane (34 km)
Railway Train : First Superfast	Rajdhani Express (Between New Delhi and Howrah)
Railway Train : First double decker	Sinhagarh Express (between Mumbai and Pune)
Rainfall : Heaviest	Masynram, Meghalaya
Refinery : Oldest	Digboi
River Bridge : Longest	Mahatma Gandhi Setu over River Ganga near Patna
Road : Highest	At Khardungla (Leh-Manali sector)
Ropeway : Highest	Mono-cable ropeway, Pavagadh, Gujarat (740m)
Sea Bridge : Longest	Indira Gandhi Bridge connecting Rameswaram Island and Mandapam (T.N)
Statue : Tallest	Gomatesvara statue at Sravanabelgola (Karnataka)
Tower : Highest	Qutub Minar, Delhi

T.V. Tower : Tallest	Pitampura, New Delhi (235 m)
Tunnel : Largest	Jawahar Tunnel Banihal Pass, Jammu and Kashmir
Union Territory : Most Literate	Lakshadweep
Waterfalls : Highest	Gersoppa waterfalls, Karnataka
Zoo : Largest	Zoological Gardens, Kolkata

INDIA IN WORLD HERITAGE LIST

1983 Ajanta Caves
1983 Ellora Caves
1983 Agra Fort
1983 Taj Mahal
1984 Sun Temple, Konark
1985 Mahabalipuram monuments
1985 Kaziranga National Park
1985 Manas Wildlife Sanctuary
1985 Keoladeo National Park
1986 Churches and Convents of Goa
1986 Khajuraho Group of monuments
1986 Group of monuments at Hampi
1986 Fatehpur Sikri & Churchs and Convent of Goa
1987 Group of monuments of Pattadakal
1987 Elephanta Caves, Maharastra
1987 Brihadeshvara Temple, Thanjavur
1987 Sundarban National Park
1988 Nanda Devi National Park
1989 Buddhist monuments at Sanchi
1993 Humayun's Tomb, Delhi'
1983 Qutub Minar and its monuments-Delhi
1999 Darjeeling Himalayan Railway
2002 Mahabodhi Temple at Bodh Gaya
2003 Marble Rocks, Bhimbhetaka
2004 Brihadeshvar Temple of Gangaikondacholapuram
2004 Airavatesvara Temple of Darasuram
2004 Champaner-Pavagadh Archaeological Park, Gujarat
2004 Chhatrapati Shivaji Railway Station, Mumbai
2005 'Phoolon Kee Ghatee' (Valley of flower), Uttaranchal
2007 'Red Fort', Delhi
2008 Kalka–Shimla Railway
2010 Jantar-Mantar, Jaipur

POSTAL ZONES IN INDIA (PIN CODES)

1. Delhi, Haryana, Punjab, Chandigarh, Himachal Pradesh, Jammu and Kashmir
2. Uttar Pradesh, Uttarachal
3. Gujarat, Rajasthan, Daman and Diu, Dadra and Nagar-Haveli
4. Maharashtra, Goa, Madhya Pradesh and Chattisgarh

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5. Andhra Pradesh and Karnataka
6. Tamil Nadu, Kerala and Lakshadweep
7. West Bengal, Andaman and Nicobar Islands, Orissa, Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura
8. Bihar and Jharkhand

NEWS AGENCIES OF WORLD

Agency		Headquarters
AA	Anadol Ajansi	Ankara
AAP	Australian Associated Press	Sydney
ADN	Allgemeiner Deutscher Nachrichtendienst	Berlin
AE	Agence Europe	Brussels
AFP	Agence France Presse	Paris
ANA	Athenagence	Athens
ANGOP	Angola Agecia Naticiosa N'gola Press	Luanda
ANP	Algemeen Nederlands Persbureau	The Hague
ANSA	Agenzia Nazionale Stampa Associate	Rome
ANTARA	Indonesian National News Agency	Jakarta
AP	Associated Press	New York
APP	Agence Parisienne de Presse	Paria
APP	Associated Press of Pakistan	Islamabad
AUP	Australian United Press	elbourne
BERNAMA	Malayasian National News Agency	Kuala Lumpur
BSS	Bangladesh Sangbad Sangstha	Dhaka
CANA	Caribbean News Agency	ridgetown
CNS	China News Service	Beijing
CP	Canadian Press	Toronto
CSTK	Ceskoslovenska Tiskova Kancelar	Prague
DPA	Deutsche Press Agentur	Hamburg
EXTEL	Exchange and Telegraph Company	London
GNA	Agence Guineennede Press	Conakry (Guinea)
GNA	Ghana News Agency	Accra
INA	Iraqi News Agency	Baghdad
IPS	Inter Press Service	Rome
IRNA	Islamic Republic News Agency	Tehran
ITIM	Associated Israel Press	TelAviv
KNA	Kenya News Agency	Nairobi
KUNA	Kuwait News Agency	Kuwait City
KYODO	Kyodon Tsushin	Tokyo
MENA	Middle East News Agency	Cairo
NOVOSTI	Agentstvo Pechati Novosti	Moscow
NPS	Norsk Press Service	Oslo

NZPA	New Zealand Press Agency	Wellington
PANA	Pan-African News Agency	Dakar
PNA	Philippines News Agency	Manila
PPI	Pakistan Press International	Karachi
PTI	Press Trust of India	Mumbai
REURTERS	Reuters	London
SPA	Saudi Press Agency	Riyadh
TANJUG	Novinska Agencija Tanjug	Belgrade
TASS	Telegraph Agency of the Sovereign States	Moscow
UNI	United News of India	New Delhi
UPI	United Press International	New York
XINHUA	Xinhua	Beijing
LANKAP -UVATH	SriLanka News Agency	Colombo
NAMPA	Namibia Press Agency	Windhoek
ZIANA	Zimbabwe Inter-Africa News Agency	Harare

Highest Honours of Some Countries

Country	Highest Honours
India	Bharat Ratna
Pakistan	Nishan-e-Pakistan
Kuwait	Mubarak-Al-Kabir Medal
Saudi Arabia	Shah Abdul Aziz Medal
Argentina	The Order of Sona Martin
Nicaragua	Augusto-Caesar Sandino Order
Vietnam	The Order of the Golden Star
Hungary	The Order of Banner
Britain	Member of British Empire, Victoria Cross
Japan	Order of Moulovenice Sun
Denmark	Order of Diana Brog
France	Legend of Honour
America	Presidential Medal of Freedom
Germany	Pore Lee Merit Iron Cross
The Netherlands	Netherlands Lion

INTELLIGENCE AGENCIES OF SOME COUNTRIES

Country	Intelligence Agency
India	Research & Analysis Wing (RAW), Intelligence Bureau (I.B.) Central Bureau of Investigation (CBI)
Pakistan	Inter Service Intelligence (I.S.I)
U.S.A.	Central Intelligence Agency, Federal Bureau of Investigation

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Britain	Military Intelligence (M.I.) 5 and 6, Special Branch,
Israel	Ultra, Joint Intelligence Organisation
Egypt	Mosad
Japan	Mukhabarat
Russia	Nicho
	K.G.B. (Komitel Gosudarstvennoy Bezopasnosty)
Canada	(Committee for State Security)
S.Africa	Security Intelligence Service
Iran	Bureau of State Security
Iraq	Sabak
Australia	Al-Mukhabarat
France	Australian Security and Intelligence Organisation
Spain	S.D.E.C.E.
Cuba	C.E.S.I.D.
	D.G.I

Principal Ten Language of the World

Language	Speaker of the Language (In Millions)	Areas Where Spoken
Mandarin	1075	China
English	514	Britain, Australia
Hindi	496	India
Spanish	425	Spain
Russian	275	Russia
Arabic	256	Central East
Bengali	215	India,
Portuguese	194	Portugal
Malay (Indonesian)	176	Malaysia
French	129	France, Switzerland

FIRST IN INDIA

British Governor of Bengal	Warren Hastings
Chief Justice of Supreme Court	Harilal J. Kania (1950-51)
Commander-in-Chief of Free India	General Sir Roy Butcher (1948-1949)
Commander-in-Chief of Free India	(Indian) General K.M. Cariappa (1949-1953)
Chief of Air Staff	Air Marshall Sir Thomas Emhirst (1947-50)
Indian Air Chief	Air Marshall S. Mukherjee (1854-60)
Chief of Army Staff	General Maharaja Rajendra Sinhji (April-May 1955)

Chief of Naval Staff (Indian)	Vice Admiral RD Katari (1958-1962)
Field Marshall	General SHFJ Manekshaw (1972-73)
Cosmonaut	Sqn, Leader Rakesh Sharma
Indian Governor-General of Indian Union	C. Rajagopalachari
Indian ICS Officer	Satyendra Nath Tagore
Indian FRS	A. Cursetji
Indian Member of the Viceroy's Executive Council	Sir S.P. Sinha
First President of India to die in harness	Dr. Zakir Husain
First Prime Minister to resign from Office	Morarji Desai
Magsaysay Award Winner	Acharya Vinoba Bhave (1958)
Man to swim across English Channel	Mihir Sen
Man to climb Mount Everest without Oxygen	Phu Dorjee
Man to climb Mount Everest twice	Nwang Gombu
Oscar Winner	Bhanu Athaiya
Woman to swim across English Channel	Ms. Arti Saha (Now Mrs. Arti Gupta)
Woman to Climb Mount Everest	Bachendri Pal
Woman Chief Justice of a High Court	Leela Seth (Chief Justice of Himachal Pradesh, 1991)
Woman to win an Asiad Gold	Kamaljit Sandhu
Woman Chairman of UPSC	Rose Million Bathew
Woman Chief Minister of a state	Mrs. Sucheta Kripalani
Woman Airline Pilot	Durba Banerjee
Woman Union Minister	Rajkumari Amrit Kaur
Woman Governor	Mrs. Sarojini Naidu
Woman Judge in Supreme Court	Mrs. Meera Sahib Fatima Biwi
Woman IPS Officer	Kiran Bedi
Woman Speaker of State Assembly	Mrs. Shanno Devi
Woman Minister in a State	Mrs. Vijayalakshmi Pandit (in 1937)
Women President	Pratibha Patil
First Indian lady to be crowned Miss World	Rita Faria
Talkie Film	Alam Ara (1931)

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Telefilm	
Test Tube Baby	Sadgati (on Doordarshan April 1981)
Speaker of Lok Sabha	Indira (Baby Harsha)
Chief Election Commissioner	G.V. Mavlankar (1952-56)
Chairman of First Finance Commission	Sukumar Sen (1950-58)
President of Indian National Congress	Sri K. C. Neogy (1951)
General Post Office in India	W.C. Banerjee
Electric Railway	Madras GPOP on the beach in Fort St. George Square (opened on June 1, 1786)
Aircraft Carrier	In February, 1929 between Victoria Terminus (Mumbai) and Kurla
First Postal Stamp Released	INS Vikrant (joined Indian Navy on Nov. 3, 1961)
Recipient of Bharat Ratna	On July 1, 1852 (Provincial) and all-India Stamp on October 1, 1854
	C. Rajagopalachari, S. Radhakrishnan and C.V. Raman (1954)
Recipient of Dada Saheb Phalke Award	Devika Rani Reorich
Recipient of Bharatiya Jnanpitha	G. Shankara Kurup (1965)
Woman Cosmonaut	Ms. Kalpana Chawala (NRI)
Woman Judicial Officer	Anna Chandy (Munsif in 1937)
Woman Congress President	Annie Besant (1917)
Woman President of Stock Exchange	Omana Abraham of Kottayam
Bank	Bank of Hindustan (1770)
Regular Oil Well	Borbil (Later Known as Digboi-discovered in 1890)
Submarine	INS Kalvari (Commissioned in 1967)

SOBRIQUETS

Personalities	Sobriquets
Sunil Gavaskar	Sunny, Little Master
Maharajah of Vizianagaram (cricketeer)	Vizzy
K.M. Munshi	Kulapati
J.B. Kripalani	Acharya
Bal Gangadhar Tilak	Lokamanya
Khan Abdul Ghaffar Khan	Frontier Gandhi, Badshah Khan
Tipu Sultan	Mysore Tiger
Dadabhai Naoroji	Grand Old Man of India
C. Rajagopalachari	Rajaji
Jawaharlal Nehru	Chacha Nehru, Pandit

Subhas Chandra Bose	Netaji
Sardar Vallabhbhai Patel	Iron Man of India
Madan Mohan Malviya	Mahamana
Lal Bahadur Shastri	Man of Peace
Sarojini Naidu	Nightingale of India
T.Prakasam	Andhra Kesari
Rabindranath Tagore	Gurudev
Adolf Hitler	Fuehrer
General Rommel	Desert Fox
Queen Elizabeth I	Maiden Queen
Margaret Thatcher	Headmistress
Florence Nightingale	Lady with the lamp
Pitt, the Younger	Great Commoner
Mother Teresa	Saint of the gutters
Dwight D. Eisenhower	Ike
C.F. Andrews	Din Bandhu
Maj. General Rajinder Singh	Sparrow
Milkha Singh	Flying Sikh
P.T. Usha	Payyoli Express
C.R. Das	Desh Bandhu
Jaya Prakash Narayan	Lok Nayak
Lala Lajpat Rai	Punjab Kesari
C.N. Annadurai	Anna
M.K. Gandhi	Bapu; Mahatma;Father of the Nation
Joan of Arc	Maid of Orleans
Bismarck	Man of Blood and Iron
Napoleon Bonaparte	Man of Destiny; Little Corporal
William Shakespeare	Bard of Avon
Sheikh Mujibur Rahman	Banga Bandhu
Sheikh Md. Abdullah	Sher-e-Kashmir (Lion of Kashmir)
William Gladstone	Grand old Man of Britain
Duke of Wellington	The Iron Duke
Richard Cobden	Apostle of Free Trade
Henry Kissinger	Desert Camel
Mussolini	Deuce
Earl of Warwick	Kingmaker
M.A. Jinnah	Quaid-e-Azam
Dr. Ho Chi Minh	Uncle Ho
Geoffrey Chaucer	Father of English Poetry
Sir Walter Scott	Wizard of the North
Pearl S. Buck	Liskwan
Prof. T.H. Huxley	Watchdog of Darwin
Gautama, the Buddha	The Enlightened One
K.V. Puttappa	Kuvempu
M.S. Golwalkar	Guruji

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Famous Religions, Founders, Holy Books & Places of Worship

Religion	Founder	Holy Books	Place of Worship
Hinduism	No single Founder.	Ramayana, Vedas, Puranas and Geeta	Temple
Sikh	Guru Nanak Dev	Guru Grantha Sahib	Gurdwara
Christianity	Jesus Christ	Bible	Church
Islam	Prophet Mohammed	Koran (Quran)	Mosque
Parsi	Zoroaster	Zend Avesta	Fire Temple
Jainism	Adinath Rishabh Dev	Jain Granth	Jain Temple
Buddhism	Gautam Buddha	Tripitaka	Buddha Stupa
Jew	Moosa	Jorah	Synagogue

SOME MORE ABOUT HINDUISM

Six Systems of Philosophy

Philosophy	Founder	Other Scholars
Sankhya	Kapila	Ishwar Krishna, Vachaspati
Nyaya	Akshapada Gautma	Vatsayayan, Udyanacyarya, Jayantbhatt
Yoga	Patanjali	Myas
Vaisheshika	Uluka Kanada	Keshav raishra, Vishvanath
Mimansa	Jamini	Sabrasvamin, Kumaril Bhatt
Vedanta	Badrayana	Shankaracharya, Vachaspati, Ramanuj, Madhvacharya etc.

OTHER HETERODOX IDEAS

1. **Makhali Putta Gosal :** Popularised Ajivka Sect.
   - ➢ Ajivaks believed in niyativad.
   - ➢ Goshala's follower centrad around Sravasti.
2. **Charvak :** Believed in complete materialism.
3. **Purana Kassapa :** Preached the doctrine of Akriya or non-action.
4. **Ajit Kesakamblin (Ucchedvad) :** Preached that everything ended with death and there is no further file after death.
5. **Pakudha Kachchayna (Asasvatavad) :** There are seven elements and the body is ultimately dissolved in these seven elements.

Other Religious-ideas and their founders

Religious ideas/sect	Founder
1. Pasupatas	Lakulisa/Nakulisa
2. Lingayats	Basava
3. Pratyabhijna	Vasugupta
4. Spanda-sastra	Kallata and Samnanda
5. Siva-Siddhanata	Srikanth-Sivacharya
6. Advait	Shankaracharya
7. Vishistadvait	Ramanujacharya
8. Brahm Sampradaya	Madhvacharya
9. Sanak Sampradaya	Nimbakacharya

SAIVISM

- ➢ The origin of Saivism can be traced back to the pre-vedic times.
- ➢ By the early centuries of the Christian era it was a popular sect all over India.
- ➢ Siva was the principle daily of this sect.
- ➢ Siva was worshipped in the form of Linga.
- ➢ Kushan king Weem Wema Kadphises was an ardent devotee of Siva.
- ➢ Prakrit text Gathasaptasati has references to Siva worship.
- ➢ Tamil Sangam work refers to Siva as the greatest of all gods (mamudu mudalvan).
- ➢ Siva's consort Parvati was adored as Sakti.
- ➢ In Satavahana kindom Parvati was worshipped as Gauri.
- ➢ Skanda was regarded as the son of Siva.
- ➢ In Tamil country Skanda was worshipped in the Murugan form.
- ➢ Ganesa was the younger brother of Skanda.
- ➢ Ganesa was also known as Vinayak.
- ➢ The most popular Saiva sect was Pasupata sect.
- ➢ The Kapalika and Kalamukha sect developed much later.

VARIOUS SECTS OF SAIVISM

A. Pasupatas/Nakulisapasupatas

- ➢ It was founded by Lakulisa/Nakulisa/Lakulin/Lakutin
- ➢ They besmear the body with ashes.
- ➢ They creates sound of Ha Ha and Hundukkara.
- ➢ It was dualistic in character.
- ➢ Pasu, the individual soul-exists with Pati, the supreme soul.
- ➢ Dakhanata (end of misery) is attained through yoga and Vidhi.
- ➢ They observe atimargika religious practices.
- ➢ The basic works are Pasupata sutras and Sarvadarsansmgraha.

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B. Kalamukhas/Kapalikas

- It was extreme form of Saivism.
- They eat food in skull, eat ashes, carry pots of wine.
- They worship Bhairava as the great God with his wife Chandika.
- The perform human sacrifices.
- They practice yoga in order to acquire miraculous powers.
- They observe unconventional and horrifying practices including sexual rites.
- It was an off shoots of Pasupata sect.
- It flourished during the Gupta and post Gupta period.

C. Mattamayuras

- It was moderate form of Saivism.
- It developed in central India.

D. Virasaivas/Lingayatas

- It was founded by Basava, the Prime Minister, of Bijjala, the Kalachuri King.
- It was anti-Brahmin in nature.
- They believe in love and self Surrender.
- They worship Linga and Nandi bull.
- They encouraged widow remarriage.
- Their philoshophy is known as Shakti Visistadvaita soul as separable union with Para-Siva through Shakti.
- The Para Siva is the supreme reality and Shakti is the power which resides in him.
- The ultimate goal of the soul is to unit with Para-Siva, this state is known as Ling Samarasya which means identity between Linga (siva) and anga (soul).
- They observed Diksha ceremony in the place of Upanayana in which even girls wear Linga.
- They do not worship Siva in temples.
- It was popular in Karnataka region.

E. Kashmir Saivism

I. Pratyabhijna

- Its origin is traced to Siva-Sutras revealed to Vasugupta.
- It's founder is vasugupta (800-900 AD).
- Its also known as Trika/Triad because it had three chief religious books.
- It regards the individual soul and the world identical with Siva.
- Pratyabhijna means realisation of the soul's identity with Siva.
- The ultimate reality is Siva.
- Siva is known as anultara which means the reality beyond which there is nothing.
- Salvation lies in recognition that the soul is one with Siva.
- It was a moderate form of Saivism.
- It believed in spiritual development.

- Some of greatest exponents were Utpalachara, Abhinavgupta and his disciple Kshemraja.

II. Spanda-Sastra

- It's founders are Kallata and Samnanda, the two disciples of Vasugupta.
- The term spanda means a change from the state of absolute unity to the plurality of the world.
- Kallata wrote Spanda-Sarvasa.
- Somananda wrote Siva-dristi.
- It was a moderate form of Saivism.

VAISHNAVISM

- The principal deity of this sect was Vishnu.
- The cult of Vishnu in the early period was known by the name Bhagavatism.
- Bhagavatism owed its origin to the Upanishadas.
- Bhagavatism arose around the Mathura region.
- Vasudeva was the central figure in the Bhagavata cult.
- Around second century B.C. Vishnu and Narayan were united and identified as one deity.
- Heliodorus erected a pillar with Garuda, at Besnagar (Vidisa) near Bhopal in honour of Vasudeva.
- Lakshmi is Vishnu's consort.
- Vasudeva-Krishna was the disciple of Ghora-Agnirasa.
- Megasthenese refers to Krishna as Herakles of Souraseni tribe.
- Ten awataras of Vishnu – (i) Matsya (fish), (ii) Kurma (tortoise), (iii) Varaha (boar), (iv) Narasimha (man-lion), (v) Vamana (dwarf), (vi) Parasurama (Rama with axe), (vii) Rama, (viii) Krishna, (ix) Budha, (x) Kalkin (yet to born).
- It was patronised by Guptas, Chalukyas, Hoyasalas, Satvahanas.
- Acharyas are the great leader philosophers of Vaishnavism who defended and popularised the religion. Some of the prominent acharyas are : Ramanuja, Chaitanya, Madhava, Nimbarka, Nathmuni, Yamunacharya.
- The earliest reference to Krishan is found in Chhandogya Upanishad.
- The reference to Vasudeva is found in Panini's Ashtyadhyayi and Patanjali's Mahabhashya.
- Narayana, the cosmic God finds mention in the Satpatha Brahamana.
- Pancharatra, a Vaishnavite school, gave the doctrine of Vyuha (emancipation) according which Sankarasana (Balram), Pradumana (Krishna's), Anirudha (Krishna's grand son) emerged out of Vasudeva.
- It was developed and popularised in south by twelve saints known as Alvars.
- Nammalvar and Tirumalisailvar were the greatest of twelve Alvars.

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TANTRISM

- The core of Tantrism means essentially orgiasticrites.
- The rites involve the use of five makaras : (i) matsya (fish) (ii) mansa (meat) (iii) madya (liquor) (iv) maithuna (sex) (v) mudra (physical gestures).
- In Tantrism high status was given to female deity.
- Tantrism emerged as a religious factor in the sixth century A.D. and became a strong force by the ninth century.
- The Tantric priest act as a priest, physician, astrologer and shraman.
- Tantrism penetrated Buddhism, Jainism and Brahmana theology.
- The Yapaniya sect of the Jainas was the foremost in propagating Tantric mode of worship in Karnataka.

SEVEN WONDERS OF THE WORLD

Ancient Period

1. The Colossus of Rhodes
2. The Pharos/Lighthouse of Alexandria
3. The Hanging Gardens of Babylon
4. The Temple of Artemis/Diana at Ephesus
5. The Pyramids of Khufu
6. The Tomb of Maüsolus at Hali Camassus
7. The Statue of Zeus at Olympia

Middle Ages

1. The Colosseum of Rome
2. The Catacombs of Alexandria
3. The Great Wall of China
4. The Pagoda (Porcelain Tower) of Nanking (China)
5. The Leaning Tower Pisa (Italy)
6. Sancta (Hagia) Sophia of Constantinople
7. Stonehenge

Modern Ages

1. The Great Pyramid of Egypt with Sphinx of Gizeh
2. Hagia Sophia (Istanbul)
3. Leaning Tower of Pisa (Italy)
4. The Taj Mahal (Agra, India)
5. The Washington Monument
6. The Eiffel Tower (Paris, France)
7. The Empire State Building (New York)

New Seven Wonders of the World

1. The Taj Mahal (Agra, India)
2. The Great Wall of China
3. The Chicken Itza (Mexico)
4. The Roman Colosseum (Rome)
5. The Statue of Christ Redeemer (Rio de Janeiro)
6. Incan Emperor Pachacutec
7. The Petra

Miss Universe

Year	Name	Country
1952	Armi Kuusela	Finland
1994	Sushmita Sen	India
1996	Alicia Machado	Venezuela
1997	Brook Lee	USA
1998	Wendy Fitzwilliam	Trinidad & Tobago
1999	Mpule Kwelagobe	Botswana
2000	Lara Dutta	India
2001	Denise M. Quinones	Puero Rico
2002	Oxana Fedrova	Russia
2002	Justine Pasek	Panama
2003	Amelia Vega Polanco	Dominican Rep.
2004	Jennifer Hawkins	Australia
2005	Natalie Glebova	Canada
2006	Juleka Rivera Mendies	Puero Rico
2007	Riyo Mori	Japan
2008	Dayana Mendoza	Venezuela
2009	Stefania Fernandez	Venezuela
2010	Jimena Navarrete	Mexico
2011	Leila Lopes	Angola

Miss World

Year	Name	Country
1951	Kerstin Haakonson (kiki)	Sweden
1966	Reita Faria	India
1994	Aishwarya Rai	India
1995	Jacqueline Maria Aguilera Marcano	Venezuela
1996	Irene Skliva	Greece
1997	Diana Hayden	India
1998	Linor Abargil	Israel
1999	Yukta Mookhey	India
2000	Priyana Chopra	India
2001	Agbani Darego	Nigeria
2002	Azra Akin	Turkey
2003	Rosanna Davison	Ireland
2004	Maria Julia Garsiya	Peru
2005	Unnur Virna	Iesland
2006	Tatana Kucharova	Czech Republic
2007	Zhang Zilin	China
2008	Kseniya Sukhinova	Russia
2009	Kynee Aldoreeno	Gibraltar
2010	Alaxinderia Mills	America

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FIRST IN SPACE

- The first space rocket brought back to earth after orbiting the moon : Zond-5
- First crew transfer between the orbiting space ships : Soyuz T-15 with Mir Space Station
- The first mission of a link-up in space by manned space ships of USA and Soviet Union : Apollo-Soyuz Test Project Mission (ASTP) (launched on July 15 and linked up in space on July 17, 1975)
- The first man to fly into space belonging to a country other than Russia or the USA : Remek (Czechoslovakia)
- The first country to send nuclear powered space craft to explore Jupiter : USA
- The first to launch earth satellite or artificial baby moon : USSR
- The first spaceship in the world to sample moon's crust : Surveyor-3 (USA)
- The First space vehicle to softland on moon : Luna 9 (USSR)
- The first manned spaceship to perform the longest stay in space (11 days) : Apollo-7 (USA)
- The first person in the world to land on the moon : Neil Armstrong and Edwin E. Aldrin
- The first man to enter space : Major Yuri Gagarin (Russian)
- The First woman cosmonaut of the world : Velentina Tereshkova
- The first unmanned spaceship to have softlanded and lifted off from the moon to return to the earth : Luna-16 (USSR) Sept. 21, 1970
- The first space vehicle to land on the moon : Lunar Exploration Module (LEM) niek-named 'Eagle'
- The first space ship which carried three American astronauts to land two of them on the moon : Apollo-11
- The first country to send man to the moon : USA

FIRST IN THE WORLD

- The first man to win 4 Olympic gold medals : Alvin Kranzein (USA) in 1900
- The first lawn tennis player who won the Wimbledon Championship for five years consecutively : Bjorn Borg
- First batsman to score three Test Century in three succesive Tests on Debut : Mohd. Azharuddin (India)
- World's first Cricketer to score more than 11,000 runs in his test carrier : Allan Border of Australia with more than 11,000 runs.
- The first person to reach the South Pole : Amundsen (Norway)
- The first person to have climbed Mount Everest : Edmund Hillary and Sherpa Tenzing 19th May, 1953
- The first person to sail round the world : Ferdinand Magellan (Portugal)

- The first woman to conquer Mount Everest : Mrs. Junko Tabei (Japan)
- The first man to have climbed Mount Everest Twice : Nawang Gombu
- The first vessel ever to reach the North Pole by sailing through the thick Arctic ice : Soviet Arktika Atomic-powered (ice-breaker)
- The leader of the expedition 'Ocean to Sky' : Sir Edmund Hillary
- The first two mountaineers who reached the summit of Everest without using oxygen : Peter Habeler (Austria) and Reinhold Messner (italy)
- The first woman Ambassador of Britain : Anne Warburton
- The first woman Prime Minister of a European Country : Margaret Thatcher
- Woman Bishop : Rev Barbara C. Harris (USA)
- Lady President of a country : Maria Estela Person (Argentina)
- The first Muslim women to win Nobel Prize : Shirin Ebadi.
- First Private Financed Manned spaceflight : Space Ship One
- The first woman Prime Minister of a country twice : Mrs. S. Bhandarnaike (Sri Lanka)
- The first President of the USA : George Washington
- The first President of the Chinese Republic : San Yet Sen
- The first Governor-General of Pakistan : Mohd. Ali Jinnah
- The first European to visit China :Marco Polo
- The first US President to resign Presidency : Richard Nixon
- The first Person to cross the Atlantic in an open wicker basket hot air balloon : David Hempleman Adams
- The first woman civilian police adviser of the U.N. : Kiran Bedi

Names Old and New

New Names	Old Names
BANJUL	Bathurst
BEIJING	Peking
BELIZE	British Honduras
BENIN	Dahomey
BOTSWANA	Bechuanaland
BURKINA FASO	Upper Volta
CAMBODIA	Kampuchea; Khamer
CHENNAI	Madras
DJIBOUTI	French Somaliland, French Territory of Afars & Issas
ETHIPIA	Abyssinia
GHANA	Gold Coast
	British Guiana

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New Names	Old Names
HANOI	Kecho
HARARE	Salisbury
HO CHI MINH CITY	Saigon
INDONESIA	Dutch East Indies
IRAN	Persia
JAPAN	Nippon
MALAYSIA	Malaya
MANCHURIA	Manchukuo
ANKARA	Angora
DHAKA	Dacca
LORE SAE	Last Timor
IRAQ	Mesopotamia
ISTANBUL	Constantinople, Byzantium
JAKARTA	Batavia
KINSHASA	Leopoldville
KOREA	The Hermit Kingdom
LAOS	Lanxang (The land of a million elephants)
LESOTHO	Basutoland
MALAWI	Nyasaland
MALABO	Santa Isable (Cap, of Equa-Guinea)
MUMBAI	Bombay
MYANMAR	Burma
NAMIBIA	South West Africa
NAURU	Pleasant Island
OSLO	Christiana
SRI LANKA	Ceylon
VOLGOGRAD	Stalingrad
ST. PETERSBURG	Leningrad
SURINAM	Dutch Guyana
TAIWAN	Formosa
TASMANIA	Van Diemen's Land
THAILAND	Siam
TOGO	Togoland
TUVALU	The Ellice Islands
VANUATU	The New Hebrides
YANGON	Rangoon
ZAIRE	Congo
ZAMBIA	Northern Rhodesia
ZIMBABWE	Southern Rhodes...

INSTITUTES OF NATIONAL IMPORTANCE

National Institute of Water Sports	: Goa
National Thermal Power Corporation	: New Delhi
National Remote Sensing Agency	: Hyderabad
National Film Development Corporation	: Mumbai
National Film Archives of India	: Pune
National Institute of Criminology and	: New Delhi
National Forensic Science	: New Delhi, Mumbai, Hyderabad, Kolkata
National Institute of Fashion Technology	: Chennai, Gandhinagar
National Institute of Ayurveda	: Jaipur
National Defence College	: New Delhi
National Aerospace Laboratories	: Bangalore
National Chemical Laboratories	: Pune
National Metallurgical Laboratories	: Jamshedpur
National Institute of Oceanography	: Dona Paula, Goa
National Physical Laboratory	: New Delhi
National Geophysical Research Institute	: Hyderabad
National Institute of Nutrition	: Hyderabad
National School of Mines	: Pune
National Institute of Communicable Diseases	: New Delhi
National Defence Academy	: Khadakvasla
National Power Training Institute	: Faridabad
National Institute of Virology	: Pune
National Police Academy	: Hyderabad
National Design Institute	: Ahmedabad
National Centre for Cell Science	: Pune
National Brain Research Centre	: New Delhi
National Bioresource Development Board	: New Delhi
National centre for Plant Genome Research	: New Delhi
National Open School	: New Delhi
National Civil Defence College	: Nagpur
National Institute of Financial Management	: New Delhi
National Institute of Hydrology	: Roorkee
National Institute of Ocean Technology	: Chennai
National Museum of Natural History	: New Delhi
National Council of Science Museums	: Kolkata
National Archives of India	: New Delhi
National Indian Institute of Geomagnetism	: Mumbai
National Academy of Sciences	: Allahabad
National Book Trust	: New Delhi
National Building Organisation	: New Delhi
National Council of Educational Research and Training	: New Delhi
National Bureau of Plant Genetic Resources	: New Delhi
National Sample Survey Organisation	: New Delhi

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Indian Council for Cultural Relation	: New Delhi
Indian Council of Agricultural Research	: New Delhi
Indian Council of Medical Research	: New Delhi
Indian Institute of Quality Management	: Jaipur
Indian Institute of Foreign Trade	: New Delhi
Indian Institute of Packaging	: Mumbai
Indian Institute of Mass Communications	: New Delhi
Indian Institute of Tourism and Travel Managament	
Indian Institute of Skiing and Mountaineering	: New Delhi
Indian National Satellite System	: Gulmarg
Indian Space Research Organisation	: New Delhi : Bangalore
Indian National Science Academy	: Thiruvananthapuram
Rashtriya Indian Military College	: Delhi
Indian Grassland and Fodder Research Institute	: Dehradun
Indian Academy of Sciences	: Jhansi
Indian National Science Academy	: Bangalore
Indian National Academy of Engineering	: New Delhi
Indian Science Congress Association	: New Delhi
Indian Institute of Tropical Meteorology	: Kolkata
Indian Institute of Technology	: Pune : Chennai, Mumbai, Kanpur, Kharagpur, New Delhi, Guwahati, Roorkee
Indian Institute of Management	: Ahmedabad, Bangalore Kolkata, Lucknow Indore, Kozhikode
Indian Academy of Sciences	: Bangalore
Indian Institute of Science	: Bangalore
Indian Institute of Astro-Physics	: Bangalore
Indian Institute of Legal Metrology	: Ranchi
Indian Institute of Chemical Biology	: Kolkata
Indian Institute of Horticulture Research	: Bangalore
Indian Institute of Sugar Technology	: Kanpur
Indian Military Academy	: Dehradun
Indian Council of Historical Research	: New Delhi
Indian Council of Philosophical Research	: New Delhi and Lucknow
Indian Council of Social Science Research	: New Delhi
Indian Institute for Advanced Study	: Shimla
Indian Bureau of Mines	: Nagpur
Indian Agricultural Research Institute	: New Delhi
Indian Rare Earths	: Aluva
V.V. Giri National Labour Institute	: Noida

Institute of National Integration	: Pune
Tata Institute of Fundamental Research	: Mumbai
Uranium Corporation of India	: Jadugunda
Geological Survey of India	: Kolkata
Council of Scientific and Industrical Research:	New Delhi
Wadia Institute of Himalayan Geology	: Dehradun
Raman Research Institute	: Bangalore
Central Institute of Higher Tibetan Studies	: Varanasi
S.N. Bose National Centre for Basic Sciences	: Kolkata
Birbal-Sahni Institure of Palaeobotany	: Lucknow
Central Drug Research Institute	: Lucknow
Central Electronics and Electrical Engineering Research Institute	: Pilani : Jadnavpur
Central Glass and Ceramic Research Institute	: Lucknow
Central Institute of Medicinal and Aromatic Plants	: Bhavnagar
Central Salt and Marine Chemicals Research Institute	: Chandigarh
Central Scientific Instrumentation Organisation	: Chennai
Central Leather Research Institute	: New Delhi
Central Tibetan Schools Administration	: Hyderabad
Central Institute of English and Foreign Languages	: Shimla
Central Potato Research Institute	: Cuttack
Central Rice Research Institute	: Delhi
Central Road Research Institute	: Dhanbad
Central Mining Research Institute	: Roorkee
Central Building Research Institute	: Mysore
Central Institure of Indian Languages	: Jodhpur (Rajasthan).
Central Arid Zone Research Institute.	: Kasergod (Kerala).
Central Coconut Research Institute	: New Delhi
Central Glass and Ceramic Research Institute	: Barracknpore (w. Bengal)
Central Inland Fisheries Research Institute	: Ernakulam (Kerala).
Central Institute of Fisheries Technology	: Kolkata (W. Bengal).
Central Jute Technological Research Institute:	: Chennai (Tamil Nadu).
Central Marine Research Station	: Durgapur (W. Bengal).
Central Mechanical Engineering Research Institute	: Dhanbad (Jharkhand)
Central Mining Research Station	

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Central Research Laboratory, Chepauk	: Chennai (Tamil Nadu).
Central Tobacco Research Station	: Rajahmundry (Andhra Pradesh).
Centre for Cellular and Molecular Biology	: Hyderabad.
Council of Scientific and Industrial Research	: New Delhi
Fluid Control Research Institute	: Kanjikod, West (Kerala)
Central Electro-Chemical Research Institute	: Pilani (Rajasthan).
Central Food Technological Research Institute	: Mysore (Karnataka)
Central Fuel Research Institute	: Dhanbad (Jharkhand)
National Aeronautical Laboratory	: Bangalore (Karnataka).
National Biological Laboratory (in Planning)	: Palampur, Kangra Distt. (Himachal Pradesh)
National Botanical Research Institute	: Lucknow (U.P.)
National Chemical Laboratory	: Pune (Maharashtra)
National Environment Engineering Institute	: Nagpur.
National Geophysical Research Institute	: Hyderabad (Andhra Pradesh)
Regional Research Laboratory	: Bhubaneshwar (Orissa), Jorhat (Assam), Jammu (Jammu and Kashmir) and Hyderabad (Andhra Pradesh).
Structural Engineering Research Centre	: Roorkee (Uttaranchal) and Chennai (Tamil Nadu).
Visnvesnvaraiya Industrial and Technological Museum	: Bangalore (Karnataka).
Indian Lac Research Institute	: Ranchi (Jharkhand).
Institute of Microbial Technology	: Hyderabad (A.P.)
National Dairy Research Institute	: Karnal (Haryana).
National Environmental Engineering Research Institute	: Nagpur Maharashtra).
National Remote Sensing Station	: Shadnagar, near Hyderabad, (A.P.)
National Sugar Research Institute	: Kanpur (U.P.)
Indian Institute of Chemical Biology	: Kolkata (W. Bengal)
Indian Institute of Petroleum	: Dehradun (Uttaranchal).
Industrial Toxicology Research Centre	: Lucknow (U.P.)

Cultural Institutions in India

Institutes	Year of Establishment	Headquarter
Sangeet Natak Academi	1955	New Delhi
Lalit Kala Academi	1954	New Delhi
Indian Council for Cultural Relations	1950	New Delhi
Archaeological Survey of India	1961	New Delhi
Anthropological Survey of India	1945	Kolkata
National Research Laboratory for Conservation of Cultural Property	—	Lucknow
Centre for Cultural Resources & Training	1979	New Delhi
Indira Gandhi National Centre for Arts	1985	Bhopal
Rashtriya Manav Sangrahalya	—	Bhopal

NATIONAL EMBLEMS OF IMPORTANT COUNTRIES

Country	National Emblem
America	Golden Rod
Australia	Kangaroo
Ireland	Shamrock
Italy	White Lily
Israel	Candelabrum
Iran	Rose
Canada	White Lily
Great Britain	Rose
Chile	Candor and Huemul
Germany	Corn Flower
Japan	Chrysanthemum
Zimbabwe	Zimbabwe Bird
Denmark	Beach
Turkey	Crescent and Star
Netherlands	Lion
New Zealand	Kiwi, Fern, Southern Cross
Norway	Lion
Nepal	Kukri
Pakistan	Crescent
Poland	Eagle
France	Lily
Belgium	Lion
Bangladesh	Water Lily
Mongolia	The Soyombo
Russia	Double headed Eagle
Lebanon	Cedar Tree
Sudan	Secretary Bird
Syria	Eagle
India	Lioned Capital

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Important Signals/Signs and their meaning

Signal/Sign	Meaning
Red Triangle	Family Planning
Red Cross	Medical Help
Red Light	Danger, 'Stop' for the movement of vehicles
Green Light	Go
Olive Branch	Peace
Dove	Peace
Black Strip on Arm	Opposition
Black Flag	Opposition, Protest
Red Flag	Danger or Revolution
White Flag	Treaty or Surrender
Yellow flag	Vehicles with patients of contagious diseases
Two Bones across with a Skull	Danger of electricity
Half mast flown Flag	National mournning Sign of civilization and culture
Wheel	Sign of Progress
A blind folded woman with scale in hand	Sign of Justice

Wedding Anniversaries

Anniversaries	Name	Anniversaries	Name
First	Paper	Second	Cotton
Third	Leather	Fourth	Fruit and Flower
Fifth	Wood	Sixth	Sugar
Seventh	Woollen	Eighth	Bronze
Ninth	Pottery	Tenth	Tin
Twelth	Silk and Fine Linen	Fifteenth	Crystal
Twentieth	China	Twenty-fifth	Silver
Thirtieth	Pearl	Thirty-fifth	Coral
Fortieth	Ruby	Fiftieth	Golden
Fifty-fifth	Emerald	Sixtieth	Diamond
Sixty-fifth	Blue Sapphire	Seventieth	Platinum

DEFENCE SERVICES

Commissioned Ranks

Army	Navy	Air Force
General	Admiral	Air Chief Marshal
Lieutenant-General	Vice-Admiral	Air Marshal
Major-General	Rear Admiral	Air Vice-Marshal
Brigadier	Commodore	Air Commodore
Colonel	Captain	Group Captain
Lieutenant-Colonel	Commander	Wing Commander
Major	Lieutenant-Commander	Squadron Leader
Captain	Lieutenent	Flight Lieutenant
Lieutenant	Sub-Lieutenant	Flying Officer

FAMOUS BOOKS AND AUTHORS

Book	Author
A Pair of Blue Eyes	Thomas Hardy
A Week with Gandhi	Louis Fischer
Accession to Extinction	D.R. Mankekar
Adhe Adhure	Mohan Rakesh
Adventures of Sherlock Holmes	Arthur Conan Doyle
Adventures of Tom Saweyer	S.L. Glementes (Mark Twain)
Aeneid	Virgil
Affluent Society	J.K. Galbraith
After the Dark Night	S.M. Ali
Ain-i-Akbari	Abul Fazal
Ambassador's Journal	J.K. Galbraith
Ambassador's Report	Chester Bowles
Ancient Mariner	Coleridge
Apple Cart	G.B. Shaw
Area of Darkness	V.S. Naipal
Abhigyan Sakuntalam	Kalidasa
Agni Pariksha	Acharya Tulsi
Agni Veena	Kazi Nazrul Islam
Alphabet of Dust	Kamla Das
All My Yesterdays	Prem Bhatia
Amarkosha	Amar Singh
Ashtadhyayi	Panini
Arms & the Man	G.B. Shaw
Arthshastra	Kautilya
August 1914	Alexander Solzhenitsyn
Autobiography of an unknown Indian	Nirad C. chowdhury
Avanti Sundari	Dandin
Adventures of Huckelberry Finn	Mark Twain
Age of Reason	Jean paul Sartre (French)
All Quiet On the Western Front	Erick Maria Remarque
All the President's Men	Carl Bernstein and Bob Wood-ward
Amores	Ovid (Ancient Roman Poet)
Apology of Socrates	Plato
Ascent of Everest	Sir John Hunt (Swedish)
A Handful of Dust	Evelyn Waugh (Br.)
A House for Mr. Biswas	V. S. Naipaul (Ind-Br.)
A Sense of Time	H.S. Vatsyayan (Ind.)
A Strange and Sublime Address	Amit Chaudhary (Ind.)
A Streetcar Named Desire	Tennesse Williams (US)
A Study of History	Arnold J. Toynbee (Br.)
A Thousand Days	Arthur M. Schlesinger (US)
A Thousand Suns	Dominique Lapierre (Fr.)

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Anandmath	Bankim Chandra Chatterjee (Ind)
And Quiet Flows the Don	Mikhail Sholokhov (Br.)
Antony and Cleopatra	William Shakespeare (Br.)
Around the World in Eighty Days	Jules Verne (Fr.)
Arrowsmith	Sinclair Lewis (US)
As You Like It	W. Shakespeare (Br.)
Accidental Death of an Anarchist	Dairo Fo
A China Passage	John K. Galbraith
A Diplomat's Diary (1947-1999) : The Tantalising Triangle-China, India and USA	T.N. Kaul
A Farewell to Arms	Ernest Hemmingway
A Million Mutinies Now	V.S. Naipaul
A Midsummer Night's Dream	William Shakespeare
A Nation Flawed : Lessons from Indian History	P.N. Chopra
A Passage to England	Nirad C. Choudhuri
A Passage to India	E.M. Foster
A Prisoner's Scrapbook	L.K. Advani
A River Sutra	Gita Mehta
A Suitable Boy	Vikram Seth
A Tale of Two Cities	Charles Dickens
A Touch of Tennis	Ramanathan and Ramesh Krishan
A Vision for India 2020	APJ Abdul Kalam Azad with Y.S. Rajan
A Village by the Sea	Anitha Desai
Airport	Arthur Halley
Akbarnama	Abul Fazl
Alice in Wonderland	Lewis Carroll
A New World	Amit Chaudhuri
An American Tragedy	Theodre Dresier
An Equal Music	Vikram Seth
An Idealist View of Life	Dr. S. Radhakrishnan
Animal Farm	George Orwell
Anna Karenina	Leo Tolstoy
Ape and Essence	Aldous Huxley
Asian Drama	Gunnar Myrdal
An American in Khadi (Biography of Satyanand Stokes)	Asha Sharma
An Invitation to the White House	Ms. Hillary Clinton
Babit	Sinclair Lewis
Baburnama	Babur
Back to Methuselah	G.B. Shaw
Bhagwat Gita	Ved Vyas
Birth and Death of the Sun, The	George Gamow

Bisarjan	R.N. Tagore
Bitter Sweet	Noel Coward
Blind Beauty	Boris Pasternak
THE Blue Bird	Maurice Maeterlink
Brezhnev—The Masks of Power	John Dornberg
Broken Wing	Sarojini Naidu
Buddha Charitam	Ashvaghosha
Bacchea	Euripedes (Ancient Greek)
Ben Hur	Lewis Wallace
Bermuda Triangle	Berlitz
Birds of Paradise	R.D. Laing
Born Free	Joy Adamson
Bubble	Mulk Raj Anand
Beloved	Toni Morrison
Beyond Belief	V.S. Naipaul
Bharat Bharati	Maithli Saran Gupta
Bread, Beauty and Revolution	Khwaja Ahmad Abbas
Broken Bangles	Hanifa Deen
Casear and Cleopatra	G.B. Shaw
Chidambra	Sumitranandan Pant
Chinese Betrayal	B.N. Mullick
Chittirappavai	P.V. Akilandam
Commedy of Errors	Shakespeare
Comus	John Milton
Confession of a Thug	Taylor
Confidental Clerk	T.S. Eliot
Continent of Circe	Nirad C. Chowdhury
Child Labour in India	Dr. Lakshmidhar Mishra
Cradle and All	James Patterson
Chitra	Rabindra Nath Tagore
City of Joy	Dominique Lapierre
Communist Manifesto	Karl Marx
Communication Today	Reuban Ray
Confessions	J.J. Rousseau
Conquest of Self	Mahatma Gandhi
Coolie	Mulk Raj Anand
Corporate Excellence	Arun Kr. Jain
Creation	Gore Vidal
Crescent Moon	Rabindra Nath Tagore
Crisis into Chaos	EMS Namboodripad
Crime and Punishment	Dostoevsky
Crisis of India	Ronald Segal
City of God	St. Augustine
Count of Monte Cristo	Alexander Dumas (French)

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Coverley Papers	Joseph Addison
Candide	Voltaire (French)
Canterbury Tales, The	Geoffrey Chaucer
Centennial	James Michener
Dash Kumar Charitam	Dandin
Death of a President	William Manchester
Decline and Fall of the Roman Empire	Edward Gibbon
Decline of the West, The	O. Spengler
Deserted Village	Oliver Goldsmith
Discovery of India	Jawaharlal Nehru
Doctor's Dilemma	G.B. Shaw
Double Helix,	J.D. Watson
The Dragon's Teeth	U.B. Sinclair
Do and Die : The Chittagong Uprising : 1930-34	Manini Chatterjee
Das Capital	Karl Marx
Dateline Kargil	Gaurav Sawant
David Cooperfield	Charles Dickens
Death of a City	Amrita Pritam
Debacle	Emile Zola
Devdas	Sharat Chandra Chatterjee
Diana Vs. Charles	James Whitaker
Disgrace	J.M. Coetze
Divine Comedy	Alghieri Dante
Divine Life	Swami Shivanand
Dr. Jekyll & Mr. Hyde	Robert Louis Stevenson
Durgesh Nandini	Bankim Chandra Chatterjee
Dynamics of Social Change	Chandra Shekhar
Decameron	Boccaccio (Italian)
Dilemma of Our Times	H.J. Laski
Dr. Zhivago	Boris Pasternak (Russian)
Don Quixote	Cervantes (Spain)
Day in Shadow	Nayantara Sehgal
Days of His Grace	Eyvind Johnson
Defence Without Drift	P.V.R. Rao
Distant Neighbours	Kuldip Nayar
Experiments with Untruth	Michael Anderson
Environmentalism : A Global History	Ramchandra Guha
Engaging Scoundreis, True Tales of Old Lucknow	Rosie Llewellyn Jones
Earth	Emile Zola
Emma	Jane Austen
Embodiment : Essay on Gender and Identity	Meenakshi Thapar
Everest Hotel	Allan Scaley

Ends and Means	A. Huxley
Essays of Elia	Charles Lamb
Eye of the Storm	Patrick White
Expanding Universe	Eddington
Far From the Madding Crowd	Thomas Hardy
Fasana-i-Azad	Ratan Nath Sarshar
Farewell the Trumpets	James Morris
Farewell to Arms,	Ernest Hemingway
A First Circle	Alexander Solzhenitsyn
Flowering Nettles	Harry Martinson
Future Shock	Alvin Tofler
Face of Everest	Major HPS Ahluwalia
Fasting, Feasting	Anita Desai
Friends and Foes	Sheikh Mujibur Rahman
Fault Lines : Journey into the New South Africa	David Goodman
Fairie Queene	Edmund Spenser
Fathers and Sons	Ivan Turgenev (Russian)
Forsyte Saga	John Galsworthy
Frankenstein	Mary Shelley
Freedom At Midnight	Larry Collins and Dominique Lapierre
Fifth Horseman	Larry Collins and Dominique Lapierre
Fools Die	Mario Puzo
From Here to Eternity	James Jones
For whom the Bell Tolls	Ernest Hemingway
Friend, Not Masters	Ayub Khan
Gardener	Rabindra Nath Tagore
Geet Govind	Jaya Dev
Gitanjali	Rabindra Nath Tagore
Glimpses of World History	Jawahar Lal Nehru
Godan	Prem Chand
Gone With the Wind	Margaret Mitchel
Good Earth	Pearl Buck
Gora	Rabindra Nath Tagore
Great Expectations	Charles Dickens
Great Illusion	Normal Angell
Guide, The	R.K. Narayan
Gulag Archipelago	Alexander Solzhenitsyn
Gul-e-Neghma	Raghupati Sahai Firaq
Gullistan Bostan	Sheikh Saadi
Gypsy (Poem)	Pushkin
Ganadevata	Tara Shanker Bandopadhyaya
Gathering Storm	Winston Churchill
God of Small Things	Arundhati Roy

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Golden Threshold	Sarojini Naidu
Grammar of Politics	Harold Joseph Laski
Great Tragedy	Z.A. Bhutto
Ground Beneath Her Feet	Salman Rushdie
Gulliver's Travel	Jonathan Swift
Glass Place	Amitabh Ghosh
Growing Up in Anglo-India	Eric Stracey
God Father	Mario Puzo
Golden Bough, The	Sir James Frazer
Great Gatsby	Scott F. Fitzgerald
Hamlet	Shakespeare
Harsha Charita	Bana Bhat
Heat and Dust	Ruth P. Jhabwala
Henderson the Rain King	Saul Bellow
Henry Esmond	Thackeray
Himalayan Blunder	Brig. J.P. Dalvi
Hindu Civilization	J.M. Barrie
Hindu View of Life	Radhakrishnan
History of the Congress Party	Dr. Sankar Ghose
Hitopdesh	Narayan
Humboldt's Gift	Saul Bellow
Harry Poter and the Prisoner of Azkaban	J.K. Rowling
Headlong	Michael Frayn
Half opened Door	M. Mohankumar
Heart of Darkness	Joseph Conrad
History of World War II	Winston Churchill
Hunchback of Notre Dame	Victor Hugo (French)
Idiot, The	Fyodor Dostoevsky (Russian)
If I am Assassinated	Zulfikar Ali Bhutto
Importance of Being Earnest	Oscar Wilde
Importance of Living	Lin Yu Tang (Chinese)
Inside Europe	John Gunther
Inside Africa	John Gunther
Inside Asia	John Gunther
Insider the CBI	Joginder Singh
Insider, The	P.V. Narasimha Rao
Idols	Sunil Gavaskar
In Memoriam	Alfred Lord Tennyson
India's Culture : The State, the Arts & Beyond	V. P. Singh
India Divided	Dr. Rejendra Prasad
Indira Gandhi, The Emergency and Indian Democracy	P.N. Dhar
	N.A. Palkhivala
India's Priceless Heritage	

India and the Bomb : Public Opinion	David Cortright & Amitabh Matto
and Nuclear Options	H.G. Wells
Invisible Man	George Perkovich
India's Nuclear Bomb	Gurucharan Das
India Unbound	Jolm Keay
India : A History	John Keats
Isabella	Stev Weissman & Herbet Krouney
Islamic Bomb	Indres Naidoo
Islands in Chains	Tennyson
Idylls of the King	K.M. Munshi
I Follow the Mahatma	Homer
Illiad	Durga Dass
India from Curzon to Nehru and After	Maulana Abul Kalam Azad
India Wins Freedom	Prof. Mohd. Mujeeb
Indian Muslims	V.D. Savarkar
Indian war of Independence	Brines
Indo-Pakistani Conflict, The	Walter Scott
Ivanhoe	Khawja Ahmed Abbas
I am not an Island	Kuldip Nayar
India After Nehru	Kuldip Nayar
India—The Critical Years	Humphrey Trevelyan
India We Left	Albert Speer
Inside the Third Reich	K.M. Munshi
Jai Somnath	Rudyard Kipling
Jungle Book	Ginu Kamani
Junglee Girl	M.K. Akbar
Kargil : Cross Border Terrorism	Tavleen Singh
Kashmir : A Tragedy of Errors	Sati Sahni
Kashmir Underground	Alain de Botton
Kiss and Tell	Manubhai Pancholi
Kurukshetra	Meenakshi Saxena
Kiran Bedi, The Kindly Baton	Charlotte Bronte
Jane Eyere	V.V. Giri
Jobs for our Millions	Bana Bhatt
Kadambari	Vatsyayana
Kama Sutra	Jai Shankar Prasad
Kamayani	Raj Sekhara (*in Sanskrit*)
Karpurmanjari	Samule Beckett
Ken Attendant Godot	Sir Walter Scott
Kennilworth	Jan Nassar Akhtar
Khake-Dil	R.L. Stevenson
Kidnapped	Bharavi
Kiratarjuniyan	Coleridge
Kubla Khan	

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Kim	Rudyard Kipling
King Lear	Shakespeare
Kipps	H.G. Wells
Leaves of Grass	Walt Whitman
Le Miserables	Victor Hugo (French)
Letters From The Field	Margaret Mead
Leviathan	Hobbes
Life of Dr. Johnson	James Boswell
Lolita	V. Nobokov
Longest Day, The	Cornelius Ryan
Lord Jim	Joseph Conrad
Lycidas	John Milton
Lady Chatterley's Lover	D.H. Lawrence
Lajja	Taslima Nasreen
Long Walk to Freedom	Nelson Mandela
Love and Longing in Bombay	Vikram Chandra
Love, Truth and A Little Malice	Khushwant Singh
L'Allegro	John Milton
Last Days of Pompeii	Bulwar Lytton
Last Phase, The	Pyare Lal
Lead Kindly Light	Vincent Shean
Le Contrat Social (The Social Contract)	Rousseau
Life Divine	Aurobindo Ghosh
Living Room	Graham Greene
Mahabharata	Vyas
Major Barbara	G.B. Shaw
Malati Madhav	Bhavabhuti
Man, the Unknown	Carrol
Man and Superman	G.B. Shaw
Man from Moscow, The	Greville Wynne
Many Worlds	K.P.S. Menon
Marriage and Morals	Bertrand Russell
Mati Matal	Gopinath Mohanty
Meghdoot	Kalidas
Memoirs of the Second World War	Churchill
Merchant of Venice	Shakespeare
Modern Painters	John Ruskin
Mother India	Katherine Mayo
Mrichchakatikam	Sudraka (*in Sanskrit*)
Mrs. Warren's Profession	G.B. Shaw
Much Ado About Nothing	Shakespeare
Mudra Rakshasa	Vishakhadatta
Murder in the Cathedral	T.S. Eliot
Muslim Dilemma in India, The	M.R.A. Baig

My Experiments with Truth	Mahatma Gandhi
My Life, Law and Other Things	M.C. Setalvad
Mysterious Universe	James Jeans
Middle March	George Eliot
Midnight's Children	Salman Rushdie
Mother Teresa	Navin Chawla
My India	S. Nihal Singh
My Land My People	Dalai Lama
My Life and Times	V.V. Giri
My Music My Life	Pt. Ravi Shankar
My Struggles	E.K. Nayanar
My Everest Story	Mark Pfetzer & Jack Galvin
Militarism in India	Dr. Apurba Kundu
Mad Dog and an English Woman	Crystal Rogers
Moth Smoke	Mohsin Ahmad
My Own Witness, A Novel	Mrinal Pande
Magic Mountain	Thomas Mann
Maneaters of Kumaon	Jim Corbett
Maurice	E.M. Forster
Mein Kampf	Adolf Hitler (German)
Metamorphoses	Ovid (Ancient Roman)
Misanthrope	Moliere (French)
Moby Dick	Herman Melville
Morte D'Arthur	Thomas Mallory
Mother	Maxim Gorky (Russian)
Myth of Sysiphus	Albert Camus
Nagananda	King Sri Harsha
Naku Thanthi	Dattatreya Ramchandra Bendre
Nana	Emile Zola
Nine Days Wonder	John Masefield
Nisheeth	Umashankar Joshi
Niti-Sataka	Bhartrihari
Odakkuzhal	G. Sankar Kurup
Odyssey	Homer
Of Human Bondage	Somerset Maugham
Oh, Calcutta	Kenneth Tynan
Oh, Le Beaux Jours	Samuel Beckett
Old Man And The Sea, The	Ernest Hemingway
Oliver Twist	Charles Dickens
On Contradiction	Mao Tse-Tung
One World	Wendell Wilkie
Only One Year	Svetlana
Origin of Species	Charles Darwin
Orion, The	Richard Henry Hone

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Othello	Shakespeare
Our India	Minoo Masani
Our Presidents	M.A. Naidu
Out of Dust	F.D. Karaka
On the Edge of a Century	Arnian Dalta
On the Threshold of Hope	Pope John Paul
Our Fathers	Andrew O'Hagan
Our Films, Their Films	Satyajit Ray
One Life	Christian Bernard
Prathama Pratishruti	Ashapurna Devi
Prison Diary	Jayaprakash Narayan
Passions of the Mind	Irving Stone
Philosophy of Right	G.U. Hegel
Picture of Dorian Gray	Oscar Wilde
Pilgrim's Progress	John Bunyan
Portrait of an Artist As a Young Man	James Joyce
Portrait of a Lady	Henry James
Prince, The	Machiavelli (Italian)
Perspective on Indian Economy	Dr. C. Rangarajan
Plain Speaking	Chandrababu Naidu &
Sewanti Ninan Pakistan Cut to Size	D.R. Mankekar
Portrait of India	Ved Mehta
Prizes	Erle Segal
Prospectus For Democracy in Asia	Tatu Vanhanen
Pakistan's ISI : Network of Terror in India	S.K. Ghosh
Postcards From No Man's Land	Adian Chambers
People Like Us	Pawan Kr. Verma
Padmavat	Jyasi, Malik Mohammed
Pakistan Crisis	David Loshak
Panchagram	Tarashankar Bandyopadhyaya
Panchali Sapatham	Subramaniam Bharati
Panchtantra	Vishnu Sharma
Paradise Lost	John Milton
Pather Panchali	Bibhuti Bhushan Bandopadhyaya
Pavittar Papi (*in Punjabi*)	Nanak Singh
Peter Pan	J.M. Barrie
Pichale-Paher	Jan Nissar Akhtar
Pickwick Papers	Charles Dickens
Plague	Albert Camus
Post Office, The (Dak Ghar)	Rabindra Nath Tagore
Prem Pachisi	Prem Chand
Prison and Chocolate Cake	Nayantara Sehgal
Prithvi Raj Raso	Chand Bardai
Pride and Prejudice	Jane Austen

Principia	Issac Newton
Pygmalion	G.B. Shaw
Quest of Conscience	Madhu Dandvate
Reading & Writing	V.S. Naipaul
Rebirth	Leonoid Brezhnev
Red Earth and Pouring Rain	Vikrama Chandra
Raghuvamsa	Kalidas
Rains Came	Louis Bromfield
Rajtarangini	Kalhana
Ramayana	Valmiki (*in Sanskrit*)
Ramayana Darshanam	K.V. Puttappa
Ram Charit Manas	Tulsidas
Rape of Bangladesh	Anthony Mascrenhas
Ratnavali	King Sri Harsha
Razor's Edge	Somerest Maugham
Red Tape and White Cap	P.V.R. Rao
Republic, The	Plato
Robinson Crusoe	Daniel Defoe
Rubaiyat-i-Omar Khaiyam	Edward Fitzgerald
Red Badge of Courage	Stephen Crane
Red Star Over China	Edger Snow
Rights of Man	Thomas Paine
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ABBREVIATIONS

☐ POLITICAL

AAGSP	:	All Assam Gana Sangram Parishad
AASU	:	All Assam Student's Union
ADMK	:	Anna Dravid Munnetra Karagam
AIADMK	:	All India Anna Dravid Munnetra Karagam
AICC	:	All India Congress Committee
AISF	:	All India Student's Federation
BKU	:	Bhartiya Kisan Union
BKKP	:	Bhartiya Kisan Kamgar Party
BMS	:	Bharatiya Mazdoor Sangh
BSP	:	Bahujan Samaj Party
BSS	:	Bharat Sevak Samaj
CITU	:	Centre of Indian Trade Unions
CPI	:	Communist Party of India
CPI (M)	:	Communist Party of India (Marxist)
DMK	:	Dravid Munnetra Karagam
INTUC	:	Indian National Trade Union Congress
ISYF	:	International Sikh Youth Federation
ITUC	:	Indian Trade Union Congress
IYC	:	Indian Youth Congress
JMM	:	Jharkhand Mukti Morcha
LCP	:	Loktantrik Congress Party
LD	:	Lok Dal
MCC	:	Maoist Communist Centre
MGP	:	Maharashtra Gomantak Party
MKSS	:	Mazdoor Kisan Sangram Samiti
NDA	:	National Democratic Alliance
NNDP	:	Naga National Democratic Party
NSCN	:	National Socialist Council of Nagaland
RJD	:	Rashtriya Janata Dal
RSS	:	Rashtriya Swayamsevak Sangh
SGPC	:	Shiromani Gurudwara Prabandhak Committee
SIMI	:	Student's Islamic Movements of India
SP	:	Samajwadi Party
TDP	:	Telugu Desam Party
TMC	:	Tamil Manila Congress

☐ TERRORIST ORGANISATION

ATPLO	:	All Tripura People's Liberation Organisation
EPRLF	:	Elam People's Revolutionary Liberation Front

GNLF	:	Gorkha National Liberation Front
HPLA	:	Hill People's Liberation Army
JKLF	:	Jammu & Kashmir Liberation Front
LeT	:	Lashkar-e-Toiba
LTTE	:	Liberation Tigers of Tamil Elam
MNF	:	Mizo National Front
NLF	:	National Liberation Front
PLA	:	People's Liberation Army (Manipur)
POTA	:	Prevention of Terrorism Act
PWG	:	People's War Group
RS	:	Ranveer Sena
TELF	:	Tamil Elam Liberation Front
TUJS	:	Tripura Upjati Jana Sabha
TULF	:	Tamil United Liberation Front

☐ ECONOMY

ADB	Asian Development Bank
ADIAD	Association of Domestic Companies Affected by Dumping
AIBP	Accelerated Irrigation Benefit Programme
APC	Agriculture Prices Commission
APL	Above Poverty Line
APM	Administered Price Mechanism
ASSOCHAM	Associated Chamber of Commerce and Industry

O

BIFR	Board for Industrial and Financial Reconstruction
BOP	Balance of Payments
BPL	Below Poverty Line

O

CADP	Command Area Development Programme
CCIS	Comprehensive Crop Insurance Scheme
CDSL	Central Depository Services Limited
CIF	Cost Insurance Freight
CPI	Consumer Price Index
CPI(AL)	Consumer Price Index for Agricultural Laboures
CP(IW)	Consumer Price Index for Industrial Workers
CPSUs	Central Public Sector Undertakings
CRR	Cash Reserve Ratio
CSO	Central Statistical Organisation
DEPB	Duty Entitlement Pass Book
DFHI	Discount and Finance House of India
DGFT	Director General Foreign Trade
DIC	District Industrial Centre
DPAP	Drought Prone Area Programme

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DRI	Differential Rate of Interest
DWCRA	Development of Women and Children in Rural Areas
EAS	Employment Assurance Scheme
EC	European Community
ECBs	External Commercial Borrowings
EEFC	Exchange Earner Foreign Exchange
EEU	European Economic Union
EOU	Export Oriented Unit
EPZ	Export Processing Zone
EXIM Bank	Export-Import Bank of India
FC	Finance Commission
FCI	Food Corporation of India
FCNR(A)	Foreign Currency Non-Resident (Accounts)
FCNR(B)	Foreign Currency Non-Resident (Banks)
FDI	Foreign Direct Investment
FEMA	Foreign Exchange Management Act
FERA	Foreign Exchange Regulation Act
FI	Financial Institutions
FICCI	Federation of Indian Chamber of Commerce and Industry
FIIs	Foreign Institutional Investors
FoB	Free on Board
FPS	Fair Price Shop
FTZs	Free Trade Zones
GAPS	General Agreement of Preference System
GATS	General Agreement on Trade and Services
GATT	General Agreement on Tariff and Trade
GDP	Gross Domestic Product
GNP	Gross National Product
GIC	General Insurance Corporation
HDI	Human Development Index
HRD	Human Resource Development
HUDCO	Housing and Urban Development Corporation
HYVP	High Yielding Varieties Programme
IADP	Intensive Area Development Programme
IARI	Indian Agricultural Research Institute
IBRD	International Bank for Reconstruction and Development (World Bank)
ICAR	Indian Council of Agricultural Research
ICDS	Integrated Child Development Programme

ICICI	Industrial Credit and Investment Corporation of India
ICOR	Incremental Capital-Output Ratio
IDBI	Industrial Development Bank of India
IDBs	India Development Bonds
IFC	International Finance Corporation
IFCI	Industrial Finance Corporation of India
IFFCO	Indian Farmers Fertilizers Cooperative Ltd.
IIP	Index of Industrial Production
IISCO	Indian Iron and Steel Company
ILO	International Labour Organisation
IMR	Infant Mortality Rate
IMY	Indira Mahila Yojana
IPR	Industrial Policy Resolution
IRA	Insurance Regulatory Authority
IRBI	Industrial Reconstruction Bank of India
IRDP	Integrated Rural Development Programme
ITPO	Indian Trade Promotion Organisation
JRY	Jawahar Rozgar Yojana
JVC	Joint Venture Companies
JVs	Joint Ventures
KVIC	Khadi and Village Industries Commission
KVKs	Krishi Vigyan Kendras
LDC	Less Developed Countries
LERMS	Liberalised Exchange Rate Management System
LIC	Life Insurance Corporation
MAT	Minimum Alternate Tax
MFAL	Marginal Farmer's and Agricultural Labourers
MMTC	Mineral and Metals Trading Corporation
MNC	Multi National Corporation
MNP	Minimum Needs Programme
MODVAT	Modified Value Added Tax
MOU	Memorandum of Understanding
MRTP	Monopolies and Restrictive Trade Practices
MSY	Mahila Samriddhi Yojana
MWS	Million Wells Scheme
NABARD	National Bank for Agriculture and Rural Development
NAFED	National Agricultural Co-operative Marketing Federation of India Ltd.
NBFC	Non-Banking Financial Companies

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NDC	National Development Council
NDP	Net Domestic Product
NEP	New Economic Policy
NFBS	National Family Benefit Scheme
NGO	Non-Government Organisaton
NHAI	National Highway Authority of India
NHB	National Housing Bank
NI	National Income
NLM	National Literacy Mission
NMBS	National Maternity Benefit Scheme
NNI	Net National Income
NNP	Net National Product
NOAPS	National Old Age Pension Scheme
NPAs	Non-Performing Assets
NR(E)RA	Non-Resident (External) Rupee Account
NRIs	Non-Resident Indians
NR(NR)RD	Non-Resident (Non-Repatriable) Rupee Deposits
NRY	Nehru Rozgar Yojana
NSAP	National Social Assistance Programme
NSC	National Seeds Corporation
NSDL	National Securities Depository Limited
NSEI	National Stock Exchange of India
NSSO	National Sample Survey Organisation
NWDPRA	National Watershed Development Project for Rainfed Area
OECD	Organisation for Economic Co-operation and Development
OGL	Open General Licence
OMO	Open Market Operations
ONGC	Oil and Natural Gas Commission
OPC	Oil Price Committee
OPEC	Organisation of Petroleum Exporting Countries
OTCEL	Over the Counter Exchange
PDS	Pubic Distribution System
PCI	Per Capital Income
PLR	Prime Lending Rate
PIO	Persons of Indian Origin
PMIUPEP	Prime Minister's Integrated Urban Poverty Eradication Programme
PMRY	Pradhan Mantri Rozgar Yojana
PRIs	Panchayati Raj Institutions
PSBs	Pubic Sector Banks
PSE	Public Sector Enterprises
PSU	Public Sector Undertaking

QRs	Quantitative Restrictions
R&D	Research and Development
RBI	Reserve Bank of India
RE	Revised Estimate
RIDF	Rural Infrastructure Development Fund
RLEGP	Rural Landless Employment Guarantee Programme
RRBs	Regional Rural Banks
SAARC	South Asian Association for Regional Co-operation
SAIL	Steel Authority of India Ltd.
SAP	Structural Adjustment Programme
SAPTA	South Asian Preferential Trade Agreement
SCOPE	Standing Conference of Public Enterprises
SDRs	Special Drawing Rights
SEBI	Securities and Exchange Board of India
SFC	State Financial Corporation
SFCI	State Farm Corporation of India
SIDBI	Small Industries Development Bank of India
SIDF	Small Industries Development Fund
SIDO	Small Industries Development Organisation
SIL	Special Import License
SJSRY	Swarna Jayanti Shahari Rozgar Yojana
SLR	Statutory Liquidity Ratio
SSI	Small Scale Industry
STC	State Trading Corporation
STEP	Support to Training and Employment Programme
SWS	Single Window Scheme
TADP	Tribal Area Development Programme
TDS	Tax Deduction at Source
TISCO	Tata Iron and Steel Company
TPDS	Targeted Public Distribution System
TRAI	Telecom Regulatory Authority of India
TRIFED	Tribal Co-operative Marketing Development Federation of India Limited
TRIMS	Trade Related Investment Measures
TRIPS	Trade Related Intellectual Property Rights
TRYSEM	Training of Rural Youth for Self-employment
UDCs	Under Developed Countries
UERS	Unified Exchange Rate System
UNDP	United Nations Development Programme

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UNO	United Nations Organisation
USEP	Urban Self-Employment Programme
UWEP	Urban Wage Employment Programme
UTI	Unit Trust of India

O

VABAL	Value Based Advanced Licensing
VAT	Value Added Tax
VCF	Venture Capital Fund
VRS	Voluntary Retirement Scheme

O

WEF	World Economic Forum
WMA	Ways and Means Advances
WPI	Wholesale Price Index
ZIP	: Zonal Improvement Plan

INTERNATIONAL

APEC	: Asia Pacific Economic Cooperation
ASEAN	: Association of South-East Asian Nations
BIMSTEC	: Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation
CIA	: Central Intelligence Agency
CIS	: Commonwealth of Independent States
ECM	: European Common Market
ECOSOC	: Economic and Social Council (UN)
EFTA	: European Free Trade Association
ESA	: European Space Agency
ESCAP	: Economic and Social Commission for Asia and the Pacific
EURATOM	: European Atomic Community
FAO	: Food and Agricultural Organisation
FBI	: Federal Bureau of Investigation
GCC	: Gulf Cooperation Council
IAEA	: International Atomic Energy Agency
IATA	: International Air Transport Association
IBCC	: International Bureau of Chamber of Commerce
IBRD	: International Bank for Reconstruction and Development
ICAO	: International Civil Aviation Organisation
ICJ	: International Court of Justice
ICPD	: International Conference on Population and Development
ICRC	: International Committee of the Red Cross
IDA	: International Development Agency
ILO	: International Labour Organisation

IMF	: International Monetary Fund
INTERPOL	: International Police
IORARC	: Indian Ocean Rim Association for Regional Cooperation
IPU	: Inter-Parliamentary Union
IRA	: Irish Republican Army
IRC	: International Red Cross
ITU	: International Telecommunication Union
KGB	: Komitet Gosudarst Vennony Bizo Pasnosti (Russian Secret Police Organisation
NAFTA	: North American Free Trade Agreement (Area)
NATO	: North Atlantic Treaty Organisation
NSG	: Nuclear Supplier Group
OAPEC	: Organisation of Arab Petroleum Exporting Countries
OAS	: Organisation of American States
OAU	: Organisation of African Unity
OECD	: Organisation of Economic Cooperation and Development
OSCE	: Organisation for Security and Cooperation
OXFAM	: Oxford Committee for Famine Relief
SAEC	: South Asian Economic Community
SAFTA	: South Asian Free Trade Area (Agreement)
SAPTA	: South Asian Preferential Trade Agreement
SUNFED	: Special United Nations Fund for Economic Development
TANA	: Telugu Association of North America
UIA	: Union Internationaldes Advocates (International Association of Lawyers)
UNCED	: United Nations Conference on Environment and Development
UNCIP	: United Nations Commission for India and Pakistan
UNCLOS	: United Nations Convention on the Law of Sea
UNCSTD	: United Nations Conference on Science and Technology for Development
UNCTAD	: United Nations Conference on Trade and Development
UNEP	: United Nations Environment Programme
UNESCO	: United Nations Educational, Scientific and Cultural Organisation
UNFPA	: United Nations Population Fund
UNICEF	: United Nations International Children's Emergency Fund
UNIDO	: United Nations Industrial Development Organisation
UNIPOM	: United Nations India-Pakistan Observation Mission
UNMOGIP	: United Nations Military Observer Group in India and Pakistan

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UNPROFOR: United Nations Protection Force
UNRRA : United Nations Relief and Rehabilitation Administration
UNU : United Nations University
USAID : United States Agency for International Development
WFTU : World Federation of Trade Unions
WHO : World Health Organisation
WMO : World Meteorological Organisation
WTO : World Trade Organisation
YMCA : Young Men's Christian Association

☐ SCIENCE

AB : Atomic Bomb
ABC : Atomic Biological and Chemical (Warfare); Audit Bureau of Circulation
ABM : Anti-Ballistic Missile
ACAS : Airborne Collision Avoidance System
ACD : Anti Collision Devices
ADHD : Attention Deficit Hyperactivity Disorder
ADS : Air Defence Ship
AICTE : All India Council of Technical Education
AIDS : Acquired Immuno Deficiency Syndrome
AIIMS : All India Institute of Medical Science
ASCII : Alphabetic Code for Information Interchange
ASLV : Augmented Satellite Launch Vehicle
ATS : Anti-Tetanus Serum
AVRC : Audio-Visual Research Centre
BARC : Bhabha Atomic Research Centre
BCG : Bacillus Calmette Guerin (Anti-TB Vaccine)
CAISS : Committee for Authorising the Establishment and Operation of Indian Satellite System
CAPES : Computer Aided Paperless Examination System
CD : Compact Disc, Certificate of Deposit
CFC : Chloro-Fluoro Carbon
CHECMATE: Compact High Energy Capacitor Module Advanced Technology Experiment
CISC : Complex Instruction Set Computing
COSMAT : Communications Satellite Corporation
CVR : Cockpit Voice Recorder
CYPLS : CSIR Programme on Youth Leadership in Science
DDT : Dichloro-diphenyl-trichloro-ethane

DIAS : DoT's Internet Access Service
DNA : Deoxyribo Nucleic Acid
DOS : Desk Operating System
DOTS : Directly Observed Treatment Short-Course
DPT : Diptheria, Pertussis and Tetanus (Vaccine)
DSB : Digital Satellite Broadcasting
DSP : Digital Signal Processing
DTP : Desk Top Publishing
E-mail : Electronic Mailing
ECR : Electron Cyclotron Resonance
EDMS : Electronic Document Management System
EEG : Electro-Encephalogram
EL : Electro-Luminescent
ELINT : Electronic Intelligence
ELISA : Enzyme Linked Immuno Sorbent Assay
ENIAC : Electronic Numerical Integrator and Calculator
ESP : Extra-Sensory Perception
ESR : Electron Spin Resonance
ETT : Embryo Transfer Technology
EVM : Electronic Voting Machine
EVR : Electro Video Recording
FBTR : Fast Breeder Test Recorder
FIRE : Fully Integrated Robotised Engine
FM : Frequency Modulation
GBP : Geosphere Biosphere Programme
GEMS : Gateway Electronic Mail Services
GIAS : Gateway Internet Access Services
GMRT : Giant Metrewave Radio Telescope
GMT : Greenwich Mean Time
GPSS : Gateway Packet Switching System
G R S : Gender Reassignment Survey (Sex change)
GSLV : Geo-Synchronus Satellite Launch Vehicle
HAL : Hindustan Aeronautics Limited
HBV : Hepatitis B Virus
HEV : Hepatitis E Virus
HF : High Frequency
HFD : High Frequency Doppler
HIV : Human Immuno Deficiency Virus

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HMT	:	Hindustan Machine Tools
HRPT	:	High Resolution Picture Transmission
HTR	:	High Temperature Reactor
ICBM	:	Inter-Continental Ballistic Missile
IDE	:	Integrated Device Electronics
IMAP	:	Internet Mail Access Protocol
INSAT	:	Indian National Satellite
INTELSAT	:	International Telecommunication Satellite
IRBM	:	Intermediate Range Ballistic Missile
ISDN	:	Integrated Services Digital Network
IUCD	:	Intra -Uterine Contraceptive Device
IVF	:	In Vitro Fertilisation
IVM	:	In Vitro Maturation
IVRS	:	Interactive Voice Response System
KVPY	:	Krishi Vigyanki Protsahan Yojana
METSAT	:	Metereological Satellite
NEVA	:	Naked Eye Vision Agglutination
SITA	:	Studies in Information Technology Applications
TEPP	:	Technopreneur Promotion Programme

☐ SPORTS

AAAA	:	Asian Amateur Athletics Association
AAFI	:	Amateur Athletics Federation of India
AGF	:	Asian Games Federation
AIFA	:	All India Football Association
AKFI	:	Amateur Kabaddi Federation of India
BCCI	:	Board of Control for Cricket in India
CCI	:	Cricket Club of India
FIFA	:	International Football Federation (Federation International de Football Association)
FIH	:	Federation of International Hockey
IBM	:	International Badminton Association
ICC	:	International Cricket Council
IOA	:	Indian Olympic Association
IOC	:	International Olympic Committee
MCC	:	Melbourne Cricket Club
NIS	:	National Institute of Sports
SAI	:	Sports Authority of India

☐ MISCELLANEOUS

AD	:	Anno Domini (Latin)
AM	:	Ante-Meridiem (Latin)
AIWC	:	All India Women Conference
AVARD	:	Association of Voluntary Agencies for Rural Development
BC	:	Before Christ
BHEL	:	Bharat Heavy Electricals Limited
BPE	:	Bureau of Public Enterprises
BREAD	:	Basic Research, Education and Development (Society)
CBI	:	Central Bureau of Investigation
CBSE	:	Central Board of Secondary Education
CID	:	Criminal Investigation Department
CISF	:	Central Industrial Security Force
CLASS	:	Computer Literacy and Studies in School
CMDRO	:	Central Marine Design Research Organisation
CMEA	:	Council for Mutual Economic Assistance
COFMOW	:	Central Organisation for Modernisation of Workshops
CSIR	:	Council of Scientific and Industrial Research
DIG	:	Deputy Inspector General
DPAP	:	Drought Prone Area Programme
DRES	:	Department of Renewable Energy Sources
ERDA	:	Energy Research and Development Administration
ESIS	:	Employees State Insurance Scheme
ESMA	:	Essential Services Maintenance Act
FTII	:	Film and Television Institute of India
GSI	:	Geological Survey of India
HMI	:	Himalayan Mountaineering Institute
IA	:	Indian Airlines
IAAI	:	International Airport Authority of India
IARI	:	Indian Agricultural Research Institute
ICAR	:	Indian Council of Agricultural Research
ICCR	:	Indian Council of Cultural Relations
ICMR	:	Indian Council of Medical Research
ICSSR	:	Indian Council of Scientific and Social Research
IDPL	:	Indian Drugs and Pharmaceuticals Limited
IDSA	:	Institute of Defence Studies and Analysis
IIAR	:	Indian Institute of Agricultural Research
INTACH	:	Indian National Trust for Art and Cultural Heritage
IPC	:	Indian Penal Code
ITDC	:	Indian Tourism Development Corporation

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MCOCA	:	Maharashtra Control of Organised Crime Act
NCERT	:	National Council of Educational Research and Training
NDDB	:	National Dairy Development Board
NEEM	:	National Elementary Education Mission
NFDC	:	National Film Development Corporation
NIFT	:	National Institute of Fashion Technology
OIL	:	Oil India Limited
OT	:	Operation Theatre
PAC	:	Public Accounts Committee
PCI	:	Press Council of India
PDA	:	Preventive Detention Act
PDS	:	Public Distribution System
PIB	:	Press Information Bureau
PM	:	Post Meridiem
PTI	:	Press Trust of India
PVC	:	Param Veer Chakra
PVSM	:	Param Vishishta Seva Medal
RAW	:	Research and Analysis Wing
RLO	:	Returned Letter Office
RMS	:	Railway Mail Service
SAIL	:	Steel Authority of India Limited
TELCO	:	Tata Engineering and Locomotive Company
UGC	:	University Grant Commission
UNI	:	United News of India
UPSC	:	Union Public Service Commission
VIP	:	Very Important Person
VPP	:	Value Payable Post
VVF	:	Village Volunteer Force
FRCS	:	Fellow of the Royal College of Surgeons
FRGS	:	Fellow of the Royal Geographical Society
GATT	:	General Agreement on Tariff and Trade
GEF	:	Global Environment Fund
G P S	:	Global Positioning System
G S P	:	Generalised System Preference
TRIMS	:	Trade Related Investment Measures
TRIPS	:	Trade Related Intellectual Property Rights
UNITA	:	Union for the Total Independence of Angola
WAY	:	World Assembly of Youth
WWW	:	World Wide Web; World Weather Watch
ZOPFAN	:	Zone of Peace, Freedom and Neutrality

LATEST ABBREVIATIONS

AAD	:	Academic for Action and Development
AAGOC	:	Afro-Asian Games Organisation Committee
ABCDE	:	Annual Bank Conference on Development Economics
ABTO	:	Association of Basic Telecom Operators
AHWR	:	Advanced Heavy Water Reactor
AICI	:	Agricultural Insurance Corporation of India
AIEEE	:	All India Engineering Entrance Examination
AJT	:	Advanced Jet Trainer
APEDA	:	Agricultural and Processed Food Product Exporting Development Authority
APHC	:	All Party Hurriyat Conference
APT	:	Asia Pacific Telecommunity
ARC	:	Asset Reconstruction Corporation of India
AREA	:	All India Rice Exporters Association
ASCI	:	Advertising Standards Council of India
ASOCIA	:	Asian Oceanic Computer Industry Association
ASVA	:	Anti Snake Animals Venom Serum
AUV	:	Autonomous Underwater Vehicle
AVUT	:	Association of Victims of Uphar Tragedy
BAGOC	:	Bushan Asian Games Organising Committee
BALCO	:	Bharat Aluminium Company Limited
BDNF	:	Brain Derived Neurotropic Factor
BDR	:	Bangla Desh Rifles
BII	:	Bottled in India
BIO	:	Bottled in Origin
BLESS	:	Borrowing and Lending Securities Scheme
BSNL	:	Bharat Sanchar Nigam Limited
BTAD	:	Bodoland Territorial Area District
BTC	:	Bodoland Territorial Council
BUPA	:	British United Provident Association
CARA	:	Central Adoption Resources Agency
CBHD	:	Centre for Bioethics and Human Dignity
CBM	:	Confidence Building Measures
CCEA	:	Cabinet Committee for Economic Affairs
CCI	:	Competition Commission of India
CCI	:	Consumer Confidence Index
CDMA	:	Code Division Multiple Access
CDS	:	Chief of Defence Staff
CEA	:	Central Electricity Authority
CIN	:	Corporate Identity Number
CITA	:	Centre for International Trade in Agriculture and Agro-based Industries

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CMG	:	Crisis Management Group
C N G	:	Compressed Natural Gas
COAI	:	Cellular Operators' Association of India
COCA	:	Control of Organised Crime Act
CPJ	:	Committee to Protect Journalist
CPI	:	Corruption Perception Index
CPCSEA	:	Committee for the Purpose of Control and Supervision of Experiments on Animals
CRA	:	Cauvery River Authority
CSE	:	Centre for Science and Environment
CTBTO	:	Comprehensive Nuclear Test Ban Treaty Organisation
CVD	:	Counter-Vailing Duty
DIA	:	Defence Intelligence Agency
DMRCL	:	Delhi Metro Rail Corporation Limited
DOTS	:	Directly Observed Treatment Short Course
DPB	:	Defence Procurement Board
ECB	:	European Central Bank
EDCIL	:	Educational Consultant India Ltd.
EEC	:	Eurasian Economic Community
EI	:	Education International
FCTC	:	Framework Convention on Tobacco Control
FICA	:	Federal of International Cricketers's Association
FLING	:	Fleet Evening
FMD	:	Foot and Mouth Disease
GEAC	:	Genetic Engineering Approval, Committee.
GSOMIA	:	General Security on Military Information Agreement
GMO	:	Genetically Modified Organism
GMUNET	:	Global Mega University Network
GOM	:	Group of Ministers
GOPIO	:	Global Organisation of People of Indian Origin
GRA	:	Global Research Alliance
GRT	:	Gross Registered Tonnage
GSM	:	Global System for Mobile Communication
GTO	:	Geo-Synchronous Transfer Orbit
HECS	:	Human Embryonic Stem Cells
HISA	:	Hero Indian Sports Academy
HHS	:	Health and Human Services
HRW	:	Human Rights Watch
IAHV	:	International Association for Human Value
IAVI	:	International AIDS Vaccine Initiative
IBAM	:	Indian Board of Alternative Medicines
ICC	:	International Criminal Court

ICODE	:	International Council for Open and Distance Education
IESA	:	International Institute of Employed System Analysis
INCB	:	International Narcotics Control Board
INSTEP	:	Integrating New and Sustainable Technologies for Elimination of Poverty
IOPT	:	International Organisation to Promote Tourism
ISMA	:	Indian Sugar Mills Association
ISS	:	International Space Station
JKNF	:	Jammu Kashmir Nationalist Front
KPF	:	Kosovo Protection Force
MAMI	:	Mumbai Academy of Moving Images
METSAT	:	Meteorological Satellite
MGC	:	Mekong-Ganga Cooperation
MMCB	:	Madhavpura Mercantile Cooperative Bank
MRTS	:	Mass Rapid Transport System
NA	:	Northern Alliance
NAAC	:	National Assessment and Accreditation Council
NABCONS	:	NABARD Consultancy Services Ltd.
NAFER	:	National Alliance for Fundamental Right to Education
NASSCOM	:	National Association of Software Services Companies
NAV	:	Net Asset Value
NBCIS	:	National Building Code and Indian Standard
NBPGR	:	National Building of Plant Genetic Resources
NCA	:	Nuclear Command Authority
NCCB	:	National Council for Cement and Building Material
NCCF	:	National Calamity Contingency Fund
NCDM	:	National Centre for Disaster Management
NCF	:	National Cultural Fund
NCFSE	:	National Curriculum Framework of Secondary Education
NCLT	:	National Company Law Tribunal
NCST	:	National Commission for Scheduled Tribes
NCSC	:	National Commission for Scheduled Castes
NEERI	:	National Environment Engineering Research Institute
NERCFA	:	North-East Conference of Commonwealth Parliamentary Association
NID	:	National Identity Card
NINI	:	National Inland Navigation Institute
NFCR	:	National Fund for Calamity Relief
NMD	:	National Missile Defence
NSAB	:	National Security Advisory Board
NTFO	:	National Technical Facilities Organisation
OPECNA	:	OPEC News Agency

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PFI	:	Peteroleum Federation of India
PGA	:	Peoples' Guerilla Army
PHDCCI	:	(Progress, Harmony and Development Chambers of Commerce and Industry
PLAN	:	Peoples' Liberation Army Navy
PMBJP	:	Pradhan Mantri ki Bharat Jodo Pariyojana
PMNRF	:	Prime Minister's National Relief Fund
PMSCP	:	Progressive Manipur State Congress Party
POTO	:	Prevention of Terrorism Ordinance
POTA	:	Prevention of Terrorism Act
PUCC	:	Pollution Under Control Certificate
RBA	:	Royal Bhutan Army
RIDF	:	Rural Infrastructure Developmenct Fund
SARS	:	Severe Acute Respiratory Syndrome
SASEC	:	South Asian Sub-regional Economic Cooperation
S C O	:	Sanghai Co-operation Organisation
SETI	:	Search of Extra Terrestrial Intelligence
SEWA	:	Self-Employed Women's Association
SFO	:	Serious Fraud Office
S G R Y	:	Sampoorna Grameen Rojgar Yojana
SIL	:	Sterlite Industries Limited
S I S	:	Secret Intelligence Services
SMS	:	Short Messaging Service
SSN	:	Social Security Number
TIFAC	:	Technology Information Forecasting and Assessment Council
TIN	:	Tax Payer's Identification Number
TIN	:	Tax Information Network
TUFS	:	Technology Upgradation Fund Scheme
TWAS	:	Third World Academy of Sciences
TWI	:	Trans World International
UNFCCC	:	United Nations Framework Convention on Climate Change
UMIOR	:	Universal Mobility in the Indian Ocean Region
UNMEE	:	United Nations Mission in Ethiopia and Eritrea
VACA	:	Voluntary Adoption Coordinating Agency
VAMBAY	:	Valmiki Ambedkar Awas Yojana
VOIP	:	Voice State Domestic Product
WCAR	:	World Conference Against Racism
WDC	:	World Dam Commission
WWW	:	World Wide Web

DEFENCE INSTITUTIONS OF INDIA

MILITARY TRAINING CENTRES

- National Defence Academy, Khadakwasla
- Indian Military Academy, Dehradun
- Rashtriya Indian Military College, Dehradun
- National Defence College, New Delhi
- Defence Services Staff College, Wellington
- Officer's Training Academy, Chennai
- College of Combat, Mhow (renamed as **Army War College)**
- Armoured Corps Centre and School, Ahmednagar
- Infantry School, Mhow
- College of Military Engineering, Pune
- Military College of Telecommunication Engineering, Mhow
- College of Defence Management, Secunderabad
- Army Cadet College, Dehradun
- Junior Cadet College, Dehradun
- Junior Leaders Wing, Belgaum
- Junior Leaders Academy, Bareilly
- High Altitude Warfare School, Gulmarg
- Army Service Corps Centre and College, Bangalore
- Military College of Electronics and Mechanical Engineering, Secunderabad
- Remount and Veterinary Corps Centre and School, Meerut
- Army Education Corps Training College and Centre, Pachmarhi
- Corps of Military Police Centre and School, Bangalore
- Army School of Physical Training, Pune
- Army Airborne Training School, Agra
- Counter Insurgency and Jungle Warfare School, Valrengate
- Institute of National Integration, Pune.
- Junior Leaders Academy, Ramgarh
- Army Air Defence College, Gopalpur-on-Sea
- School of Artillery, Deolali
- Military Music Wing, Pachmarhi
- Army Medical Corps Centre and School, Lucknow
- Army Education Corps Training College and Centre, Bhopal
- Military School at Ajmer, Bangalore, Belgaum, Chail and Dholpur

NAVAL TRAINING CENTRES

- INS *Chilka*, Bhubaneshwar
- INS *Circars*, Vishakhapatnam
- INS *Hamla*, Malad, Mumbai
- INS *Shivaji*, Lonavala (Maharashtra)
- INS *Valsura*, Jamnagar (Gujarat)
- INS *Venduruthy*, Kochi
- Indian Naval Academy, Kochi

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- Navy Shipwright School, Vishakhapatnam
- Sailors' Training Establishment, Dabolim (Goa).

AIR FORCE TRAINING CENTRES

- Air Force Administrative College, Coimbatore
- Air Force Flying College, Jodhpur
- Air Force Technical College, Jalahalli (Bangalore)
- Air Force School, Jalahalli (Bangalore)
- Air Force School, Tarambaram
- Net Training Wings and Transport Training Wing Hakimpet and Begmet (Hyderabad)
- School of Aviation Medicine, Bangalore
- Air Force Paratroopers Training School, Agra

LAW ENFORCEMENT AGENCIES.

- **Police :** The Police Force in the country is entrusted with the responsibilities of maintenance of public order, prevention and detection of crimes. Public order and police being state subject under the constitution, police is maintained and controlled by states.
- **Central Bureau of Investigation (CBI) :** The Central Bureau of Investigation was created in April 1963. The CBI through its Special Police Establishment Division is the principal investigating agency of the Central Government.
- **Indo-Tibetan Border Force (ITBP) :** The Indo-Tibetan Border Force was raised on October 24, 1962. In 1975 the primary task of the ITBP was re-defined as security of northern borders, to check illegal immigration and trans-border crimes. From 1995, the ITBP began to be inducted in a big way in counter insurgency operations in the Kashmir Valley.
- **Border Security Force (BSF) :** The Border Security Force raised in 1965, is entrusted with the task of maintaining permanent vigilance of India's international borders. It has 157 battalions.
- **Assam Rifles :** The Assam Rifles was raised as Cacher Levy in 1835. The force has 38 battalions. Its contribution towards assimilation of the people of north-east into the national mainstream is truly monumental.
- **Central Reserve Police Force (CRPF) :** This force was raised in 1939 as the Crown Representative's Police and was renamed as CRPF in 1949. It has 154 battalions.
- **Central Industrial Security Force (CISF) :** It was established in 1969 to provide security to industrial undertakings of the Government.
- **National Security Guards (NSG) :** It has been set up in 1984 for handling terrorists, kidnappers, saboteurs, anti-hijacking operations, recovery of hostages, VIP security, etc. For the first time in the country, a unit of women 'Black Cat' commandos was created on October 15, 2005 in the elite NSG.

SPORTS

CUPS AND TERMINOLOGY

Cricket : World Cup, Titan Cup, Triangular Series, Singer Cup, Sahara Cup, Natwest Trophy, Asia Cup, ICC Trophy, Benson and Hedges Cup, Ranji Trophy, Duleep Trophy, Irani Trophy, Deodhar Trophy, Rohington Baria Trophy, Cooch Bihar Trophy, Sheesh Mahal Trophy, Wills Cup, Vinoo Manked Trophy, Vijay Merchant Trophy, Rani Jhansi Trophy etc.

: Swing, Cut, Overdrive, Pull, Hook, Chinaman, Short Pitch, Googly, Wide, Throw, Mid off, Mid on, Long leg, Short leg, Fine leg, Forward short leg, Mid wicket, Third man, Slip, Point, Thirty yard circle, Crease, Flight, Bouncer, Round the wicket, Over the wicket, Leg before wicket, Follow on, Protection guard, Abdominal guard, Bails, Retired hurt, Third Umpire, Opener, First down, Line and length, Seam, Leg cutter, Off break, Leg spin, Bowler, Batsman, Wicket keeper, Helmet, Pad, Extra, No ball, Chucker, Dead Ball, Beamer, Reverse swing, Full toss, Bowled, Hit wicket, Played on, Run out, Caught Behind, Catch, Over throw, Shooter, Run, Innings, Gloves, Runner etc.

Football : FIFA Cup (World Cup), UFA Cup, F.A. Cup, European Championship, Winners Cup, Presidents Cup, African Nations Cup, Kings Cup, Mardeka Cup, Asian Cup, Kankecafe Gold Cup, Santosh Trophy (National Championship), Jawahar Lal Nehru International Gold Cup, Rajiv Gandhi International Cup, Durand Cup, Rovers Cup, I.F.A. Shelid, DCM Trophy, Federation Cup, Subroto Cup, B.C. Roy Trophy, Mir Iqbal Hussain torphy, Stafford Cup, Caesers Cup, Vithal Cup, Baradoloi Trophy, Nagaji trophy, Airlines gold Cup, Bandodkar Gold Cup, Ashutosh Trophy, Begum Hazrat Mahal Trophy etc.

: Mid field, Centre pass, Back pass, Goal keeper, Forward, Direct kick, Striker, Indirect kick, Comer, Free kick, Dribble, Penalty kick, Extra time, Scisson kick, Foul, Goal, Refree, Linesman, Sweeper, Back, Throw in, Volley, Touch line, Send off, Net winger, Tie breaker, flag, fist, First half, Second, half, Sudden death, Winger, Tackle, Far post, Sliding tackle, Off side, Hatrick, handball, Chip, Lob, Fair charge, Booking, Cross, Kick off, Goal kick, Marking, Through ball, Abbey etc.

Lawn Tennis : Grand slam (Wimbledon, French Open, Australlian Open, U.S. open), Davis Cup, Whiteman Cup, Federa-

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tion Cup, Hopman Cup, ATP championship, Even
Cup, Virginia slims championship, Itallian open, Q
nadian open, Japan open, Indian satellite open, D
Rajendra Prasad Cup, German open, WTA champion
ship etc.

: Deuce, Volley, Service, Back hand, Stroke, Forehand,
Singles, Doubles, Racket, Net ball, Service break,
Straight set, Service line, Return, Side umpire,
Baseline, Centre line, Grass Court, Hard court, Clay
Fault, Grip, Ground stroke, Refree, Linesman, in, Out,
Match Point, Tie break, Set point, Half volley, Smash,
pace, Top spin, Wrong foot, Love, Seed, Break point,
Change of ends, Over head, Lob, Passing shot, Kill etc.

Hockey : Mumbai gold Cup, DhyanChand Trophy, Jawahar Lal
Nehru Cup, Surjeet Singh Cup, Agha Khan Cup,
Scindhia Gold Cup, Him Gold Cup, Ceasers Clark
Cup, Murugappa Gold Cup, Cuppuswamy Cup, Ma-
haraja Ranjit Singh Gold Cup, Roop Singh Gold Cup,
Khan Abdul Ghaffar Khan Trophy, K.D. Singh Babu
Trophy, D.C.M. Sriram trophy, Challenge Cup, Rene
Frank trophy (World championship), Champions tro-
phy, Stand Cup, B.M.W. Trophy, Azlan Shah Cup,
Indira Gandhi International Gold Cup, Rangaswamy
Cup (National men's championship), Lady Ratan Tata
Trophy (National women's championship), Beighton
Cup, Obedullah gold Cup, Federation Cup etc.

: Infringement, Sideline, Tie breaker, Sudden death,
Hatrick, Stick, Under cutting, Circle, Bulley, Rollin,
Pushin, Shooting circle, Polley, Right and left back,
Outside right, Inside right, Centre forward, Inside left,
Outside left, Centre half, Line, Corner, Short corner,
long corner, Penalty stroke, Flick, Reverse flick, Scoop,
Umpire, Linesman, Half volley, Pad, Gloves etc.

Badminton : Chaddha Cup (national women's team championship),
Vikas Topiwala Challenge Cup (National men's singles),
Olympian Challenger Cup (National women singles),
Amrit Diwan Cup, Aggarwal Cup, S.R. Rula Cup, Sofia
kitkara Cup, Hiralal Cup, Thomas Cup (World men),
Uber Cup (world women), All England championship,
sudiraman Cup, Yonnex Cup, Abdul Rahman Cup,
European Cup etc.

: Refree, Linesman, Let drop, flight, Skirt, Innings, Net
shot, Low service, High service, Lift, Pen handle push,
setting service break, Match point, Set point, Smash
etc.

Volleyball : Federation Cup, India Cup, Shivanti Gold Cup, Shiva
Subramaniyaum Cup (National Women Championship
ship), V.C.C. Cup, Mannarkat M.M Joseph Trophy (Nat

tional Men's Championship), and Poornima Trophy etc.

: Hock serve, Tennis serve, Refree, Linesman, Double fault, Fore arm pass, Set up, Block, Aerial smash, Rotation, Double hit, Volley pass, Dig pass, Switch, Overtapping, Booster, Love, Dig, Net Fault, Net ball, Floater, Service, Power serve etc.

Boxing : Ring master, Jab, Reach, Cover up, Clinch, In fighting, Bell, Back header, Barrage, Volvo punch, Upper cut, Lower cut, Below the belt, Back peddle, Bout, Bunting, Kidney punch, Lead, Neutral corner, Right cross, Swing, Seconds out, Not out, Knockout, Belt block, Blow, Bounce of ropes, Hook, Guard, Hang on, Hill, Pivot punch, Round, Wag, Pench ball, Punch drunk, Sash, Ring craft etc.

: World Cup Championship Presidents Cup, Meyers Cup, Kings Cup, Virginia long corn trophy, WBA title, WBC crown etc.

: Golden eagle trophy, National Championship, European Championship, Federation Cup, America Cup, Asia Cup, V.C. Gupta Trophy, William Jones Cup etc.

Basketball : Assist, Dribbling Duck, Goal tending, Jump ball, Head ball, Lay up, Pivot, Post screening, Steal, Tap, Throw, Three point, Play, Tip in, Tum over etc.

TERMINOLOGY OF OTHER IMPORTANT SPORTS

Snooker/ Billiards : Bridge, Cue, Cue ball, Object balls etc.

Golf : Bogey, Foursome, Tee, Put, Hole, Nivlick, Caddy, Link, Putting, Vrily, Birdic etc.

Atheitics : Alley, Apron, Baton, Bend, Blindpass, Box, Circle, Clearance, Crossbar, Heats, False start, Flop style, Foul, Hurdles, Lane, Lap, Decathion Heptathion Marathon, Pentathion, Scratch, Shotput, Sprint, Starting blocks, Steeplechase, Straddle, Stride, Tie, Zone.

Baseball : Arm-thrower, Around the Horn, Balk, Ball, Ball hawk, Base open, Base runner, Bat, Batter, Battery, Blank, Block, Bobble, Catcher, Cocked arm, Crossfire, Downer, Home, Hot Corner, Infield fly, Keystone, Sack, Letup, Peg, Pinch, Hitter, Poppy, Punch, Rubber, Run-up, Sinker, Slider, Threefoot lines.

Cycling : Ankling, Break, Bunch, Handicap, Honk, Madison relay, Musette, Pursuit.

Rowing : Aweigh all, Beat, Bow, Canvass, Catch, Coxswain or Cox, Double, Eight, Paddle, Puddle, Recovery, Rigging, Row, Sculls, Single, Slide, Sweep, Swivel.

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back, Button-hook, Centre, Clipping, Cross-bar, Cutback, Dead ball line, Drop kick, Fade, Faircatch, Flanker, Flat pass, Fumble, Goal, Huddle, Kickoff, Looping line, Off-side, Pack, Punt, Pushing the passer, Safety man, Screen pass, Slugging, Tackle, Throw-in, Time out, Trap, Try.

Shooting : Airgun, Barrel, Bore diameter, Bull, Calibre, Canting, Drag, Firearm, Grip, Long riffle, Muzzle velocity, Rifle, Sighters, Snap, Stock.

Squash : Angle, Board court, Cutline, Drive, Footfault, Half court line, Hammer, Hand in, Kill, Nick, Penalty point, Rally, Service box, Set, Short line, Volley, Wells

OLYMPIC MOTTO, EMBLEM, FLAG, CREED AND OATH

Motto : "Citius, Altius, Fortius". These are Latin words, which mean 'Swifter, Higher and Stronger'. They were composed in 1897 by Rev. Father Didon, a friends of Baron Pierre de Coubertin, and introduced in the 1920 games for the first time.

mblem : Is composed of five interwined rings, each of different colour, representing five continents of the world, placed at the centre of the Olympic Flag.

Colour of Ring	Countinent Represented
Blue ring	Europe
Yellow ring	Asia
Black ring	Africa
Red ring	America
Green ring	Oceania

Flag : The Olympic flag is white in colour (originally made of cotton) 3m × 2m. The emblem placed in the middle is 206 cm % 60 cm. The flag was designed by Coubertin himself in 1913 and it was first hosted in 1920 at the Antwerp Games and the motto was then added to it.

Creed : "The most important thing in the Olympic Games is not to win but to take part, just as the most important thing in the not the triumph but the struggle. The essential thing is not to have conquered but to have fought well."

Oath : An athlete of the host country recites the following at the opening ceremony. "In the name of all competitors I promise that we will take part in these Olympic Games, repecting and abiding by the rules which govern them, in the spirit of sportsmanship for the glory of sport and the honour of our terms." Both the oath and the creed were composed by Baron Pierre de Coubertin, the founder of modern Olympics.

Olympic Torch : The Olympic flame symbolizes the continuity between the ancient and the modern Olympics. The Olympic flame was lighted for the first time in 1928 at the Amsterdam stadium and since then the practice has countinued.

: The torch used to kindle the flame is first lit by the sun's rays at the shrine of Zeus (Greece). It is then carried overland by a relay of runners to the site of the games and placed in bowl where is burns during the period of the Games.

The Olympic Torch Relay : The practice of Torch Relay from Olympia (Greece) to the venue of the Games was first introudced by German Olympic Committee for the Berlin Games in 1936 and has since become part of the Olympic Games.

The Olympic Mascot : It was introuced in 1972 at the 20th Olympics Games hald at Munich and since then an Olympic Mascot is slected for a particular year and venue.

Year	Mascot	Venue
1972	Waldi (Dachshund)	Munich
1976	Amik (Beaver)	Montreal
1980	Misha (Bear)	Moscow
1984	Sam (Eagle)	Los Angeles
1988	Hodori (Tiger Cub)	Seoul
1992	Cobi (spain)	Barcelona
1996	Izzy (derived from what is it?)	Atlanta
2000	'Ollie' - a Kooka-burra, 'Syd' - a Playtypus; and 'Milli'- an Echidna, are three native animals of Australia which represent the earth, air and water	Sydney (Australia)
2004	'Phevos' and 'Athena' Two bell-shaped cartoons inspired by ancient Greek dolls. They are brother and sister and named after two Greek Gods.	Athens
2008	Like the five Olympic rings from which they draw their color and inspiration, Fuwa will serve as the official Mascots of Beijing 2008 Olympic games, carrying a message of friendship and peace and good wishes from China to children all over the world.	Beijing (China)

The Olympic Awards and Certificates : Originally the meat of the sacrificed animal was offered as a prize to the winners; which

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was subsequently replaced by a crown of olive branches. However, in modern Olympics winners are awarded medals and certificates. There are three medals for the top three positions.

First	Prize	Gold Medal
Second	Prize	Silver Medal
Third	Prize	Bronze Medal

For the fourth, fifth, sixth, seventh and eighth positions only certificates are given.

Medals : The medal is about 60 mm in diameter and 3 mm in thickness. The gold and silver medals are both made of 92.5 per cent pure silver. However, the gold medal is plated with 6gm of pure gold. The third position medal is made of bronze.

Olympics : Where and When

Olympaid	Year	Venue	Host Country
Ist	1896	Athens	Greece
2nd	1900	Paris	France
3rd	1904	St. Louis	France
4th	1906	Athens	Greece
4th	1908	London	Great Britain
5th	1912	Stockholm	Sweden
6th**	1916		
7th	1920	Antwerp	Belgium
8th	1924	Paris	France
9th	1928	Amsterdam	Netherlands
10th	1932	Los Angeles	USA
11th	1936	Berlin	Germany
12th***	1940	Tokyo (then Helsinki)	Japan (then Finland)
13th***	1944	London	Great Britain
14th	1948	London	Great Britain
15th	1952	Helsinki	Finland
16th	1956	Melbourne	Australia
17th	1960	Rome	Italy
18th	1964	Tokyo	Japan
19th	1968	Mexico City	Mexico
20th	1972	Munich	W Germany
21st	1976	Montreal	Canada
22nd	1980	Moscow	Russia
23rd	1984	Los Angeles	USA
24th	1988	Seoul	South Korea
25th	1992	Barcelona	Spain
26th	1996	Atlanta	USA
27th	2000	Sydney	Australia
28th	2004	Athens	Greece
29th	2008	Beijing	China
30th	2012	London	Britain
31st	2016	Rio Di Janeriyo	Brazin

* Games were not recognised by IOC
** Games were not held due to World War I
*** Games were not held due to World War II

In addition to prizes given to athletes, there are certain awards and trophies that are awarded to those who promote the cause of Olympics. On July 2, 2003 during a press conference held in Prague, the Athens 2004 Olympic Games, President, Gianna Angelopoulos, presented the new medals of Olympic Games 2004 to the IOC. The design of the Olympic medals for the Olympic Games changed for the first time since 1928, incorporating exclusive Greek elements. The creator of the medals is Elena Votsi.

The Olympic Order : Instituted in 1974, the Olympic Order in gold, silver or bronze decoration is awarded to a person who has rendered outstanding services or displayed the Olympic ideals. Mrs. Indira Gandhi was awarded this order in 1983 by the IOC for her contribution to the organisation of the New Delhi Asiad (1982).

The Olympic Cup : Instituted in 1906 by Coubertin, its reproduction is awarded to an institution that contributed to the development of sports in general and the Olympic movement in particular. The original cup remains at the Chateau de Vivy in France.

WINTER OLYMPICS

The Winter Olympics commenced in 1924 when the first games were held in Chamonix, France. Since then these games are held at an interval of four years in the same calendar year as the Summer Olympic games.

The winter Games include : Ice hockey, Skating, Speed sketing Alpine Skiing and biathlon.

Winter Olympics : Where and When

Year	Place
1924	Chamonix (France)
1928	St. Mortiz (Switzerland)
1932	Lake Placid (New York)
1936	Garmisch-Parten Kirchen (Germany)
1948	St. Mortiz
1952	Oslo Norway
1956	Cortina d' Ampezze, Italy
1960	Squaw Valley, California
1964	Innsbruck, Australia
1968	Grenoble, France
1972	Sapporo, Japan
1976	Innsbruck
1980	Lake Placid
1984	Sarajevo, Yugoslavia
1988	Calgary, Alberta
1992	Albertville, France
1994	Lillehammer, Norway
1998	Nagono, Japan
2002	Salt Lake City, USA
2006	Turin, Italy
2010	Vancauver, Canada

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Presidents of International Olympic Committee (IOC)

Duration	Name	Country
1894-1896	Dimitrias Vikelas	Greece
1896-1925	Baron Pierre de Coubertin	France
1925-1942	Count Henri de Baillet-Latour	Belgium
1946-1952	Sigfrid Edstrom	Sweden
1952-1972	Avery Brundage	USA
1972-1980	Lord Killanin	Ireland
1980-2001	Juan Antonio Samaranch	Spain
2001-till date	Jacques Rogge	Belgium

India in Olympics

Venue	Year	Winner/Event	Medal
Paris	1900	200 M Hurdles (N.G. Pritchard)	Silver
Amsterdam	1928	Hockey	Gold
Los Angeles	1932	Hockey	Gold
Berlin	1936	Hockey	Gold
London	1948	Hockey	Gold
Helsinki	1952	Hockey	Gold
Helsinki	1952	57 Kg Free Style Wrestling (K.D. Jadhav)	Bronze
Melbourne	1956	Hockey	Gold
Rome	1960	Hockey	Silver
Tokyo	1964	Hockey	Gold
Mexico	1968	Hockey	Bronze
Munich	1972	Hockey	Bronze
Moscow	1980	Hockey	Gold
Atlanta	1996	Tennis (Leander Paes)	Bronze
Sydney	2000	Weight Lifting (K. Malleswari)	Bronze
Athens	2004	Double Trape Shooting (R.V.S. Rathore)	Silver
Beijing	2008	10 mtr. Rifle shooting (Abhinav Bindra)	Gold
		66 Kg. Freestyle Wrestling (Shushil Kumar)	Bronze
		75 Kg. Middleweight Boxing (Vijendra Kumar)	Bronze

India in Olympic Hockey

Year	Venue	Position	Year	Venue	Position
1928	Amsterdam	Gold	1932	Los Angeles	Gold
1936	Berlin	Gold	1948	London	Gold
1952	Helsinki	Gold	1956	Melbourne	Gold
1960	Rome	Silver	1964	Tokyo	Gold
1968	Mexico	Bronze	1972	Munich	Bronze
1976	Montreal	Seventh	1980	Moscow	Gold
1984	Los Angeles	Fifth	1988	Seoul	Sixth
1992	Barcelona	Seventh	1996	Atlanta	Eighth
2000	Sydney	Seventh	2004	Athens	Seventh
2008	Beijing	not appear			

World Cup Cricket

Year	Name of Cup	Venue	No. of Nations	Winner	Runner	Man of the Match
1975	Prudential Cup	England	8	West Indies	Australia	Clive Lloyd
1979	Prudential Cup	England	8	West Indies	England	Viv Richards
1983	Prudential Cup	England	8	India	West Indies	M. Amarnath
1987	Reliance Cup	India & Pakistan	8	Australia	England	David Boon
1992	Benson & Hedges Cup	Australia & New-Zealand	9	Pakistan	England	W. Akram
1996	Wills Cup	India, Pakistan & Sri Lanka	12	Sri Lanka	Australia	A. Desilva
1999	ICC Cup	England	12	Australia	Pakistan	Shane Warne
2003	ICC Cup	S. Africa Kenya Zimbabwe	14	Australia	India	Ricky Ponting
2007	ICC Cup	W.Indies	16	Australia	Sri Lanka	A. Gilcrist
2011	ICC Cup	Bangladesh, India and Sri Lanka	14	India	Sri Lanka	M.S.Dhoni
2015	ICC Cup	Australia & N.Zealand	—	—	—	—

National Sports of Some Countries

S.No.	Country	National Sports/Games
1.	Australia	Cricket
2.	Canada	Cricket
3.	England	Cricket & Rugby Football
4.	India	Hockey
5.	Japan	Ju-Jitsu
6.	Russia	Chess
7.	Scotland	Rugby Football
8.	Spain	Bull Fighting
9.	USA	Baseball
10.	Pakistan	Hockey

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Asian Games

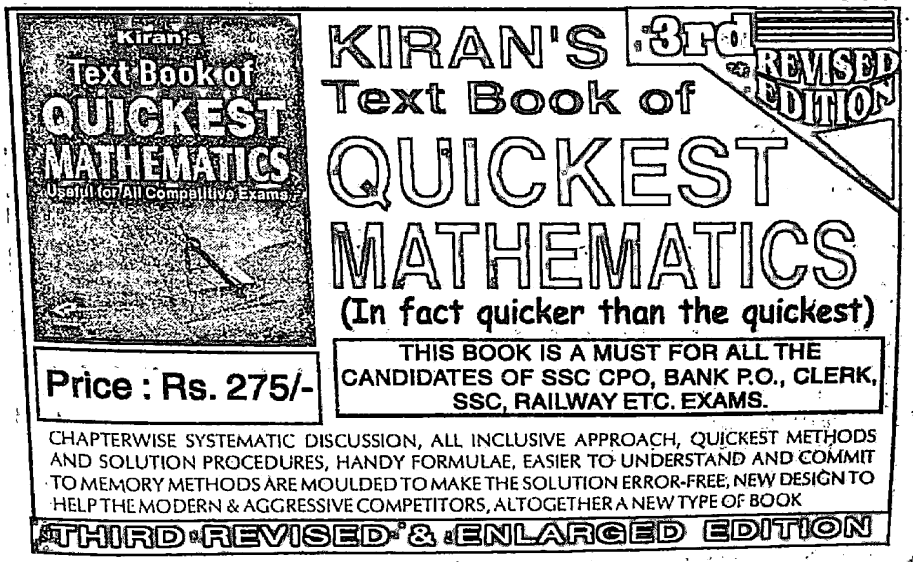
Year	Venue	Year	Venue
1951	New Delhi (India)	1954	Manila (Philippines)
1958	Tokyo (Japan)	1962	Jakarta (Indonesia)
1966	Bankok (Thailand)	1970	Bankok (Thailand)
1974	Tehran (Iran)	1978	Bankok (Thailand)
1982	New Delhi (India)	1986	Seoul (South Korea)
1990	Beijing (China)	1994	Hiroshima (Japan)
1998	Bankok (Thailand)	2002	Pusan (South Korea)
2006	Doha (Qatar)	2010	Guangzhu (China)

Famous Stadiums

Stadium	Sports	Venue
National Stadium	Hockey & others	Mumbai
Wankhede Stadium	Cricket	Mumbai
Braboune Stadium	Cricket	Mumbai
Indraprastha Stadium	Indoor games	Delhi
J.L. Nehru Stadium	Athletics	Delhi
Firoz Shah Kotla	Cricket	Delhi
Ambedkar Stadium	Football	Delhi
National Stadium	Hockey & others	Delhi
Talkotora Stadium	Swimming	Delhi
Eden Garden	Cricket	Kolkata
Ranjit Stadium	Football	Kolkata
Salt Lake Stadium	Football	Kolkata
Green Park Stadium	Cricket	Kanpur
Keenan Stadium	Cricket	Jamshedpur
Chepauk Stadium	Cricket	Chennai
Epsom	Derby	Britain
Black heath	Rugby & Football	London
Headingly, Manchester	Cricket	Britain
Lords, Oval, Leeds	Cricket	Britain
Wimbledon	Lawn Tennis	Britain
Flushing Meadow	Lawn Tennis	U.S.
Brookland	Football	Britain
Timbukhum	Rugby	Britain
Wembley	Football	Britain

Winners and Venues of the World Cup Soccer Tournaments

Year	Winner	Final Opponent	Venue
1930	Uruguay	Argentina	Uruguay
1934	Italy	Czechoslovakia	Italy
1938	Italy	Hungary	France
1950	Uruguay	Brazil	Brazil
1954	W Germany	Hungary	Switzerland
1958	Brazil	Sweden	Sweden
1962	Brazil	Czechoslovakia	Chile
1966	England	W Germany	England
1970	Brazil	Italy	Mexico
1974	W Germany	Netherlands	W Germany
1978	Argentina	Netherlands	Argentina
1982	Italy	W Germany	Spain
1986	Argentina	W Germany	Mexico
1990	W Germany	Argentina	Italy
1994	Brazil	Italy	US
1998	France	Brazil	France
2002	Brazil	Germany S.Korea	Japan and
2006	Italy	France	Germany
2010	Spain	Netherland	South Africa



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Appendix - I

COMPARISON TABLES

AREA

State Name	Area (sq. km.)
Rajasthan	342239
Madhya Pradesh	308000
Maharashtra	307713
Andhra Pradesh	276754
Uttar Pradesh	236286
Jammu and Kashmir	222236
Gujarat	196024
Karnataka	191791
Orissa	155707
Chhattisgarh	135191
Tamil Nadu	130058
Bihar	94163
West Bengal	88752
Arunachal Pradesh	83743
Jharkhand	79714
Assam	78438
Himachal Pradesh	55673
Uttarakhand	53483
Punjab	50362
Haryana	44212
Kerala	38863
Meghalaya	22429
Manipur	22327
Mizoram	21087
Nagaland	16579
Tripura	10491
Sikkim	7096
Goa	3702
National Capital Territory	
Delhi	1483
Union Territory	
Andaman and Nicobar	8249
Puducherry	492
Dadra and Nagar Haveli	491
Chandigarh	114
Daman and Diu	112
Lakshadweep	32

POPULATION

State Name	Population
Uttar Pradesh	199581477
Maharashtra	112372972
Bihar	103804637
West Bengal	91347736
Andhra Pradesh	84665533
Tamil Nadu	72138958
Madhya Pradesh	72597565
Rajasthan	68621012
Karnataka	61130704
Gujarat	60383628
Orissa	41947358
Kerala	33387677
Jharkhand	32966238
Assam	31169272
Punjab	27704236
Haryana	25353081
Chhattisgarh	25540196
Jammu and Kashmir	12548926
Uttarakhand	10116752
Himachal Pradesh	6856509
Tripura	3671032
Meghalaya	2964007
Manipur	2721756
Nagaland	1980602
Goa	1457723
Arunachal Pradesh	1382611
Mizoram	1091014
Sikkim	607688
National Capital Territory	
Delhi	16753235
Union Territory	
Puducherry	1244464
Chandigarh	1054686
Andaman and Nicobar	379944
Dadra and Nagar Haveli	342853
Daman and Diu	242911
Lakshadweep	64429

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STATEHOOD

State Name	Statehood (Year)
Andhra Pradesh	1956
Arunachal Pradesh	1987
Assam	1950
Bihar	1950
Chhattisgarh	2000
Goa	1987
Gujarat	1960
Haryana	1966
Himachal Pradesh	1971
Jammu and Kashmir	1957
Jharkhand	2000
Karnataka	1950
Kerala	1956
Madhya Pradesh	1950
Maharashtra	1950
Manipur	1972
Meghalaya	1972
Mizoram	1987
Nagaland	1963
Orissa	1950
Punjab	1950
Rajasthan	1956
Sikkim	1975
Tamil Nadu	1950
Tripura	1972
Uttarakhand	2000
Uttar Pradesh	1950
West Bengal	1950
National Capital Territory	**NCT Status**
Delhi	1992
Union Territory	**UT STATUS**
Andaman and Nicobar	1956
Chandigarh	1996
Dadra and Diu	1961
Daman and Diu	1987
Lakshadweep	1956
Puducherry	1963

NUMBER OF ASSEMBLY SEATS

State Name	Number of Seats
Andhra Pradesh	295
Arunachal Pradesh	60
Assam	126
Bihar	243
Chhattisgarh	90
Goa	40
Gujarat	182
Haryana	90
Himachal Pradesh	68
Jammu and Kashmir	87
Jharkhand	81
Karnataka	225
Kerala	140
Madhya Pradesh	230
Maharashtra	288
Manipur	60
Meghalaya	60
Mizoram	40
Nagaland	60
Orissa	147
Punjab	117
Rajasthan	200
Sikkim	32
Tamil Nadu	234
Tripura	60
Uttarakhand	70
Uttar Pradesh	403
West Bengal	294
National Capital Territory	
Delhi	70
Union Territory	
Andaman and Nicobar	—
Chandigarh	—
Dadra and Nagar Haveli	—
Daman and Diu	—
Lakshadweep	—
Puducherry	30

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NUMBER OF LOK SABHA SEATS

State Name	Number of Seats
Andhra Pradesh	42
Arunachal Pradesh	2
Assam	14
Bihar	40
Chhattisgarh	11
Goa	2
Gujarat	26
Haryana	9
Himachal Pradesh	4
Jammu and Kashmir	6
Jharkhand	14
Karnataka	28
Kerala	19
Madhya Pradesh	29
Maharashtra	47
Manipur	2
Meghalaya	2
Mizoram	1
Nagaland	1
Orissa	21
Punjab	13
Rajasthan	25
Sikkim	1
Tamil Nadu	39
Tripura	2
Uttar Pradesh	80
Uttarakhand	5
West Bengal	42
National Capital Territory	
Delhi	7
Union Territory	
Andaman and Nicobar	1
Chandigarh	1
Dadra and Nagar Haveli	1
Daman and Diu	1
Lakshadweep	1
Puducherry	1
Others	
Nominated Members	2
Total	**542**

NUMBER OF RAJYA SABHA SEATS

State Name	Number of Seats
Andhra Pradesh	18
Arunachal Pradesh	1
Assam	7
Bihar	16
Chhattisgarh	5
Goa	1
Gujarat	11
Haryana	5
Himachal Pradesh	3
Jammu and Kashmir	4
Jharkhand	6
Karnataka	12
Kerala	9
Madhya Pradesh	11
Maharashtra	19
Manipur	1
Meghalaya	1
Mizoram	1
Nagaland	1
Orissa	10
Punjab	7
Rajasthan	10
Sikkim	1
Tamil Nadu	18
Tripura	1
Uttarakhand	3
Uttar Pradesh	31
West Bengal	16
National Capital Territory	
Delhi	3
Union Territory	
Puducherry	1
Others	
Nominated member	12
Total	**245**

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POPULATION DENSITY

State Name	Population Density (persons per sq. km.)
Bihar	1102
West Bengal	1029
Kerala	859
Uttar Pradesh	828
Punjab	550
Tamil Nadu	555
Haryana	573
Goa	394
Assam	397
Jharkhand	414
Maharashtra	365
Tripura	350
Andhra Pradesh	308
Karnataka	319
Gujarat	308
Orissa	269
Madhya Pradesh	236
Rajasthan	201
Uttarakhand	189
Chhattisgarh	189
Nagaland	119
Himachal Pradesh	123
Manipur	122
Meghalaya	132
Jammu and Kashmir	124
Sikkim	86
Mizoram	52
Arunachal Pradesh	17
National Capital Territory	
Delhi	11,297
Union Territory	
Chandigarh	9,252
Puducherry	2598
Lakshadweep	2013
Daman and Diu	2169
Dadra and Nagar Haveli	698
Andaman and Nicobar	46

GOVERNORS AND CHIEF MINISTERS SINCE INDEPENDENCE

ANDHRA PRADESH

1 October, 1953	Andhra Part A State created from part of Madras
1 November, 1956 – 28 December, 2009	Andhra Pradesh
	till date ESL Narsimham
GOVERNORS	
1 October, 1953 – 1 Auguust, 1957	Sir Chandulal Madhavlal Trivedi
1 August, 1957 – 8 September, 1962	Bhim Sen Sachar
8 September, 1962 – 4 May 1964	Satyavant Mallannah Srinagesh
4 May, 1964 – 11 April 1968	Pattom Thanu Pillai
11 April 1968 – 25 January, 1975	Khandubhai Kasanji Desai
26 January 1975 – 10 January, 1976	S. Obul Reddy
10 January, 1976 – 16 June, 1976	Mohan Lal Sukhadia
16 June, 1976 – 17 February, 1977	R.D. Bhandare
17 February, 1977 – 5 May, 1977	B.J. Diwan
5 May, 1977 – 15 August, 1978	Sharada Mukherjee
15 August, 1978 – 15 August, 1983	Kochakkan Chacko Abraham
15 August, 1983 – 29 August, 1984	Thakur Ram Lal
29 August, 1984 – 26 November, 1985	Shankar Dayal Shrama
26 November, 1985 – 7 February, 1990	Kumudben Joshi
7 February, 1999 – 22 August, 1997	Krishan Kant
22 August, 1997 – 24 Novembber 1997	Gopala Ramanujam
24 November, 1997 – 3 January 2003	Chakravarti Rangarajan
3 January, 2003, – 4 November, 2004	Surjit Singh Barnala
4 November, 2004 – 28 January, 2006	Sushil Kumar Shinde
29 January, 2006 – 18 August, 2007	Rameshwar Thakur (Addl. Charge)
22 August, 2007 – 27 December, 2009	Narayan Dutt Tiwari
27 December, 2009 - till date	ESL Narasimhan
CHIEF MINISTERS	
1 October, 1953 – 15 November, 1954	Tanguturi Prakasam
28 March, 1955 – 1 November, 1956	Bezawada Gopala Reddy
1 November, 1956 – 11 January, 1960	N. Sanjiva Reddy
11 January, 1960 – 12 March, 1962	Damodaram Sanjivayya
12 March, 1962 – 29 February, 1964	N. Sanjiva Reddy
29 February, 1964 – 30 Sept, 1971	Kasu Brahmananda Reddy
30 September, 1971 – 10 Jan, 1973	P.V. Narsimha Rao
10 December, 1973 – 6 March, 1978	Jalagam Vengala Rao
6 March, 1978 – 11, October, 1980	Marri Channa Reddy

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1 February, 1982 – 20, Sept., 1982	Tanguturi Anjaiah
20 September, 1982 – 9 January, 1983	Bhavanam Venkatram
9 January, 1983 – 16 August 1984	Kotla Vijaya Bhaskara Reddy
16 August, 1984 – 16 September 1984	N.T. Rama Rao
16 September, 1984 – 3 December 1989	N. Bhaskara Rao
3 December, 1989 – 17 December, 1990	N.T. Rama Rao
17 December, 1990 – 9 October, 1992	Marri Channa Reddy
9 October, 1992 – 12 December, 1994	N. Janardhan Reddy
12 December, 1994 – 1 Sept., 1995	Kotla Vijaya Bhaskara Reddy
1 September, 1995 – 14 May, 2004	N. T. Rama Rao
14 May, 2004 – 2 Sept., 2009	Nara Chandrababu Naidu
2 September, 2009 – 25 Nov. 2010	Y.S. Rajasekhara Reddy
25 Nov. 2010 – till date	Konijeti Rosaiah
	Nallari Kiran Kumar Reddy

HYDERABAD

CHIEF MINISTERS

26 January, 1950 – 6 March, 1952	M.K. Vellodi
6 March, 1952 – 31 October, 1956	Burgula Ramakrishna Rao

ARUNACHAL PRADESH

21 January, 1972	Union territory created from part of Assam
20 February, 1987	State

LIEUTENANT GOVERNORS

15 August, 1975 – 18 January, 1979	K.A.A. Raja
18 January, 1979 – 23 July, 1981	R.N. Haldipur
23 July 1981 – 10 August, 1983	H.S. Dubey
10 August, 1983 – 21 November, 1985	Thanjavelu Rajeshwar
21 November, 1985 – 20 February, 1987	Shiva Swroop

GOVERNORS

20 February, 1987 – 19 March, 1987	Bhishma Narain Singh (acting)
19 March, 1987 – 17 March, 1990	R.D. Pradhan
17 March, 1990 – 9 May 1990	Gopal Singh (acting)
9 May 1990 – 17 March 1991	D.D. Thakur (acting)
17 March 1991 – 26 March, 1991	Loknath Mishra (acting)
26 March 1991 – 5 July, 1993	Surendra Nath Dwivedi
5 July, 1993 – 21 October, 1993	Madhukar Dighe (acting)
21 October, 1993 – 17 May, 1999	Mata Prasad
17 May, 1999 – 2 August, 1999	S.K. Sinha
2 August, 1999 – 13 June, 2003	Arvind Dave
13 June, 2003 – 16 December, 2004	Vinod Chandra Pande

16 December, 2004 – 4 September, 2007	S.K. Singh
4 September, 2007 – 27 January, 2008	K. Shankar Narayan
27 January, 2008 – till date	J.J. Singh

CHIEF MINISTERS

13 August, 1975 – 18 September, 1979	Prem Khandu Thungon
18 September, 1979 – 3 Nov., 1979	Tomo Riba
18 January, 1980 – 19 January, 1999	Gegong Apang
19 January, 1999 – 3 August, 2003	Mukut Mithi
3 August, 2003 – 9 April, 2007	Gegong Apang
9 April, 2007 – 4 May, 2011	Doroji Khandu
5 May, 2011 – till date	Jarbom Gamlin

ASSAM

15 August, 1947	Province
26 January, 1950	State (until 1956 : Part A)

GOVERNORS

15 August, 1947 – 28 December, 1948	Sir Akbar Hydari
30 December, 1948 – 16 February, 1949	Sir Ronald Francis Lodge (acting)
16 February, 1949 – 27 May, 1950	Sri Prakasa
27 May, 1950 – 15 May, 1956	Jairamdas Daulatram
15 May, 1956 – 22 August, 1959	Sir Saiyid Fazl Ali
23 August, 1959 – 14 October, 1959	Chandreswar Prasad
14 October, 1959 – 12 November, 1960	Satyavant Mallannah Srinagesh
12 November, 1960 – 13 January, 1961	Vishnu Sahay
13 January, 1961 – 7 September, 1962	Satyavant Mallannah Srinagesh
7 September, 1962 – 17 April, 1968	Vishnu Sahay
17 April, 1968 – 19 September, 1973	Braj Kumar Nehru
19 September, 1973 – 10 August, 1981	Lallan Prasad Singh
10 August, 1981 – 28 March, 1984	Prakash Chndra Mehrotra
28 March, 1984 – 15 April, 1984	T.S. Mishra
15 April, 1985 – 10 May, 1989	Bhishma Narain Singh
10 May, 1989 – 21 July, 1989	Harideo Joshi
21 July, 1989 – 2 May, 1990	Anisetti Roghuvir
2 May, 1990 – 17 March, 1991	D.D. Thakur
17 March, 1991 – 1 September, 1997	Loknath Mishra
1 September, 1997 – 21 April, 2003	S.K. Sinha
21 April, 2003 – 5 Junuary, 2003	Arvind Dave
5 June, 2003 – 25 June, 2008	Ajai Singh

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25 June, 2008 – 25 June, 2009	Shivcharan Mathur
26 June, 2009 – 27 July, 2009	K. Sankaranarayanan (acting)
27 July, 2009 – 11 Dec., 2009	Saiyad Sibtey Razi
11 December 2009 – till date	J. B. Patnayak

CHIEF MINISTERS

15 August, 1947 – 6 August, 1950	Gopinath Bardoloi
9 August, 1950 – 28 December, 1957	Bishnuram Medhi
28 December, 1957 – 6 November, 1970	Bimali Prasad Chaliha
11 November, 1970 – 31 January, 1972	Mahendra Mohan Choudhury
31 January, 1972 – 12 March, 1978	Sarat Chandra Sinha
12 March, 1978 – 4 September, 1979	Golap Borbora
9 September, 1979 – 11 Dec., 1979	Jogendra Nath Hazarika
12 December, 1980 – 29 June, 1981	Anwara Taimur
13 January, 1982 – 19 March, 1982	Keshav Chandra Gogoi
27 February, 1983 – 24 Dec., 1985	Hiteswar Saikia
24 December, 1985 – 27 Nov., 1990	Prafulla Kumar Mahanta
30 June, 1991 – 22 April, 1996	Hiteshwar Saikia
22 April, 1996 – 15 May, 1996	Bhumidhar Barman
15 May, 1996 – 18 May, 2001	Prafulla Kumar Mahanta
18 May, 2001 – till date	Tarun Gogoi

BIHAR

15 August, 1947	Province
26 January, 1950	State (until 1956 : Part A)

GOVERNORS

15 August, 1947 – 11 January, 1948	Jairamdas Daultram
12 January, 1948 – 16 June, 1952	Madhavrao Sriharl Aney
16 June, 1952 – 1957	Ranganath Ramachandra Diwakar
1957 – 12 May, 1962	Zakir Husain
12 May, 1962 – December, 1967	M. Ananthasayanam Ayyangar
December, 1967 – 1 February, 1971	Nityanand Kanungo
1 February, 1971 – February, 1973	Dev Kanta Borooah
1974 – June, 1976	R.D. Bhandare
June 1976 – 11 September, 1979	Jagannath Kaushal
11 September, 1979 – 1985	A.R. Kidwai
1985 – February 1988	Pendekanti Venkatasubbaiah
February 1988 – 1989	Govind Narayan Singh
1989 – February 1990	Jagannath Pahadia
February 1990 – February 1991	Mohammad Yunus Saleem
February 1991 – 1991	B. Satyanarayan Reddy
1991 – August 1993	Mohammed Shafi Qureshi
August 1993 – April 1998	A.R. Kidwai

27 April 1998 – 15 March 1999	Sunder Singh Bhandari
15 March 1999 – 6 October 1999	Brij Mohan Lal (acting)
6 October 1999 – 23 November 1999	Suraj Bhan
23 November, 1999 – 12 June 2003	Vinod Chandra Pande
12 June, 2003 – 1 November, 2004	M. Rama Jois
1 November, 2004 – 5 November, 2004	Ved Marwah
5 November, 2004 – 26 January, 2006	Buta Singh
22 June, 2006 – 25 June, 2008	R.S. Gavai
26 June, 2008 – 29 June, 2009	R.L. Bhatia
29 June, 2009 – till date	Devanand Kunwar

CHIEF MINISTERS

15 August, 1947 – 31 January, 1961	Srikrishna Sinha
1 February, 1961 – 18 February, 1961	Deep Narayan Singh
18 February 1961 – 1 October, 1963	Binodanand Jha
1 October, 1963 – 5 March, 1967	Krishna Ballabh Sahay
5 March, 1967 – 28 January, 1968	Mahamaya Prasad Sinha
28 January, 1968 – 1 February, 1968	Satish Prasad Sinha
1 February, 1968 – 23 February, 1968	Bindeshwari Prasad Mandal
23 February, 1968 – 29 June 1968	Bhola Paswan Shastri
29 February, 1969 – 22 June 1969	Harihar Prasad Singh
22 June 1969 – 4 July 1969	Bhola Paswan Shastri
17 February, 1970 – 22 Dec., 1970	Daroga Prasad Rai
22 December, 1970 – 2 June, 1971	Karpoori Thakur
2 June, 1971 – 9 January, 1972	Bhola Paswan Shastri
19 March, 1972 – 9 July, 1973	Kedar Pandey
2 July 1973 – 11 April, 1975	Abdul Ghafoor
11 April, 1975 – 30 April, 1977	Jagannath Mishra
24 June 1977 – 21 April, 1979	Karpoori Thakur
21 April, 1979 – 17 February, 1980	Ram Sundar Das
8 June, 1980 – 14 August, 1983	Jagannath Mishra
14 August, 1983 – 25 March, 1985	Chandra Shekhar Singh
25 March, 1985 – 14 February, 1988	Bindeshwari Dubey
14 February, 1988 – 11 March, 1989	Bhagwat Jha Azad
11 March, 1989 – 6 December, 1989	Satyendra Narain Sinha
6 December, 1989 – 10 March, 1990	Jagannath Mishra
10 March, 1990 – 28 March, 1995	Laloo Prasad Yadav
4 April, 1995 – 25 July, 1997	Laloo Prasad Yadav
25 July 1997 – 12 February, 1999	Rabri Devi
9 March, 1999 – 3 March, 2000	Rabri Devi
3 March 2000 – 10 March 2000	Nitish Kumar
10 March, 2000 – 7 March, 2005	Rabri Devi
24 November, 2005 – till date	Nitish Kumar

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CHHATTISGARH

15 August, 1947	Province
1 January, 1948	Part of Central Provinces and berar
1 November, 2000	(Later Madhya Pradesh) State

CHIEF COMMISSIONER

1947 – 1 January, 1948	S.N. Mehta

GOVERNORS

1 November, 2000 – 2 December, 2003	Dinesh Nandan Sahay
2 June, 2003 – January, 2007	Krishna Mohan Seth
25 January, 2007 – 23 January, 2010	E.S.L. Narsimhan
23 January, 2010 – till date	Shekhar Dutt

CHIEF MINISTERS

1 November, 2000 – 7 December, 2003	Ajit Jogi
7 December 2003 – till date	Raman Singh

GOA

16, March, 1962	Goa, Daman and Diu union territory
	(formerly Portuguese India)
30 May, 1987	Split into Goa state and Daman and Diu Union territory

LIEUTENANT GOVERNORS

7 June, 1962 – 2 September, 1963	Tumkur Sivasankar
2 September, 1963 – 8 December, 1964	M.R. Sachdev
12 December, 1964 – 24 February, 1965	Hari Sharma
24 February, 1965 – 18 April, 1967	Kashinath Raghunath Damle
18 April, 1967 – 16 November, 1972	Nakul Sen
16 November, 1972 – 16 November, 1977	S.K. Banerjee
16 November, 1977 – 31 March, 1981	Pratap Singh Gill
31 March, 1981 – 30 August, 1982	Jagmohan
30 August, 1982 – 24 Feburay, 1983	Idris Hasan Latif
24 February, 1983 – 4 July, 1984	Kershasp Tehmurasp Satarawala
4 July, 1984 – 24 September, 1984	Idrish Hasan Latif (acting)
24 September, 1984 – 29 May, 1987	Gopal Singh

GOVERNORS

30 May, 1987 – 18 July, 1989	Gopal Singh
18 July, 1989 – 18 March, 1991	Khurshed Alam Khan

18 March, 1991 – 4 April 1994	Bhanu Prakash Singh
4 April, 1994 – 4 August, 1994	B. Rachaiah
4 August, 1994 – 16 June, 1995	Gopala Ramanujam
16 June, 1995 – 19 July, 1996	Romesh Bhandari
19 July, 1996 – 16 January, 1998	P.C. Alexander
16 January, 1998 – 19 April 1998	Tumkur Ramaiya Satish Chandran
19 April, 1998 – 26 November, 1999	J.F.R. Jacob
26 November, 1999 – 26 October, 2002	Mohammed Fazal
26 October, 2002 – 2 July, 2004	Kedar Nath Sahani
2 July, 2004 – 17 July, 2004	Mohammed Fazal
17 July 2004 – 21 July, 2008	S.C. Jamir
21 July, 2008 – 26 August, 2011	Shivinder Singh Sidhu
26 August, 2011 – till	K. Shankarnarayanan

CHIEF MINISTERS

8 June, 1962 – 2 December, 1966	Dayanand B. Bandodkar
5 April, 1967 – 12 August, 1973	Dayanand B. Bandodkar
12 August, 1973 – 27 April, 1979	Shashikala G. Kakodkar
16 January, 1980 – 27 March, 1990	Pratapsing Rane
27 March, 1990 – 14 April, 1990	Churchill Braz Alemao
14 April, 1990 – 14 December, 1990	Luis Proto Barbosa
25 January, 1991 – 18 May, 1993	Ravi Naik
18 May, 1993 – 2 April, 1994	Wilfred D'Souza
2 April, 1994 – 8 April, 1994	Ravi Naik
8 April, 1994 – 16 December, 1994	Wilfred D'Souza
16 December, 1994 – 30 July, 1998	Pratapsingh Rane
30 July, 1998 – 26 Novemebr, 1998	Wilfred D'Souza
26 November, 1998 – 9 February, 1999	Luizinho Faleiro
9 June, 1999 – 24 November, 1999	Luizinho Faleiro
24 November, 1999 – 24 October, 2000	Francisco Sardinha
24 October, 2000 – 2 February, 2005	Manohar Parrikar
2 February, 2005 – 4 March, 2005	Pratapsing Rane
7 June, 2005 – 8 June, 2007	Pratapsing Rane
8 June, 2007 – till date	Digamber V. Kamat

GUJARAT

1 May, 1960	State crated from part of Bombay (see Maharashtra)

GOVERNORS

1 May, 1960 – 1 August, 1965	Mehdi Nawaz Jung
1 August, 1965 – 7 December, 1967	Nityanand Kanungo
7 December, 1967 – 26 December, 1967	P.N. Bhagwati (acting)
26 December, 1967 – 17 March, 1973	Shriman Narayan

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17 March, 1973 – 4 April, 1973	P.N. Bhagwati (acting)
4 April, 1973 – 14 August, 1978	Kambanthodath Kunhan Vishwanatham
14 August, 1978 – 6 August, 1983	Sharada Mukherjee
6 August, 1983 – 26 April, 1984	Kizhekethil Mathew Chandy
26 April, 1984 – 26 February, 1986	Braj Kumar Nehru
26 February, 1986 – 2 May 1990	Ram Krishna Trivedi
2 May, 1990 – 21 December, 1990	Mahipal Shastri
21 Decemer, 1990 – 1 July, 1995	Sarup Singh
1 July, 1995 – 1 March, 1996	Naresh Chandra
1 March, 1996 – 25 April, 1998	Krishna Pal Singh
25 April, 1998 – 16 January, 1999	Anshuman Singh
16 January, 1999 – 18 March, 1999	K.G. Balakrishnan (acting)
18 March, 1999 – 7 May, 2003	Sunder Singh Bhandari
7 May, 2003 – 2 July, 2004	Kailashpati Mishra
2 July, 2004 – 24 July, 2004	Balram Jakhar
24 July, 2004 – 18 July, 2009	Nawal Kishore Sharma
27 November, 2009 – till date	Mrs. Kamla Beniwal

CHIEF MINISTERS

1 May, 1960 – 18 September, 1963	Jivraj Mehta
18 September, 1963 – 19 Sept, 1965	Balwantrai Mehta
1 October, 1965 – 13 May, 1971	Hitendra Kaniyalal Desai
17 March, 1972 – 20 July, 1973	Ghanshyam Oza
20 July, 1973 – 9 February, 1974	Chimanbhai Patel
18 June, 1975 – 12 March, 1976	Babubhai Jashbhai Patel
24 December, 1976 – 11 April, 1977	Madhavsingh Solanki
11 April, 1977 – 17 February, 1980	Babubhai Jashbhai Patel
7 June, 1980 – 6 August, 1985	Madhasinh Solanki
6 August, 1985 – 10 December, 1989	Amarsinh Chaudhary
10 December, 1989 – 4 March, 1990	Madhavsingh Solanki
4 March, 1990 – 17 Febuary, 1994	Chimanbhai Patel
17 February, 1994 – 14 March, 1995	Chhabildas Mehta
14 March, 1995 – 21 October, 1995	Keshubhai Patel
21 October, 1995 – 19 September, 1996	Suresh Chandra Mehta
23 October, 1996 – 28 October, 1997	Shankersinh Vaghela
28 October, 1997 – 4 March, 1998	Dilip Parikh
4 March, 1998 – 7 October, 2001	Keshubhai Patel
7 October, 2001 – till Date	Narendra Modi

SAURASHTRA

CHIEF MINISTERS

1948 – 1954	Uchharangray Navalshankar Dhebar
10 December, 1954 – 1956	Rashiklal Umedchand Parikh

HARYANA

1 November, 1966	State created from part of Punjab

GOVERNORS

1 November, 1966 – 15 September, 1967	Dharma Vira
15 September, 1967 – 27 March, 1976	Birendra Narayan Chhakravarti
27 March, 1976 – 14 August, 1976	Ranjit Singh Narula
14 August, 1976 – 24 September, 1977	Jaisukh Lal Hathi
24 September, 1977 – 10 Dec., 1979	Harcharan Singh Brar
10 December, 1979 – 28 Feb., 1980	S.S. Sandhawalia
28 February, 1980 – 14 June, 1984	Ganpatrao Devji Tapase
14 June, 1984 – 22 February, 1988	S.M.H. Burney
22 February, 1988 – 7 February, 1990	Hara Anand Barari
7 February, 1990 – 14 June, 1995	Dhanik Lal Mandal
14 June, 1995 – 19 June, 2000	Mahabir Prasad
19 June, 2000 – 2 July, 2004	Babu Parmanand
2 July 2004 – 7 July, 2004	Om Prakash Verma
7 July, 2004 – 27 July, 2009	A.R. Kidwai
27 July, 2009 – till date	Jagannath Pahariya

CHIEF MINISTERS

1 November, 1966 – March, 1967	Bhagwat Dayal Sharma
24 March, 1967 – 21 November, 1967	Rao Birendra Singh
21 May 1968 – 7 December, 1975	Bansi Lal
7 December, 1975 – 21 May, 1977	Banarsi Das Gupta
21 May, 1977 – 28 June, 1979	Devi Lal
28 June, 1979 – 5 July, 1985	Bhajan Lal
5 July, 1985 – 19 June, 1987	Bansi Lal
17 July 1987 – 2 December, 1989	Devi Lal
2 December, 1989 – 22 May, 1990	Om Prakash Chautala
22 May 1990 – 12 July, 1990	Banarsi Das Gupta
12 July, 1990 – 17 July, 1990	Om Prakash Chautala
17 July 1990 – 22 March 1991	Hukam Singh
22 March, 1991 – 6 April, 1991	Om Prakash Chautala
23 July, 1991 – 11 May, 1996	Bhajan Lal
11 May, 1996 – 24 July, 1999	Bansi Lal
24 July, 1999 – 5 March, 2005	Om Prakash chautala
5 March, 2005 – till date	Bhupinder Singh Hooda

HIMACHAL PRADESH

15 April, 1948	Province
26 January, 1950	Part C state
1 November, 1956	Union territory
25 January, 1971	State

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CHIEF COMMISSIONERS

April, 1948 – 1951	E.P. Menon
1951 – 1952	Bhagwan Sahay

LIEUTENANT GOVERNORS

1 March, 1952 – 1 January, 1955	M.S. Himmatsinhji
1 January, 1955 – 14 August, 1963	Bajrang Bahadur Singh
14 August, 1963 – 26 February, 1966	Bhadri
26 February, 1966 – 7 May 1967	Bhagwan Sahay
7 May, 1967 – 16 May, 1967	Venkata Vishwanathan
16 May, 1967 – 25 January, 1971	Om Prakash
	Kanwar Bahadur Singh

GOVERNORS

25 January, 1971 – 17 February, 1977	Subramaniam Chhakravarti
17 February, 1977 – 26 August, 1981	Aminuddin Ahmad Khan
26 August, 1981 – 16 April, 1983	Asoka Nath Banerji
16 April, 1983 – 8 March, 1986	Hokishe Sema
8 March, 1986 – 17 April, 1986	Prabodh dinkarrao Desai (acting)
17 April, 1986 – 16 February, 1990	Rustom Khusro shampoorjee Gandhi
16 February, 1990 – 20 Dec., 1990	B. Rachaiah
20 December, 1990 – 30 Jan., 1993	Virendra Verma
30 January, 1993 – 11 Feb., 1993	Surendra Nath
11 February, 1993 – 30 June, 1993	Bali Ram Bhagat
30 June, 1993 – 27 Nov 1993	Gulsher Ahmed
27 November 1993 – 10 July, 1994	Surendra Nath
10 July, 1994 – 30 July, 1994	Viswanathan Ratnam
30 July, 1994 – 18 September, 1995	Sudhakarrao Naik
18 September, 1995 – 17 Nov, 1995	Mahabir Prasad
17 November, 1995 – 23 April, 1996	Sheila Kaul
23 April, 1996 – 26 July, 1997	Mahabir Prasad
26 July, 1997 – 2 December, 1999	V.S. Rama Devi
2 December, 1999 – 24 November, 2000	Vishnu Kant Shastri
24 November, 2000 – 8 May, 2003	Suraj Bhan
8 May, 2003 – 19 July, 2008	Vishnu Sadashiv Kokje
19 July, 2008 – 25 January, 2010	Mrs. Prabha Rao
25 January, 2010 – till date	Mrs. Urmila Singh

CHIEF MINISTERS

8 March, 1952 – 1956	Yashwant Singh Parmar
1 July, 1963 – 28 January, 1977	Yahswnat Singh Parmar
28 January, 1977 – 22 June, 1977	Ram Lal Chauhan
22 June, 1977, – 14 February, 1980	Shanta Kumar
14 February, 1980 – 8 April, 1983	Thakur Ram Lal
8 April, 1983 – 5 March, 1990	Virbhadra Singh

5 March, 1990 – 3 December, 1993	Shanta Kumar
3 December, 1993 – 24 March, 1998	Virbhadra Singh
24 March, 1998 – 6 March, 2003	Prem Kumar Dhumal
6 March, 2003 – 29 December, 2007	Virbhadra Singh
30 December, 2007 – till date	Prem Kumar Dhumal

JAMMU & KASHMIR

GOVERNORS

30 March, 1965 – 15 May 1967	Karan Singh
15 May, 1967 – 3 July, 1973	Bhagwan Sahay
3 July 1973 – 22 February, 1981	Lakshmi Kant Jha
22 February, 1981 – 26 April, 1984	Braj Kumar Nehru
26 April, 1984 – July, 1989	Jagmohan
July 1989 – 19 January, 1990	K.V. Krishna Rao
19 January, 1990 – 26 May 1990	Jagmohan
26 May, 1990 – 12 March, 1993	Girish Chandra Saxena
12 March, 1993 – 2 May, 1998	K.V.Krishna Rao
2 May, 1998 – 4 June, 2003	Girish Chandra Saxena
4 June, 2003 – 11 June, 2008	S.K. Sinha
25 June, 2008 – till date	N.N. Bohara

PRIME MINISTERS

11 August 1947 – 15 October 1947	Janak Singh (acting)
15 October, 1947 – 5 March, 1948	Meher Chand Mahajan
5 March, 1948 – 9 August, 1953	Sheikh Mohammed Abdullah
9 August, 1953 – 12 October, 1963	Bakshi Ghulam Mohammad
12 October, 1963 – 29 February, 1964	Khwaja Shams-ud-Din
29 February, 1964 – 30 March, 1965	Ghulam Mohammad Sadiq

CHIEF MINISTERS

30 March, 1965 – 12 December, 1971	Shulam Mohammed Sadiq
12 December, 1971 – 25 February, 1975	Syed Mir Qasim
25 February, 1975 – 26 March, 1977	Sheikh Mohammad Abdullah
9 July, 1977 – 8 September, 1982	Sheikh Mohammad Abdullah
8 September 1982 – 2 July, 1984	Farooq Abdullah
2 July, 1984 – 6 March, 1986	Ghulam Mohammed Shah
7 November, 1986 – 19 January, 1990	Farooq Abdullah
9 October, 1996 – 18 October, 2002	Farooq Abdullah
2 November, 2002 – 2 November, 2005	Mufti Mohammad Sayeed
2 November 2005 – 7 July, 2008	Gulam-Nabi Azad
5 January 2009 – till date	Omar Abdulla

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JHARKHAND

15 November, 2000	State created form part of Bihar
GOVERNORS	
15 November, 2000 – 1 February, 2002	Prabhat Kumar
1 February, 2002 – 15 July, 2002	Vinod Chandra Pande
15 July, 2002 – 12 June 2003	M. Rama Jois
12 June, 2003 – 10 December, 2004	Ved Marwah
10 December, 2004 – 26 July, 2009	Syed Sibtey Razi
26 July, 2009 – 22 January, 2010	K. Sankarnarayanan
22 January, 2010 – 26 August, 2011	MOH Farooq
26 August, 2011 – till date	Dr. Syeed Ahmad
CHIEF MINISTERS	
15 November, 2000 – 18 March, 2003	Babulal Marandi
18 March, 2003 – 2 March, 2005	Arjun Munda
2 March, 2005 – 12 March, 2005	Shibu soren
12 March, 2005 – 14 September, 2006	Arjun Munda
18 September, 2006 – 27 August, 2008	Madhu Koda
27 August, 2008 – 19 January, 2009	Shibu Soren
19 January, 2009 – 30 December, 2009	President's Rule
30 December, 2009 – 1 June, 2010	Shibu Soren
1 June, 2010 – 11 September, 2010	President's Rule
11 September, 2010 – till date	Arjun Munda

KARNATAKA

15 August, 1947	Mysore state (1950 – 56 : part B)
1 November, 1973	Renamed Karnataka
RAJPRAMUKH	
1947 – 1 November, 1956	Jayachamarajendra Wodeyar
GOVERNORS	
1November, 1956 – 4 May, 1964	Jayachamarajendra Wodeyar
4 May, 1964 – 2 April, 1965	Satyavant Mallannah Srinagesh
2 April, 1965 – 13 May, 1967	Varahagiri Venkata Giri
13 May 1967 – 30 August, 1969	Gopal Swarup Pathak
23 October, 1969 –1 February, 1972	Dharma Vira
1 February, 1972 – 10 January, 1976	Mohan Lal sukhadia
10 January, 1976 – 2 August, 1977	Uma Shankar Dikshit
2 August, 1977 – 15 April, 1983	Govind Narain Singh
16 April, 1983 – 25 Feb 1988	Asoka Nath Banerji
26 February, 1988 – 5 February, 1990	Pendekanti Venkatasubbaiah
8 May, 1990 – 6 January, 1991	Bhanu Pratap Singh
6 January, 1991 – 2 December, 1999	Khurshed Alam Khan
2 December, 1999 – 21 August, 1999	V.S. Rama Devi
21 August, 2002 – 20 August, 2007	T.N. Chaturvedi
21 August, 2007 – 29 June, 2009	Rameshwar Thakur
29 June, 2009 – till date	Hansraj Bhardwaj

CHIEF MINISTERS	Arcot Ramaswami Mudaliar
1946 – 25 October, 1947	Kysasambally Chengalaraya Reddy
25 October, 1947 – 30 March, 1952	Kengal Hanumanthaiah
30 March, 1952 – 19 August, 1956	Kadidal Manjappa
19 August, 1956 – 1 November, 1956	Siddhavvanahalli Nijalingappa
1 November, 1956 – 16 May, 1958	Basappa Danappa Jatti
16 May, 1958 – 9 March, 1962	Shivalingappa Rudrappa Kanthi
14 March, 1962 – 21 June, 1962	Siddhavvanahalli Nijalingappa
21 June, 1962 – 3 March, 1967	Veerendra Patil
29 May, 1968 – 27 March, 1971	Deveraj Urs
20 March, 1972 – 31 December, 1977	Deveraj Urs
28 February, 1978 – 12 Junuary, 1980	R. Gundu Rao
12 January, 1980 – 10 January, 1983	Ramakrishna Hegde
10 January, 1983 – 13 August, 1988	Somappa R. Bommai
13 August, 1988 – 21 April, 1989	Veerendra Patil
30 November, 1989 – 10 October, 1990	S. Bangarappa
17 October, 1990 – 20 November, 1992	M. Veerappa Moily
20 November, 1992 – 11 Dec., 1994	H.D. Deve Gowda
11 December, 1994 – 31 May, 1996	Jayadeveappa Halappa Patel
31 May, 1996 – 11 October, 1999	S.M. Krishna
11 October, 1999 – 28 May, 2004	Dharam Singh
28 May, 2004 – 27 January, 2006	H.D. Kumaraswamy
3 February, 2006 – 9 October, 2007	B.S. Yedeurappa
12 November, 2007 – 20 Nov., 2007	B.S. Yedeurappa
30 May, 2008 – till date	

KERALA

1 July, 1949	Travancore-Cochin state formed (for 1950 : Part B)
1 November, 1956	Kerala state
RAJPRAMUKH	
1 July, 1949 – 31, October, 1956	Sir Bala Rama Varma II
GOVERNORS	
22 November, 1956 – 1 July, 1960	Burgula Ramakrishna Rao
1 July, 1960 – 2 April, 1965	Varahagiri Venkata Giri
2 April, 1956 – 6 February, 1966	Ajit Prasad Jain
6 February, 1966 – 15 May, 1967	Bhagwan Sahay
15 May, 1967 – 1 April, 1973	Venkata Vishwanathan
1 April, 1973 – 14 October, 1977	Niranja Nath Wanchoo

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14 October, 1977 – 27 October, 1982	Jyoti Venkatachalam
27 October, 1982 – 23 February, 1988	Parthasarathy
23 February, 1988 – 12 February, 1990	Ramachandran
12 February, 1990 – 20 December, 1990	Ram Dulari Sinha
20 December, 1990 – 12 Nov., 1995	Sarup Singh
12 November, 1995 – 4 May, 1996	B. Rachaiah
4 May, 1996 – 25 January, 1997	P. Shiv Shanker
25 January, 1997 – 18 April, 2002	Khurshed Alam Khan
18 April, 2002 – 23 February, 2004	Sukhdev Singh Kang
25 February, 2004 – 23 June, 2004	Sikander Bakht
23 June, 2004 – 10 July, 2008	T.N. Chaturvedi
10 July, 2008 – 26 August, 2011	Raghunandan Lal Bhatia
26 August, 2011 – till date	R.S. Gavai
	MOH Farooq

CHIEF MINISTERS

(of Travancore to 1 July, 1949)

24 March, 1948 – 20 October, 1948	Pattom Thanu Pillai
20 October, 1948 – January 1951	T.K. Narayan Pillai
January, 1951 – 12 March, 1952	C. Kesavan
12 March, 1952 – 16 March, 1954	Anapparambul Joseph John
16 March, 1954 – 10 February, 1955	Pattom Thanu Pillai
10 February, 1955 – 23 March, 1956	Panampilly Govinda Menon
5 April, 1957 – 31 July, 1959	E.M. Sankaran Namboodiripad
22 February, 1960, 25 September, 1962	Pattom Thanu Pillai
25 September, 1962 – 9 September, 1964	R. Sankar
5 March, 1967 – 1 November, 1969	E.M. Sankaran Namboodiripad
1 November, 1969 – 4 August, 1970	C. Achutha Menon
4 October, 1970 – 11 April 1977	C. Achutha Menon
11 April, 1977 – 25 April, 1977	K. Karunakaran
25 April 1977 – 29 October, 1978	A.K. Antony
29 October, 1978 – 12 October, 1979	P.K. Vasudevan Nair
12 October, 1979 – 5 December, 1979	C.H. Mohammed Koya
25 January, 1980 – 20 October, 1981	E.K. Nayanar
28 December, 1981 – 17 March, 1982	K. Karunakaran
24 May, 1982 – 25 March, 1987	K. Karunakaran
25 March, 1987 – 24 June, 1991	E.K. Nayanar
24 June, 1991 – 22 March, 1995	K. Karunakaran
22 March 1995 – 20 May, 1996	A.K. Antony
20 May, 1996 – 18 May, 2001	E.K. Nayanar
18 May, 2001 – 31 August, 2004	A.K. Antony
31 August, 2004 – 12 May, 2006	Oommen Chandy
18 May, 2006 – 18 May, 2011	V.S. Achyutanandan
18 May, 2011 – till date	Oommen Chandy

MADHYA PRADESH

15 August, 1947	Central Province and Berar
26 January, 1950	Madhya Pradesh state (until 1956 : part A)

GOVERNORS

1947 – 1952	Mangaldas Mancharam Pakvasa
1952 – 14 June, 1957	B. Pattabhi sitaramayya
14 June, 1957 – 11 February, 1965	Hari Vinayaha Pataskar
11 February, 1965 – 8 March, 1971	Kysasambally Chengalaraya Reddy
8 March, 1971 – 14 October, 1977	Satya Narayan Sinha
14 October, 1977 – 17 August, 1978	Niranja Nath Wanchoo
17 August, 1978 – 30 April, 1980	Cheppudira Muthana Poonacha
30 April, 1980 – 15 May 1984	Bhagwat Dayal Sharma
15 May 1984 – 31 March, 1989	Kizhekethil Mathew Chandy
31 March, 1989 – 6 February, 1990	Serla Grewal
6 February, 1990 – 24 June, 1993	Kunwar Mahmood Ali Khan
24 June, 1993 – 22 April, 1998	Mohammed Shafi Qureshi
22 April, 1998 – 7 May, 2003	Bhai Mahavir
7 May 2003 – 1 May 2004	Ram Prakash Gupta
2 May 2004 – 30 June, 2004	Krishna Mohan Seth
30 June, 2004 – 30 June, 2009	Balram Jakhar
30 June, 2009 – 26 August, 2011	Rameshwar Thakur
26 August, 2011 – till date	Ram Naresh Yadava

CHIEF MINISTERS

15 August, 1947 – 31 December, 1956	Ravi Shankar Shukla
1 January, 1957 – 31 January, 1957	Bhagwantrao Mandloi
31 January, 1957 – 11 March, 1962	Kailash Nathi Katju
11 March, 1962 – 30 September, 1963	Bhagwantrao Mandloi
30 September, 1963 – 30 July, 1967	Dwarka Prasad Mishra
30 July, 1967 – 13 March, 1969	Govind Narayan Singh
13 March, 1969 – 26 March, 1969	Raja Naresh Chandra Singh
26 March, 1969 – 29 January, 1972	Shayama Charan Shukla
29 January, 1972 – 23 December, 1975	Prakash Chandra Sethi
23 December, 1975 – 29 April, 1977	Shyama charan shukla
26 June, 1977 – 18 January, 1978	Kailash Chandra Joshi
18 January, 1978 – 20 January, 1980	Virendra Kumar Saklecha
20 January, 1980 – 17 February, 1980	Sunderlal Patwa
9 June, 1980 – 14 March, 1985	Arjun Singh
14 March, 1985 – 14 February, 1988	Motilal Vora
14 February, 1988 – 25 January, 1989	Arjun singh
25 Jan 1989 – 9 December, 1989	Motial Vora
9 December, 1989 – 5 March, 1990	Shyama Charan shukla

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5 March, 1990 – 15 December, 1992	Sunderlal Patwa
7 December, 1993 – 8 December, 2003	Digvijay Singh
8 December, 2003 – 23 August, 2004	Uma Bharti
23 August, 2004 – 29 November, 2005	Babulal Gaur
29 November, 2005 – till date	Shivraj Singh Chauhan

MADHYA BHARAT
CHIEF MINISTERS

January, 1948 – May 1949	Lilasthar Joshi
May 1949 – 18 Oct 1950	Gopikrishnan Vijayavargiya
18 October, 1950 – 3 March, 1952	Takhatmal Jain
3 March, 1952 – 16 April, 1955	Mishrilal Gangwal
16 April, 1955 – 31 October, 1956	Takhatmal Jain

BHOPAL
CHIEF MINISTERS

April, 1948 – January, 1949	Qudh narain Baisatya
January, 1949 – 1952	Pandit Chatur Narain Malviya
1952 – 1956	Shankar Dayal Sharma

VINDHYA PRADESH
CHIEF MINISTERS

1948 – 1949	Awadesh Pratap Singh
13 March, 1952 – 31 October, 1956	Shambhunath Shukla

MAHARASHTRA

15 August, 1947	Bombay province
26 January, 1950	State (until 1956 : Part A)
1 May 1960	Divided into Maharshtra and Gujarat

GOVERNORS

15 August, 1947 – 6 January, 1948	David John Colville, Baron Clydesmuir
January, 1948 – 30 May 1952	Raja Maharaj Singh
30 May 1952 – 5 December, 1954	Sir Girja Shankar Bajpai
5 December, 1954 – 1 March, 1955	Mangaldas Mancharam Pakvasa
1 March, 1955 – 14 October, 1956	Harekrushna Mahatab
14 October, 1956 – 10 December, 1956	Mohomedali Currim Chagla
10 December, 1956 – 16 April, 1962	Sri Prakasa
16 April, 1962 – 6 October, 1962	P. Subbarayan
6 October, 1962 – 5 December, 1962	H.K. Chainani
5 December, 1962 – 5 September, 1963	Vijaya Lakshmi Pandit
5 September, 1963 – 18 December, 1963	H.K. Chainani
18 December, 1963 – 8 October, 1964	Vijaya Lakshmi Pandit

8 October, 1964 – 14 November, 1964	Mangaldas Mancharam Pakvasa
14 Nov 1964 – 9 November, 1969	P.V. Cherian
9 November, 1969 – 26 February, 1970	S.P. Kotval
26 February, 1970 – 11 Dec 1976	Ali Yavar Jung Bahadur
12 December, 1976 – 30 April, 1977	R.M. Kantawala
30 April, 1977 – 3 November, 1980	Sadiq Ali
3 November, 1980 – 5 February, 1982	Om prakash Mehra
6 March, 1982 – 18 April, 1985	Idris Hasan Latif
18 April, 1985 – 30 May 1985	K. Madhava Reddy
30 May 1985 – 3 April, 1986	Kona Prabhakara Rao
3 April, 1986 – 3 September, 1987	Shankar Dayal Sharma
3 September, 1987 – 6 November, 1987	S.K. Desai
6 November, 1987 – 20 February, 1988	Chittatosh Mookerjee
20 February, 1988 – 15 February, 1989	Kasu Brahmananda Reddy
15 February, 1989 – 12 January, 1993	Chidambaram Subramaniam
12 January, 1993 – 13 July, 2002	P.C. Alexander
13 July, 2002 – 10 October, 2002	C.K. Thakkar (acting)
10 October, 2002 – 6 December, 2004	Mohammed Fazal
6 December, 2004 – 9 March, 2008	S.M. Krishna
9 March,2008 – 8 July, 2008	S.C. Jamir (acting)
8 July, 2008 – 22 January, 2010	S.C. Jamir
22 January, 2010 – till date	K Shankar Narayanan

CHIEF MINISTERS

15 August, 1947 – 21 April, 1952	Bal Gangadhar Kher
21 April, 1952 – 1 November, 1956	Morarji Desai
1 November, 1956 – 19 Nov., 1962	Yashwantrao halwantrao Chavan
19 November, 1962 – 25 Nov., 1963	Marotrao Sambashio Kannamwar
5 December, 1963 – 20 February, 1975	Vasantrao Phulsing Naik
20 February, 1975 – 1 April, 1977	shankarrao Chavan
1 April, 1977 – 18 July, 1978	Vasantrao Patil
18 July, 1978 – 9 June, 1980	Sharad Pawar
9 June, 1980 – 20 January, 1982	Abdul Rahman Antulay
20 January, 1982 – 2 February, 1983	Babasaheb Bhosale
2 February, 1983 – 2 June, 1985	Vasantrao Patil
2 June, 1985 – 12 March, 1986	Shivajirao Patil Nilangekar
13 March, 1986 – 24 June, 1988	Shankarrao Chavan
25 June, 1988 – 25 June, 1991	Sharad Pawar
25 June, 1991 – 3 March, 1993	Sudhakarrao Naik
3 March, 1993 – 14 March, 1995	Sharad Pawar
14 March, 1995 – 1 February, 1999	Manohar Joshi
1 February, 1999 – 18 Oct 1999	Narayan Rane
18 October, 1999 – 18 January, 2003	Vilasrao Deshmukh
18 January, 2003 – 1 November, 2004	Sushil Kumar shinde
1 November, 2004 – 8 December, 2008	Vilasrao Deshmukh
8 December, 2008 – 11 November, 2010	Ashok Chavhan
11 November, 2010 – till date	Prithviraj Chavan

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MANIPUR

15 October, 1949	State (from 1950 : Part C)
1 November, 1956	Union territory
21 January, 1972	State

CHIEF COMMISSIONERS **(from 19 December, 1969, lieutenant governors)**

15 October, 1949 – 18 October, 1949	Rawal Amar Singh
18 October, 1949 – December, 1950	Himmat Singh K.Maheswari
January, 1951 – 22 Setember 1952	E.P. Moon-Jan,
22 September, 1952 – 3 January, 1955	Rameshwar Prasad Bharagava
3 January, 1955 – 25 April, 1958	P.C. Mathew
26 April, 1958 – 23 November, 1963	Jagat Mohan Raina
23 November, 1963 – January, 1970	Baleshwar Prasad
January, 1970 – 21 January, 1972	Dalip Rai Kohli

GOVERNORS

21 January, 1972 – 21 September, 1973	Braj Kumar Nehru
21 September, 1973 – 12 August, 1981	Lallan Prasad Singh
12 August, 1981 – 12 June, 1984	S.M.H. Burney
12 June, 1984 – 10 July, 1989	K.V. Krishna Rao
10 July, 1989 – 20 March, 1993	Chintamani Panigrahi
20 March, 1993 – 31 August, 1993	K.V. Reghunatha Reddy
31 August, 1993 – 23 December, 1994	V.K. Nayar
23 December, 1994 – 2 December, 1999	Oudh Narain Shrivastava
2 December, 1999 – 12 June, 2003	Ved Marwah
12 June, 2003 –6 August, 2004	Arvind Dave
6 August, 2004 – 23 July, 2008	Shivinder Singh Sidhu
23 July, 2008 – till date	Gurubachan Singh Jagat

CHIEF MINISTERS

1 July, 1963 – 12 January, 1967	M. Koireng Singh
20 March, 1967 – 4 October, 1967	M. Koireng Singh
13 October, 1967 – 25 October, 1967	Longjam Thambou Singh
19 February, 1968 – 17 October, 1969	M. Koireng Singh
23 March, 1972 – 28 March, 1973	Mohammed Alimuddin
4 March, 1974 – 10 July, 1974	Mohammed Alimuddin
10 July, 1974 – 6 December, 1974	Yangmasho shaiza
6 December, 1974 – 16 May 1977	R.K. Dorendra Singh
29 June, 1977 – 14 November, 1979	Yangmasho Shaiza
14 January, 1980 – 27 November, 1980	R.K. Dorendra Singh
27 November, 1980 – 28 February, 1981	Rishang Keishing
19 June, 1981 – 4 March, 1988	Rishang Keishing
4 March, 1988 – 23 February, 1990	R.K. Jaichandra Singh
23 Febrauary 1990 – 7 January, 1992	Raj Kumar Ranbir Singh

8 April, 1992 – 11 April, 1993	R.K. Dorendra Singh
11 April, 1993 – 31 December, 1993	Dasarath Deb
14 December, 1994 – 16 Dec, 1997	Rishang Keishing
16 December, 1997 – 15 February, 2001	W. Nipamacha Singh
15 February, 2001 – 2 June, 2001	Radhabinod Koijam
7 March, 2002 – 2 March, 2007	Okram Ibobi Singh
2 March, 2007 – till date	Okram Ibobi Singh

MEGHALAYA

2 Arpil 1970	State within Assam
21 January, 1972	Separate State

GOVERNORS

2 April, 1970 – September, 1973	Braj Kumar Nehru
September, 1973 – 11 August, 1981	Lallan Prasad Singh
11 August, 1981 – 29 March, 1984	Prakash Chandra Mehotra
29 March, 1984 – 16 April, 1984	Triveni Sahai Mishra
16 April, 1984 – 11 May, 1989	Bhishma Narain Singh
11 May, 1989 – 27 July, 1989	Harideo Joshi
27 July, 1989 – 9 May, 1990	Abubakar Abdul Rahim
9 May, 1990 – 19 June, 1995	Madhukar Dighe
19 June, 1995 – 12 April, 2007	M.M. Jacob
12 April, 2007 – 29 October, 2007	B.L. Joshi
29 October, 2007 – 1 July, 2008	Shivinder Singh Sidhu
1 July, 2008 – till date	Ranjeet Shekhar Mushaha

CHIEF MINISTERS

2 April, 1970 – 10 March, 1978	Williamson A. Sangma
10 March, 1978 – 7 March, 1979	Darwin Diengdoh Pugh
7 May 1979 – 7 May 1981	Brington Buhai Lyngdoh
7 May 1981 – 2 March, 1983	Williamson A. Sangma
2 March, 1983 – 2 April, 1983	Brington Buhai Lyngdoh
2 April, 1983 – 6 February, 1988	Williamson A. Sangma
6 February, 1988 – 26 March, 1990	Purno Agitok Sangma
26 March, 1990 – 11 October, 1991	Brington Buhai Lyngdoh
5 February, 1992 – 19 February, 1993	D.D. Lapang
19 February, 1993 – 10 March, 1998	Salseng C. Marak
10 March, 1998 – 8 March, 2000	Brington Buhai Lyngdoh
8 March, 2000 – 8 Dec 2001	E.K. Mawlong
8 December, 2001 – 4 March, 2003	Flinder Anderson Khonglai
4 March, 2003 – 14 June, 2006	D.D. Lapang
15 June, 2006 – 10 March, 2007	J.D. Rymbai
10 March, 2007– 19 March, 2008	D.D. Lapang
19 March, 2008 – 19 March, 2009	Donkupar Roy
13 May, 2009 – 19 April, 2010	D.D. Lapang
20 April, 2010 – till date	Mukul Sangma

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MIZORAM

21 January, 1972	Union territory created form part of Assam State
20 February, 1987	

CHIEF COMMISIONER

21 January, 1972 – 24 April, 1972	S.J. Das

LIEUTENANT GOVERNORS

24 April, 1972 – 13 June, 1974	Shanti Priya Mukherjee
13 June, 1974 – 27 September, 1977	S.K. Chhibbar
27 September, 1977 – 1980	Mohan Prakash Mathur
1980 – 16 April, 1981	K.A.A. Raja
16 April, 1981 – 10 August, 1983	S.N. Kohli
10 August, 1983 – 11 December, 1986	Mari Shankar Dhube
11 December, 1986 – 20 February, 1987	Hiteshwar Saikia

GOVERNORS

20 February, 1987 – 30 April, 1989	Hiteshwar Saikia
1 July, 1989 – 8 February, 1990	Williamson A. Sangma
8 February, 1990 February, 1993	Swaraj Kaushal
10 February, 1993 – 29 January, 1998	Paty Ripple Kyndiah
29 January, 1998 – 2 May 1998	Arun Prasad Mukherjee
2 May 1998 – 22 November, 2000	Anandam Padmanabhan
22 November, 2000 – 18 May 2001	Ved Marwah
18 May 2001 – 24 July, 2006	Amolak Rattan Kohli
25 July, 2006 – 26 August, 2011	M.M. Lakhera
26 August, 2011 – till date	Vokkom Purushottam

CHIEF MINISTERS

3 May 1972 – 10 May 1977	L. Chal Chhunga
2 June, 1978 – 10 November, 1978	Thenphunga Sailo
8 May 1979 – 4 May 1984	Thenphunga Sailo
5 May 1984 – 20 August, 1986	Lal Thhanhawla
21 August, 1986 – 7 September, 1988	Laldenga
24 January, 1989 – 3 December, 1998	Lal Thhanhawla
3 December, 1998 – 11 December, 2008	Zoram Thanga
11 December, 2008 – till date	Lal Thhanhawla

NAGALAND

1 December, 1963	State created form part of Assam

GOVERNORS

1 December, 1963 – 17 April, 1968	Vishnu Sahay
17 April, 1968 – 19 September, 1973	Braj Kumar Nehru
19 Septemer 1973 – 10 August, 1981	Lallan Prasad Singh

10 August, 1981 – 13 June, 1984	S.M.H. Burney
13 June, 1984 – 20 July, 1989	K.V. Krishna Rao
20 July, 1989 – 4 May 1990	Gopal Singh
4 March, 1990 – 9 May 1990	Chintamani Panigrahi
9 May 1990 – 13 April, 1992	M.M. Thomas
13 April, 1992 – 2 October, 1993	Loknath Mishra
2 October, 1993 – 5 August, 1994	V.K. Nayar
5 August, 1994 – 12 November, 1996	Oudh Narain Shrivastava
12 November, 1996 – 28 January, 2002	Om Prakash sharma
28 January, 2002 – 2 February, 2007	Shyamal Datta
3 February 2007 – 22 July, 2009	K. Shanker Narayanan
22 July, 2009 – 14 October, 2009	Gurubachan Singh Jagat
15 October, 2009 – till date	Nikhil Kumar

CHIEF MINISTERS

1 December, 1963 – 14 August, 1966	Shilu Ao
14 August, 1966 – 22 February, 1969	T.N. Angami
22 February, 1969 – 26 February, 1974	Hokishe Sema
26 February, 1974 – 10 March, 1975	Vizol
10 March, 1975 – 22 March, 1975	John Bosco Jasokie
25 November, 1977 – 18 January, 1980	Vizol
18 January, 1980 – 18 April, 1980	George A. Pang
18 April, 1980 – 5 June, 1980	S.C. Jamir
5 June, 1980 – 18 November, 1982	John Bosco Jasokie
18 November, 1982 – 29 October, 1986	S.C. Jamir
29 October, 1986 – 7 August, 1988	Hokishe Sema
25 January, 1989 – 15 May 1990	S.C. Jamir
15 May 1990 – 19 June, 1990	K.L. Chishi
19 June, 1990 – 2 April, 1992	Vamuzo Phesao
22 February, 1993 – 6 March, 2003	S.C. Jamir
6 March, 2003 – 11 March, 2008	Neiphiu Rio
12 March, 2008 – till date	Neiphiu Rio

ORISSA

15 August, 1947	Province
26 January, 1950	State (unitl 1956 : Part A)

GOVERNORS

15 August, 1947 – 20 June, 1948	Kailash Nathi Katju
21 June, 1948 – 6 June, 1952	Janab M. Asaf Ali
7 June, 1952 – 9 February, 1954	Sir Saiyid Fazl Ali
10 February, 1954 – 11 September, 1956	Poosapati S. Kumar iswamy Raja
12 September, 1956 – 31 July, 1957	Bhim Sen Sachar
31 July, 1957 – 15 September, 1962	Yeshwant Narayan Sukthankar
16 September, 1962 – 30 January, 1968	Ajudhia Nath Khosla

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31 January, 1968 – 20 Setpember 1971	Shaukatullah Shah Ansari
20 September, 1971 – 30 June, 1972	Sardar Jogendra Singh
1 July, 1972 – 8 November, 1972	Gatikrisina Misra (acting)
8 November, 1972 – 20 August, 1974	Basappa Danappa Jatti
21 August, 1974 – 25 October, 1974	Gatikrishina Misra (acting)
25 October, 1974 – 17 April, 1976	Akbar Ali Khan
17 April, 1976 – 7 February, 1977	Shiva narayin Sankar (acting)
7 February, 1977 – 22 September, 1977	Harcharan Singh Brar
23 September, 1977 – 30 April, 1980	Bhagwat Dayal Sharma
30 April, 1980 – 17 August, 1983	Cheppudira Muthana Poonacha
17 August, 1983 – 20 November, 1988	Bishambhar Nath Pande
20 November, 1988 – 6 February, 1990	Nurul Hasan
7 February, 1990 – 1 February, 1993	Yagya Dutt Sharma
1 February, 1993 – 31 May 1993	Nurul Hasan
1 June, 1993 – 17 June, 1995	B. Satyanarayan Reddy
18 June, 1995 – 27 April, 1998	Gopala Ramanujam
27 April, 1998 – 14 November, 1999	Chakravarti Rangarajan
15 November, 1999 – 17 November, 2004	M.M.Rajendran
17 November, 2004 – 21 August, 2007	Rameshwar Thakur
21 August, 2007 – till date	Murilidhar Bhandare

CHIEF MINISTERS

15 August, 1947 – 12 May 1950	Harekrushna Mahatab
12 May 1950 – 15 October, 1956	Nabakrushna Choudhary
15 October, 1956 – 25 February, 1961	Harekrushna Mahatab
28 June, 1961 – 2 October, 1963	Bijayananda Patnai
2 October, 1963 – 21 February, 1965	Biren Mitra
21 February, 1965 – 8 March, 1967	Sadasiva Tripathy
8 March, 1967 – 11 January, 1971	Rajendra Narayana Singh Deo
3 April, 1971 – 14 June, 1972	Biswanath Das
14 June, 1972 – 3 March, 1973	Nandini Satpathy
6 March, 1974 – 16 December, 1976	Nandini Satpathy
29 December, 1976 – 25 June, 1977	Binayak Acharya
25 June, 1977 – 17 February, 1980	Nilamani Routray
9 June, 1980 – 7 December, 1989	Janaki Ballabha Patnaik
7 December, 1989 – 5 March, 1990	Hemananda Biswal
5 March, 1990 – 15 March, 1995	Bijayananda Patnaik
15 March, 1995 – 15 February, 1999	Janaki Ballabh Patnaik
15 February, 1999 – 6 December, 1999	Giridhar Gomango
6 December, 1999 – 5 March, 2000	Hemananda Biswal
5 March, 2000 – till date	Naveen Patnaik

PUNJAB

	Province
15 August, 1947	State (Until 1956 : part A)
26 January, 1950	
GOVERNORS	
15 August, 1947 – 11 March, 1953	Sir Chandulal Madhavlal Trivedi
11 March, 1953 – 15 September, 1958	C.P.N. Singh
15 September, 1958 – 1 October, 1962	Narhar Vishnu Gadgil
1 October, 1962 – 4 May 1964	Pattom Thanu Pillai
4 May 1964 – 1 September, 1965	Hafiz Muhammad Ibrahim
1 September, 1956 – 26 June, 1966	Sardar ujjal Singh
27 June, 1966 – 1 June, 1967	Dharma Vira
1 June, 1967 – 16 October, 1967	Mehar Singh
16 October, 1967 – 21 May 1973	Dadasaheb Chitanani Pavate
21 May 1973 – 1 September, 1977	Mahendra Mohan Choudhury
1 September, 1977 – 24 Sept., 1977	Ranjit Singh Narula
24 September, 1977 – 26 August, 1981	Jaisukh Lal Hathi
26 August, 1981 – 21 April, 1982	Aminuddin Ahmad Khan
21 April, 1982 – 7 February, 1983	Marri Channa Reddy
7 February, 1983 – 21 February, 1983	S.S. Sandhawalia
21 February, 1983 – 10 October, 1983	Anant prasad Sharma
10 October, 1983 – 3 July, 1984	Bhairab Dutt Pande
3 July, 1984 – 14 March, 1985	Kershasp Tehmurasp Satarawala
14 March, 1985 – 14 November, 1985	Arjun Singh
14 November, 1985 – 26 Nov, 1985	Hokishe Sema
26 November, 1985 – 2 April, 1986	Shankar Dayal Sharma
2 April, 1986 – 8 December, 1989	Siddharta shankar Ray
8 December, 1989 – 14 June, 1990	Nirmal Mukarji
14 June, 1990 – 18 December, 1990	Vikrendra Verma
18 December, 1990 – 7 August, 1991	Om Prakash Malhotra
7 August, 1991 – 9 July, 1994	Surendra Nath
10 July, 1994 – 18 September, 1994	Sudhakar Panditrao Kurdukar
18 September, 1994 – 18 Nov, 1999	B.K.N. Chhibber
27 November, 1999 – 8 May 2003	J.F.R. Jacob
8 May 2003 – 3 November, 2004	Om Prakash Verma
3 November, 2004 – 16 Nov, 2004	A.R. Kidwai
16 November, 2004 – 22 January, 2010	S.F. Rodrigues
22 January, 2010 – till date	Shivraj Patil
CHIEF MINISTERS	
15 August, 1947 – 13 April, 1949	Gopichand Bharagava

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13 April, 1949 – 18 October, 1949	Bhim Sen Sachar
18 October, 1949 – 20 June, 1951	gopichand Bhargava
17 April, 1952 – 23 January, 1956	Bhim Sen Sachar
23 January, 1956 – 21 June, 1964	Sardar Paratap Singh Kairon
21 June, 1964 – 6 July, 1964	Gopichand Bhargava
6 July, 1964 – 5 July, 1966	Ram Kishan
1 November, 1966 – 8 March, 1967	Gurumukh Singh Musafir
8 March, 1967 – 25 November, 1967	Sardar Gurnam Singh
25 November, 1967 – 23 August, 1968	Sardar Lachhman Singh Gill
17 February, 1969 – 27 March, 1970	Sardar Gurnam Singh
27 March, 1970 – 14 June, 1971	Prakash Singh Badal
17 March, 1972 – 30 April, 1977	Zail Singh
20 June, 1977 – 17 February, 1980	Parkash Singh Badal
6 June, 1980 – 6 October, 1983	Darbara Singh
29 September, 1985 – 11 May 1987	Surjit Singh Barnala
25 February, 1992 – 31 August, 1995	Beant Singh
31 August, 1995 – 21 November, 1996	Harcharan Singh Brar
21 November, 1996 – 12 February, 1997	Rajinder Kaur Bhattal
12 February, 1997 – 27 February, 2002	Prakash Singh Badal
27 February, 2002 – 2 March, 2007	Amarinder Singh
2 March, 2007 – till date	Prakash Singh Badal

Patiala and East Punjab States Union

CHIEF MINISTERS

22 April, 1952 – 2 March, 1953	Sardar Gian Singh Rarewala
8 March, 1954 – 7 January, 1955	Sardar Raghbir Singh
12 January, 1955 – October, 1956	Brish Bhan

RAJASTHAN

25 March, 1948	Rajasthan Union
18 April, 1948	United States of Rajasthan
30 April, 1949	United States of Greater Rajasthan (form 1950 : Part B)
1 November, 1956	Rajastan

RAJPRAMUKHS

25 March, 1948 – 18 April, 1948	Bhim Singh II
18 April, 1948 – 4 July, 1955 (from 1 April, 1949, maharajpramukh)	Sir Bhopal Singh

GOVERNORS

1 November, 1956 – 16 April, 1962	Gurumukh Nihal Singh
16 April, 1962 – 16 April, 1967	Sampurnanand

16 April, 1967 – 1 July, 1972	Sardar Hukam Singh
1 July, 1972 – 15 February, 1977	Sardar Jogendra Singh
15 February, 1977 – 11 May 1977	Vedpal Tyagi (acting)
17 May, 1977 – 8 August, 1981	Raghukul Tilak
8 August, 1981 – 6 March, 1982	K.D. Sharma (acting)
6 March, 1982 – 4 January, 1985	Om Prakash Mehra
20 November, 1985 – 15 October, 1987	Vasantrao Patil
20 February, 1988 – 3 February, 1990	Sukhdev Prasad
3 February, 1990 – 14 February, 1990	Milap Chand Jain (acting)
14 February, 1990 – 26 August, 1991	Debi Prasad Chattopadhyaya
26 August, 1991 – 5 February, 1992	Swarup Singh (acting)
5 February, 1992 – 31 May 1993	Marri Channa Reddy
31 May 1993 – 30 June, 1993	Dhanik Lal Mandal (acting)
30 June, 1993 – 1 May 1998	Bali Ram Bhagat
1 May 1998 – 24 May 1998	Darbara Singh
25 May 1998 – 16 January, 1999	Navrang Lal Tibrewal (acting)
16 January, 1999 – 14 May 2003	Anshuman Singh
14 May, 2003 – 22 September, 2003	Niramal Chandra Jain
22 September, 2003 – 14 January, 2004	Kailashpati Mishra
14 January, 2004 – 1 November, 2004	Madan Lal Khurana
1 November, 2004 – 8 November, 2004	Thanjavelu Rajeshwar
8 November, 2004 – 23 June, 2007	Pratibha Patil
23 June, 2007 – 6 September, 2007	A.R. Kidwai (acting)
6 September, 2007 – 01 Dec. 2009	Shilendra Kumar Singh
03 December, 2009 – 26 April, 2010	Mrs. Prabha Rao
26 April, 2010 – till date	Shivraj Patil (acting)

CHIEF MINISTERS

25 March, 1948 – 18 April, 1948	Gokul Lal Asawa
18 April, 1948 – 7 April, 1949	Manikya Lal Verma
7 April, 1949 – 6 January, 1951	Hiralal Shastri
6 January, 1951 – 26 April, 1951	Cadambi Seshachar Venkatachari (acting)
26 April, 1951 – 3 March, 1952	Jai Narayan Vyas
3 March, 1952 – 1 November, 1952	Tikaram Pailliwal
1 November, 1952 – 13 November, 1954	Jai Narayan Vyas
13 November, 1954 – 13 March, 1967	Mohan Lal Sukhadia
26 April, 1967 – 9 July, 1971	Mohan Lal Sukhadia
9 July, 1971 – 11 October, 1973	Barkatuallah
23 October, 1973 – 22 June, 1977	Harideo Joshi
22 June, 1977 – 16 February, 1980	Bhairon Singh Shekhawat
6 June, 1980 – 14 July, 1981	Jagannath Pahadia
14 July, 1981 – 23 February, 1985	Shiv Charan Mathur
23 February, 1985 – 10 March, 1985	Heera Lal Devpura

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10 March, 1985 – 20 January, 1988	Harideo Joshi
20 January, 1988 – 4 Decemeber, 1989	Shiv Charan Mathur
4 Decemebr, 1989 – 4 March, 1990	Harideo Joshi
4 March, 1990 – 15 Decemeber, 1992	Bhairon Singh Shekhawat
4 Decemeber 1993 – 1 Decemeber	Bhairon Singh Shekhawat
1 Decemeber 1998 – 8 Decemeber 2003	Ashok Gehlot
8 Decemeber 2003 – 13 December 2008	Vasundhara Raje
13 December, 2008 – till date	Ashok Gahlot

MATSYA

Matsya Union formed by merger of former princely states of Alwar, Bharatpur, Dholpur, and Karauli

CHIEF MINISTER

18 March, 1948 – 15 May 1949	Shobha Ram

AJMER

CHIEF MINISTER

24 March, 1952 – 1956	Hari Bhau Upadhyay

SIKKIM

16 May 1975	State

GOVERNORS

16 May, 1975 – 10 January, 1981	Bipen Bihari Lal
10 January, 1981 – 16 June, 1984	Homi J.H. Taleyarkhan
16 June, 1984 – 31 May 1985	Kona Parabhakara
31 May, 1985 – 21 November, 1985	Bhishma Narain Singh
21 Novemeber, 1985 – 2 March, 1989	Thanjavelu Rajeshwar
2 March, 1989 – 8 February, 1990	S.K. Bhatnagar
8 February, 1990 – 21 September,	R.H. Tahiliani
21 September, 1994 – 12 Nov., 1995	P. Shiv Shanker
12 November, 1995 – 10 March, 1996	K.V. Raghunatha Reddy
10 March, 1996 – 18 May 2001	Chaudhury Randhir Singh
18 May 2001 – 25 October, 2002	Kidar Nath Sahani
25 October, 2002 – 25 October, 2007	V.Rama Rao
25 October, 2007 – 9 July, 2008	Sudarshan Agarwal
9 July, 2008 – till date	Balmiki Prasad Singh

CHIEF MINISTERS

16 May, 1975 – 18 August, 1979	Kazi Lhendup Dorji
18 October, 1979 – 11 May 1984	Nar Bahadur Bhandari
11 May, 1984 – 25 May 1984	B.B. Gurung
8 March, 1985 – 18 May 1994	Nar Bahadur Bhandari
18 May, 1994 – 12 December, 1994	Sanchaman Limboo
12 December, 1994 – till date	Pawan Kumar Chamling

TAMIL NADU

	Madras province
15 August, 1947	State (until 1956 : Part A)
26 January, 1950	Renamed Tamil Nadu
14 January, 1969	

GOVERNORS

15 August, 1947 – 7 Septemeber, 1948	Sir Archibald Edward Nye
7 Septemeber, 1948 – 12 March, 1952	Sir Krishnakumarsinhji Bhavsinhji
12 March, 1952 – 10 December, 1956	Sri Prakasa
10 December, 1956 – 30 Sept., 1957	Anapparambul Joseph John
24 January, 1958 – 4 May 1964	Bishnuram Medhi
4 May, 1964 – 26 June, 1966	Jayachamarajendra Wodeyar
26 June, 1966 – 27 May 1971	Sardar Ujjal Singh
27 May, 1971 – 16 June, 1976	Kodardas Kalidas Shah
16 June, 1976 – 8 April, 1977	Mohan Lal Sukhadia
8 April, 1977 – 27 April, 1977	C.P.N. Singh (acting)
27 April, 1977 – 4 November, 1980	Prabhudas balubhai Patwari
4 November, 1980 – 3 September, 1982	Sadiq Ali
3 September, 1982 – 17 February, 1988	Sundar Lal Khurana
17 February, 1988 – 24 May, 1990	P.C. Alexander
24 May, 1990 – 15 February, 1991	Surjit Singh Barnala
15 February, 1991 – 31 May, 1993	Bhishma Narain Singh
31 May, 1993 – 2 December, 1996	Marri Channa Reddy
2 December, 1996 –25 January, 1997	Krishan Kant
25 January, 1997 – 3 July, 2001	Fathima Beevi
3 July, 2001 – 18 January, 2002	Chakravarti Rangarajan
18 January, 2002 – 3 November, 2004	P.S. Ramamohan Rao
3 November, 2004 – 26 August, 2011	Surjit Singh Barnala
26 August, 2011 – till date	K. Rossaia

CHIEF MINISTERS

15 August, 1947 – 6 April, 1949	Amandur Ramaswami Reddiar
6 April, 1949 – 10 April, 1952	Poosapati S. Kumaraswamy Raja
10 April, 1952 – 13 April, 1954	Chakravarti Rajagopalachari
13 April, 1954 – 2 October, 1963	Kumaraswami Kamaraj
2 October, 1963 – 4 March, 1967	M. Bhaktavatsalam
4 March, 1967 – 3 February, 1969	C.N. Annadurai
10 February, 1969 – 31 January, 1976	Kalaignar Muthuvel Karunanidhi
30 June, 1977 – 17 February, 1980	Marudur Gopala Ramachandran
9 June, 1980 – 24 December, 1987	Marudur Gopala Ramachandran

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7 January, 1988 – 30 January, 1988	Janaki Ramachandran
24 June, 1991 – 13 May, 1996	Jayaram Jayalalitha
13 May, 1996 – 14 May, 2001	Kalaignar Muthuvel Karunanidhi
14 May, 2001 – 21 September, 2001	Jayaram Jayalalitha
21 September, 2001 – 2 March, 2002	O. Paneerselvam
2 March, 2002 – 11 May, 2006	Jayaram Jayalalitha
13 May, 2006 – 16 May, 2011	M. Karunanidhi
16 May, 2011 – till date	Jayaram Jaylalitha

TRIPURA

15 October, 1949	Province
26 January, 1950	Part C State
1 November, 1956	Union territory
21 January, 1972	State

CHIEF COMMISSIONERS

15 October, 1949 – 1951	R.K. Ray
1951 – 1955	Venkatasubrami Nanjappa
1955 – 1956	H.L. Atal
1956 – 1958	Kalka Prasad Bhargawa
1958 – 1962	N.M. Patnaik
15 November, 1962 – 17 January, 1967	Shanti Priya Mukherjee
17 January, 1967 – 5 November, 1967	U.N. Sharma
5 November, 1967 – 31 January, 1970	D.K. Bhattacharya
31 January, 1970 – 8 August, 1971	Anthony Lancelot Dias
8 August, 1971 – 21 January, 1972	Baleshwar Prasad

GOVERNORS

21 January, 1972 – 22 September, 1973	Baraj Kumar Nehru
22 September, 1973 – 10 August, 1980	Lallan Prasad Singh
10 August, 1980 – 14 August, 1981	Prakash Chandra Mehotra
14 August, 1981 – 14 June, 1984	S.M.H. Burney
14 June, 1984 – 12 July, 1989	K.V. Krishna Rao
12 July, 1989 – 12 February, 1990	Sultan Singh
12 February, 1990 – 15 August, 1993	K.V. Raghunatha Reddy
15 August, 1993 – 16 June, 1995	Romesh Bhandari
16 June, 1995 – 23 June, 2000	siddheswar Prasad
23 June, 2000 – 2 June, 2003	Krishna Mohan Seth
2 June, 2003 –	Dinesh Nandan Sahay
15 October, 2009 – 25 Nov., 2009	Dr. Kamla Beniwal
27 November, 2009 – till date	D.Y. Patil

CHIEF MINISTERS

1 July, 1963 – 1 November, 1971	Sachindra Lal Singh
20 March, 1972 – 1 April, 1977	Sukhamoy Sen Gupta
1 April, 1977 – 26 July, 1977	Prafullah Kuma Das
26 July, 1977 – 5 November, 1977	Radhika Ranjan Gupta
5 January, 1978 – 5 February, 1988	Nripen Chakraborty
5 February, 1988 – 19 February, 1992	Sudhir Ranjan Majumdar
19 February, 1992 – 11 March, 1993	Samir Ranjan Barman
10 April, 1993 – 11 March, 1998	Dasarath Deb
11 March, 1998 – till date	Manik Sarkar

UTTAR PRADESH

15 August, 1947	United Province
26 January, 1950	Uttar Pradesh state (until 1956 : Part A)

GOVERNORS

15 August, 1947 – 2 March, 1949	Sarojini Naidu
3 March, 1949 – 2 May, 1949	Bidhubhusan Malik (acting)
2 May, 1949 – 2 June, 1952	Sir Hormasji Peroshaw Mody
2 June, 1952 – 10 June, 1957	Kanaiyalal Maneklal Munshi
10 June, 1957 – 1 July, 1960	Varahagiri Venkata Giri
1 July, 1960 – 16 April, 1962	Burgula Ramakrishna Rao
16 April, 1962 – 1 May, 1967	Biswanath Das
1 May, 1967 – 1 July, 1972	Bezawada Gopala Reddy
1 July, 1972 – 14 November, 1972	Shashi Kanta Verma (acting)
14 November, 1972 – 25 October, 1974	Akbar Ali Khan
25 October, 1974 – 2 October, 1977	Marri Channa Reddy
2 October, 1977 – 28 February, 1980	Ganpatrao Devji Tapase
28 February, 1980 – 31 March, 1985	C.P.N. Singh
31 March, 1985 – 12 February, 1990	Mohammed Usman Arif
12 February, 1990 – 27 May, 1993	B. Satyanarayan Reddy
27 May, 1993 – 3 May, 1996	Motilal Vora
3 May, 1996 – 19 September, 1996	Mohammed Shafi Qureshi
19 September, 1996 – 17 March, 1998	Romesh Bhandari
17 March, 1998 – 20 April, 1998	Mohammed Shafi Qureshi
20 April, 1998 – 24 November, 2000	Suraj Bhan
24 November, 2000 – 2 July, 2004	Vishnu Kant Shastri
2 July, 2004 – 8 July, 2004	Sudarshan Agarwal
8 July, 2004 – 18 July, 2009	Thanjavelu Rajeshwar
18 July, 2009 – till date	B.L. Joshi

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CHIEF MINISTERS

15 August, 1947 – 28 December, 1954	Govind Ballabh Pant
28 December, 1954 – 7 December, 1960	Sampurnanand
7 December, 1960 – 2 October, 1963	Chandra Bhanu Gupta
2 October 1963 – 14 March, 1967	Sucheta Kriplani
14 March, 1967 – 3 April, 1967	Chandra Bhanu Gupta
3 April, 1967 – 17 February, 1968	Charan Singh
26 February, 1969 – 18 February, 1970	Chandra Bhanu Gupta
18 February, 1970 – 2 October, 1970	Charan Singh
18 October, 1970 – 4 April, 1971	Tribhuvan Narain Singh
4 April, 1971 – 12 June, 1973	Kamlapati Tripathi
8 November, 1973 – 30 November, 1975	Hemwati Nandan Bahuguna
21 January, 1976 – 30 April, 1977	Narain Dutt Tiwari
23 June, 1977 – 28 February, 1979	Ram Naresh Yadav
28 February, 1979 – 17 February, 1980	Banarsi Das
9 June, 1980 – 19 July, 1982	Vishwanath Pratap Singh
19 July, 1982 – 3 August 1984	Sripati Mishra
3 August, 1984 – 24 September, 1985	Narain Dutt Tiwari
24 September, 1985 – 25 June, 1988	Bir Bahadur Singh
25 June, 1988 – 5 December, 1989	Narain Dutt Tiwari
5 December, 1989 – 24 June, 1991	Mulayam Singh Yadav
24 June, 1991 – 6 December, 1992	Kalyan Singh
5 December, 1993 – 3 June, 1995	Mulayam singh Yadav
3 June, 1995 – 18 October, 1995	Mayawati
21 March, 1997 – 21 September, 1997	Mayawati
21 September, 1997 – 21 February, 1998	Kalyan Singh
21 February, 1998 – 23 February, 1998	Jagadambika Pal
23 February, 1998 – 12 November, 1999	Kalyan Singh
12 November, 1999 – 28 October, 2000	Ram Prakash Gupta
28 October, 2000 – 8 March, 2002	Rajnath Singh
3 May, 2002 – 29 August, 2003	Mayawati
29 August, 2003 – 13 May, 2007	Mulayam Singh Yadav
13 May, 2007 – till date	Mayawati

UTTARAKHAND

9 November, 2000	State created form part of Uttar Pradesh

GOVERNORS

9 November, 2008 – 8 January 2003	Surjit Singh Barnala
8 January, 2003 – 29 October, 2007	Sudarshan Agarwal
29 October, 2007 – 6 August, 2009	B.L. Joshi
6 August, 2009 – till date	Margrate Alva

CHIEF MINISTERS

9 November, 2000 – 30 October, 2001	Nityanand Swamy
30 October, 2001 – 2 March, 2002	Bhagat Singh Koshiyar
2 March, 2002 – 8 March, 2007	Narain Dutt Tiwari
8 March, 2007 – 23 June, 2009	B.C. Khanduri
24 June, 2009 – 11 September, 2011	Ramesh Pokhariyal Nishank
11 September, 2011 – till date	B.C. Khanduri

WEST BENGAL

15 August, 1947	Province
26 January, 1950	State (until 1956 : Part A)

GOVERNORS

15 August, 1947 – 21 June, 1948	Chakravarti Rjagopalachari
21 June, 1948 – 1 November, 1951	Kailash Nathi Katju
1 Novemebr, 1951 – 8 August, 1956	Harendra Coomar Mookerjee
8 August, 1956 – 3 November, 1956	Phani Bhusan Chakraborty
3 Novmeber, 1956 – 1 June, 1967	Padmaja Naidu
1 June, 1967 – 1 April, 1969	Dharma Vira
1 April, 1969 – 19 September, 1969	Deep Narayan Sinha
19 Spetember, 1969 – 21 August, 1971	Shanti Swaroop Dhavan
21 August, 1971 – 6 November, 1977	Anthony Lancelot Dias
6 Novembre, 1977 – 12 September, 1981	Tribhuvana Narayana Singh
12 September, 1981 – 10 October, 1983	Bhairab Dutt Pande
10 October, 1983 – 16 August, 1984	Anant Prasad Sharma
16 August, 1984 – 1 October, 1984	Satish Chandra
1 October, 1984 – 12 August, 1986	Uma Shankar Dikshit
12 August, 1986 – 20 March, 1989	Nurul Hasan
20 March, 1989 – 7 February, 1990	Thanjavelu Rajeshwar
7 February, 1990 – 12 July, 1993	Nurul Hasan
13 July, 1993 – 14 August, 1993	B. Satyanarayan Reddy
14 August, 1993 – 27 April, 1998	K.V. Raghunatha Reddy
27 April, 1998 – 18 May, 1999	A.R. Kidwai
18 May, 1999 – 4 December, 1999	Shyamal Kumar Sen
4 December, 1999 – 14 December, 2004	Viren J. Shah
14 December, 2004 – 22 January, 2010	Gopalkrishna Gandhi
22 January, 2010 – till date	M K Narayanan

CHIEF MINISTERS

15 August, 1947 – 14 January, 1948	Prafulla Ghosh
14 January, 1948 – 1 July, 1962	Bidhan Chandra Roy
8 July, 1962 – 15 March, 1967	Prafulla Sen
15 March, 1967 – 2 November, 1967	Ajoy Kumar Mukherjee
2 November, 1967 – 20 February, 1968	Prafulla Ghosh
25 February, 1969 – 19 March, 1970	Ajoy Kumar Mukherjee

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2 April, 1971 – 28 June, 1971	Prafulla Ghosh
19 March, 1972 – 21 June, 1977	Siddharta Shankar Ray
21 June, 1977 – 6 November, 2000	Jyoti Basu
6 November, 2000 – 20 May, 2011	Buddhadev Bhattacharya
20 May, 2011 – till date	Mamta Banerjee

DELHI

15 August, 1947	Province
26 January, 1950	Part C State
1 November, 1956	Union territory
1 February, 1992	National Capital Territory of Delhi

LIEUTENANT GOVERNORS

1November, 1966 – 1970	Adity Nath Jha
1970 – 1971	M.C. Pimputkar
1971 – 1974	Baleshwar Prasad
1974 – 1978	Krishan Chand
1978 – 1979	Dalip Rai Kohli
February, 1980 – 1981	Jagmohan
1981 – September, 1982	Sundar Lal Khurana
September, 1982 – March, 1984	Jagamohan
March, 1984 – November, 1984	P.G. Gavai
November, 1984 – November, 1985	Mohan M.K. Wali
November, 1985 – August, 1988	Harkishan Lal Kapoor
August, 1988 – December, 1989	Romesh Bhandari
December, 1989 – December, 1990	Arjun Singh
December, 1990 – 1992	Markandey Singh
4 May, 1992 – 4 January, 1997	Prasannabhai Karunashankar Dave
4 January, 1997 – 20 April, 1998	Tejendra Khanna
20 April, 1998 – 9 June, 2004	Vijai Kapoor
9 June 2004 – 9 April, 2007	B.L. Joshi
9 April, 2007 – till date	Tejendra Khanna

CHIEF MINISTERS

17 March, 1952 – 12 February, 1955	Chaudhary Brahm Prakash
12 February, 1955 – November, 1956	G.N. Singh
1993 – 26 February, 1996	Madan Lal Khurana
26 February, 1996 – 12 October, 1998	Sahib Singh Verma
12 October, 1998 – 3 December, 1998	Sushma Swaraj
3 December, 1998 – till date	Sheila Dikshit

ANDAMAN AND NICOBAR ISLANDS

15 August, 1947	Province
26 January, 1950	Part D territory
1 November, 1956	Union Territory

LIEUTENANT GOVERNORS

12 November, 1982 – 3 December, 1985	Manohar L. Kampani
4 December, 1985 – December, 1989	Tirath Singh Oberoi
December, 1989 – 24 February, 1990	Romesh Bhandari
25 February, 1990 – December, 1990	Ranjit Singh Dayal
December, 1990 – 18 March, 1993	Surjit Singh Barnala
19 March, 1993 – 18 March, 1996	Vakkom Purushothaman
19 March, 1996 – 25 May, 2001	Ishwari Prasad Gupta
26 May 2001 – 4 January, 2004	Nagendra Nath Jha
5 January, 2004 – 30 May, 2006	Ram Kapse
12 February, 2006 – 29 Dec. 2006	M.M. Lakhera (acting)
29 December, 2006 – till date	Bhupinder Singh

CHANDIGARH

1November, 1996	Union territory created form part of Punjab

CHIEF COMMISSIONERS

1 November, 1966 – 31 October, 1968	M.S. Randhava
31 October, 1968 – 8 April, 1969	Damodar Dass
8 April, 1969 – 1 September, 1972	B.P. Bagchi
1 September,1972 – December, 1975	Mohan Prakash Mathur
December 1975 – 15 June, 1976	G.P. Gupta
15 June, 1976 – June, 1978	T.N. Chaturvedi
June 1978 – 19 July 1980	J.C. Agrawal
19 July 1980 – 8 March, 1982	B.S. Sarao
8 March, 1982 – 2 June, 1984	Krishna Banerji
2 June, 1984 – 2 August, 1984	The Governor of Punjab (administrator)
2 August, 1984 – 30 May, 1985	Krishna Banerji
30 May, 1985 – till date	The Governor of Punjab (administrators)

DADRA AND NAGAR HAVELI

2 August, 1954	End of Portuguese rule
11 August, 1961	Union territory

ADMINISTRATORS

1962 – 2 September, 1963	Tumkur Sivasankar

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2 September, 1963 – 8 December, 1964	M.R. Sachdev
12 December, 1964 – 24 February, 1965	Hari Sharma
24 February, 1965 – 18 April, 1967	Kashinath Raghunath Damle
18 April, 1967 – 16 Novembr, 1972	Nakul Sen
16 November, 1972 – 16 November, 1977	S.K. Banerjee
16 November, 1977 – 31 March, 1981	Pratap Singh Gill
31 March, 1981 – 30 August, 1982	Jagmohan
30 August, 1982 – 24 February, 1983	Idris Hasan Latif (acting)
24 February, 1983 – 4 July, 1984	Kershasp Tehmurasp Satarawala
4 July, 1984 – 24 September, 1984	Idris Hasan Latif (acting)
24 September, 1984 – 18 July 1989	Gopal Singh
18 July 1989 – 25 March, 1991	Khurashed Alam Khan
25 March, 1991 – 16 March, 1992	Bhanu Prakash Singh
16 March, 1992 – 28 March, 1994	K.S. Baidwan
28 March, 1994 – 15 July, 1995	Ramesh Chandra
15 July, 1995 – 26 June, 1998	S.P. Aggarwal
26 June, 1998 – 23 February, 1999	Ramesh Negi (acting)
23 February, 1999 – 23 April, 1999	Sanat Kaul
23 April, 1999 – 19 July, 1999	Ramesh Negi (acting)
19 July 1999 – 12 November, 2002	O.P. Kelkar
12 November, 2002 – 16 November, 2002	Arun Mathur
16 November, 2005 – 26 May, 2006	B.K. Singh
26 May, 2006 – 1 June, 2006	Dhermendera
1 June, 2006 – 2008	R.K. Verma
2008 – till date	A.K. Singh

DAMAN AND DIU

6 May, 1962	Part of Goa, Daman, and Diu Union territory
30 May, 1987	Separate Union territory
ADMINISTRATORS	
30 May 1987 –	The Administrators of Dadra and Nagar Haveli

LAKSHADWEEP

1 Noveber 1956	Laccadive, Minicoy, and Amindivi Islands Union territory (separated form Madras [see Tamil Nadu])
1 November, 1973	Renamed Lakshadweep
ADMINISTRATORS	
1 November, 1956 – 7 November, 1956	U.R. Panicker

8 November, 1956 – 21 September, 1958	S.Moni
22 September, 1958 – 5 December, 1961	C.K. Balakrishna Nair
6 December, 1961 – 8 April, 1965	M. Ramunny
9 April, 1965 – 31 October, 1969	C.H. Nayar
1 November, 1969 – 30 April 1973	K. D. Menon
22 May 1973 – 21 June, 1975	W. Shaiza
22 June, 1975 – 14 February, 1977	M.C. Verma
21 February, 1977 – 30 July, 1978	S.D. Lakhar
31 July, 1978 – 15 June, 1981	P.M. Nair
15 June, 1981 – 21 July, 1982	Pradip Mehra
21 July, 1982 – 9 July, 1985	Omesh Saigal
9 July, 1985 – 8 September, 1987	J. Sagar
8 September, 1987 – 31 January, 1990	Wajahat Habibullah
1 February, 1990 – 1 May, 1990	Pradip Singh
2 May, 1990 – 3 May, 1992	S.P. Aggarwal
4 May, 1992 – 9 September, 1994	Satish Chandra
9 September, 1994 – 14 June, 1996	G.S. Chima
1 August, 1996 – 1 June, 1999	Rajeev Talwar
1 June 1999 – 20 August, 1999	R.K. Verma
21 August, 1999 – 30 April, 2001	Chaman Lal
30 April, 2001 – 19 June, 2001	R.K. Verma
19 June, 2001 – 20 June, 2004	K.S. Mehra
21 June, 2004 – 21 November, 2004	S.P. Singh
22 November, 2004 – 11 August, 2006	Parimal Rai
22 December, 2006 – 16 May, 2009	B.V. Selvaraj
13 July 2009 – till date	J.K. Dadoo

PUDUCHERRY

1 November, 1954	French India becomes de facto part of India
16 August, 1962	De jure transfer to India
2 January, 1963	Pondicherry Union territory
HIGH COMMISSIONERS	
1 November, 1954 – 1957	Kewal Singh
1957 – 1958	M.K. Kripalani
1958 – 1958*	L.R.S. Singh
1960	A.S. Bam
1961 – 1961*	Sarat Kumar Dutta
LIEUTENANT GOVERNORS	
14 October, 1963 – 14 October, 1968	S.L. Sailam
14 October, 1968 – 8 Novembr, 1972	Basappa Danappa Jatti

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8 November, 1972 – 30 August, 1976	Cheddy Lal
30 August, 1976 – 1 November, 1980	Bidesh T. Kulkarni
1 November, 1980 – 16 April, 1981	Ram Kishore Vyas
16 April, 1981 – 169 April, 1981	Sadiq Ali
27 July, 1981 – 15 May, 1982	R.N. Haldipur
15 May, 1982 – 5 August, 1982	Kizhekethil Mathew Chandy
19 August, 1983 – 18 June, 1984	Kona Prabhakara Rao
18 June, 1984 – 1 October, 1984	Sundar Lal Khurana
1 October, 1984 – 22 June 1988	Thiru Tribhuvan Prasad Tewary
22 June, 1988 – 19 February, 1990	Ranjit Singh Dayal
19 February, 1990 – 19 December, 1990	Chandrawati
19 December, 1990 – 6 February, 1993	Swarup Singh
6 February, 1993 – 31 May, 1993	Bhishma Narain Singh
31 May 1993 – 2 May, 1995	Marri Channa Reddy
2 May 1995 – 23 April, 1998	Rajendra Kumari Bajpai
23 April 1998 – 31 July 2002	Rajani Rai
31 July 2002 – 27 October, 2003	K.R. Malkani
31 October, 2003 – 5 January, 2004	P.S. Ramamohan Rao (administrator)
5 January, 2004 – 7 July, 2004	Nagendra Nath Jha
7 July 2004 – 19 July, 2006	M.M. Lakhera
19 July, 2006 – 15 March, 2008	Mukut Mithi
15 March, 2008 – 23 July, 2008	Bhupinder Singh
23 July, 2008 – 6 April, 2009	Govind Singh Gurjar
8 April, 2009 – 27 July, 2009	Surjit Singh Barnala
27 July, 2009 – till date	Iqbal Singh

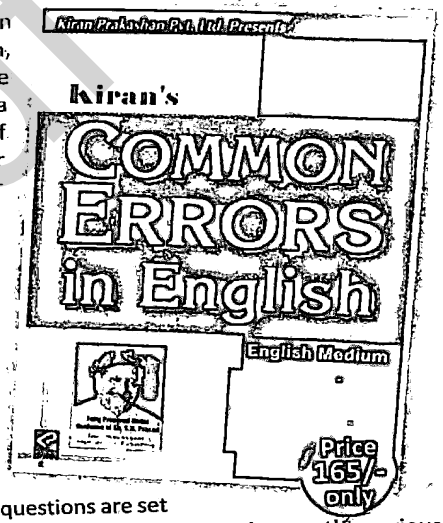
CHIEF MINISTERS

1 July, 1963 – 11 September, 1964	Edouard Goubert
11 September, 1964 – 9 April, 1967	V.Venkatasubha Reddiar
9 April, 1967 – 9 March, 1968	M.O. H asan Farook Maricar
6 March, 1968 – 18 September, 1968	V.Venkatasubha Reddiar
17 March, 1969 – 3 January, 1974	M.O. Hasan Farook Maricar
6 March 1974 – 28 March, 1974	Subramanyam Ramaswamy
2 July 1997 – 12 November, 1978	Subramanyam Ramaswamy
16 January, 1980 – 24 June, 1983	D. Ramachandran
16 March, 1985 – 19 January, 1989	M.O. Hasan Farook Maricar
5 March, 1990 – 12 January, 1991	D. Ramachandran
4 July 1991 – 14 May, 1996	V.Vaithilingam
26 May 1996 – 18 March, 2000	R.V. Janakiraman
22 March 2000 – 27 October, 2001	P. Shanmugam
27 October, 2001– 3 September, 2008	N. Rangaswamy
4 September, 2008– 16 May, 2011	V. Vaidyalingam
16 May, 2011 – till date	N. Rangaswamy

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Kiran's
COMMON ERRORS in English
A MUST FOR ALL ASPIRANTS



It is generally said that subtleness is the foundation of success. In today's world of competition, seeking opportunity by faring in competitive examinations has really become indisputably a tough affair. In this context, the importance of English, as a subject, is undeniable. Not only for the sake of examinations, but just to master English, one should have the knowledge of good and apt English, correct standard of written English, proper art of conversation and application of correct dialogue, as well as personal development, which all pose as a stairway of qualities towards sound English proficiency.

AN OUTSTANDING BOOK THAT HELPS ASPIRANTS In their SUCCESSFUL PREPARATION FOR COMPETITIVE EXAMS

In order to test the knowledge of English Language in various competitive examinations, questions are set in several patterns to ascertain one's understanding of the language. Among the various patterns, one is related to the topic of Common Errors. Having essential knowledge in Grammar, we learn to read and write well as talk correct English. Due to the presence of various topics in Grammar and the rules that are related to those topics, we somehow miss to explore the correct usage of English.

In this book, all these topics have been widely discussed with explanations and examples for better grasp of the minute difficulties that appear in examinations and which restrain us from dealing with those questions related to Common Errors. The explanations which have been given at the end of each chapter, are in all way helpful to understand each and every problem with clarity and thus sharpen the edge of knowledge.

Salient Features

- This book has been divided into two parts. The first part contains several topics of English Grammar, which are classified into 14 different chapters. Each chapter discusses a topic at length. The second part consists of Model Question Papers.
- In each of the 14 chapters, concepts about the Fundamental and Basic Principles/Rules have been provided. Simultaneously, while discussing the various aspects of the chapter, several related examples have been provided. The variety of the questions tell the tale of the nature of questions asked in different competitive exams.
- Each chapter is essentially supplemented with 'a ready reckoner', which helps in understanding and recapitulating the basic rules at a glance.
- Each chapter is supplemented with a number of questions based on the topic discussed. The questions may have Error in one part and you are required to find out that error.
- The questions have been explained adequately, which help you understand the root cause of the error.
- Model Question Papers help in understanding the overall genre of a topics and thereby assist in developing a solid and sound knowledge of the topic of discussion.

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