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CONTENTS

Current Affairs with MCQs

INDIAN RAILWAYS SWOT

INTRODUCTION

- It is the state owned railway company of India, overseen by the Ministry of Railways.
- The first time a rail locomotive was used in India on 21st Dec. 1851 over Ganga Canal near Town Rurki.
- First train in India ran between Bori Bunder, Bombay to Thane on Saturday 16th April 1853, with 14 carriages/ coaches and 400 guests and journey of 33.81 kms taking 1:15 hrs. It was the first commercial passenger service.
- By 1947, there were 42 rail system or railway companies.
- The Great Indian Peninsula Railway was the first railway company of India.
- The first train was hauled by three engines - Sindh, Sahib and Sultan, the Steam Locomotives.
- The Great Indian Peninsula Railway took a set of 8 locomotives from Vulcan Foundry, England in the beginning of operation in India.
- In December 1851, first steam engine Thomason was operated in Roorkee, second was named after Bombay Governor as Lord Falkland, and third was used as trial run of the passenger train in Nov. 1852.
- On August 15, 1854, the first passenger train in eastern section ran between Howrah to Hooghly (24 miles).
- On March 3, 1859, North India got its first passenger train ran between Allahabad and Kanpur (180 Kms).
- In 1895, India started manufacturing its own locomotives.
- In September 1921, Acworth Committee headed by William Acworth decided to separate railway finances from general finances. In 1904, the idea to electrify the rail network was proposed.
- In 1925, India's first ever railway budget was presented.
- The first electric train on Feb 3, 1925 ran on Mumbai Victoria Terminus (VT) - Kurla branch line, a distance of 16 kms.
- In 1951, these 42 companies were nationalised as one unit.
- On April 14, 1951, Southern Railway was formed.
- On April 14, 1952, Northern Railway was formed.
- In 1970, the last steam Locomotive was rolled out of Chittaranjan Locomotive works. By 1985, steam Locomotives were phased out.
- The third class in the Indian Railway was abolished in 1974.
- Railway Fund to assist victims of railway accidents was set up in 1974.
- In 1977, India got its first Railway Museum spreading over 10 acres in New Delhi.
- On March 31, 1978, Railways were split into 9 zones.
- On October 24, 1984, Kolkata became the first Indian city where first metro rail ran 25 kms from Calcutta to Dumdum.
- In 1985, steam locomotives were replaced by diesel and electric locomotives.
- In 1987, computerization of reservation was first carried out in Bombay.
- In 1989, Indian train numbers were standardised to 4 digits.
- On 24 march 1994, first live telecast of railway budget took place.

- In 1995, entire railway reservation was computerised through the railways internet.
- In 1998 Konkan railway was opened for public.
- In 1999, Fairy Queen bagged the National Tourism Award for most innovative and unique Tourism Venture.
- In 2000, Mamta Banerjee became the first woman Railway Minister of India.
- On December 24, 2002, Delhi Metro Rail Corporation (DMRC) began its operation in Delhi.
- Six times Rail Budgets were presented by the Railway Minister Lalu Prasad Yadav from 2004 to 2009.
- On Monday, February 1, 2010 Wi-Fi facility was first launched at Mysore Railway station.
- On October 20, 2011, Bengaluru got Namma Metro.
- On June 8, 2014, Mumbai got Mumbai Metro and Mumbai Monorail.
- The largest platform in India is Kharagpur (W.B.), i.e. 2733 feet long.
- The longest railway tunnel is Konkan (Maharashtra), i.e. 65 km.
- The longest rail bridge is across Godavari river i.e. 10052 feet long.
- Chenab Railway Bridge Kalra (J&K) 359 metres/1177 feet will be world's highest bridge by Dec. 2016. It will surpass current tallest over Beipanjiang river in China (i.e. 275 meters high).
- The largest marshalling yard is at Mughal Sarai.
- Seven classes are at present: (1) AC-1T, (2) AC-2T, (3) AC-3T, (4) Sleeper, (5) AC chair car, (6) First class and (7) Second class.

SWOT ANALYSIS

Strengths

- Indian railways is the lifeline of the nation.
- Indian railways has largest land property in the country.
- It is the largest employer in India followed by Defence.
- 13.36 Lakh gazetted and non-gazetted workers are currently employed.
- Its production units produce complete range of products in its area of operation, i.e., DG sets, loco components and sub-assemblies.
- Indian railroad network (66,030 kms) is the largest in Asia and 4th largest in the world followed by China(3rd), Russia (2nd), USA (1st) and Canada (5th).
- It is the world's second largest under one management.
- It has taken steps to conduct all examinations online as a measure against malpractices.
- It permits Railway Recruitment Board (RRB) candidates to keep the question booklets.
- It permitted RRB candidates to upload answer keys and cut-off marks in 2014-15.
- In 2014-15, it conducted examinations for 48, 822 vacancies in 284 categories.
- It has its own Indian Railways Institute of Civil Engineering Forum to study its various projects and its execution.
- Total locomotives are 10822 (Steam 43 + Diesel 5714 + Elec. 5065) in which broad gauge 10391 + Metre gauge 233 in the year 2014-15.
- Total passenger coaches are 67308 (EMU 8475 + Conventional 51833 + Others 7000) with a capacity of 1920768 accomodation in 2014-15.
- Total freight cars/ wagons are 2,54,006 (Broad gauge 250,711 + Metre gauge 3,139 + Others)
- Total tracks are 108706 kms (BG-86,526 kms + MG-18,529 kms + NG-3651 kms)
- Total Routes are 66,030 kms (BG 58825 km + MG 4908 km + NG 2297 km) 2014-15.
- Total double/multiple tracks are 20,633 kms i.e., 31.25% of total Route kms (2014-2015)
- Total Route electrified are 22,224 kms out of total 66,030 kms (i.e., 33.66% of total), 2014-15.
- Now it carries over 1.30 crores passengers & 13 lakh tones of freight every day.
- It runs about 20,038 trains daily (passenger -12,617 (freight-7421)
- It has most powerful locomotive, i.e. Electric Locomotive WAG-9/ WAP-7 (Modified version) capable of hauling 24 coaches at a speed of 140 to 160 km/hour.

- It has solar power run trains.
- It has almost 7500 railway stations.
- It manufactures locomotives and engines indigenously.
- Its Electric Locomotives are manufactured at Chittaranjan Locomotive Works (W. Bengal)
- Its Diesel Locomotives are manufactured in Varanasi.
- Soon India is going to get the first Bullet train from Japan to run between Mumbai and Ahmedabad.
- Indian railways networks are divided into 16 zones.
- Fairy Queen - the oldest working steam locomotives engine in the world and it is the oldest steam engine in operation hauling luxurious train from Delhi to Alwar for tourists. It secured a place in the Guiness Book of World record and got Heritage Awardat Int'l Tourist Bureau, Berlin in March, 2000.
- Electric Multiple Units (EMU) coaches are used in large cities -mainly Mumbai, Chennai, Delhi, Kolkata, Pune, Hyderabad, Bangalore, etc.
- In 2016, the fastest train in India is the Bhopal Shatabdi that runs with a top seed of 150 km/h.
- 'Gatimaan Express' first proposed in July 2014, India's first semi-high speed bullet train had a successful trial run from Delhi to Agra in 90 minutes. Its maximum speed will be 200 km/h. It will run at a speed of 160 km/h.
- Darjeeling Himalayan Railways attained the World Heritage status from UNESCO.
- Indian Railways revenue estimates of 2016-17 is ₹ 1,84,820 crore.

Weaknesses

- Indian Railways Passenger sector is loss making, i.e. among the lowest of passenger fare in the world.
- Accidents and delays cause a dent to the image.
- Facilities not comparable to international standards.
- Unorganised railway stations, i.e. dirty and poor in infrastructure.
- Infrastructure Bottlenecks leading to low average speeds.
- Freight train speeds lowest in the world, i.e. 25km/hr.
- Poor track record of project completion.
- Lacklustre growth in revenues - both passenger and freight.
- Poor operating ratio (i.e. % age of revenues account for expenses) which is expected to be 92% for 2016-17 which was 90% in 2015-16.
- Unhygienic condition of pantry car.
- Poor quality of food supplied to passengers.
- Dirty toilets
- Toilet facilities are absent in EMU trains.
- Stations are not clean.
- Toilets at stations are in very bad conditions.
- Maintenance and overhead expenses are very high.
- Lack of flexibility in routes and turnings.
- Lack of door to door services.
- Inefficiency and high costs are due to lack of competition.
- Unsuitable for short distance and small roads.
- More time & Labour required in booking & delivery of goods.
- Not rural area oriented.
- Under-utilisation of its capacity.
- Over centralised administration
- It is a hostage of vote bank politics to offer populist measures.
- Free travels for politicians, government employees and ministers is negative for its economy.
- Reserved seats for politicians and higher dignitaries reflects bad impressions.

Opportunities

- Indian Railways can capture large chunk of container traffic by introducing block container trains at passenger speeds.
- Its 70% revenue comes from freight sector and has scope to add more companies.
- Its Operating Ratio (OR) has been decreasing drastically in last 10 years has further scope.
- Monetisation from non-tariff measure-advertising, leasing of land adjacent to rail network, date analytics with the available data.
- Asset monetisation

- Creation of dedicated freight corridors and increased focus on containerisation.
- Improving traveller amenities and customer experiences.
- Website of Indian Railway catering and Tourism Corporation can be exploited for economic activities.
- Green track for Road Railer Service can increase penetration into non-freight segment of companies/regions.
- Technological upgradation (i.e. Wi-Fi, Mobile applications, e-commerce platform, etc.) can improve customer interface and monitoring of project implementation.
- 2016 budget puts spotlight on over-stressed suburban (EMU) train services in metros like Mumbai, Kolkatta & Delhi.
- Railways Minister has proposed to revive the Ring Rail network in Delhi and two new corridors in Mumbai.
- Rail Budget 2016 has proposed to develop 3 freight corridors, draft a freight train timetable, increase the speed to 50 kms/hr and build rail side logistics parks & ware houses.
- Rail Budget 2016-Vision 2020 for on demand reservation, technology for safety, Punctuality -95%, Freight trains time-table, increased average speed, etc.
- By 2020 there will be zero direct discharge of human waste.
- By 2020 unmanned crossing will be eliminated.
- Budget 2016 has proposed new structure for railways by - Cooperation, Collaboration, Creativity and Communication.
- The IR minister Prabhu's 3 pronged strategies to overhaul the operating efficiency are Reorganise, restructure and rejuvenate.
- 1.21 lakh crore Rupees proposed investment for 2016-17 should facilitate modernization of the Railways.
- Railway Budget 2016 has proposed to start- Antyodaya Express – a long distance, unreserved, superfast-train.
- Indian Railways has proposed to launch 3 select train services – Humsafar, Tejas and UDAY.
- Indian Railways has proposed e-ticketing to be opened to foreign cards for tourists, NRIS.
- It has proposed 44 new partnership works valued at about `92,714 crore to be implemented.

Threats

- Open railway tracks can cause any disaster for trains, travellers, goods, etc.
- Chain-pulling to stop train anywhere is a serious threat by terrorists.
- Unchecked boarding at majority of stations can cause major mishappenings.
- Very high competition from road and low cost airlines in passengers and freight.
- Over dependence on low yield bulk cargo (currently 10 commodities account for 80% of the freight).
- Increase in allowable gross weight of road vehicle.
- Possible introduction of double road trailers.
- Finding the money over Rs.1.21 lakh crore that is targeted to be invested in 2016-17.
- High democratic /political presence against higher tariffs.
- Indian Railways has faced twin headwinds from the tepid economy and the impact of 7th pay commission award.
- The operating ratio improved from 98% in 2001 to 76% in 2008. But now it has again reached to 92% for 2017.
- Tatkal ticket booking is not working either on window or on e-ticketing for direct general public.
- There are 10000 unmanned railways crossing all over the country.
- Corruption at every level is a threat for its development, services, security and safety.
- Passengers especially older people, women and children are not safe.
- There is security threat in IT system of railways.
- Mumbai suburban Railway is most severe overcrowding accident prone in the world.

RAILWAY BUDGET 2016

Railway Budget 2016 was presented on February 25, 2016 by Suresh Prabhu, the Railway Minister of India. Here are the highlights of the rail budget 2016:

- No hike in passenger fares.
- Swacch Bharat: 17000 biotoilets and additional toilets in 475 stations before the close of this financial year.
- Wifi at 100 stations this year and 400 stations next year.
- 33% reservation to women in reserved quota in Railways to be introduced.
- Deen Dayal coaches for long distance trains for unreserved passengers. These coaches will include potable water and higher number of mobile charging points.
- Janani Sewa: Children's menu, baby foods, baby boards to be made available for travelling mothers.
- Overnight double-decker train Uday Express to be introduced on busiest routes, carrying capacity to be 40% more.
- Porters not to be called "coolies" but be called "sahayaks" now; will be trained in soft skills.
- Railways to increase lower berth quota for senior citizens by 50%.
- Ajmer, Amritsar, Gaya, Mathura, Nanded, Nashik, Puri, Tirupati, Varanasi, Nagapattinam and other pilgrim stations to be beautified.
- Bar-coded tickets to be introduced at select stations on pilot basis to tackle nuisance of ticketless travel.
- Two elevated suburban railway corridors – Churchgate-Virar and CST-Panvel to be constructed in Mumbai; Ring railway covering 21 stations to be revived with state participation.
- GPS-based digital display in coaches for showing upcoming stations.
- North-East India, especially Mizoram and Manipur, to be connected through broad gauge soon.
- 1,600 km of electrification this year and 2,000 km proposed for the next year.
- Introduced 1,780 Automatic Ticket Vending Machines, mobile apps & GoIndia smartcard for cashless purchase of UTS and PRS tickets, enhanced capacity of e-ticketing system from 2,000 tickets per minute to 7,200 tickets per minute and to support 1,20,000 concurrent users as against only 40,000 earlier.
- Propose to invite FM Radio stations for providing train-borne entertainment; extend 'Rail Bandhu' to all reserved classes of travelers and in all regional languages.
- Security through helplines & CCTVs; Safety - 350 manned level crossings closed, eliminated 1,000 unmanned level crossings, 820 ROB/RUB completed in the current year and work going on in 1,350 of them.
- SMART (Specially Modified Aesthetic Refreshing Travel) Coaches are redesigned coaches with redesigned bio-vaccum toilets, vending machines, advertising boards, PA system, dustbins, ergonomic seating.
- Clean my Coach: Passengers will be able to demand cleaning of a toilet via SMS. The audit will be done by third party and action to be taken based on passenger feedback.
- Tejas: It will showcase the future of train travel in India with operating speeds of 130 kmph.
- Rail Mitra Sewa: Expanding Sarathi Seva in Konkan Railway to help the old and disabled passengers, strengthening the existing services for enabling passengers to book battery operated cars, porter services, etc. on a paid basis in addition to the existing pick up and drop, and wheel chair services.

GST 2016

Why do we need GST?

- Evolution of businesses has lead to blurred Taxation lines between Centre & State, leading to double taxation
- Cascading effect due to multiplicity of taxes & their non-creditable nature
- Extreme disparities in the rate of taxes levied by states
- Amendments in state VAT laws, leading to multiple compliance requirements
- Tax System needs to be destination based, rather than origin based

GST - Council

- Setup within 60 days of enactment of GST.
- Be a recommendatory body
- FM as chairman with State Govts. nominees as members.
- Recommends on GST rates, exemptions of limits, etc.
- Recommends adoption & implementation by Centre & State

Journey

2006 - 07
- UPA Govt. proposed GST by 2010.
- Negotiations with States began.

2008
- Empowered Committee (EC) constituted
- GST structure finalised.

2009
- EC released First Discussion Paper.
- 13th Finance panel recommended GST

2011
- UPA Govt. introduced GST-Constitution Amendment Bill 115th in Lok Sabha.
- Referred to P.S. Committee.

2013
- P.S. Committee submitted report on GST
- Revised GST bill sent to Empowered Committee.

Dec. 2014
- FM introduced revised GST Bill in Lok Sabha.

May 2015
- LS passed the GST Bill & referred to select committee.

May 2015 - Mar. 2016
- Bill not tabled in Rajya Sabha

July 2016
- Centre & States agreed against capping GST rate

3rd Aug 2016
- Rajya Sabha pass constitution(122n Amendment Bill.

Features

- Uniform regime of taxes across India
- Common market of goods & services across India
- States will collect service taxes.
- Centre will collect Integrated Goods & Service Tax (IGST) on inter-state suppliers.
- IGST rate will be equal to CGST plus SGST.
- It will subsume 16 central & state's taxes.

GST - 2016
Goods & Service Tax

GST Replaces

States Taxes
- VAT/Sales Tax
- Entry Tax/ Octroi
- Local Tax
- Entertainment Tax
- Purchase Tax
- Mandi Tax/ Local Levis
- Luxury Tax
- Tax on Lottery & Betting
- Inter-state Sales Tax

Central Taxes
- Central Excise Duty
- Excise Duty on Medicinal & Toilet
- Additional Custom Duty
- Sp. Add. Custom Duty
- Countervailing Duty
- Service Tax
- Cesses & Surcharges

Who will gain?

Economy
- Dual monitoring by the Centre & States will reduce tax-evasion.
- Speed up in time matching of supplier & purchaser, i.e. transaction.
- ₹ 1.8 lakh crore recovery due to cut in excise duty exemptions.
- ₹ 1.5 lakh crore recovery to States due to cut in tax exemptions.

Companies
- Lower tax burden improve profit margin
- No distinction between product & service tax
- Uniform tax across India to ease business.
- Smooth movement of products across states.
- One time increase in compliance cost likely.

Consumer
- Suggested 3 tax rates 12%, 17-18% & 40% beneficial for all.
- Most products will be less expensive over time.
- Most services (restaurant, travel, mobile bills, insurance premium) to cost more.
- Mobiles, jewellery, readymade wear to cost more in some states

Impact

Price Impact
- Impact on prices is unknown.
- Inflation may rise in 1st year.
- Most services will be costlier.
- Agricultural goods costlier by 0.61% to 1.18%.
- Manufactured items cheaper by 1.22% to 2.53%.
- Over all tax inputs will lower.
- Exports will be competitive.
- Logistics, FMCG, automobiles & consumer durables will benefit.
- Jewellery will be costlier by 2-6%.

General Impact
- India will be a common market facilitating good's movement from one state to another
- Will make compliance easier with simplified tax regime.
- Reduction of production costs due to input credits.
- No cascading taxes.
- Widening of tax base & interested revenue collection.

Exclusion

- **Alcohol** — Remains as states monopoly
- **Petroleum** — Out for 2 years with states
- **Real Estate** — Stamp duty with States; Service tax with GST

Implementation Drive

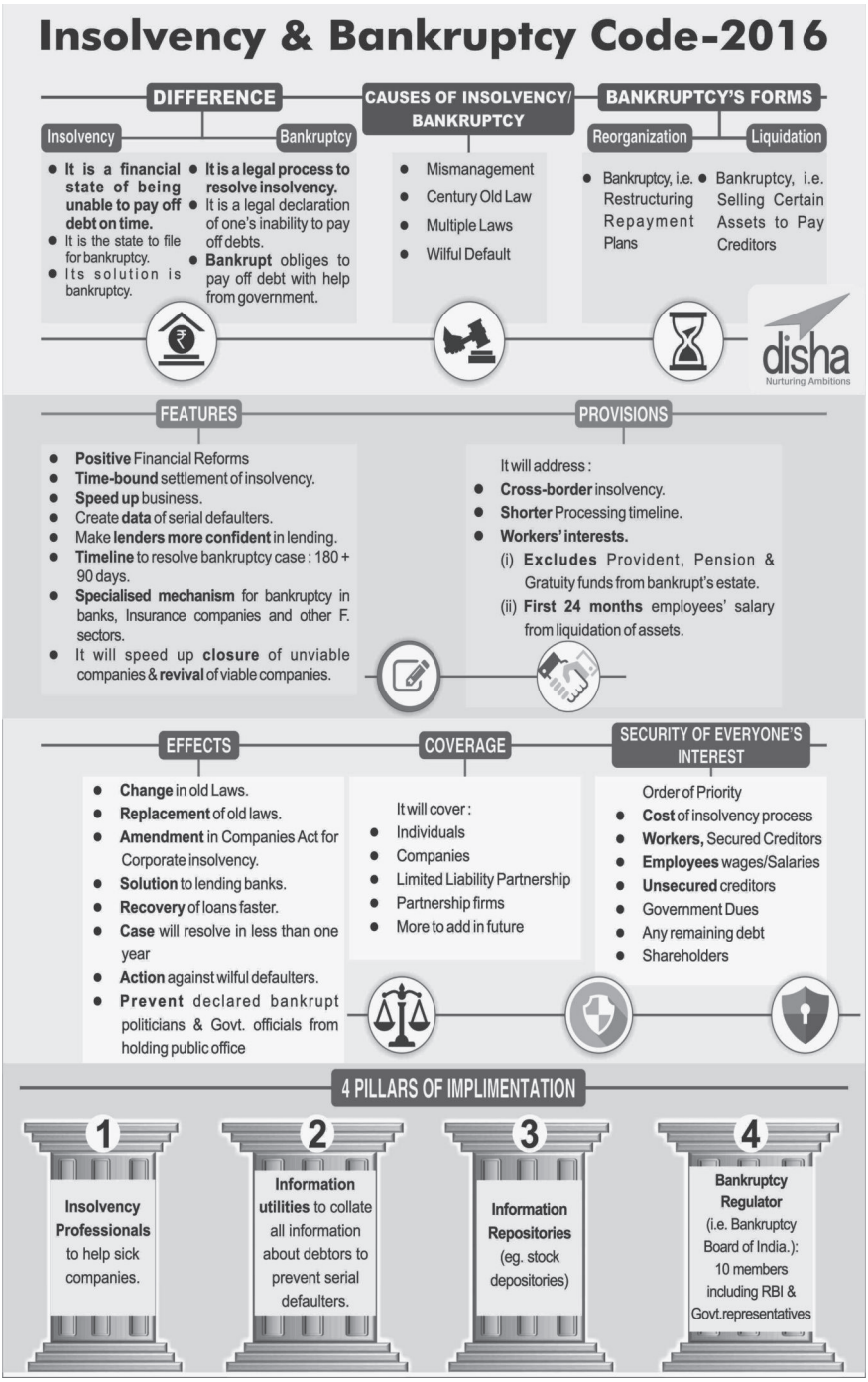
Hardware/ Manpower
- 60,000 Centre & States officials to be trained on GST & IT-Framework.
- Workshops to organise across country.
- Training has started at Hyderabad & Jaipur.
- Training to be completed by March 2017.

Software/ GST-network
- GSTN is a Pvt. Ltd. Company-2013.
- GSTN is a Infosys biproduct of ` 1380 Crore worth.
- GSTN-System is 60% completed & will be ready by December 2016.
- Its chairman is Navin kumar.
- GSTN will help tax-payers in:-
  - Registration, Return sifting, handle invoices, Inter-states tax settlement & Linking Centre & States for two-way data flow.
- GSTN Company will build & maintain the technology network.
- GSTN will be a portal naming, "gstindia"
- Traders manufactures, services providers will get GST-ID Code.

GST-Abroad

165 countries have GST/ VAT

Country	Introduces	GST/ VAT	Country	Introduces	GST/ VAT
Germany	1968	19%	Japan	1989	08%
Italy	1973	22%	Canada	1991	05%
South Africa	1973	14%	Russia	1991	18%
Argentina	1975	21%	China	1994	17%
Korea	1977	10%	Australia	2000	10%
New Zealand	1986	15%	Malaysia	2015	06%



Update : Political, Economic, Industries, Art & Culture, Events 2016

Political

- The Strategic Forces Command (SFC) a part of National Command Authority (NCA) added to Second Schedule of the RTI Act, 2005 to exempt from RTI purview.
- First BRICS Employment Working Group meeting held in Hyderabad, Telangana in July 2016.
- Haryana Government has launched Pashudhan Bima Yojana.
- Maharashtra Govt. accorded minority status to Jews as per State Minorities Commission Act.
- Union Government banned potassium bromate ($KbrO_3$) as a food additive as it is carcinogenic.
- The Union Finance Ministry announced that NRIs can open National Pension Savings (NPS) accounts online through eNPS if have Aadhaar Card or Permanent Account Number (PAN).
- Union Cabinet approved retirement age of Central Health Services doctors from 62 to 65 years.
- Lakshadweep became first UT in the counry to sign 24×7 Power for All document.
- PM Narendra Modi & Sri Lankan President released Simhastha Declaration at Ninora in Ujjain.
- PM Narendra Modi invited to address a joint meeting of the US Congress on June 8, 2016.
- India and Mauritius signed MoU to promote cooperation in traditional medicine and homeopathy.
- The 13th edition of India-European Union Summit was held on in Brussels, capital of Belgium.
- Supreme Court approved Union Government's guidelines to protect Good Samaritans, who help road accident victims.
- Union Government approves winding up of National Manufacturing Competitiveness Council.
- President Pranab Mukherjee declares Kerala as first digital state in the country.
- Union Government extended e-Tourist Visa Scheme to 37 more countries to make the total 150.
- Faustin Archange Touadera won the 2016 Presidential election of Central African Republic (CAR)
- NATO and European Union signed agreement on Cooperation in Cyber Defence to counter modern forms of hybrid warfare.
- First Ministerial Meeting of Arab-India Cooperation Forum held at Manama, capital of Bahrain.
- US lifts nuclear sanctions on Iran after commitments to roll back its nuclear programme.
- India decided to become member of International Energy Agency – Ocean Energy Systems.
- Justice Lodha Committee submitted its report to the Supreme Court on BCCI reforms.
- India and Pakistan exchanged the list of their nuclear installations and facilities under the Agreement on the Prohibition of Attack against Nuclear installations.
- People of UK in a historic Brexit referendum have voted in favour of leaving European Union.
- Conservative party leader Theresa May (59) became Prime Minister of United Kingdom on 12 July 2016.
- Eminent Economist Arvind Panagariya has taken charge as first Vice-Chairman of the newly-created National Institution for Transforming India (NITI) Aayog on 13 January 2015.
- Paolo Gentiloni became the new Prime Minister of Italy on 11 December, 2016.
- Antonio Guterres will be come the new UN Secretary General on1st January, 2017.Bill English became New Zealand's 39th Prime Minister.
- Rajasthan High Court struck down Special Backward Classes reservation given to Gujjars and five other communities in the state.
- Donald Trump on 7 December, 2016 was declared as Time Magazine's person of the year.

- BJP leader and former Union Minister Sarbananda Sonowal (54) was sworn-in as the 14th Chief Minister of Assam after winning 2016 state assembly election with absolute majority.
- The 2016 Group of Twenty (G20) Summit was held in Hangzhou, China from 4th to 5th September 2016 to discuss efforts to reform global economic governance. It was the eleventh meeting of the G20. It was the first ever G20 summit to be hosted in China and the second Asian country after 2010 G20 Seoul summit was hosted in South Korea.
- Veteran CPI (M) leader Pinarayi Vijayan was sworn-in as 12th Chief Minister of Kerala after the left Democratic Front (LDF) had won 2016 state assembly election.
- Bernard Cazeneuve became the new French Prime Minister.
- Jagdish Singh will be the 44th Chief Justice of India.
- Chief Minister of Tamil Nadu, J Jayalalithaa passed away on 5th December, 2016.
- O Panneerselvam was sworn in as the chief-minister of Tamil Nadu on 5th December, 2016.
- Rakesh Asthana was appointed as the Intrim Director of Central Bureau of Investigation (CBI) on 3 December, 2016.
- The 6th Ministerial Conference of the Heart of Asia Istanbul Process concluded on 4th December, 2016 after adopting Amritsar Declaration.
- 64 year old Crown Prince Maha Vajiralongkorn has become the King of Thailand, on December 1, 2016, 50 days after the death of his father, King Bhumibol Adulyadej.
- Interim leader Shavkat Mirziyoyev become the new President of Uzbekistan after he 1 secured 88.6 percent of the votes in the presidential election.
- Alexander Van Der Bellen Sworn in as Austrian president in May 2016.
- Bindheswar Pathak appointed as Brand Ambassador of Swachh Rail Mission.
- Former Prime Minister and leader of Lebanon's Future Movement Saad Hariri was named as Lebanon's new prime minister by the President Michel Aoun on November 3, 2016:
- India and Bangladesh defence cooperation, strengthened with a joint military training exercise SAMPRITI which 2016 which started at Tangail in Dhaka, Bangladesh from 05 to 18 November 2016.
- Kamala Harris, California's Attorney General, is the first Indian- American Senator in the US Congress.
- China once again blocked India's effort to join NSG in a meeting in Seoul on November 4, 2016. Out of 48 members of NSG 47 supported India except China.
- Centre to extend the Armed Forces Special Powers Act (AFSPA) in three districts of Arunachal Pradesh.
- India for the first time hosted the Second meeting of Communication Ministers of BRICS countries which was concluded in Bengaluru on November 11, 2016. The meeting aimed at framing new cooperation and collaboration framework among BRICS countries and discussed ways to improve collaboration in the field of digital economy, future communications, mobile technology etc.
- Indian Navy is considering to select candidates into the 10+2 B Tech cadet scheme through JEE (Main) ranks, instead of class 12th.
- Guy Ryder was re-elected as Director-General of the International Labour Organisation (ILO) for another five-year term from October 2016.
- A team of women commandos has been inducted for the first time in Central Reserve Police Force (CRPF) to counter Naxal insurgency in Jharkhand.
- The Union Cabinet has given its approval to the constitution of "Special Committee for Inter-Linking of Rivers" in compliance with Supreme Court judgment 2012.
- Russia's President Vladimir Putin, has signed an executive order announcing Russia's withdrawal from the International Criminal Court (ICC) in The Hague. This means crimes committed by Russian citizens will no longer fall under the jurisdiction of the ICC.
- India has been ranked 20th on Climate Change Performance Index (CCPI) 2017 according to Germanwatch and Climate

Action Network Europe Publication. Positive trends are seen as well among emerging economies of G20 like India (rank 20), Argentina (36) and Brazil (40), which all improved their ranking.

- Fidel Castro, political leader from Cuba died on 25 November 2016 due to illness at the age of 90.
- General Qamar Javed Bajwa appointed as new Pakistan Army chief.
- The Delhi High court on November 29, 2016, directed that a son, irrespective of his marital status does not have any legal right to live in his parents' house.
- The Supreme Court on November 30, 2016, made it mandatory for cinema halls to play National anthem before screening of a film in theatres across the country.
- Nepal's government registered the new Constitution amendment bill in Parliament on November 29, 2016, aimed at carving out a new state in southern Nepal to meet the demands of agitating Madhesis and other ethnic groups whose protests for bigger federal state last year left more than 50 people dead.
- Pakistan postponed the 19th SAARC Summit after India along with four other member states of the regional grouping decided against attending the meet.
- The 4th Meeting of BRICS Education Ministers Conference held in New Delhi to promote education cooperation and people to people exchanges among the BRICS countries.
- India formally joined the Paris Climate Change Agreement. It is been done by submitting its instrument of ratification at UN headquarters in New York on the birth anniversary of Mahatma Gandhi.
- S. Kumar – appointed as full time member of 21st Law Commission.
- This for the first time that a leader of the United Arab Emirates crown prince of Abu Dhabi, Sheikh Mohammed bin Zayed Al Nahyan would be honored with the invitation of being the Chief Guest at India's Republic Day parade.
- Colombian voters rejected FARC (revolution ary Armed Forces of colombia) peace plan in a referendum.
- Kersti Kaljulaid elected next President of Estonia.
- Indian woman wrestler Geeta Phogat was appointed as a Deputy Superintendent of Police (DSP) in Haryana Police by Haryana Government.
- Irom Sharmila announces formation of political party named Peoples Resurgence and Justice Alliance.
- The Milan City Council bestowed honorary citizenship on His Holiness the Dalai Lama despite strong objections from Chinese government.
- Vice Admiral SN Ghormade, NM takes over as Director General of Naval Operations.
- Air Marshal Rakesh Kumar Singh Bhadauria took over as Deputy Chief of the Air Staff on 1st January 2016.
- Veteran Communist Party of India leader A.B. Bardhan, 92, passed away after a long illness on 2nd January at New Delhi.
- Jammu and Kashmir Chief Minister Mufti Mohammad Sayeed passed away on 7 January 2016 at the AIIMS hospital in New Delhi.
- Additional Secretary of Home Affairs, Sailesh was appointed as the Registrar General and Census Commissioner of India on 7 January 2016.
- K Durga Prasad was appointed as the Special Director General (DG) of the Central Reserve Police Force (CRPF) on 27 January 2015.
- Former Lok Sabha Speaker Balram Jakhar passed away on 3 February 2016 in New Delhi.
- Kalikho Pul was sworn in as the Chief Minister of Arunachal Pradesh on 19 February 2016.
- Distinguished Scientist KN Vyas on 23 February 2016 took charge as Director of the Bhabha Atomic Research Centre (BARC).
- Former Lok Sabha Speaker Purno Agitok Sangma died on 4 March 2016.
- Tsai Ing-wen was sworn-in as the President of Taiwan on 20 May 2016.
- The former United Nations Secretary-General Boutros Boutros-Ghali passed away on 16 February 2016 in Cairo, Egypt.

- Iceland ruling coalition on 6 April 2016 named Sigurdur Ingi Johannsson as the Prime Minister of the country.
- The 2016 Pathankot attack was a terrorist attack committed on 2 January 2016 by a heavily armed group which attacked the Pathankot Air Force Station, part of the Western Air Command of the Indian Air Force.
- The 2016 unrest in Kashmir, also known as the Burhan Wani aftermath is a series of violent protests in the Muslim-majority Kashmir Valley in the Indian-administered state of Jammu and Kashmir. It started with the killing of Burhan Wani, a militant commander of the Kashmir-based Hizbul Mujahideen, by Indian security forces on 8 July 2016. On 8 July 2016, Burhan Wani was killed in a planned operation by the Jammu and Kashmir Police and the Rashtriya Rifles.
- The eighth BRICS summit was held in Goa from 15 to 16 October 2016. The summit concluded with adaptation of Goa Declaration.
- In the month of July the Union Government started the operation 'Sankat Mochan' to evacuate Indian citizens stranded in South Sudan's capital Juba.
- Mehbooba Mufti Sayeed (56) took oath as the first woman Chief Minister of Jammu and Kashmir on 4 April 2016 bringing to an end the three-month Governor's Rule in the state.

Economic

- Bank of Japan's (BoJ) announced that it is joining the European Central Bank (ECB), the Swiss National Bank and the Central Banks of Denmark and Sweden in charging a negative interest rate on commercial bank reserves.
- Union Cabinet increases limit for foreign investment in Stock Exchanges from 5% to 15%.
- Permanent Court of Arbitration(PCA) at Hague, Netherlands rules against Antrix Corporation in Devas Corporation over sharing of spectrum on satellites.
- G-20 Finance ministers and Central Bank Governors meeting held in the Chinese city of Chengdu pledged to boost the global economy.
- The Parliament has passed the Benami Transactions (Prohibition) Amendment Bill.
- Technocrat Anant Maheshwari is appointed as the President of Microsoft India, a subsidiary of US based software giant Microsoft Inc.
- The fourth tranche of the Sovereign Gold Bonds (SGB) scheme opened for subscription. Government has fixed 3,119 Rupees per gram as the issue price for the bond in this tranche.
- The Housing Development Finance Corporation (HDFC) has become the first Indian company to issue rupee-denominated bonds "Masala Bonds" on London Stock Exchange (LSE).
- The Reserve Bank of India (RBI) has set up an inter-regulatory Working Group to study the regulatory issues relating to Financial Technology (Fintech) and Digital Banking in India.
- India ranks 35th in 2016 Logistics Performance Index: World Bank Report.
- The Bharti Group chief, Sunil Bharti Mittal elected as chairman of the International Chambers of Commerce (ICC).
- India has surpassed Japan to become the world's third-largest oil consumer.
- India ranked 2nd on GRD index on ease of doing business by A T Kearney, London.
- The National Aluminium Company Limited (NALCO) signs MoU with Iran to set up smelter plant in Chabahar.
- Apple Inc opens Development Office in Hyderabad, Telangana.
- SBI seeks to take over 5 associate PSBs, Bhartiya Mahila Bank. 5 subsidiary banks are: (i) State Bank of Bikaner and Jaipur, (ii) State Bank of Hyderabad, (iii) State Bank of Mysore, (iv) State Bank of Patiala and (v) State Bank of Travancore.
- India and other 5 countries viz. Canada, Iceland, Israel, New Zealand and China have signed OECD's (Organisation for Economic Co-operation and Development) Multilateral Competent Authority Agreement in Beijing (China).
- Union Government has appointed Urjit Patel (52) as new Governor of Reserve Bank of India (RBI) on 4 September 2016. He will be 24th Governor of RBI.

- Indian Banks data breach was reported in October 2016. It was estimated 3.2 million debit cards were compromised. Major Indian banks- SBI, HDFC Bank, ICICI, YES Bank and Axis Bank were among the worst hit. Many users reported unauthorised use of their cards in locations in China.
- The Insolvency and Bankruptcy Board of India (IBBI) has set up two high-level advisory committees to gather inputs from experts, including on service providers and corporate liquidation. IBBI has been set up under the Insolvency and Bankruptcy Code, 2016 and is expected to soon operationalize. The two committees have begun their deliberations.
- Black Civil Rights leader Viola Desmond will appear on the new Canadian $10 banknotes. She will be the first Canadian women to figure on a banknote.
- On April 14, 2016, Prime Minister launched National Agriculture Market (NAM) as a pan-India electronic trading portal for farm produce which creates a unified national market for agricultural commodities by integrating the existing Agriculture Produce Market Committee (APMC) markets. This portal provides a single window service for all APMC related services and information, such as commodity arrivals and prices, provision for responding to the trade offers, buy and sell trade offers, among other services.
- Cyrus Mistry is removed as director of Tata Industries on 12 December, 2016.
- Gotthard Base Tunnel (GBT) in Switzerland was opened on 11 December, 2016 became the longest rail tunnel in the world with a length of 57 kilometres and depth of 2300 metres.
- Indian Railway on 5th December 2016 declared that the reservations of railway tickets for senior citizens will be directly linked to Aadhaar from 1st April, 2017 onwards on a mandatory basis for availing concession at both counter and e-tickets.
- Vittiya Saksharata Abhiyan was launched on 1st December, 2016 to make people aware about cashless economic system.
- The Union Govt. approved for the inclusion of 15 new castes and modification of 13 others in the OBC list.
- NITI Aayog on 30 November, 2016 formed Chandrababu Naidu Committee to identify the best global practices for implementing an economy primarily based on digital payment.
- Bharatiya Mahila Bank Ltd. (BMBL) merged with State Bank of India.
- The Lok Sabha passed the Taxation Laws (second amendment) Bill, 2016 to amend the Income Tax Act, 1961 and Finance Act, 2016. The Bill proposes to introduce the Pradhanmatri Garib Kalyan Yoja, 2016.
- China and Pakistan launched the direct rail & sea freight service between Kunming and Karachi as a part of China-Pakistan Economic Corridor project (CPEC).
- Maharashtra based private sector lender RBL Bank has launched Aadhaar Payment Bridge System (APBS) on November 30, 2016, for small ticket micro-finance loan disbursements.
- The Gross Domestic Product (GDP) of Indian economy has grown at the rate of 7.3% in the second quarter of 2016-2017, which is up from the 7.1% recorded in the previous three months.
- Cheng Wei, Co-founder and Chief Executive of China's largest ride-sharing service provider Didi Chuxing (Didi) is Forbes Asia's Businessman of the Year for 2016.
- Chitra Ramkrishna quits as CEO & MD of NSE (National Stock Exchange of India) J. Ravichandran to take charge for interim period
- The Finance Ministry made it mandatory on December 5, 2016 for all Government Departments to make Electronic Payments to suppliers, contractors or institutions if the order value exceeds Rs 5,000, to give a boost to Digital Payment System.
- India has achieved the status of being a safe and dynamic investment destination in the world and crossed the $ 300 billion Foreign Direct Investment (FDI) between April 2000 and September 2016.

- The Reserve Bank of India, on December 1, 2016, authorised the Receivables Exchange of India (RXIL), promoted by SIDBI and NSE, to launch the country's first trade receivables exchange platform, TReDS, for MSMEs, buyers and financiers.
- With high level frauds involving industrialists such as Vijay Mallya loan default case revealed, the Central Vigilance Commission (CVC) has now made it compulsory for the public sector banks to report to it all such matters involving funds over Rs.1 crore.
- GST Council approved a four-tier GST tax structure of 5%, 12%, 18% and 28%, with lower rates for essential items and the highest for luxury and de-merits goods that would also attract an additional cess.
- Public sector lenders, State Bank of India, Allahabad Bank and Bank of Baroda and two private banks HDFC Bank and IDFC Bank have joined the Unified Payments Interface (UPI) bandwagon, thereby taking the total number of banks using UPI to 26.
- Life Insurance Corporation. has been the country's most attractive brand in the banking and financial services segment for the third year.
- India was ranked second on the optimism index during the third quarter. India improved its ranking by one spot in a global index of business optimism, with policy reforms and Goods and Services tax (GST) expected to become a reality soon.
- Prime Minister Shri Narendra Modi addressed the nation on November 8, 2016, made a historical announcement that the ₹ 500 and ₹ 1000 currency notes currently in use will no longer be legal tender from midnight 8th November, 2016 i.e., these notes will not be accepted for any kind of transactions from midnight onwards.
- Federal Bank opened its first overseas branch in Dubai.
- Pakistan opened a trade route linking southwestern Gwadar port to Kashgar city in China as part of $46 billion project to jumpstart economic growth in the South Asian country on November 14, 2016.
- Sweden could be first with national digital currency.
- Leading stock exchange BSE has opened its regional investor service centre in Shimla on November 19, 2016 to expand its operations and conform to SEBI's directives.
- Islamic Banking or Sharia banking to be opened in India.
- RBI doubled the E-wallet Limit to Rs. 20,000.
- Army launched a full-fledged bench of Armed Forces Tribunal in Jammu.
- Centrum Direct launched CentrumPay payment Solution to Help Foreigners from Cash Crunch.
- After Ujjivan Small Finance Bank got final license from RBI for its set up in November, Utkarsh Micro Finance has also received final license from RBI to start operations as Small Finance Bank (SFB).
- Government approves 6 new SEZs for IT, biotech.
- Black money worth ₹ 65,250 crore disclosed under Income Declaration Scheme.
- According to World Bank, India accounted for the largest number of people living below international poverty line in 2013, with 30 per cent of its population under the $1.90-a-day poverty measure.
- SBI has announced its entry into Myanmar by opening a branch in the Yangon, former capital city of Myanmar.
- Aadhaar card became mandatory for LPG subsidy after November 2016.
- 2016 World Economic Forum (WEF) India Economic Summit held in New Delhi.
- Rajeev Rishi was elected as the Chairman of the Indian Banks' Association (IBA) for the financial year 2016-17 at IBA meeting held in Mumbai on October 7 2016.
- Mr. Atul Sobti has been the Chairman and Managing Director at Bharat Heavy Electricals Ltd., since January 01, 2016.
- Senior revenue service officer Atulesh Jindal was appointed chairman of Central Board of Direct Taxes (CBDT) on 21 January 2016.

- The Institute of Chartered Accountants of India (ICAI) has elected M. Devaraja Reddy as its new President.
- Christine Lagarde, who steered the IMF through some troubled times including the Eupropean financial crisis, has been re-appointed as its Managing Director for a second five-year term after an uncontested election on Feb 20.

Industries

- The Indian auto industry accounts for 7.1% of the country's GDP.
- The Automobile Mission Plan (AMP) for the period 2006–2016, designed to accelerate and sustain growth in this sector.
- The industry has attracted FDI worth US$ 14.32 billion during the period April 2000 to December 2015.
- CAG in a report tabled in Parliament, said 831.88 sq km of KG-D6 area needs to be taken away from RIL as per the contract because of $1.6 billion of excess cost.
- India ranks third, just behind US and China, among 40 countries in renewable energy production.
- Agricultural product is the 4th largest exported principal commodity with a share of 10% of total exports of the country.
- Indian auto component industry grows by 8.8% in FY16 to ₹ 2.55 lakh crore.
- The Civil Aviation Ministry has cleared proposals for small airports in Uttar Pradesh.
- Tata Advanced Systems Ltd. is tying up with US- Bell Helicopter to compete against the Mahindra-Airbus combination for a $2-billion naval chopper manufacturing contract.
- Government infused ₹ 22,915 crore into 13 PSU banks to boost lending, balance sheet, etc.
- IDFC Bank Ltd will acquire a Tamil Nadu based microfinance institution (MFI), i.e. Grama Vidiyal.
- State Bank of India, has opened its first branch dedicated to serving start-up companies, in Bengaluru.
- Exim Bank of India and the Government of Andhra Pradesh has signed a MoU to promote exports in the state.
- SBI and the World Bank have inked agreements for a $625 million (₹ 4,200 crore) for Grid-connected Rooftop solar Programme (GRPV) in the country.
- US- medical devices maker Boston Scientific Corporation. has agreed for its biggest R&D at Gurgaon to develop stents, catheters and pacemakers for the Asia Pacific, Middle East and Africa by 2017.
- Nirma, the Ahmedabad-based detergent and soap maker, announced its acquisition of Lafarge India's 11-million-tonne (mt) cement business for $1.4 billion (about ₹ 9,478 crore).
- The Indian food industry, currently valued at US$ 39.71 billion is expected to grow 11% to US$65.4 billion by 2018.
- The overall gross exports of Gems & Jewellery in April 2016 stood at US$ 3.23 billion, whereas exports of cut and polished diamonds stood at US$ 1.78 billion.
- A total of 3,598 hospitals and 25,723 dispensaries across the country offer AYUSH (Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy) treatment to the people.
- The Japan International Cooperation Agency (JICA), agreed for a soft loan of JPY 19.064 billion (US$ 161.2 million) for the project of pollution abatement of Mula-Mutha river in Pune.
- Vice Media LLC(USA) has entered into a Joint Venture with the Times Group to open a new bureau and production hub in Mumbai through digital, television and mobile.
- New Delhi based BHEL has commissioned the first unit of the 4×30 MW Pulichintala Hydroelectric project (HEP) on December 1, 2016 in Guntur district of Andhra Pradesh on the river Krishna.
- www.girlsgottaknow.in Website launched to educate Indian women on their legal rights.
- BS Bhullar appointed chief of aviation regulator DGCA (Directorate General of Civil Aviation).
- Gita Jayanti Express Train inaugurated at Kurukshetra Railway Station. The train is scheduled to run five days in week except Saturday and Sunday between Kurukshetra and Mathura.

- The Hazrat Nizamuddin-Visakhapatnam train is renamed as Vizag Steel Samta Express to promote its brand Vizag Steel.
- Government has fixed the minimum wage at ₹ 350 per day for unskilled agricultural labour in C-class towns in central sphere. It will effective from November 1, 2016.
- Google has associated with Archaelogical Survey of India (ASI) for 360 degree virtual tour of 280-odd monuments across the country.
- TRAI, has made it mandatory for all the Broadband providers to at least give a minimum speed of 512Kbps after users consumed their initial data quota.
- The first titanium project of India being established by Saraf Group in Ganjam district of Odisha started its test production.
- The Ministry of Commerce had imposed anti-dumping investigation on import of low ash met coke from Australia and China last year. The imposition of anti dumping duty resulted in an increase in the cost of finished steel by ₹700 to ₹1500 per tone.
- To protect the 968 glaciers of Uttarakhand spread in the area of 2,857 km, The Uttarakhand High imposed a complete ban on any type of construction within 2 km radius of major lakes of the State and also on any construction within 25 km from the edges of all glaciers in the State.
- Pradhan Mantri Kaushal Vikas Kendra in every Parliamentary constituency to offer skill training to the people and make them employable.
- Infrastructure company Adani Enterprises Ltd announced that it commissioned India's largest tracker-based solar power plant at Bhatinda in Punjab. The 100 megawatt plant is also the largest solar project in Punjab.
- Pradhan Mantri YUVA Yojana a flagship scheme on entrepreneurship education and training launched.
- Sri Lankan government has decided to obtain10 diesel engines from RITES India Ltd. under credit line facility provided by Indian Government.
- Swiss based Molinari Rail AG has entered into a strategic agreement with Government of India to design, manufacture and deliver the auxiliary power units (APUs) for 1,000 diesel locomotives to be built in India for Indian Railways.
- Reliance group partnered with Cisco Jasper for a new venture named 'UNLIMIT' to provide Internet of Things (IoT) services to customers across India.
- Unmanned Combat Air Vehicle (UCAV) developed by DRDO named "Rustom-2" completed its first flight on 15 November 2016 in Challakere, Chitradurga district, Karnataka.The drone can be used by Indian Army, Navy and Air Force to keep an eye on enemy territory and carry a variety of cameras and radar for surveillance.
- Government of India has imposed a safeguard duty on import of certain steel products effective from November 23, 2016 till May 22, 2019.
- Indian Railways all set to launch "Tri-Netra (Terrain Imaging for diesel drivers infrared, enhanced optical and radar assisted system)" to check collisions between tracks.
- Cyrus Mistry removed as Tata Steel chairman during board meeting held in Mumbai on November 25, 2016. He was replaced by former head of SBI, O P Bhatt.
- Prime Minister Narendra Modi flagged off the Humsafar train between Gorakhpur and Delhi`s Anand Vihar terminus from Kushinagar in Uttar Pradesh on November 27, 2016. This train will run between the two station thrice in a week.
- Indian Railways and IRCTC have included "transgender as third gender" in the option alongside male and female in ticket reservation and cancellation forms both online and offline.
- Government removed excise duty on goods for manufacturing of POS (Point of Sale) machines that are in great demand as merchants are being compelled to use them in the wake of currency crisis.
- Reliance tied up with Dassault to execute Rafale offsets.

- Union Minister for Railways Suresh Prabhu flagging-off the first freight train which featured a newly-developed guard van, which uses solar power to run fans and lights at Delhi Safdarjung Railway Station.
- As per the forecast by the International Air Transport Association (IATA), India will become the third largest aviation market in the world displacing the UK by 2026.
- Microsoft developed first human-like speech recognition system.
- The Union Ministry of Road Transport & Highways has made it mandatory for all automobile manufacturers to provide emission and noise pollution details for every vehicle they produce by April 2017.
- IT giant Wipro, India's third largest IT services exporter, on 4 January 2016 appointed current Chief Operating Officer (COO) Abid Ali Neemuchwala as the Chief Executive Officer (CEO) and member of the board.
- Devender Kumar Sikri was appointed as Chairman of fair-trade regulator Competition Commission of India (CCI) on 7 January 2016.
- Gurdeep Singh was appointed as the Chairman and Managing Director (CMD) of NTPC Ltd. on 28 January 2016.
- Leslie Berland was appointed as the Chief Marketing Officer (CMO) of Twitter Inc, an online social networking site on 26 January 2016.
- The President of India Pranab Mukherjee has declared Kerala as India's first digital state during the launch of digital empowerment campaign at Kozhikode, Kerala. Kerala is the first Indian state to successfully link its villages with broadband connectivity under the National Optical Fibre Network (NOFN) programme.
- Gatimaan Express is the India's first semi high-speed train. The train runs between Delhi and Agra. The trials of the semi-high speed train have already been conducted twice on the 200-km-long tracks between the two destinations and awaits the mandatory clearance from the Commissioner of Railway Safety (CRS). The train will run at a maximum speed of 160 kmph and is expected to cover the 200-km distance in about 105 minutes.

Art & Culture

- UNESCO lists Khangchendzonga National Park in Sikkim and Chandigarh' Capitol Complex in World Heritage Sites.
- Kerala Tourism campaign wins Golden City Gate Award at the Internationale Tourismus-Börse Berlin (ITB-Berlin) 2016.
- The 42nd Khajuraho Dance Festival began at Khajuraho in Chhatrapur in Madhya Pradesh.
- The 30th Surajkund International Crafts Mela began at Faridabad in Haryana.
- World famous Rath Yatra of Lord Jagannath begins in the coastal city of Puri at 12th century Jagannath temple.
- Every year World Heritage Day is being observed across the world on April 18. It is also known as International Day for Monuments and Sites.
- Traditional Chapchar Kut festival celebrated across Mizoram.
- South Korea's Seong-Jin Cho has won the prestigious 17th international Frederic Chopin Piano competition.
- Canberra based art gallery in Australia has agreed to return a 2,000-year-old Indian-origin sculpture of Gautama Buddha back to India.
- Varanasi and Jaipur became the Creative City Network of UNESCO.
- A French scientist claimed a different portrait hidden behind that of the Mona Lisa of Leonardo da Vinci , created between AD 1503 and 1506 at the Louvre. It is the most valued painting in the world with its insurance value – adjusted for inflation – being at $782 million.
- Losar festival beings in Ladakh region of J&K.
- Annual Hundred Drums Wangala Festival began in Meghalaya.
- Australian art gallery to return 2000 year old Buddha idol to India.
- The Central Board of Film Certification had asked makers of film "Udta Punjab" to remove all references to Punjab.

- A team of Italian and Pakistani archaeologists unearthed layers of an Indo-Greek city in Barikot of Swat valley, Pakistan.
- Nearly thousand year old inscription on Kapalikas has been discovered in Raichur, Karnataka.
- Recently, United States initiated the process of returning over 200 stolen artifacts back to India.
- 500 years old 'MUD PALACE' in Sural village, close to Udupi in Karnataka is madeover. It has no foundation and is supported by wooden pillars using the inter-locking method.
- BHARATVANI portal launched at Lucknow to deliver knowledge about various languages in India. It is a project of the Ministry of HRD implemented by Central Institute of Indian Languages (CIIL) Mysuru.
- Narikurava tribe from Tamil Nadu recently included in the Scheduled Tribe category by the Union Government.
- The Ministry of Tourism is set to announce the Buddhist Circuit as India's first trans-national tourist circuit. Its map includes Bodh Gaya, Vaishali, Rajgir in Bihar, Kushinagar, Sarnath and Shravasthi in UP, along with Kapilvastu and Lumbini in Nepal.
- IIT Kharagpur and ASI published in the 'Nature' journal that Indus Valley Civilization might be 8000 years old rather than 5500.
- British mathematician Andrew Wiles (62) was named as the winner of the prestigious 2016 Abel Prize.
- Dr. B. R. Ambedkar's birthday 14 April, will be observed as 'Water Day'.
- Usain Bolt won the IAAF male Athlete of the year award.
- Ethiopia's Almaz Ayana won the IAAF woman Athlete of the Year award.
- Indian women cricket team won 2016 Asia Cup T20 defeating Pakistan at Bangkok, Thailand.
- Magnus Carisen won the 2016 World Chess Championship.
- The 10-day long Hornbill Festival began at the Naga Heritage village Kisama on December 1, 2016, which is coinciding with the Statehood Day of Nagaland.
- The 7th World Ayurveda Congress (WAC) has been organized at Kolkata from December 1 to December 4, 2016 by the World Ayurveda Foundation with support of Ministry of AYUSH.
- Bollywood Actor Ranveer Sing was named the first Indian ambassador for promoting 2017 Switzerland Tourism's campaign- "Nature wants you back".
- Prime Minister Narendra Modi is set to be the mascot of 'Incredible India' campaign with the tourism ministry.
- Hockey India President Narinder Batra was elected as the president of the International Hockey Federation (FIH) in Dubai on November 12, 2016.
- India's women's carrom team defeated Sri Lanka to win the gold at the 7th World Carrom Championship in Birmingham (UK).
- Australia opened online program for its pre-schools to learn foreign languages, including Hindi from 2017.
- CBSE Class X Board Exam to be re-introduced from 2017-2018
- BBC World Service launched 11 new language services as part of its biggest expansion "since the 1940s", due to the funding boost.
- PV Sindhu won maiden China Open Super Series title defeating Sun Yu of China.
- Mariamma Koshy appointed as New president of Hockey India.
- Sachin Tendulkar's autobiography "Playing it my Way" has won the Crossword Book of the Year Award (Autobiography category)
- Sports Sector got the Infrastructure Status.
- Indian golfer Gaganjeet Bhullar won Korea Open.
- The Indian Boxing Council, a licensing body for the country's professional boxers, has been inducted into the World Boxing Organisation with voting rights in the WBO's annual convention at Puerto Rico.
- Vigender Singh defended his WBO Asia Pacific Super-Middle weight title by beating Tanzanian boxer Francis Cheka by a TKO at Thyagaraj Stadium in New Delhi on 17 December 2016.

- Veteran South Indian classical vocalists Sanjay Subrahmanyam has been conferred with the 2015 Sangita Kalanidhi award on 2nd January.
- Cartoonist Sudhir Tailang died on 6 February 2016 due to brain tumor in Gurgaon.
- Noted Urdu Poet and well known Bollywood lyricist Nida Fazli died due to heart attack in Mumbai on 8 February 2016.
- British writer Kate Atkinson on 4 January 2016 won the novel-of-the-year prize at Britain's Costa Book Awards 2015 for the second time in three years. She fetched the award for *A God in Ruins*, a story of war and its aftermath.
- Veteran Urdu fiction writer and poet Intizar Hussain died on 2 February 2016 in Lahore.
- The 12th edition of South Asian Games (SAG) took place in Guwahati on 5th February, 2016 Assam and was inaugurated by Prime Minister Narendra Modi at the Indira Gandhi Athletics Stadium. The 11-day event is being jointly hosted by Guwahati and Meghalaya capital, Shillong.
- Rest of India has won the Irani Cup Cricket Title 2015-16 by defeating Mumabi in the final match of the cup by four wickets.
- Mumbai has won the Ranji Trophy for a season 2015-16 by defeating Saurashtra. With this victory, Mumbai clinched Ranji title for record 41st time (10 of them being won with innings wins) after playing in record 45 finals.
- The 2016 Indian Federation Cup Final was a football match played on 21 May 2016 at the Indira Gandhi Stadium in Guwahati between Aizawl and Mohun Bagan. Mohun Bagan won the final by defeating Aizawl 5–0 with a brace from Jeje Lalpekhlua and goals each from Sony Norde, Dhanachandra Singh and Bikramjit Singh.
- Delhi Acers on 17th Jan 2016 emerged victorious over Mumbai Rockets to clinch the premier Badminton League.
- Australia defeated India 4-0 in the summit showdown to win the Sultan Azlan Shah Cup hockey tournament in Ipoh, Malaysia.
- Sunrisers Hyderabad (SRH) has won the ninth edition of the Indian Premier League (IPL). It is their maiden IPL title. In the final match played at Chinnaswamy stadium in Bangalore (Karnataka), SRH defeated Royal Challengers Bangalore (RCB) by eight runs.
- India's ace shuttler Pusarla Venkata Sindhu won the silver medal in women's singles badminton event at 2016 Rio Olympics. In the final match of women's singles badminton event, Sindhu lost to Spain's Carolina Marín (World No.1) by 21-19, 12-21, 15-21 score.
- Freestyle wrestler Sakshi Malik (23) won India's first medal at the 2016 Rio Olympic Games by clinching the bronze in the 58kg category. With this victory she created history by becoming the first Indian woman wrestler to win an Olympic medal. It was India's overall 25th medal in Olympic Games.
- Deepa Malik has created history by winning silver medal in Women's shotput at the 2016 Rio Paralympics. With this she becomes first Indian woman to win a medal at the Paralympics.
- Devendra Jhajharia (36) has won gold medal in the men's javelin throw, F46 event held at the 2016 Rio Paralympics. With this, he becomes only the second gold medallist at the Paralympics for the country. He won the gold medal with world-record throw of 63.97 metres.
- Mariyappan Thangavelu became only the third Indian ever to clinch a Paralympic gold, while Varun Bhati secured a bronze as the duo scripted history for the country in the men's T42 high jump event of the Rio Games.
- Vadodara will be the country's first railway university. National Academy of Indian Railways now trains and management development institute for the officers of Indian Railways.
- Eminent author and social activist Mahasweta Devi passed away in Kolkata, West Bengal after a multi-organ failure.

OBITUARY IN 2016

Jan 7, 2016	Mufti Mohammad Sayeed Former-Jammu and Kashmir Chief Minister.
Jan 10, 2016	David Bowie–Legendary artist.
Jan 19, 2016	Ravindra Kalia–Noted Hindi writer.
Jan 21, 2016	Mrinalini Sarabhai–Legendary dancer.
Jan 25, 2016	Kalpana Ranjani–Noted Malayalam film actress.
Feb 2, 2016	S S Tarapore–Former RBI Deputy Governor.
Feb 2, 2016	Intizar Hussain–Veteran Urdu writer.
Feb 9, 2016	Sushil Koirala–Former Nepal Prime Minister.
Feb 18, 2016	Ustad Abdul Rashid Khan–Veteran singer of Gwalior Gharana.
Feb 19, 2016	Bhubaneswari Mishra–Renowned singer.
Mar 4, 2016	Purno Agitok Sangma–Former Lok Sabha Speaker.
Mar 5, 2016	Ray Tomlinson–inventor of E-mail.
Mar 16, 2016	Ustad Ali Ahmad Hussain–Famous Shehnai exponent.
Mar 26, 2016	Jim Harrison–Renowned American author.
Apr 5, 2016	Barbara Turner–Hollywood actress and screenwriter.
Apr 14, 2016	Satyanand Munjal–Hero Group co-founder.
Apr 21, 2016	Prince Rogers Nelson–Music legend.
Apr 27, 2016	V T Thomas–Kerala cartoonist.
May 11, 2016	Tony Cozier–Renowned commentator.
May 27, 2016	RG Jadhav – Noted Marathi writer.
Jun 3, 2016	Muhammad Ali–American Boxer.
Jun 12, 2016	Achyut Lahkar–Noted Playwright and Actor.
Jun 22, 2016	Amjad Sabri–a famed Pakistani Qawwal.
Jun 29, 2016	KG Subramanyan–Renowned painter.
Jul 1, 2016	Ramchandra Chintaman Dhere–Eminent Marathi literary scholar.
Jul 20, 2016	Mohammed Shahid – Indian Hockey legend.
Jul 28, 2016	Mahasweta Devi–Writer and social activist.
Jul 28, 2016	Pandit Lacchu Maharaj–Veteran tabla maestro.
Aug 14, 2016	Na Muthukumar–Tamil Lyricist.
Aug 8, 2016	Mahim Bora–Eminent Assamese litterateur.
Aug 9, 2016	Kalikho Pul–Former Chief Minister of Arunachal Pradesh.
Aug 22, 2016	Sellapan Ramanathan–Singapore's longest serving president.
Sep 2, 2016	Islam Karimov–President of Uzbekistan.
Sep 5, 2016	Lindsay Tuckett–World's oldest cricketer.
Sep 24, 2016	Reoti Saran Sharma–Hindi and Urdu writer.
Sep 27, 2016	Syed Shamsul Haq–Renowned Bangla writer.
Sep 28, 2016	Shimon Peres–Former Israeli Prime Minister.
Oct 13, 2016	Bhumibol Adulyadej–King of Thailand.
Nov 22, 2016	M. Balamuralikrishna–Indian Carnatic musician and composer
Nov 25, 2016	Fidel Castro - Cuban Politician, Prime Minister.
Nov 25, 2016	Dilip Padgaonkar–Journalist, Editor in Chief.
Dec 5, 2016	Jayalalithaa Jayaraman- Indian actor and Chief Minister of Tamil Nadu.

IMPORTANT APPOINTMENTS 2016

Jan 1, 2016	*Amitabh Kant* appointed CEO of NITI (National Institution for Transforming India) Aayog.
Jan 4, 2016	*RK Mathur* sworn in as 8th Chief Information Commissioner (CIC).
Jan 25, 2016	*K Durga Prasad* appointed as DG of CRPF (Central Reserve Police Force).
Feb 2, 2016	*Archana Ramasundram* becomes 1st woman DG of Sashastra Seema Bal.
Feb 3, 2016	*DJ Pandian* appointed AIIB (Asian Infrastructure Investment Bank) Vice-President.
Feb 13, 2016	*Ashok Chawla* appointed as new Chairman of TERI (The Energy and Resources Institute).
Feb 23, 2016	*KN Vyas* appointed as Director of Bhabha Atomic Research Centre.
Feb 25, 2016	*Rajendra Singh* appointed as DG of Coast Guard.
Feb 29, 2016	Former *CJI HL Dattu* takes over as Chairman of NHRC (National Human Rights Commission).
Mar 2, 2016	*Vice Admiral Atul Kumar Jain* appointed as Chief of Staff of Eastern Naval Command.
Mar 11, 2016	*Justice Balbir Singh Chauhan* appointed as Chairman of 21st Law Commission of India.
Mar 12, 2016	*Lt Gen N P S Hira* appointed Deputy Chief of Army.
Mar 15, 2016	*Htin Kyaw* elected as first civilian President of Myanmar.
Mar 23, 2016	*Justice Permod Kohli* appointed as Chairman of Central Administrative Tribunal.
April 7, 2016	*CP Gurnani* appointed as Chairman of NASSCOM (National Association of Software and Services Companies).
May 3, 2016	*Bhupendra Kainthola* takes charge as FTII (Film and Television Institute of India) Director.
May 31, 2016	*Admiral Sunil Lanba* takes charge as Navy chief.
June 3, 2016	*Navin Agarwal* appointed as DG of NADA (National Anti Doping Agency).
June 15, 2016	*Peter Thomson* elected as President of 71st session of United Nations General Assembly.
June 15, 2016	Hollywood actress *Anne Hathaway* appointed as UN Women Goodwill Ambassador.
June 22, 2016	*Ken Miyauchi* appointed as President and COO of SoftBank Group.
June 23, 2016	BCCI appoints *Anil Kumble* as the head coach of Indian Cricket Team.
June 27, 2016	*Sujoy Bose* appointed as first CEO of NIIF (National Investment and Infrastructure Fund).
June 28, 2016	*NS Vishwanathan* appointed as deputy governor of RBI.
July 4, 2016	*Sudarshan Sen* appointed Executive Director of RBI.

July 11, 2016	*D Rajkumar* appointed as CMD of BPCL (Bharat Petroleum Corporation Ltd).
July 14, 2016	*Rakesh Kumar Chaturvedi* appointed as Chairman of CBSE.
July 19, 2016	*Guruprasad Mohapatra* appointed as Chairman of Airports Authority of India.
July 21, 2016	*Ajay Bhushan Pandey* appointed as CEO of UIDAI (Unique Identification Authority of India).
Aug 1, 2016	*Rani Singh Nair* appointed as Chairman of CBDT (Central Board of Direct Taxes).
Oct 3, 2016	*S Sivakumar* appointed as full-time member of 21st Law Commission of India.
Oct 6, 2016	*Sushil Chandra* appointed CBDT Chairman.
Oct 14, 2016	*Portugal's Antonio Guterres* appointed UN Secretary-General.
Oct 18, 2016	*Amandeep Singh Gill* appointed as India's Ambassador to UN Conference on Disarmament, Geneva.
Oct 21, 2016	*Vice Admiral SV Bhokare* assumes office as the Commandant of Indian Naval Academy.
Oct 27, 2016	*Karnal Singh* appointed as Director of Enforcement Directorate.
Sep 4, 2016	*Urjit Patel* assumes charge as 24th Governor of Reserve Bank of India.
Dec 5, 2016	Senior AIADMK leader O Panneerselvam appointed as the new AIADMK chief and the new Tamil Nadu Chief Minister.
Sep 19, 2016	*Alka Sirohi* appointed UPSC chairman.
Sep 28, 2016	World Bank reappoints *Jim Yong Kim* for second term as President.
Nov. 7, 2016	*M Rajeshwar Rao* new RBI Executive Director.
Nov. 24, 2016	*Yudhvir Singh Malik* appointed as new Chairman of NHA.

AWARDS AND HONOURS

- Dada Saheb Phalke Award 2016 - Manoj Kumar:
- Moortidevi Award of Bharatiya Jnanpith - Telugu writer Kalakaluri Enoch:
- Tamil film Visaranai selected as India's official entry to Oscars 2017.
- Kiran M Shaw appointed Knight of Legion of Honor by France.
- Bezwada Wilson, TM Krishna receive 2016 Magsaysay Award.
- Padma Sachdev awarded 2015 Saraswati Samman.
- 2016 Rajiv Gandhi Khel Ratna Award- PV Sindhu (Badminton), Sakshi Malik (Wrestling), Dipa Karmakar (Gymnastics) and Jitu Rai (Shooting).
- 2016 Dronacharya Award - Nagapuri Ramesh (Athletics), Sagar Mal Dhayal (Boxing), Raj Kumar Sharma (Cricket), Bishweshwar Nandi (Gymnastics), S. Pradeep Kumar (Swimming) and Mahabir Singh (Wrestling).
- 2016 Arjuna Award -Rajat Chauhan (Archery), Lalita Babar (Athletics), Sourav Kothari (Billiards & Snooker), Shiva Thapa (Boxing),Ajinkya Rahane (Cricket), Subrata Paul (Football), Rani (Hockey),Raghunath

V.R. (Hockey), Gurpreet Singh (Shooting), Apurvi Chandela (Shooting), Soumyajit Ghosh (Table Tennis),Vinesh (Wrestling), Amit Kumar (Wrestling), Sandeep Singh Mann (Para-Athletics) and Virender Singh (Wrestling).

- 2016 Dhyan Chand -Satti Geetha (Athletics), Sylvanus Dung Dung (Hockey) and Rajendra Pralhad Shelke (Rowing).
- Shubha Mudgal selected for Rajiv Gandhi National Sadbhavana Award
- 51st Jnanpith Award conferred on Gujarati writer Dr. Raghuveer Chaudhari.
- PM Narendra Modi conferred Afghanistan's highest civilian honour Amir Amanullah Khan Award.
- AR Rahman conferred with Japan's Fukuoka prize 2016.
- South Korean author Han Kang wins 2016 Man Booker International Prize for her novel 'The Vegetarian'.

63rd National Film Awards 2016

- Best Actor: Amitabh Bachchan (Piku).
- Best Actress: Kangana Ranaut (Tanu Weds Manu Returns).
- Best Direction: Sanjay Leela Bhansali (Bajirao Mastani).
- Best Film on Social Issues: Niranayakam (Malayalam) directed by V. K. Prakash.
- Best Supporting Actor: Samuthirakani for the film Visaranai (Tamil).
- Best Supporting Actress: Tanvi Azmi for the film Bajirao Mastani (Hindi).
- Best Children's Film: Duronto (Hindi) directed by Soumnedra Padhi.
- Best Child Artist: Gaurav Menon for the film Ben (Malayalam).
- Special Jury Award: Margarita with a Straw (Hindi) directed by Kalki Koechlin.
- Best Cinematography: Sudeep Chatterjee for the film Bajirao Mastani (Hindi).
- Indira Gandhi Award for Best Debut Film of a Director: Neeraj Ghaywan for the film Masaan (Hindi).
- Nargis Dutt Award for Best Feature Film on National Integration: Nanak Shah Fakir (Punjabi) directed by Sartaj Singh Pannu.
- Swat activist Tabassum Adnan wins 2016 Nelson Mandela Award.
- Man Booker International Prize - South Korean Novelist Han Kongfor for his Novel "The Vegetarian".

List of 2016 Pulitzer Prize Winners

Books, Drama and Music

Fiction: The Sympathizer by Viet Thanh Nguyen.

Drama: Hamilton by Lin-Manuel Miranda.

History: Custer's Trials: A Life on the Frontier of a New America by T.J. Stiles.

Biography: Barbarian Days: A Surfing Life by William Finnegan,

Poetry: Ozone Journal by Peter Balakian. Music: In for a Penny, In for a Pound by Henry Threadgill.

- World No 1 tennis player Novak Djokovic from Serbia has won the 2016 Laureus Sportsman of the Year Award.
- Viswanathan Anand conferred with 2016 Hridaynath Mangeskar Award.
- PM Narendra Modi conferred Saudi Arabia's highest civilian honour-the King Abdulaziz Sash.
- Playback Singer P. Susheela enters Guinness World Records for singing highest number of songs.
- Indira Gandhi International Airport wins three international awards.
- Retained World's number one airport for consecutive second year in 25 to 40 Million Passengers Per Annum (MPPA) category.
- Best airport by size & region Asia Pacific (25-40 MPPA).
- Second best airport by region (Asia Pacific).

Oscar Awards: 88th Academy Awards, 2016

Best Picture: Spotlight.

Best Actor: Leonardo DiCaprio (The Revenant).

Best Actress: Brie Larson (Room).

Best Supporting Actor: Mark Rylance (Bridge of Spies).

Best Supporting Actress: Alicia Vikander (The Danish Girl). Best Director: Alejandro G. Iñárritu (The Revenant). Best Original Screenplay: Tom McCarthy (Spotlight).

2016 Padma Vibhushan Awards

- Rajinikanth-Art-Cinema
- Girija Devi- Art-Classical Vocal
- Ramoji Rao -Literature & Education
- Dr. Viswanathan Shanta Medicine- Oncology
- Shri Shri Ravi Shankar-Spiritualism
- Jagmohan- Public Affairs
- Yamini Krishamurthi - Dance
- Dr. V Shanta - Cancer Specialist

Padma Bhushan Awards

- Anupam Kher -Art-Cinema
- Udit Narayan Jha Art-Playback Singing
- Ram V. Sutar -Art-Sculpture
- Heisnam Kanhailal- Art-Theatre
- Vinod Rai- Civil Service
- Dr. Yarlagadda Lakshmi Prasad - Literature & Education
- Prof. N. S. Ramanuja Tatacharya - Literature & Education
- Dr. Barjinder Singh Hamdard- Literature & Education
- Prof. D. Nageshwar Reddy -Medicine-Gastroenterology

58th Grammy Awards 2016

The 58th Annual Grammy Awards were announced on December 7, 2015 by the Recording Academy announced at the Staples Center in Los Angeles, California (USA).
The ceremony has recognized the best recordings, compositions and artists in the eligibility year, which was from October 2014, to September 2015. The 2016 Award ceremony was held on February 15, 2016 at Staples center in Los Angeles.

LIST OF TOP GRAMMY AWARDS WINNERS

Category	Album	Artist
Record of the Year	Uptown Funk	Mark Ronson featuring Bruno Mars
Album of the Year	1989	Taylor Swift
Song of the Year	Thinking Out Loud	Ed Sheeran & Amy Wadge
Best New Artist		Meghan Trainor
Best Pop Solo Performance	Thinking Out Loud	Ed Sheeran
Best Pop Duo/Group Performance	Uptown Funk	Mark Ronson featuring Bruno Mars
Best Traditional Pop Vocal Album	The Silver Lining: The Songs Of Jerome Kern	Tony Bennett & Bill Charlap
Best Pop Vocal Album	1989	Taylor Swift
Best Dance Recording	Where Are Ü Now	Skrillex and Diplo with Justin Bieber
Best Dance/Electronic Album	Skrillex and Diplo Present Jack	Skrillex and Diplo

Nobel Prize 2016

Peace: The current President of Colombia, **Juan Manuel Santos**, was awarded Nobel Peace Prize for his resolute efforts to bring the country's more than 50-year-long civil war to an end, a war that took away the lives of at least 2,20,000 Colombians and displaced nearly six million people.
Physics: British trio of physicists David Thouless, F Duncan M Haldane and Michael Kosterlitz have won the 2016 Nobel Prize in Physics.
Economics: Two economists Oliver Hart and Bengt Holmstrom have won the 2016 Nobel Memorial Prize in Economic Sciences.
Chemistry: Trio of Jean-Pierre Sauvage, J Fraser Stoddart and Bernard L Feringa have won the prestigious 2016 Nobel Prize in Chemistry.
Literature: American singer-songwriter, artist and writer Bob Dylan (75) has won the 2016 Nobel Prize in Literature. He is the first American to win the prize since novelist Toni Morrison in 1993.
Medicine: Yoshinori Ohsumi (71) of Japan has won the 2016 Nobel Prize for physiology or Medicine for his pioneering work on autophagy.

Bills & Acts 2016

- Union Government introduces Taxation Laws (Second Amendment) Bill, 2016.
- Draft National Water Framework Bill, 2016 suggests basin-level management.
- Cabinet approves amendments to HIV and AIDS (Prevention and Control) Bill, 2014.
- Union Cabinet approves Admiralty (Jurisdiction and Settlement of Maritime Claims) Bill, 2016.
- Rajya Sabha passes Maternity Benefits (Amendment) Bill, 2016.
- Parliament passes Central Agricultural University (Amendment) Bill, 2016.
- Lok Sabha passes Taxation Laws (Amendment) Bill, 2016.
- Parliament passes Enforcement of Security Interest and Recovery of Debts Laws Amendment Bill, 2016.
- Lok Sabha passes Employee's Compensation (Amendment) Bill, 2016.
- Parliament passes The Constitution (122nd Amendment) (GST) Bill, 2014.
- Rajya Sabha passes Mental Health Care Bill.
- Union Cabinet approves Motor Vehicle (Amendment) Bill, 2016.
- Benami transaction bill passed in Rajya Sabha.
- Parliament passes Institutes of Technology (Amendment) Bill, 2016.
- Parliament passes Indian Medical Council (Amendment Bill), 2016.
- Parliament passes NIT, Science Education & Research (Amendment) Bill, 2016.
- Parliament passes Compensatory Afforestation Fund Bill, 2016.
- Lok Sabha passes Lokpal and Lokayukta (Amendment) Bill, 2016.
- Parliament passes Child Labour (Prohibition and Regulation) Amendment Bill, 2016.
- Lok Sabha passes Bill for new NIT in Andhra Pradesh.
- Union Cabinet approves Transgender Persons (Protection of Rights) Bill, 2016.
- Parliament passes Insolvency and Bankruptcy Code Bill, 2016.
- Parliament Passes Anti-Hijacking Bill, 2016.
- Parliament passes Mines and Minerals Amendment Bill, 2016.
- Real Estate (Regulation and Development) Act, 2016 comes into force.
- Parliament passes Industries (Development and Regulation) Amendment Bill, 2015.
- Parliament passes Constitution (Scheduled Castes) Order (Amendment) Bill, 2016.
- Parliament passes Sikh Gurdwaras (Amendment) Bill, 2016.
- Maharashtra becomes first state to pass law against social boycott.
- Haryana Assembly unanimously passes Reservation Bill.
- Union Government notifies Aadhaar Act, 2016.
- Lok Sabha passes Enemy Property (Amendment and Validation) Bill, 2016.
- Parliament passes Carriage by Air amendment Bill, 2015.
- Lok Sabha passes Election Laws (Amendment) Bill, 2016.
- Scheduled Tribes (Prevention of Atrocities) Amendment Act, 2015 came into force.
- The Juvenile Justice (Care and Protection of Children) Act, 2015 comes into force.
- President gives assent to The Sugar Cess (Amendment) Bill, 2015.

Policies and Schemes 2016

- Union Government is going to launch National Resource Centre Vanjeevan for Tribal Livelihood.
- Government launches e-Pashuhaat portal to connect farmers and breeders of bovine animals.
- Rajasthan Government is going to launch Annapurna Rasoi Programme to provide quality meal at cheap price.
- PM Narendra Modi launches Pradhan Mantri Gramin Awas Yojana.

- Union Government launches Pehchan identity cards for artisans.
- Union Government launches Pradhan Mantri Yuva Yojana for entrepreneurs.
- MNRE issue bidding guidelines for setting up 1000 MW Wind Power Projects.
- PM Narendra Modi launches Saur Sujala Yojana in Chhattisgarh.
- Odisha Government launches Madhubabu Aain Sahayata Sibir Scheme.
- Union Government launches Biotech-KISAN and Cattle Genomics to empower farmers.
- Union Government launches UDAN Scheme for Regional Air Connectivity.
- Maharashtra Government launches Kaushalya Setu skill-development programme.
- PM launches National SC/ST hub and Zero Defect – Zero Effect scheme.
- National Seismic Programme launched in Odisha.
- The International Energy Agency (IAE) is going to tie up with India for its global LED programme.
- Union Government approves Rs.114 crore worth projects under HRIDAY Scheme.
- Jharkhand becomes first state to implement DBT in Kerosene.
- Union Cabinet approves Varistha Pension Bima Yojana, 2003 and Varistha Pension Bima Yojana, 2014.
- Integration of DigiLocker with Driving Licenses & Vehicle Registration Certificates launched.
- Union Government approves ₹ 450 crore for five states under Swadesh Darshan scheme.
- First Phase of ESICS Pilot Project of Telemedicine Services inaugurated.
- Union Government launches Accessible E-Library Sugamya Pustakalaya.
- Union Government constitutes DISHA for timely implementation of Central Schemes.
- Union Government issues notification for implementation of 7th Pay Commission.
- Fourth tranche of Sovereign Gold Bond scheme opened for subscription.
- Punjab Government launches Rapid Rural Police Response System.
- Gujarat Government launches Smart Village program.
- Odisha Government launches Biju Kanya Ratna Yojana.
- Union Government notifies National Apprenticeship Promotion Scheme.
- Indian Railways launches insurance scheme for passengers travelling on e-ticket.
- PM Narendra Modi launches Mission Bhagiratha in Telangana.
- Odisha Government launches Baristha Bunakar Sahayata Yojana.
- Union Government launches MAA, nation-wide breast feeding programme.
- Haryana Government launches Pashudhan Bima Yojana.
- Rajasthan becomes first state to approve sewage & waste water policy.
- Union Government launches KVK portal for monitoring of farm centres.
- Namami Gange projects for cleaning river Ganga launched.
- Union Cabinet approves National Apprenticeship Promotion Scheme.
- Union Cabinet Approves Interest Subvention Scheme for farmers for year 2016-17.
- Union Government launches National Green Highways Mission.
- Union Government approve Ramayana & Krishna Circuits under Swadesh Darshan Scheme.
- Income Declaration Scheme 2016.
- Andhra Pradesh Government launches Chandranna Bima Yojana.
- Union Government launches UJALA Scheme.
- Jharkhand Government launches Bhimrao Ambedkar Awas Yojana for widows.

- Odisha Government launches Adarsh Vidyalaya Project.
- Union Cabinet gives nod to implementation of One Rank One Pension Scheme.
- PM Narendra Modi launches Stand up India scheme for SC/ST, women.
- Karnataka launches Mukhyamantri Santwana Harish Yojana for free treatment to accident victims.
- Swachh Himachal Padhai bhi, Safai bhi.
- Udyam Aakansha scheme to promote SMEs.
- National Capital Goods Policy 2016.
- Bihar becomes sixth state to join UDAY Scheme.
- Rashtriya Gram Swaraj Abhiyan.
- Deen Dayal Antyodaya Yojana.
- National Dialysis Services Programme.
- Pradhan Mantri Ujjwala Yojana.

Books and Authors 2016

Driven: The Virat Kohli Story– Vijay Lokapally
Democrats and Dissenters: Ramachandra Guha
One Indian girl: Chetan Bhagat
Six Machine (I Don't Like Cricket ... I Love It): Chris Gayle
His Bloody Project: Graeme Macrae Burnet
AB The autobiography: AB De Villiers
Citizen and Society: Hamid Ansari
The Ocean of Churn: How the Indian Ocean Shaped Human History: Sanjeev Sanyal
R D Burmania: Panchamemoirs- Chaitanya Padukone
India Rising: Fresh Hope, New Fears- Ravi Velloor
The Great Derangement: Climate Change and the Unthinkable- Amitav Ghosh
Courage & Commitment- Margaret Alva
India vs Pakistan: Why Can't we just be Friends? - Husain Haqqani
Chaos and Caliphate: Jihadis and the West in the Struggle for the Middle East- Patrick Cockburn
A Call to Mercy: Hearts to Love, Hands to Serve- Mother Teresa
The Unseen Indira Gandhi: Dr KP Mathur
A Life in Diplomacy: Maharajakrishna Rasgotra
Blood on my Hands: Confessions of Staged Encounters- Kishalay Bhattacharjee
The Making of India: The Untold Story of British Enterprises- Kartar Lalvani
A State in Denial- BG Verghese
The Kiss of Life- Emraan Hashmi
Anything But Khamosh: The Shatrughan Sinha Biography- Bharathi S Pradhan
Gandhi: An Illustrated Biography- Pramod Kapoor
Fixed! Cash and Corruption in Cricket- Journalist Shantanu Guha Ray
"Who was Shivaji?"- Govind Pansare
A Kingdom for His Love- Vani Mahesh, Shinie Antony
Nathuram Godse: The Story of an Assassin- Anup Ashok Sardesai
The Turbulent Years, Volume II- President Pranab Mukherjee
The Z Factor- Subhash Chandra
Jawaharlal Nehru and The Indian Polity in Perspective- Hamid Ansari
MARU BHARAT SARU BHARAT- Jain Acharya Maharaj
Tolerance: Mamata Banerjee
Transendence: APJ Abdul Kalam
Indian Paper Money: Razack
My Favourite Nature Stories: Rusbind Bond
Auto biography ' Ace Against odds: Sania Mirza
India's most Powerful women: Mrs. Prem Ahluwalia
Harry Potter and the cursed child: JK Rowling
The Ministry of utmost Happiness: Arundhati Roy
Andhere se Ujale ki Aur: Arun Jaitley
An Era of Darkness: The British Empire India
Ashoka in Ancient India: Nayanjot Lahiri: Dr Shashi Tharoor

CURRENT AFFAIRS MCQS

1. India's first amphibious bus project has been launched by which state government?
   (a) Haryana (b) Andhra Pradesh
   (c) Punjab (d) Uttar Pradesh
2. Which state government has tied u p with Tata Trust to strengthen Public Distribution System (PDS)?
   (a) Uttar Pradesh (b) Tamil Nadu
   (c) Kerala (d) Andhra Pradesh
3. Gotthard Base Tunnel(GBT), the world's longest and deepest traffic tunnel, is located in which country?
   (a) France (b) Japan
   (c) Switzerland (d) China
4. Which of the following footballers has won the 2016 FIFA Ballon D'or Award ?
   (a) Neymar
   (b) Cristiano Ronaldo
   (c) Lionel Messi
   (d) Antoine Griezmann
5. The book "The Other One Percent: Indians in America" has been authored by whom?
   (a) Mohana Krishnan
   (b) Sanjoy Chakravorty
   (c) Joe Harris
   (d) Balaji Vittal
6. "100 Million for 100 Million" campaign for child rights have been launched by whom?
   (a) Pranab Mukherjee
   (b) Narendra Modi
   (c) Maneka Gandhi
   (d) Raj Nath Singh
7. The Narmada Seva Yatra has been launched by which of the following states?
   (a) Chhattisgarh
   (b) Madhya Pradesh
   (c) Gujarat
   (d) Maharashtra
8. Who has been named as the new Prime Minister of Italy?
   (a) Enrico Letta
   (b) Paolo Gentiloni
   (c) Matteo Renzi
   (d) Sergio Mattarella
9. Which state has become the first Indian state to launch crop insurance claim distribution programme?
   (a) Haryana
   (b) Rajasthan
   (c) Uttar Pradesh
   (d) Madhya Pradesh
10. What is the theme of 2016 Human Rights Day (HRD)?
    (a) Our Rights, Our Freedoms, Always
    (b) Stand up for someone's rights today
    (c) My Voice Counts
    (d) Human Rights 365
11. Who has been named as the Time magazine's Person of the Year 2016?
    (a) Donald Trump
    (b) Mark Zuckerberg
    (c) Narendra Modi
    (d) Hillary Clinton
12. Which high court of India has termed the practice of triple talaq (Talaq-e-bidat) among Muslims as unconstitutional?
    (a) Allahabad High Court
    (b) Delhi High Court
    (c) Calcutta High Court
    (d) Mumbai High Court
13. What is the India's rank in the 2016 Global Terrorism Index (GTI)?
    (a) 9th (b) 7th
    (c) 11th (d) 13th
14. Which is the most powerful language according to the 2016 World Power Language Index (PLI)?
    (a) Mandarin (b) English
    (c) French (d) Spanish
15. Who has been appointed as the new Chief Justice of India (CJI)?
    (a) Jasti Chelameswar
    (b) Dipak Misra
    (c) Madan B Lokur
    (d) Jagdish Singh Khehar
16. Who has been named as the "Asian of the Year 2016"?
    (a) Sachin Bansal
    (b) Ratan Tata
    (c) Mukesh Ambani
    (d) Sunil Mittal

17. "2016 Indra NAVY" naval exercise will be held between India and which country?
    (a) Russia (b) United States
    (c) Japan (d) China
18. Which country team has won the 2016 Women's Twenty20 Asia Cup cricket tournament?
    (a) Pakistan (b) India
    (c) Nepal (d) Bangladesh
19. Which famous personality has won the online reader's poll for TIME magazine's Person of the Year 2016?
    (a) Narendra Modi
    (b) Vladimir Putin
    (c) Barack Obama
    (d) Donald Trump
20. What is the theme of 2016 Heart of Asia (HoA) ministerial conference?
    (a) Connect world with harmony
    (b) E-connectivity for prosperity
    (c) Peace: Priority for all
    (d) Addressing challenges, achieving prosperity
21. What system is to be introduced by Indian Railways to reduce rail accidents?
    (a) Tri-Netra (b) Tri-Sutra
    (c) Tri-Sewa (d) Tri-Shakti
22. Which section was made the India's first Green Rail Corridor?
    (a) Okha-Kanalus
    (b) Porbandar-Wansjaliya
    (c) Rameswaram-Manamadurai
    (d) Lucknow-Delhi
23. Who has been appointed as the new interim director of Central Bureau of Investigation (CBI)?
    (a) R K Raghavan
    (b) R K Dutta
    (c) Rakesh Asthana
    (d) Anil Sinha
24. Which service was launched to make rail travel comfortable for elderly, differently-abled and ailing travelers?
    (a) Sahayak Sewa
    (b) Janani Sewa
    (c) Yatri sewa
    (d) Yatri Mitra Sewa
25. Which portal has been launched by Ministry of Women and Child Development to register online complaints of child sexual abuse?
    (a) POCSO e-BOX (b) POCSO m-BOX
    (c) POCSO c-BOX (d) POCSO m-BOX
26. India has recently signed deal for 145 M777 ultra-light howitzers guns with which country?
    (a) Russia (b) Japan
    (c) Brazil (d) United States
27. Where is the headquarters of Indian Council of Medical Research (ICMR)?
    (a) Pune (b) New Delhi
    (c) Kolkata (d) Bengaluru
28. Which film has won the Golden Peacock award at the 2016 International Film Festival of India (IFFI)?
    (a) Rauf (b) Daughter
    (c) The Throne (d) Cold of Kalanda
29. Which Indian snooker has won bronze at IBSF World Snooker Championship 2016?
    (a) Pankaj Advani
    (b) Geet Sethi
    (c) Manan Chandra
    (d) Aditya Mehta
30. Which advisory committee has been formed by the Insolvency and Bankruptcy Board of India (IBBI) on service providers?
    (a) Ajay Tyagi committee
    (b) M S Sahoo committee
    (c) Uday Kotak committee
    (d) Mohandas Pai committee
31. The 50th anniversary of the United Nations Commission on International Trade Law (UNCITRAL) has been hosted by which country?
    (a) India (b) Germany
    (c) Singapore (d) Malaysia
32. The book "Swimmer Among the Stars" has been authored by whom?
    (a) Kanishk Tharoor
    (b) Nikunj Juneja
    (c) Amitav Ghosh
    (d) AK Ramanujan

33. Anand Yadav, who passed away recently, was the author of which language?
(a) Hindi (b) Marathi
(c) Odia (d) Telugu
34. The 2016 annual Conference of Directors-General of Police (DGPs) of States has been held in which city?
(a) New Delhi (b) Pune
(c) Hyderabad (d) Guwahati
35. India's first underwater festival has been held in which city?
(a) Pune (b) Kochi
(c) Mumbai (d) Guwahati
36. "Indian Police at Your Call" mobile app has been launched by whom?
(a) Rajnath Singh
(b) Arun Jaitely
(c) Narendra Modi
(d) Sushma Swaraj
37. The 2nd edition of Judima Festival will be hosted by which state?
(a) Arunachal Pradesh
(b) Sikkim
(c) Assam
(d) Haryana
38. India's first digital and cashless village "Akodara" is located in which state?
(a) Tamil Nadu (b) Gujarat
(c) Maharashtra (d) Kerala
39. What is the theme of 2016 International Day for the Elimination of Violence against Women?
(a) Orange your neighbourhood
(b) Orange the world
(c) Orange the life
(d) Orange the people
40. Fidel Castro, who passed away recently, was the revolutionary leader of which country?
(a) Cuba (b) Libya
(c) Namibia (d) Ethiopia
41. What amount will the Indian Railways insurance cover for passengers travelling on e- ticket?
(a) 1 lakh rupees (b) 5 lakh rupees
(c) 10 lakh rupees (d) 1 crore rupees
42. The Union Railway Ministry has flagged off the maiden broad gage train service dubbed as?
(a) ManipurSundari Express
(b) Tripura Sundari Express
(c) Arunachal Pradesh Sundari Express
(d) Assam Sundari Express
43. Which Indian boxer to be honoured with 'Legends Award' by International Boxing Association (AIBA)?
(a) Sarjubala Devi
(b) Mary Kom
(c) Mandeep Jangra
(d) Shiva Thapa
44. Which portal has been launched by Union Government to track air flights & register complaints?
(a) AirSuraksha Portal
(b) AirSandesh Portal
(c) AirTrack Portal
(d) AirSewa Portal
45. "e-pashuhaat portal" has been launched by which union ministry for livestock?
(a) Narendra Modi
(b) Arun Jaitley
(c) Radha Mohan Singh
(d) Rajnath Singh
46. The book "Banaras City of Light" has been authored by whom?
(a) Vrinda Grover (b) Diana Eck
(c) Mini Kapoor (d) Sanjaya Baru
47. "Annapurna Rasoi Programme" will be started by which state government to provide quality meal to weaker section?
(a) Rajasthan
(b) Uttar Pradesh
(c) Madhya Pradesh
(d) Odisha
48. Which Indian institution has been ranked as the top institution in India by QS Graduate Employability Rankings 2017?
(a) IIT-Delhi
(b) University of Delhi
(c) IIT Kharagpur
(d) IIT-Madras
49. The 2016 Wangala harvest festival has celebrated by which tribe of North-East India?
(a) Deori tribe (b) Khasi tribe
(c) Garo tribe (d) Nyishi tribe

50. What is the India's rank in the 2016 Global ICT Development Index (IDI)?
(a) 71st (b) 138th
(c) 155th (d) 66th
51. Which committee has been constituted to convert 100% Government – Citizen Transactions to the digital platform?
(a) Piyush Goyal committee
(b) Arun Jaitely committee
(c) Kirti Parekh committee
(d) Amitabh Kant committee
52. The book "Midnight's Furies: The Deadly Legacy of India's Partition" has been authored by whom?
(a) Kisan Jha (b) Nisid Hajari
(c) Milan Vaishnav (d) Ruskin Bond
53. Dileep Padgaonkar, who passed away recently, was the famous personality of which field?
(a) Sports (b) Journalism
(c) Politics (d) Science
54. Union Railway Minister Suresh Prabhu laid the foundation stone of one Megawatt (MW) solar power plant in which city?
(a) Chandigarh (b) Ludhiana
(c) Amritsar (d) Rewari
55. "Smart Water Distribution Monitoring" web portal has been launched by which state government ?
(a) Andhra Pradesh
(b) Telangana
(c) Kerala
(d) Tamil Nadu
56. Which of the following entities has launched India's first payment bank?
(a) Reliance Industries
(b) Airtel M Commerce Services
(c) Vodafone M-Pesa
(d) FINO PayTech
57. Who has been honoured with the 2016 International Maritime Organisation (IMO) Award?
(a) Rainer Brinkmann
(b) William S. Benson
(c) Radhika Menon
(d) Wu Shengli
58. India has recently signed bank information sharing deal with which country for the implementation of Automatic Exchange of Information (AEOI)?
(a) Malaysia
(b) Switzerland
(c) Mauritius
(d) Singapore
57. Who has been appointed as the new Chairman of National Highways Authority of India (NHAI)?
(a) Danish Kapoor
(b) K K Sahoo
(c) Raghav Chandra
(d) Yudhvir Singh Malik
58. Which Indian film has been nominated as Indian entry for ICFT UNESCO Gandhi Medal?
(a) Harmonia
(b) Allama
(c) Beluga
(d) A Real Vermeer
59. Which committee was constituted by Union Government on Yoga Education in Universities?
(a) M M Lal committee
(b) Dwarakanath Bhavan Committee
(c) Suresh Lal Barnawal committee
(d) H R Nagendra committee
60. The 2016 International Tourism Mart has started in which state of India?
(a) Arunachal Pradesh
(b) Manipur
(c) Tripura
(d) West Bengal
61. What is the name of world's first hospital on a train by Indian railways?
(a) Gatiman Express
(b) SMOM
(c) Jeevan Express
(d) Lifeline Express
62. Who has been appointed as chairman and managing director (CMD) of Konkan Railway Corporation Limited (KRCL)?
(a) Sanjay Gupta
(b) E. Sreedharan
(c) B P Tayal
(d) Madhu Dandavate

63. Who has been elected as the new President of Federation of Indian Chambers of Commerce and Industry (FICCI) for 2017?
(a) Pankaj Patel
(b) Harshavardhan Neotia
(c) Nikunj Srivastav
(d) Anil Bhatti

64. Which of the following has become the India's first e-assembly constituency?
(a) Dharamshala assembly constituency
(b) Palampur assembly constituency
(c) Rinchenpong assembly constituency
(d) Chujachen assembly constituency

65. India's first International Children's festival will be held in which city?
(a) Mumbai (b) Pune
(c) New Delhi (d) Guwahati

66. Maha Chakri Sirindhorn, who has been conferred the first 'World Sanskrit Award', is belonged to which country?
(a) India (b) Malaysia
(c) Thailand (d) Indonesia

67. Prof.MGK Menon, who passed away recently, was the chief of which organisation?
(a) Defence Research and Development Organisation (DRDO)
(b) Indian Space Research Organisation (ISRO)
(c) Bhabha Atomic Research Centre (BARC)
(d) Vikram Sarabhai Space Centre (VSSC)

68. Which Indian journalist has been honoured with the CPJ's 2016 International Press Freedom Award?
(a) Malini Subramaniam
(b) Zafarul Islam Khan
(c) Prannoy Lal Roy
(d) Palagummi Sainath

69. Who will be the chief guest at the 14th Pravasi Bharatiya Divas (PBD) Convention?
(a) Li Keqiang
(b) Shinzo Abe
(c) Antonio Costa
(d) Satyandre Adhin

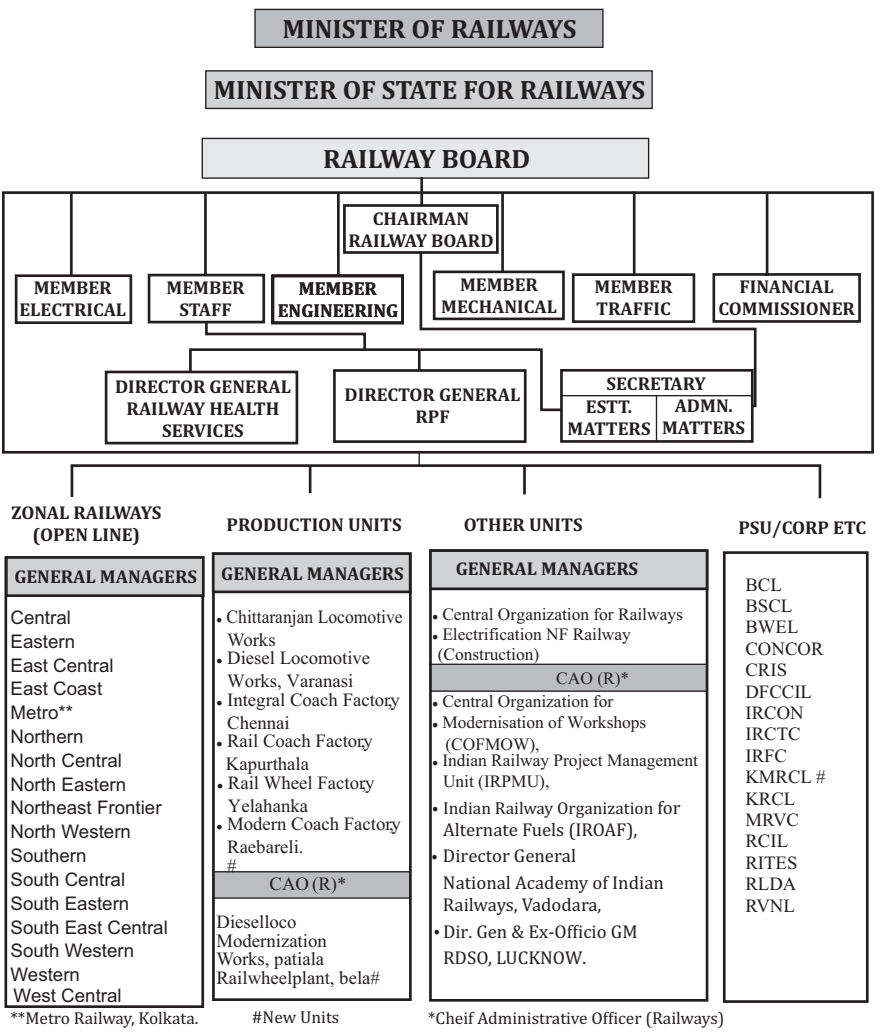
70. Which online system was launched for redressal of service related grievance of serving and former Railway employees?
(a) www.kportal.indianrailways.gov.in
(b) Complaint Management System (COMS)
(c) Centralised Public Grievance Redress and Monitoring System (CPGRAMS)
(d) Nivaran portal

Anskey

1.	(c)	15.	(d)	29.	(a)	43.	(b)	57.	(c)
2.	(a)	16.	(a)	30.	(d)	44.	(d)	58.	(b)
3.	(c)	17.	(a)	31.	(a)	45.	(c)	59.	(d)
4.	(b)	18.	(b)	32.	(a)	46.	(b)	60.	(b)
5.	(b)	19.	(a)	33.	(b)	47.	(a)	61.	(d)
6.	(a)	20.	(d)	34.	(c)	48.	(c)	62.	(b)
7.	(b)	21.	(a)	35.	(a)	49.	(c)	63.	(d)
8.	(b)	22.	(c)	36.	(c)	50.	(b)	64.	(a)
9.	(d)	23.	(c)	37.	(c)	51.	(d)	65.	(a)
10.	(b)	24.	(d)	38.	(b)	52.	(b)	66.	(b)
11.	(a)	25.	(a)	39.	(b)	53.	(b)	67.	(a)
12.	(a)	26.	(d)	40.	(a)	54.	(c)	68.	(c)
13.	(b)	27.	(b)	41.	(c)	55.	(a)	69.	(b)
14.	(b)	28.	(b)	42.	(b)	56.	(b)	70.	(a)

Indian Railways

ORGANIZATION STRUCTURE



**Metro Railway, Kolkata.

#New Units

*Cheif Administrative Officer (Railways)

INTRODUCTION

- Considered as the lifeline of the nation the Indian Railways reflects the general state and mood of our country.
- Railways are the principal mode of transportation for freight and passengers in India.
- It conducts multifarious activities like business, sightseeing, pilgrimage along with transportation of goods over longer distances.
- Apart from an important means of transport the Indian Railways have been a great integrating force for more than 150 years.
- It binds the economic life of the country as well as accelerates the development of the industry and agriculture.
- The Indian Railways is an Indian state-owned enterprise, owned and operated by the Government of India through the Ministry of Railways.
- It is one of the world's largest railway networks comprising 115,000 km and 7,113 stations.

HISTORICAL DEVELOPMENT

The first proposals for railways in India were being debated in Great Britain in the 1840s and the people there started entering into lobbying in support of these proposals by banks, traders, shipping companies etc. The businessmen of England had a strong interest in seeing railways be formed in India. But they wanted the British Parliament to create a Guarantee System.

In the Guarantee System, any company that constructed railways in India was guaranteed a certain rate of interest on its capital investment. This guarantee was to be honoured by the East India Company which then controlled large parts of India. The railways which were made on this arrangement were called Guaranteed Railways. The guarantee was for a return of 5% annually, and the right for the railway company to pull out of the venture and get compensation from the government at any time. Thus Indian Railways started on a Guarantee System.

- On 27th Sept, 1825 the first rail engine ran from Darling to Stockton in England.
- In the year 1843, Lord Dalhousie first conceived the possibility of opening up of India by means of railway communication. He had proposed to link the three ports of Bombay, Calcutta and Madras by a railway.
- In May, 1845 or about 20 years after construction of first rail road in England, the East Indian Railway Co. was founded. The managing director of this company Mr. R. McDonald Stephenson can be considered the founder of the company. He was the first person to have introduced the idea of rail roads in India and vigorously advocated the construction of East Indian Lines from Howrah to Delhi via Mirzapore.
- After a visit to India in 1845 Stephenson made a proposal to the Court of Directors of East India Company for building a rail line from Calcutta to Burdwan. East India Co. considered this a "wild proposal". However, with Lord Dalhousie, the then Governor General of India, actively supporting the cause of the Railways for administrative reasons, the Court of Directors of East India Co. finally signed an agreement on 17th August,1849 with EIR for construction of a short experimental line. The main provision was that the company should be economically viable. On August 1, 1849, the Act to incorporate the Great Indian Peninsula Railway was initiated.
- Initially 2 companies were established to develop Railways in India:
  - East India Railway company (1845).
  - Great Indian Peninsular Railway Company (August 1, 1849).

- Another company The Madras Railway Company (MR) was formed provisionally in July 1852 to acquire lands in the "East Indies" and to construct and work a railway or railways in that territory.
- The first Indian Railway started during Lord Dalhousie's time that on April 16, 1853 at 3:35pm with 14 railway carriages and 400 guests left Bombay's Bori Bunder for Thane, with a 21-gun salute.
- The first train covered a distance of 34km between Mumbai and Thane. This train was run by the Great Indian Peninsula Company of Central Railway.
- The name of the first rail engine was 'Beauty.'
- The three locomotives were Sindh, Sultan, and Sahib. This 75 minutes journey was the first Journey of Indian Railway that embarked an era of development thereafter. But this was a passenger service.
- Prior to this there is a trace of Railway in India. In 1851, a steam loco, Thomason, was used for transporting construction material in Roorkee for the Solani viaduct, which was a part of the construction in the Salony Valley.
- The locomotive **Thomason** was assembled on the spot from parts transported from Calcutta. Second locomotive to arrive in India was **Falkland** (named for a governor of Bombay), used by the contractors of the GIPR for shunting operations on the first line out of Bombay that was being built.
- In 1854, second train ran between Hoogly and Howrah.
- Meter gauge started functioning in 1870.
- In the first stage, railway was run by private sector, since Indian British Government did not have fund.
- Lord Salisbury had issued three instructions regarding construction and expansion of Indian railways in the states.
- Guarantee system in railway started in 1882.

Chronological Development

1844: First proposals for the construction of Railways in India were submitted to East India Company by R.M. Stephenson, a Railway Engineer in British India.

1849: East India company undertakes a construction of a 160 km Railway line from Calcutta to Mirzapur.

1850: Contract undertaken by Indian Peninsular Railway for construction of a line from Bombay to Kalyan.

1853: First Railway line between Boribunder (Bombay VT) and Thane (32 km) opened.

1854: First train between Howra and Hoogly (39 km) was run.

1855-60: Following eight Railway companies were established in India.

1. Great Indian Peninsula Railway
2. The East Indian Railway
3. The Madras Railway
4. The Bombay-Baroda and Central India Railway
5. The Scindia Railway
6. The Eastern Bengal Railway
7. The South Indian Railway
8. The Calcutta and South Eastern Railway

1862: Assistance was given to Railways to construct feeder lines in Northern India

1866: Completion of line from Calcutta to Delhi. This included Son Bridge and Rail-cum-Road bridges over Yamuna in Naini and Delhi.

1867: Completion of Bombay-Bhusaval-Itarsi-Jabalpur route of the GIP Railway and connecting it to East India Railway at Naini.

1869-1881: Government took over construction of Railway lines and stopped giving any fresh contract to companies. Disastrous famines occurred during 1874-79 demanded rapid expansion of Railways.

1871: A selection committee of British Parliament was appointed to review the schemes of Railway construction.

1879: Total length of Railway line goes to 14920 km.

1880: The Famine Commission recommended construction of 8000 km of Railway lines in India to protect the country from famine.

1881: Lord Hardington, Secretary of State for India, formulated rules for construction of Railways. He divided Railways into 3 categories (i) productive (ii) unproductive and (iii) protective.

1881-97: New Contracts were given to the following new companies:

1. Bengal Central Railway
2. The Bengal North Western Railway
3. The Rohilkhand and Kumaon Railway
4. The Southern Mahratta Railway
5. The Indian Midland Railway
6. The Bengal Nagpur Railway
7. The Assam Bengal Railway Company
8. The Burma Railway Company

1890: Passing of the Indian Railways Act which came into force on 1st May 1890.

1900: Total length of Railway line goes to 39,603 km with capital outlay of 329 crores.

1901: Mr. Thomas Robertson was appointed to investigate into railway administration, organization and system.

1902: Setting up of Indian Railways Conference Association to frame or modify rules and regulations of interchange of traffic between Railways.

1905: A Railway Board was established with one President and two members under the Department of Commerce and Industries. Railways branch of the Public Works Department abolished.

1907: Mckay Committee was appointed to examine the financial problems of Railways.

1908: Railway Board was reorganized.

1914: Total length of Railway line goes to 56,456 km with capital outlay of 495 crores.

1914- 21: World War I period saw Railway fares increasing considerably. Some lines of strategic importance were constructed.

1920: "Indian Railway Enquiry Committee" was appointed under the chairmanship of Sir William Acworth to look into Railway policy, financial and administrative. The report of this Committee laid the foundation of the State management and State control of the Indian Railways.

1922: The Railway Board was reorganized.

1923: Nationalization of Railways started.

1924: As recommended by Railway Finance Committee, headed by Sir Malcolm Hailey, the Railway finances were separated from the General budget by a "Separation Convention".

1925: Government took over the management of East Indian and Great Indian Peninsula Railways. First Electric Traction was introduced from Bombay VT to Kurla and local train system from Bombay to Kurla started.

1929-30: Route Kilometrage gone up to 66,358 and capital investment gone up to 857 crores.

1930-31: Great Economic depression. Rs. 11 Crore was withdrawn from the Railway Reserve Fund for general revenues.

1937: Burma was separated from India due to which total railway Kilometrage was curtailed by 3200 km.

1939: Total Railway Kilometrage stands at 65850 km.

1939-47: World War II. Due to extensive usage of wagons for military movements very few were left out for private use.

1942: War Transport Board was created.

1943-44: Bengal famine period.

1947-48: Indian Railways suffered great loss during partition of India.

1949-50: Government acquired control over all Railways except a very few private companies. Prior to integration of princely states there were 21 Railways operated by Government of India and Princely States.

1950: Regrouping of Railways was done and 6 Railway zones were formed as follows.

Southern Railway HQ : Madras	Comprised of former South Indian Railway, the Madras and Southern Mehratta and Mysore State Railways.
Central Railway HQ : Bombay	Comprised GIP Railways three Princely State Railways viz, Nizam, Scindhia and Dholpur.
Western Railway HQ : Bombay	Comprised B.B. and C.I., Saurashtra, Rajasthan and Jaipur Railways.
Eastern Railway HQ : Calcutta	Comprised Bengal-Nagpur Railway and Sealdah, Howra, Assansol, Danapore and Dhanbad Divisions of E.I. Railways.
Northern Railway HQ : Delhi	Remaining parts of E.I.R., Eastern Punjab Railway, Jodhpur Railway, Bikaner Railway and Delhi-Rewari-Fazilka section of the Western Railway.
North-Eastern Railway HQ :Gorakhpur	Oudh-Tirhut Railway, the Assam Railway, Kanpur Achnera section of the Western Railway.

- Indian Railways was Nationalised in 1951.
- The country's first railway, built by the Great Indian Peninsula Railway.
- It is the biggest employer in the world and the largest single undertaking in the country.
- It has the second biggest electrified system in the world after Russia.
- Indian Railways is divided into 17 zones. Each zone is headed by a general manager.
- The first diesel engine in India ran in 1957.
- At present, diesel engines are manufactured in Varanasi.

Progress of Locomotives

- First locomotive factory was set up in Chittaranjan of West Bengal. This Industrial coach factory was based on the model of Switzerland.
- **1893:** First railway foundry was set up at Jamalpur (Bihar).
- **1895:** First locomotive was built with old pairs at Ajmer workshop.
- **1899:** Lady Curzon was first locomotive built in India, at Ajmer.
- January 26, 1950: Chittaranjan Locomotive Works (CLW) built first steam engine, Deshbandhu.
- **1952:** Tata Engineering and Locomotive Company (TELCO) begins production of BG locomotives.
- **1961:** CLW made the first 1500 DC electric locomotive Lokmanya

Electric Traction

- The name of first electric train was Deccan Queen, which ran between Pune and Mumbai.
- In 1929, it ran between Pune and Kalyan
- New name of this train is Royal Oriental Express
- Electric traction was introduced on Indian Railways in year 1925. The first electric train ran between Bombay's Victoria Terminus and Kurla along the Harbour Line of CR, on February 3, 1925, a distance of 9.5 miles, flagged off the then Governor of Bombay Sir Leslie Orme Wilson.
- In the year 1957, Indian Railways decided to adopt 25 kV 50 Hz AC traction based on French Railway (SNCF) technology.
- The first 25kV AC electrified section was Burdwan-Mughalsarai, completed in 1957, followed by the Tatanagar-Rourkela section on the Howrah-Bombay route.
- The first actual train run (apart from trial runs) using 25kV AC was on December 15, 1959 on the Kendposi-Rajkharswan section (SER).
- Howrah-Gaya was electrified by about 1960, electrification till Kanpur on

the Howrah-Delhi route was done by about 1972, and the entire Howrah-Delhi route was electrified on August 5, 1976.
- The Bombay-Delhi (WR) route was electrified by February 1, 1988. The CR route was fully electrified by June 1990.
- Considering the advantages of 2 x 25kV AC system , it was commissioned between Bina and Katni (CR) on January 16, 1995 as a pilot project. This was later extended to Bishrampur.

Rail Transport Public Undertakings

- Rail India Technical and Economic Services (RITES) Ltd.
- Indian Railway Construction (IRCON) Corporation Ltd.
- Container Corporation (CONCOR) of India Ltd.
- Indian Railway Finance Corporation (IRFC) Ltd.
- Konkan Railway Corporation (KRC) Ltd.
- Centre for railway Information Systems (CRIS).
- Mumbai Rail Vikas Corporation (MRVC).
- Railtel Corporation of India Ltd.
- Railway Vikas Nigam ltd. (RVNL).
- Indian Railway Welfare Organization (IRWO) (A society under the patronage of the Ministry of Railways).
- Delhi Metro Rail Corporation (DMRC).

The Railway Board (1905)

- The first Railway Board in India was appointed by Lord Curzon's government in 1905. It consisted by Government Railway official, who was the Chairman of the Board, a Railway Manager from England and an Agent of a Company Railway. The Board was placed under the Department of Commerce and Industry of the British Indian Government.
- Following Robertson's report, the Secretary of state for India sanctioned the formation of the board of a chairman and two members all of whom were Railway experts.
- Then the Railway Board was established in 1905. The Railway branches of the Public Work Department were abolished and the control was transferred to the Railway Board.
- Pursuant to the Acworth Committee's recommendations in 1921, the Railway Board was reconstituted with effect from 1 April 1924.
- The reconstituted board consisted of the Chief Commissioner, a Financial Commissioner and two Members, one responsible for Way and Works, Projects and Stores and the other for General Administration, Staff and Traffic subjects.
- In 1929, an additional post of a Member was created and he was placed in charge of Staff matters, so that the Member in charge of Traffic could concentrate fully in transportation and commercial matters. During this time, Frank D'Souza became the first Indian member of the board.
- The Railway Board, which is the apex body of the Indian Railways reports to the Minister of Railways. The Railway Board comprises one Chairman, five "members of the Railway Board", and a Financial Commissioner (who is the representative of the Ministry of Finance in the Railway Board). It also includes a Director-General (Railway Health Services) and a Director-General (Railway Protection Force). A number of directorates report to the Railway Board.
- The Ministry of Railways is housed inside Rail Bhavan in New Delhi.

Nationalization

- In 1951 the Indian Railways was nationalised as one unit. It became one of the largest networks in the world.
- There were as many 42 independent Railway systems big and small operated by the Government of

India and princely states. After the integration of the princely states, in 1951-52, the Railways were regrouped into the zones, starting with the southern zone on 14 April 1951 and ending with the Eastern zone on 14 April 1952.

- With seven new zones created during 2003 and 2004. Indian Railway is today divided into 17 zones.
- The seven new zones are North Western Railway (NWR), Eastern Central Railway (ECR), East Coast Railway (EC0R), North Coast Railway (NCR), South Eastern Central Railway (SECR), Western Coast Railway (WCR) and South Western Railway (SWR).

Zones & Divisions

The current 17 zones of the Indian Railways are:

Sl. No	Name of the Railway zone	Abbr.	Route length (in Km)	Zone Headquarters	Railway Divisions
1.	Northern Railway	NR	6968	Delhi	Delhi, Ambala, Firozpur, Lucknow NR, Moradabad
2.	North Eastern Railway	NER	3667	Gorakhpur	Izzatnagar, Lucknow NER, Varanasi
3.	Northeast Frontier Railway	NFR	3907	Guwahati	Alipurduar, Katihar, Rangiya, Lumding, Tinsukia
4.	Eastern Railway	ER	2414	Kolkata	Howrah, Sealdah, Asansol, Malda
5.	South Eastern Railway	SER	2631	Kolkata	Adra, Chakradharpur, Kharagpur, Ranchi
6.	South Central Railway	SCR	5803	Secunderabad	Secunderabad, Hyderabad, Vijayawada, Guntakal, Guntur, Nanded
7.	Southern Railway	SR	5098	Chennai	Chennai, Tiruchirappalli, Madurai, Palakkad, Salem, Thiruvananthapuram
8.	Central Railway	CR	3905	Mumbai	Mumbai, Bhusawal, Pune, Solapur, Nagpur
9.	Western Railway	WR	6182	Mumbai	Mumbai WR, Ratlam, Ahmedabad, Rajkot, Bhavnagar, Vadodara
10.	South Western Railway	SWR	3177	Hubballi	Hubballi, Bengaluru, Mysuru,
11.	North Western Railway	NWR	5459	Jaipur	Jaipur, [Ajmer, Bikaner, Jodhpur
12.	West Central Railway	WCR	2965	Jabalpur	Jabalpur,[49] Bhopal,[50] Kota [51]
13.	North Central Railway	NCR	3151	Allahabad	Allahabad, Agra, Jhansi

14.	South East Central Railway	SECR	2447	Bilaspur	Bilaspur, Raipur, Nagpur SEC
15.	East Coast Railway	ECoR	2572	Bhubaneswar	Khurda Road, Sambalpur, Waltair
16.	East Central Railway	ECR	3628	Hajipur	Danapur, Dhanbad, Mughalsarai, Samastipur, Sonpur
17.	Konkan Railway[66]	KR	741	CBD Belapur, Navi Mumbai	Karwar, Ratnagiri

Track Gauge

- The total track length used by Indian Railways is 115,000 km (71,000 mi) while the total route length of the network is 66,030 km (41,030 mi) in 2015.
- India is the only country in the world which has rails of different breadths.
- There are four types of width of rail lines:
  (a) Broad gauge : 5ft. 6 inch. ___ 1.676 metre
  (b) Metre gauge : 3ft. 3 inch ___ 1 metre
  (c) Narrow gauge : 2ft. 6 inch ___ 0.762 metre
  (d) Special gauge : 2ft 31 inch ___ 0.61 metre
- Urban rail transit lines which serve the urban areas are being built in standard gauge. These encompass metro, monorail and trams. These lines are not owned by Indian Railways.

Luxury Train Routes

Name	Run by	Route
Palace on Wheels	Rajasthan Tourism	Delhi-Jaipur-Sawai-Madhopur-Chittorgarh-Udaipur-Jaisalmer-Jodhpur-Bharatpur-Agra-Delhi
Deccan Odyssey	Maharashtra Tourism	New Delhi – Sawai Madhopur – Agra – Jaipur – Udaipur – Vadodara – Ellora Caves – Mumbai
The Golden Chariot	Karnataka Tourism	Bengaluru, Kabini, Mysore-Belur – Halebidu – Hampi – **Badami –Goa – Bengaluru**
Royal Rajasthan	Rajasthan Tourism	Delhi – Jaipur – Jaisalmer – Jodhpur –Sawai – on Wheels Madhopur – Chittorgarh – Udaipur – Bharatpur – Agra – Delhi

Main Railway Factories

(a) Integral Coach Factory : Perembur
(b) Rail Coach Factory : Kapurthala
(c) Wheel and Axle Plant : Bangalore
(d) Diesel Component Works : Patiala
(e) Diesel Locomotive : Varanasi
(f) Chittaranjan Locomotive Works : Chittaranjan

IMPORTANT FACTS

- Biggest yard of India: Mugalsarai, Uttar Pradesh.
- Biggest railway crossing of India: Itarsi, Madhya Pradesh.
- Biggest railway station of India: Kharagpur.
- Longest railway River Bridge: Vembanad Rail Bridge, Kerala, 4.62 km.

- Railway station in maximum height: Ghum 2,258 m (7,407 ft) – Darjeeling, Himalayan Railway.
- First rail museum in India: New Delhi.
- First computerised railway reservation in India: New Delhi.
- First rail-bus service in India: Meratapur, Rajasthan.
- First rail minister of India: Asaf Ali.
- First women rail driver of India: Mumtaz Kathwala.
- Beginning of AC coaches in India: 1936
- First railway postal service in India: 1907.
- The longest distance train in India: Dibrugarh - Kanyakumari Vivek Express.
- Beginning of Insurance in railway: 1st April, 1994, with the name 'Train passenger insurance scheme, by United India Insurance Company.
- Father of Indian Railway – Lord Dalhousie.
- Fastest train – The Bhopal Shatabdi Express,1988,between Agra and New Delhi.
- Slowest train in India- Nilgri Express, between Chennai and Mettupalayam
- First electric train – Deccan Queen, 1931, connects Mumbai with Pune .
- First double-decker train – Shatabdi train was flagged off in October 2011.
- First air-conditioned double-decker train – Shatabdi train from Mumbai to Goa.
- First underground railway (Metro Railway) – Kolkata Metro(1984).
- Largest Zone in Indian Railways – Northern Railway.
- A platform surrounded by rail lines from all the four sides – Island platform
- First railway station – Chhatrapati Shivaji Terminus railway station in Mumbai.
- Longest railway platform –Gorakhpur railway station, Uttar Pradesh.
- First broad gauge super fast train – Rajdhani express, New Delhi, Howrah 1st March, 1969.
- First metre gauge super fast train – pink city express New Delhi Jaipur 17th Oct, 1981.
- First narrow gauge super fast train – Shivalik Deluxe Express Kalka – Shimla 9th Aug, 1996.
- First time table 1853 Central India
- First stamp on Indian railways 4 annas 10th December, 1936 by King George.
- First automatic signalling system 1928
- First railway tunnel of Indian railway -Parsik tunnel.
- Division that has maximum number of tunnels – Kalka Simla division of Northern Railway (103 tunnels).
- Last railway station of Northern Railway and Indian Railway – Bajalta.
- Indian state has maximum rail routes – Uttar Pradesh, Himsagar Express passes through – 11 States(Jammu and Kashmir, Punjab, Haryana, Delhi, Uttar Pradesh, Rajasthan, Madhya Pradesh, Andhra Pradesh, Tamilnadu, Karnataka and Kerala).
- First female operator in Delhi Metro – Minakshi Sharma.
- First female to become the member of Railway Board – Vijaylaxmi Vishwanathan.
- Longest platform situated – Khadagpur (West Bengal).
- Train only for women run – From Churchgate to Boriwali in Mumbai.
- Metro Rail in Calcutta – 1984.
- Railway week celebrated on 10–16 April.
- 21 Railway Recruitment Boards are there in India.
- First tourist rail – Palace on wheels in 1982 between Delhi–Jaipur.
- First monorail operate in India – From Sarhind to Alampur and Bhawani mandi to Patiala.
- India's first indigenous steam engine – F–734.
- First telecommunication between guard and driver – Mumbai–New Delhi (Rajdhani Express).

- First Rajdhani Express ran between New Delhi–Howrah , 1969.
- First DC electrical rail engine – Lokmanya (CLW manufactured it in 1961).
- Southern Eastern Railway is known as 'Blue chip'.
- Metroman – **Shridharan** (Ex. Delhi Metro Rail Engineer).
- First **Duranto Express** ran between Sialdah and New Delhi 18 September, 2009.
- First railway factory established in Jamalpur, 1890.
- Train runs between India and Pakistan – **Samjhauta Express**, Thar Express.
- Railway zone launched first Railway Time Table -Central Railway.
- State with minimum rail routes – Manipur.
- First blind friendly train, from Mysuru to Varanasi – Train no. 16226/ 16230.

LIST OF RAILWAY RECRUITMENT BOARDS

Indian Railway body is classified in 4 groups i.e. Group A, Group B, Group C and Group D. There are whole 21 Railway Recruitment Board (RRBs) in Indian Railways providing a perfect career and release recruitment notification many times in a year.

RRB Boards Name	Official Website	Address
RRB Ahmedabad	www.rrbahmedabad.gov.in	1st Floor, Meter Gauge Building, Railway Station, Kalupur, Ahmadabad – 380 002, Gujarat
RRB Ajmer	www.rrbajmer.org	Nehru Marg, Near Ambedkar Circle, Ajmer – 305001, Rajasthan
RRB Allahabad	www.rrbald.gov.in	Opposite to G.M./NCR Building, Near Subedarganj Railway Hospital, Subedarganj, Allahabad – 211 033, Uttar Pradesh
RRB Bangalore	www.rrbbnc.gov.in	18, Millers Road, Bangalore – 560046, Karnataka
RRB Bhopal	www.rrbbhopal.gov.in	East Railway Colony, [Near Bhopal Railway Station], Bhopal – 462010, Madhya Pradesh
RRB Bhubaneswar	www.rrbbbs.gov.in	D-79/80, Rail Vihar , B.D.A. Rental Colony, Chandrasekharpur, Bhubaneswar -751023, Orissa
RRB Bilaspur	www.rrbbilaspur.gov.in	General Manager/SECR's Office Complex Bilaspur (C.G) Pin: 495 004, Chhattisgarh
RRB Chandigarh	www.rrbcdg.gov.in	SCO 34, IInd Floor, Madhya Marg, Sector – 7-C, Chandigarh, Punjab
RRB Chennai	www.rrbchennai.net	5, Dr. P.V. Cherian Crescent Road, Edmore, Chennai – 600 008, Tamil Nadu
RRB Gorakhpur	www.rrbgkp.gov.in	Railway Station Road, Gorakhpur – 273012, Uttar Pradesh
RRB Guwahati	www.rrbguwahati.gov.in	Station Road, Guwahati, Assam

RRB Jammu Srinagar	www.rrbjammu.nic.in	Railway Colony (West), Jammu-180012
RRB Kolkata	www.rrbkolkata.org	Metro Railway A.V. Complex, Chitpur, Opp. To R. G. Kar Medical College & Hospital, R. G. Kar Road, Kolkata-700 037, West Bengal
RRB Malda	www.rrbmalda.gov.in	Kalibari Railway Colony, P.O Jhaljhalia, Malda – 732102, West Bengal
RRB Mumbai	www.rrbmumbai.gov.in	Railway Divisional office compound, Mumbai Central, (E), Mumbai – 400 202, Maharashtra
RRB Patna	www.rrbpatna.gov.in	Mahendrughat, Patna – 800 004, Bihar
RRB Ranchi	www.rrbranchi.org	Railway Offices Complex, Chutia, Ranchi-834027, Jharkhand
RRB Secunderabad	www.rrbsecunderabad.nic.in	South Lallaguda, Secunderabad–500017, Andhra Pradesh
RRB Silliguri	www.rrbsiliguri.org	Subhashpally, Siliguri, District-Darjeeling-734001, West Bengal
RRB Thiruvananthapuram	www.rrbthiruvananthapuram.net	Thampanoor, Thiruvananthapuram – 695 001, Kerala
RRB Muzaffarpur	www.rrbmuzaffarpur.bih.nic.in	Lichi Bagan, Maripur, Muzaffarpur-842001, Bihar

ROLE OF RAILWAY

Indian Railways & Socio-Economic Development

Indian Railways is one of the largest systems in the world. It is also one of the very few railway systems in the world generating operating surpluses. With a modest beginning in India the Indian Railways has emerged today as the main vehicle for socio-economic development of the country.

Rail transportation has a number of favourable characteristics as compared to road transportation. It is six times more energy-efficient than road and four times more economical. The social costs in terms of environment damage or degradation are significantly lower in rail. Rail construction costs are approximately six times lower than road for comparable levels of traffic. It is the only major transport mode capable of using any form of primary energy.

Contributing to Modern Market Economy

Since its inception, the Indian Railways has served to integrate the fragmented markets and thereby, stimulating the emergence of a modern market economy. It connects industrial production centres with markets and with sources of raw materials and facilitates industrial development and link agricultural production centres with distant markets. It provides rapid, reliable and cost-effective bulk transportation to the energy sector, to move coal from the coal fields to power plants and petroleum products from refineries to consumption centres. It links places, enabling large-scale, rapid movement of general and business people across the length and breadth of the country. In the process, the Indian Railways has become a symbol of national integration and a strategic instrument for

enhancing our defence preparedness.

The Indian Railways contributes to India's economic development, accounting for about one per cent of the GNP and the backbone of freight needs of the core sector. It accounts for six per cent of the total employment in the organised sector directly and an additional 2.5 per cent indirectly through its dependent organisations.

The debate on the transport sector in India has not focused adequately on the rail sector despite its many economic and environmental advantages. It is high time that Railways' role as a major infrastructure service provider is reinforced. Constructive support from the Government and the pro-active and market-oriented response to the challenges of an open economy will set the tone for the renaissance of the Indian Railways as we march towards the new millennium.

Social Contribution

It has invested significantly in health, education, housing and sanitation. With its vast network of schools and investment in training, the Indian Railways plays an important role in human resource development. The Indian Railways, with nearly 63,000 route kilometres fulfils the country's transport needs, particularly, in respect of long-distance passenger and goods traffic. Freight trains carry nearly 1.2 million tonnes of originating goods and 7,500 passenger trains carry nearly 12 million passengers every day.

RAILWAYS INITIATIVES

Tri-Netra

Indian Railways will soon introduce Tri-Netra (terrain imaging for diesel drivers infrared, enhanced optical and radar assisted) system on its trains to reduce train accidents. Tri-Netra is an advance system is made up of a high-resolution optical video camera, high-sensitivity infrared video camera and a radar-based terrain mapping system. These three components will act as three eyes (Tri-Netra) of the Locomotive Pilot. The Tri-Netra system uses infrared and radar technology to collect signals up to a distance of 2-3 km and displays the information on a screen fitted inside the locomotive. Tri-Netra will help reduce train accidents by keeping a record of the track maintenance and will also provide better visibility during foggy days.

Key Features of Tri-NETRA system:

The device uses infrared and radar technology to collect signals up to a distance of 2-3 km and displays the information (composite video image) on a screen fitted inside the locomotive. The Tri-Netra will alert the drivers of any physical obstruction on railway tracks ahead and thus give ample time for the driver to apply the brakes to prevent train accidents. It will be very useful during fog, heavy rain and nights, when drivers have to constantly look outside the locomotive to judge the condition.

Three components of the system are:

It is made of high sensitivity infra-red video camera, high-resolution optical video camera and a radar-based terrain mapping system. These three components shall act as three eyes (Tri-Netra) of the Locomotive Pilot.

The concept of **TRI-NETRA** was developed by Development Cell under the guidance of Member Mechanical, Railway Board. Specifications and design of critical components of the system will be approved by the Research Designs & Standards Organisation, the railways research arm. TRI-NETRA system is based on technology employed by fighter aircrafts to see through clouds and operate in pitch darkness. It is also based

technology used by naval ships in mapping the ocean floor and navigating in the night.

Biotoilets

The Union Ministry of Railways has taken up a mammoth task of equipping human discharge free bio-toilets in all its coaches by 2021-22 in order to contribute to mission 'Swachh Bharat Abhiyan'. The environment-friendly bio-toilets for passenger coaches were developed jointly by Indian Railways and Defence Research and Development Organisation (DRDO). In the bio-toilet fitted coaches, human waste is collected in biodigester tanks below the toilets and is decomposed by a consortium of anaerobic bacteria. By the process of hydrolysis, acetogenesis, acidogenesis and methanogenesis, the anaerobic bacteria converts human faecal matter into water and small amount of gases (including methane).

Yatri Mitra

Indian Railways has launched 'Yatri Mitra Sewa' in a move to make rail travel comfortable for elderly, differently-abled and ailing travellers. The 'Yatri Mitra Sewa' will facilitate access to wheelchairs, battery operated cars and porter services elderly, differently-abled and ailing travellers. 'Passenger Friend' or 'Yatri Mitra' can be assistant (Sahayak) or any other person nominated for the purpose. The service will be available at major railway stations across the country. The service can be availed at the time of online booking of tickets, calling or messaging '139', accessing an app developed by the Centre for Railway Information Systems (CRIS).

Janani Sewa for Mothers

Under this scheme hot milk, hot water and baby food will be available at railway stations. Initially on pilot basis this scheme will be available at 25 railway stations including New Delhi, Howrah, Mumbai, Chennai, Surat and Lucknow.

Idea of CCTV installation in Indian Railways

A plan to set up 35,000 CCTV cameras that scan every corner of 1,000 railway stations across the country is the Centre Government's latest bid to make woman passengers feel safer. This would be the biggest surveillance system installation by Indian Railways ever.

Railways plans to install at least 35 CCTV cameras in each station and link the feeds to a server at its divisional headquarters. This feed will be preserved for 30 days. Eventually, all servers might be enabled to converge at one place for a more central monitoring, if needed.

Railways has drawn up a list of 1,000 stations (981 to begin with) and has instructed zonal authorities on how much money they would be allowed to spend on the project this year.

Railways plans to install at least 35 CCTV cameras in each station and link the feeds to a server at its divisional headquarters. This feed will be preserved for 30 days. Eventually, all servers might be enabled to converge at one place for a more central monitoring, if needed.

Trainman and Ola Team up to Boost Mobility for Indian Railway Travelers

Trainman, the online platform that caters to Indian Railway travellers by assisting them with extensive train related information and intelligence, has partnered with Ola.

The tie-up enables Trainman consumers to book Ola rides while travelling to and from railway stations or anywhere in the city.

The service will be made available to users of the Trainman android app across India where Ola is currently operational.

With this integration, Trainman users across cities will now be able to book an Ola cab across categories such as Micro,

Mini, Prime and Lux directly from the Trainman app.

A special Ola icon has been integrated on the home menu of the Trainman mobile app. Users can click on the icon and request for the nearest available Ola cab.

Other than seeing the nearest available cabs, they will also get the details of estimated fare and the expected time of Arrival (ETA) for the cab.

Real-time tracking will also be available for users booking an Ola cab through the Trainman app.

FACTORS AFFECTING RAILWAYS

The pattern of Indian railway network has been influenced by geographical, economic and political factors.

1. *Geographical Factors*

The North Indian plain with its level land, high density of population and rich agriculture presents the most favourable conditions for the development of railways. However, the presence of large number of rivers makes it necessary to construct bridges which involve heavy expenditure. There are practically no railways in the flood plains of many rivers in Bihar and Assam. The plateau region of south India is not as much suitable for railways as the North Plain area. The Himalayan region in the north is almost entirely devoid of railways due to its rugged topography.

Some railway terminals such as Jammu Tawi, Kotdwar, Dehra Dun, Kathgodam, etc. are found on the foothills. Some narrow gauge railway tracks are found in the Himalayan region. A railway link between Jammu and Kashmir valley is being planned at a very high cost. The sandy areas of Rajasthan are also not much favourable for railways.

There was no railway line between Jodhpur and Jaisalmer till 1966. Similarly, forested areas of Madhya Pradesh and Orissa, deltaic swamps of West Bengal, marshy areas of Rann of Kachchh and hilly tract of Sahyadri are also unfavourable for the development of railways.

Sahyadri can only be crossed through gaps like Thalghat, Bhorghat and Palghat to reach coastal trail heads like Mumbai, Vasco-de-Gama, Mangalore and Kochi. Obviously, the railways tend to follow the path of least resistance.

2. Economic Factors

Railways develop more in the economically advanced areas where the need for railway network is felt more. Conversely, railways bring economic prosperity to the areas through which they pass. This is because of the economic linkages that we find the highest density of railways near big urban and industrial centres and in areas which are rich in mineral and agricultural resources.

3. Political and Administrative Factors

The present railway system in India is the legacy of the British rule. The British administration planned the direction and pattern of the railway lines in such a way that they could exploit the valuable raw materials of India for the benefit of their industries and flood the Indian markets with the finished goods from Britain.

Besides, the Britishers wanted to maintain their military supremacy, for which quick movement of troops and arms was necessary and construction of railways became unavoidable. Thus, top priority was given to the big ports of Mumbai, Kolkata and Chennai. These ports were connected with their hinterlands by railway lines to facilitate imports and exports. It is from the ports that the railway network spread to the other parts of the country.

QUALITATIVE IMPROVEMENTS

In addition to the quantitative expansion, Indian railways have an impressive record of qualitative improvements. The major areas of qualitative improvement during the recent years are gauge conversion, rolling stock, track electrification, automatic signalling, introduction of fast trams and amenities and facilities for rail users.

Gauge Conversion

'Gauge' is the name given to the distance between the inner faces of the pair of rails in the track. The Britishers constructed broad gauge railways on trunk routes connecting the port cities of Mumbai, Kolkata and Chennai and some other major cities. In areas lying beyond the frame work of trunk routes, only metre gauge lines were constructed. Thus, the area lying north of the Ghagra-Ganga alignment, whole of Rajasthan and Gujarat as well as large parts of the peninsular India were covered by metre gauge.

Different gauges create serious hindrance in the smooth flow of traffic. Passengers have to change trains at the break of gauge station and are put to great inconvenience. Goods have to be transhipped which results in loss of time, increased cost of transportation, pilferage and damage to consignments. The Government of India has, therefore, adopted a policy of gauge conversion, mainly from metre gauge to broad gauge.

The unigauge system of railways assures larger capacity, higher speed and cheaper transportation. The process of gauge conversion was initiated immediately after Independence but significant achievement has been recorded in recent years.

Rolling Stock

A perceptible improvement in rolling stock, both locomotives and coaches, has been noticed. Upto 1950s and 1960s most of the trains were run by steam engines using coal as the source of energy. These engines had less traction power and caused environmental pollution by emitting smoke.

An urgent need was felt to replace these engines by diesel and electric locomotives which are more powerful and their operation is more economical. On the Indian railways, introduction of diesel traction on a single line route can increase the capacity by 30 to 45 per cent and electrification by nearly 100 per cent.

Moreover, diesel engines cause less environmental pollution as compared to coal engines, and electric engines do not cause any pollution. Therefore, the steam engines have been phased out and their production has been stopped in India. In 1960-61, there were as many as 10,312 steam locomotives against only 181 diesel and 131 electric locomotives. The number of steam engines decreased gradually for two decades upto 1980-81 but their number fell drastically to 2,915 in 1990-91. By 2002-03 only 52 steam engines were left with the Indian Railways. On the other hand, the number of diesel locomotives increased from a miserable 17 in 1950-51 to gigantic number of 4,699 in 2002-03.

The corresponding figures for electric vehicles were 72 and 2,930 for these years. The percentage of steam, diesel and electric locomotives to the total number of locomotives in 1950-51 was 98.92, 0.21 and 0.87 respectively which showed a complete reversal of 0.68, 61.18 and 38.14 per cent in 2002-03.

This trend is likely to continue till all the steam engines are completely taken off the rails. Further, production of 5000 HP electric locomotives and fuel efficient diesel locomotives has also commenced at Chittaranjan Locomotive Works and Diesel Locomotive Works at Varanasi respectively. Coaching vehicles and

wagons have also been improved to make the transportation of passengers and goods more comfortable and economical. Cushioned seats, toilets, pantry cars, etc. are provided in almost all the important trains.

Earlier, many of such facilities were conspicuous by their absence. Till the beginning of the 20th century, third class passengers were almost uncared for, although they formed 97 per cent of the coaching receipts. Third class travel has now been replaced by second class travel. A.C. 3-Tier coach has been introduced to make AC travel cheaper and comfortable.

Track Electrification

As mentioned earlier, use of electric locomotives increases the capacity by as much as 100 per cent. But the use of electric locomotives is possible only if the railway tracks are electrified. Track electrification is a major thrust area by virtue of which efficiency of the railways can be increased considerably. Track electrification was introduced in early 1920s and the first two sections from Victoria Terminus to Kurla and from Victoria Terminus to Bandra, totalling 16 route km were electrified in 1925. Thus the Indian railways entered the push button era. In the first four decades from'1920-21 to 1960-61, the process of track electrification was rather slow and the length of electrified track stood at 388 km in 1950-51 and 748 km in 1960-61.

After that the electrification of railway tracks picked up and the length of electrified track increased to 3,706 km in 1970-71 to 16,272 km in 2002-03.

The percentage of electrified track increased from a meagre 1.33 in 1960-61 to 25 78 in 2002-03.

Green Train Corridors

The Union Ministry of Railways has declared the Okha-Kanalus and the Porbandar-Wansjaliya railway sections of Gujarat as Green Train Corridors. All trains passing on these 175-km long lines (141-km-long Okha-Kanalus route and the 34-km-long Porbandar-Wansjaliya route) are now equipped with bio-toilets. On these routes, about 29 trains consisting of nearly 700 coaches have been equipped with bio-toilets to prevent open discharge free zone on tracks as part of the Swachh Bharat Mission.

Green Train Corridors are sections of the railways which will be free of human waste discharge on the tracks. Trains running on these corridors will be equipped with bio-toilets. Thus, it will completely stop discharge of human waste from trains onto the ground which in turn would help in improving cleanliness and hygiene. The 114-km long Rameswaram-Manamadurai section of Tamil Nadu was made the India's first Green Rail Corridor in July 2016 .

The Union Ministry of Railways has taken up a mammoth task of equipping human discharge free bio-toilets in all its coaches by 2021-22 in order to contribute to mission 'Swachh Bharat Abhiyan'. It aims at completely stopping discharge of human waste from trains onto the ground to improve cleanliness and hygiene.

The environment-friendly bio-toilets for passenger coaches were developed jointly by Indian Railways and Defence Research and Development Organisation (DRDO). In the bio-toilet fitted coaches, human waste is collected in biodigester tanks below the toilets and is decomposed by a consortium of anaerobic bacteria. By the process of hydrolysis, acetogenesis, acidogenesis and methanogenesis, the anaerobic bacteria converts human faecal matter into water and small amount of gases (including methane).

Other improvements

Automatic signals have been introduced on the trunk routes. For heavy traffic track structure has been strengthened

by providing heavier and stronger rails and concrete sleepers. For fast and comfortable journey several new trains including Rajdhani and Shatabdi trains have been introduced. Public amenities at the railway stations have been diversified and improved.

Indian Railways is also helping Indian economy in many ways like by providing fast and reliable transport medium for various needy articles across the country. These include Rice, Wheat, Cereals and Vegetable oils etc. Indian Railways is also transporting various petroleum products like Petrol, Diesel, Cooking Gas, Natural Gas, Kerosene etc.

The various types of railways running within our country are:

1. **Gatiman Express:** It is the fastest train introduced in India in April 2016 with a speed of 160 km per hour between Delhi Nizamuddin to Agra Cantt. It covers 200 km in 100 minutes.
2. **Duronto Express:** Duronto Express, the non-stop trains which eventually running faster than Rajdhani Express between state capitals & major cities.
3. **Rajdhani Express:** The Rajdhani Express, the full AC train which connects all major cities to our capital New Delhi. It is running at over 150 km per hour.
4. **Shatabdi and Jan Shatabdi Express:** These are only chair car trains which connect inter cities in the neighbouring states.
5. **Garib Rath Express:** These are trains which has AC 3 tier facilities at the lower cost in compare to different train in the same class.
6. **Superfast Express:** These trains are running more over 55 km per hour and have few stops in their travelling routes.
7. **Express and Mail Train:** These are common kinds of trains which have more stops than Express trains in India but have lower fare than it.
8. **Fast Passenger and Passenger Train:** These common trains have lowest fares and have sitting, sleeper class facilities. These trains stop at almost every station.
9. **Suburban Trains:** The Suburban trains are running in the major cities in India like Kolkata, Mumbai, Delhi, Chennai etc. These trains have only sitting facilities and fare starts at only ₹5.00. The Mumbai Suburban trains have 1st Class facilities.

SIGNIFICANCE OF INDIAN RAILWAYS

1. Railways provide the cheapest and most convenient mode of passenger transport both for long distance and suburban traffic.
2. Railways have played a significant role in development and growth of industries. Growth of textile industry in Mumbai, jute industry in areas surrounding Kolkata, coal industry in Jharkhand, etc is largely due to the development of railway network in these areas.
3. Agriculture also owes its growth to railways to a great extent. Now farmers can sell their agricultural produce to distant places and even sell them in the world market at remunerative prices.
4. Railways are also helpful in removing isolation between cities and countryside and have played a significant role in disseminating innovations and new ideas.
5. Railways are particularly suited to long distance journey and provide a strong medium of national integration.
6. Railways play a vital role in mitigating the sufferings of the people in the event of natural calamities like droughts, floods, famines, earthquakes, etc. This is done by carrying relief and rescue

teams and essential items to the affected areas and save people from sufferings and starvation.

7. Railways also help in facing man-made calamities like social, political, religious disturbances, insurgency, etc. It facilitates easy movement of police, troops, defence equipment, etc. The importance of railways to save the country's freedom and integrity from external aggression has been proved at several occasions.
8. Railways carry the British legacy and connect major ports to their hinterlands, thereby lending a helping hand to the overall prosperity of the coastal areas.
9. Introduction of superfast trains and container services in major cities of India have ensured quick movement of men and material.
10. Railways are specially suited to long haulage of bulky materials like coal, petroleum and ores.

PROBLEMS OF INDIAN RAILWAYS:

Although Indian Railways have progressed a lot, both quantitatively and qualitatively, during the last few years, this system is still plagued by a number of problems which require immediate attention.

A lot has been done, but a lot more is yet to be done. Some of the major problems faced by the Indian Railways are briefly discussed as under:

1. Safety

Indian Railways have been in the news albeit for wrong reasons. With the rapid increase in passenger and goods traffic, the frequency of train accidents is increasing very fast. This has raised serious doubts in the public mind about safety of Rail travel and the general health of the railway network

According to the Khanna Railways Safety Review Committee Report, nearly 25 per cent of the total railway track in India is overaged and is due for replacement.

2. Cost and Revenue Problems

As is the case with most of the government organisations, Indian Railways face chronic financial crisis. The annual rate of increase in cost has overtaken that of revenues during the last few years.

Following are the main causes of costs and revenue problems.

(i) Low level of employee productivity

Indian Railways face a serious problem of low level of employee productivity. Transport output in terms of passengers and freight tonne kilometres per employee on Indian Railways is only 400 as compared to 500 for Chinese and 570 for French Railways.

(ii) Staff Wages

With the implementation of the recommendations of the Seventh Pay Commission, staff wages have increased tremendously and have put heavy strain on the financial resources of the Railways. With life expectancy going up and wage escalations taking place periodically, the position will only worsen leaving little scope for development plans.

(iii) Increase in lease charges

Paucity of funds forces the Indian Railways to resort to market borrowings which results in increased lease charges. Market borrowings started in 1986 and the trend is increasing. At present payout of lease charges constitute about 8.5 per cent of the revenue.

3. Slowdown in Revenue Growth

With saturation of trunk routes and low quality of services and reliability, the revenue growth has registered a slowdown. The railways are increasingly becoming a transporter of bulk commodities for public sector (coal, iron

ore, food-grains, etc.) and are consistently losing to roadways. Most of the national highways run parallel to railways and are consistently snatching revenues from the railways

4. Social Burden

Indian Railways have to play a dual role of revenue earning as well as meeting the social obligations. On one hand, the Railways are seen as a commercial organisation and on the other hand, it is treated as a social organisation which must perform its social obligations.

The two functions are diametrically opposite and difficult to reconcile. There are several social obligations on the railways which are always running below cost. Suburban passenger services, concessionary travel to certain section of travellers, concessional freight movement of certain commodities, particularly to remote and inaccessible areas like the North-east region, providing rail services to backward regions are some of the outstanding social obligations on the Indian Railways.

5. Other Problems

A large number of miscellaneous problems include late running of trains, lack of passenger facilities including cleanliness at the railway stations, lack of security arrangement on the railways resulting in theft and dacoities, etc. Political pressure and interference is a very big problem which the Indian Railways are facing with increasing impact. Several projects which are not economically viable have been initiated for political considerations.

PEOPLE TO REMEMBER

Minister of Railways: Suresh Prabhu (since 10 November, 2014 present)
Chairmen Railway Board A.K.Mitta (31-12-2014—present)

List of Railway Ministers

S. No	Name	From	To	Political Party
1	Suresh Prabhu	Nov 10, 2014	Incumbent	Bharatiya Janata Party
2	D. V. Sadananda Gowda	May 27, 2014	Nov 10, 2014	Bharatiya Janata Party
3	Mallikarjun Kharge	Jun 17, 2013	May 25, 2014	Indian National Congress
4	C. P. Joshi	May 11, 2013	Jun 16, 2013	Indian National Congress
5	Pawan Kumar Bansal	Oct 28, 2012	May 10, 2013	Indian National Congress
6	C. P. Joshi	Sep 22, 2012	Oct 28, 2012	Indian National Congress
7	Mukul Roy	Mar 20, 2012	Sep 21, 2012	Trinamool Congress
8	Dinesh Trivedi	Jul 12, 2011	Mar 14, 2012	Trinamool Congress
9	Mamata Banerjee	May 26, 2009	May 19, 2011	Trinamool Congress
10	Lalu Prasad Yadav	May 23, 2004	May 25, 2009	Rashtriya Janata Dal
11	Nitish Kumar	Mar 20, 2001	May 22, 2004	Janata Dal (United)
12	Mamata Banerjee	Oct 13, 1999	Mar 15, 2001	Trinamool Congress
13	Ram Naik	Aug 6, 1999	Oct 12, 1999	Bharatiya Janata Party
14	Nitish Kumar	Mar 19, 1998	Aug 5, 1999	Samata Party
15	Ram Vilas Paswan	Jun 1, 1996	Mar 19, 1998	Janata Dal
16	Jaffer Sharief	Jun 21, 1991	Oct 16, 1995	Indian National Congress
17	Janeshwar Mishra	Nov 21, 1990	Jun 21, 1991	Samajwadi Janata Party

18	George Fernandes	Dec 5, 1989	Nov 10, 1990	Janata Dal
19	Madhavrao Scindia	Oct 22, 1986	Dec 1, 1989	Indian National Congress
20	Mohsina Kidwai	Jun 24, 1986	Oct 21, 1986	Indian National Congress
21	Bansi Lal	Dec 31, 1984	Jun 4, 1986	Indian National Congress
22	A. B. A. Ghani Khan Choudhury	Sep 2, 1982	Dec 31, 1984	Indian National Congress
23	Prakash Chandra Sethi	Jan 15, 1982	Sep 2, 1982	Indian National Congress
24	Kedar Pandey	Nov 12, 1980	Jan 14, 1982	Indian National Congress
25	Kamalapati Tripathi	Jan 14, 1980	Nov 12, 1980	Indian National Congress
26	T. A. Pai	Jul 30, 1979	Jan 13, 1980	Janata Party (Secular)
27	Madhu Dandavate	Mar 26, 1977	Jul 28, 1979	Janata Party
28	Kamalapati Tripathi	Feb 11, 1975	Mar 23, 1977	Indian National Congress
29	Lalit Narayan Mishra	Feb 5, 1973	Jan 2, 1975	Indian National Congress
30	T. A. Pai	Jul 23, 1972	Feb 4, 1973	Indian National Congress
31	K. Hanumanthaiya	Mar 18, 1971	Jul 22, 1972	Indian National Congress
32	Gulzarilal Nanda	Feb 18, 1970	Mar 17, 1971	Indian National Congress
33	Panampilli Govinda Menon	Nov 4, 1969	Feb 18, 1970	Indian National Congress
34	Ram Subhag Singh	Feb 14, 1969	Nov 4, 1969	Indian National Congress
35	C. M. Poonacha	Mar 13, 1967	Feb 14, 1969	Indian National Congress
36	S. K. Patil	Jun 9, 1964	Mar 12, 1967	Indian National Congress
37	H. C. Dasappa	Sep 21, 1963	Jun 8, 1964	Indian National Congress
38	Swaran Singh	Apr 10, 1962	Sep 21, 1963	Indian National Congress
39	Jagjivan Ram	Dec 7, 1956	Apr 10, 1962	Indian National Congress
40	Lal Bahadur Shastri	May 13, 1952	Dec 7, 1956	Indian National Congress
41	N. Gopalaswami Ayyangar	Sep 22, 1948	May 13, 1952	Indian National Congress
42	John Mathai	Aug 15, 1947	Sep 22, 1948	Indian National Congress
43	Asaf Ali	Sep 2, 1946	Aug 14, 1947	Indian National Congress

INDIAN RAILWAY CATERING AND TOURISM CORPORATION

Type: Subsidiary of the Indian Railways
Industry: Railways
Headquarters: New Delhi, NCT
Products: e-ticketing
Services: Catering, Tourism and Online Ticketing
IRCTC Helpline: Toll free 1800-111-139.

IRCTC was incorporated on 27th September, 1999 as an extended arm of the Indian Railways to upgrade, professionalize and manage the catering and hospitality services at stations, on trains and other locations and to promote domestic and international tourism through development of budget hotels, special tour packages, information and commercial publicity and global reservation systems.

It has since then grown manifold and diversified its objectives beyond catering and tourism services. IRCTC has launched various tourism products and services for promotion of tourism industry in India. It is best known for changing the face of railway ticketing in India. On an

average more than 2,03,000 tickets are sold through IRCTC's website in a day. It has pioneered internet-based rail ticket booking through its website, as well as from the mobile phones via WiFi, GPRS or SMS. In addition to e-tickets, Indian Railways and Catering Tourism Corporation also offers I-tickets that are basically like regular tickets except that they are booked online and delivered by post. The tickets PNR status is also made available. Commuters on the Mumbai Suburban Railway can also book season tickets through the website. It has also launched a loyalty program called Shubh **Yatra** for frequent travellers. Through this program, passengers can avail discounts on all tickets booked round the year by paying an upfront annual fee.

By doing this, IRCTC is not only saving the time of the public but also saving their cost of travelling to these centers.

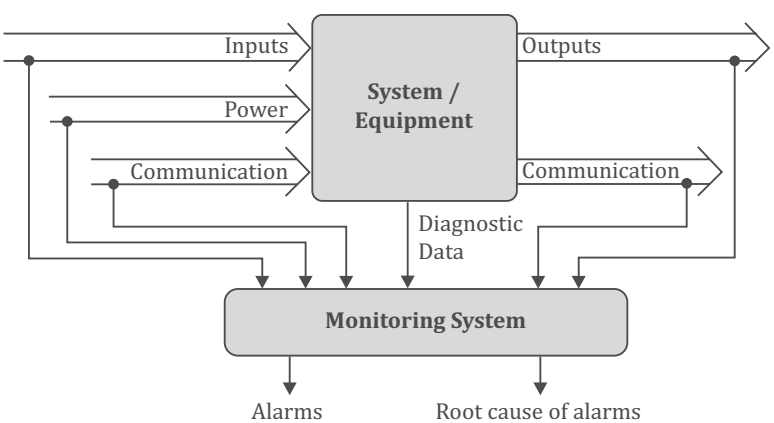
The company has made a significant mark in its passenger-services oriented business lines like setting up of Food Plazas on Railway premises, 'Railneer', Rail Tour Packages and 'Internet Ticketing', bringing great deal of professionalism into the operations. IRCTC also manages on-Board Catering Services in Rajdhani / Shatabdi / Duronto and Mail / Express Trains and Static Catering Units such as Refreshment Rooms, AVMs, Book Stalls, Milk Stalls, Ice Cream Stalls, Petha & Peda Stalls etc. across the Indian Railway Network.

RAILWAY SIGNALLING

Railway signalling is a system used to direct railway traffic and keep trains clear of each other at all times. Trains move on fixed rails, making them uniquely susceptible to collision. This susceptibility is exacerbated by the enormous weight and inertia of a train, which make it difficult to quickly stop when encountering an obstacle. Most forms of train control involve movement authority being passed from those responsible for each section of a rail network (e.g., a signalman or station master) to the train crew.

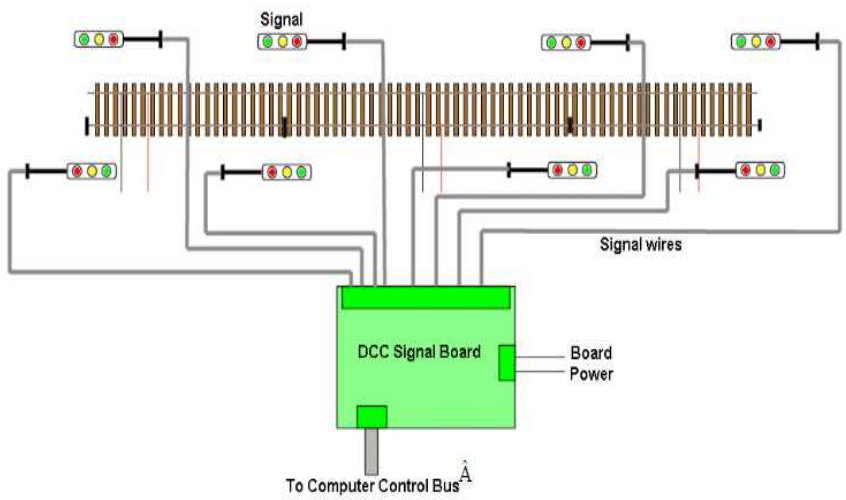
The earliest rail cars were first hauled by horses or mules. A mounted flagman on a horse preceded some early trains. Hand and arm signals were used to direct the "train drivers". Foggy and poor-visibility conditions gave rise to flags and lanterns.

Typical System / Equipment Monitoring Model



Entering and leaving a manually controlled block

Before allowing a train to enter a block, a signalman must be certain that it is not already occupied. When a train leaves a block, its driver must inform the signalman controlling entry to the block. Even if the signalman receives advice that the previous train has left the block, he is usually required to seek permission from the next signal box to admit the next train. When a train arrives at the end of a block section, before the signalman sends the message that the train has arrived, he must be able to see the end-of-train marker on the back of the last vehicle. This ensures that no part of the train has become detached and remains within the section. The end of train marker might be a coloured disc (usually red) by day or a coloured oil or electric lamp (usually red). If a train enters the next block before the signalman sees that the disc or lamp is missing, he asks the next signal box to stop the train and investigate.

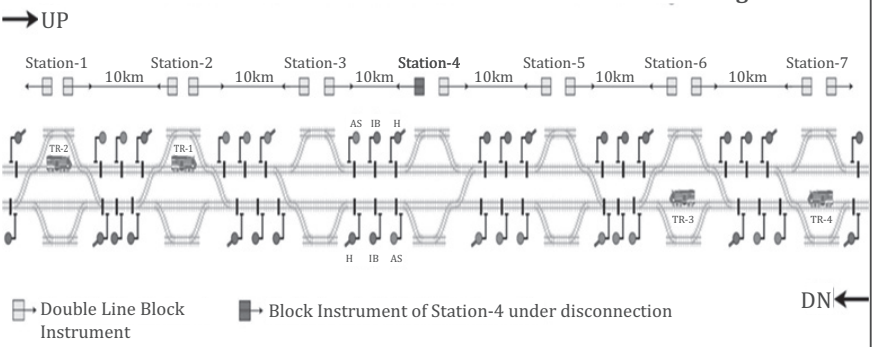


Computer Program

The computer program controls the system. It looks at the blocks, if occupied or not; looks at the position of the turnouts; and looks at any other sensor indications that are being sent to the computer.

The logic in the program takes all of these inputs, tests them with the program logic, and then sends the appropriate commands to the signal board to light the signals with their proper aspects or colours. The computer panel shown here was designed using JMRI Panel Pro. JMRI also provides the logic for everything to work. When turnouts are thrown, blocks occupied by a train, and the signals change, the display icons change to reflect these events. This panel is currently being built and modified as more block detection and signals are added to the railroad. The center window is the most complete.

Affect of Block Instrument Disconnection on Train Running



Train1 If it is express, it reaches IB signal between station 3 & 4 in 10 minutes, if it is Goods Train it reaches with in 15 minutes.

Train2 If it is express, it reaches IB between station 3 & 4 with in 17 minutes (if Train-1 is not there at all).

Train3 If it is express, it reaches IB between station 3 & 4 with in 17 minutes.

Train4 If it is express, it reaches IB between station 3 & 4 with in 23 minutes.

If Block Instrument is disconnected for 20 minutes - no up and down express trains shall be there in two block sections on both ends

Train Detection to Avoid Accidents:

Colour lights signals

On most modern railways, colour light signals have largely replaced mechanical ones. Colour light signals have the advantage of displaying the same aspects by night as by day, and require less maintenance than mechanical signals.

Although signals vary widely between countries, and even between railways within a given country, a typical system of aspects would be:

- Green: Proceed at line speed. Expect to find next signal displaying green or yellow.
- Yellow: Prepare to find next signal displaying red.
- Red: Stop.

On some railways, colour light signals display the same set of aspects as shown by the lights on mechanical signals during darkness.

Route Signalling and Speed Signalling

Under **route signalling**, a driver is informed which route the train will take beyond each signal (unless only one route is possible). This is achieved by a *route indicator* attached to the signal. The driver uses his route knowledge, reinforced by speed restriction signs fixed at the lineside, to drive the train at the correct speed for the route to be taken. This method has the disadvantage that the driver may be unfamiliar with a route onto which he has been diverted due to some emergency condition. Several accidents have been caused by this alone. For this reason, in the UK drivers are only allowed to drive on routes that they have been trained on and must regularly travel over the lesser used diversionary routes to keep their route knowledge up to date.

Under **speed signalling**, the signal aspect informs the driver at what speed he may

proceed, but not necessarily the route the train will take. Speed signalling requires a far greater range of signal aspects than route signalling, but less dependence is placed on drivers' route knowledge.

Track circuits

One of the most common ways to determine whether a section of line is occupied is by the use of a track circuit. The rails at either end of each section are electrically isolated from the next section, and electrical current is fed to both running rails at one end. A relay at the other end is connected to both rails. When the section is unoccupied, the relay coil completes an electrical circuit, and is energized. However, when a train enters the section, it short-circuits the current in the rails, and the relay is de-energized. This method does not explicitly need to check that the entire train has left the section. If part of the train remains in the section, the track circuit detects that part.

This type of circuit detects the absence of trains, both for setting the signal indication and for providing various interlocking functions—for example, not permitting points to move when a train stands over them. Electrical circuits also *prove* that points are in the appropriate position before a signal over them may be cleared. Staff working in track circuit block areas, carry (TCC) so that, in the event of something fouling an adjacent running-line, the track circuit can be short-circuited. They place signals on that track to 'danger' and can be used to help prevent a collision before the signalman can be alerted.

Track change

To make a train change its track, a special mechanical arrangement is made. This arrangement is known as a railroad switch and it consist of pair of rails, known as switching rails or points that are linked to one another. As the name suggests, the switching rails can direct or guide the train, either on straight path or on the diverging path which is established by a curved rail line.

The railroad switch can only be in one of the two positions at a time. If it is locked the train will change the track. If it is open, it will go straight-through.

It is very important that the switch is set up carefully. Most train derailments take place at the point when it goes from one track to another track. A loose set up is a guarantee of making train jump off the track, which turns into a disaster. However, railway authorities, not only in India, but around the world has expertise in the art of train track changing. Most times the process is so smooth, that one even doesn't notice it. However an experienced traveler can make out with the sound of the train, that the track has changed.

Safety systems

A train driver failing to respond to a signal's indication can be disastrous. As

a result, various auxiliary safety systems have been devised. Any such system requires installation of some degree of trainborne equipment. Some systems only intervene in the event of a signal being passed at danger (SPAD). Others include audible and/or visual indications inside the driver's cab to supplement the lineside signals. Automatic brake application occurs if the driver should fail to acknowledge a warning. Some systems act intermittently (at each signal), but the most sophisticated systems provide continuous supervision.

In-cab safety systems are of great benefit during fog, when poor visibility would otherwise require that restrictive measures be put in place.

NEW TECHNOLOGY FOR INDIAN RAILWAYS

The Indian Railways is all set to install a new technology which will allow the detection of faults in rail passenger coaches, wagons and locomotives while on run.

As per a press release issued by the Ministry of Railways, the modern technology will greatly enhance safety in railway operations.

The new maintenance technique, based on the acoustic method of diagnostics, is known as **Acoustic Bearing Detectors** (ABD) & Wheel Impact Load Detectors (WILD) – when used in combination together they are known as **Online Monitoring of Rolling Stock** (OMRS) systems.

The system works by way of recording the noise and forces generated by coaches, wagons and locomotives in motion. An array of microphones and sensors are employed to detect the same.

The sensitive equipment will pick up any abnormal noise or change in force thereby indicating that the specific sub-component is not behaving normally. What makes the system more potent is that the data can be monitored remotely.

In the current method, it is near impossible to detect such defects as the rolling stock is checked at the maintenance depots when are stationary. And by the time the defects are detected the fault generally requires a complete overhaul which leads to larger turnaround time.

The new system will ensure that the maintenance time remains minimal, thereby ensuring availability of high number of wagons/coaches etc. for operation.

As a pilot project, the system was installed near Bakkas in Lucknow division of Northern Railway. The system has successfully detected a number of wheel bearing faults.

WILD have been installed in 15 locations across the country in the initial phase and these have also detected faulty vehicles that have caused higher than normal impact force on the rails. These 15 locations are: Ajni, Asansol, Mughal sarai-I, Mughal sarai-II, Barwadih, Vishakhapatnam, Arakkonam, Gunakal, Mahalimarup, Dongargarh, Bhilai, Hospet, Bina, Itarsi and New Katni.

Indian operating rules

In Indian Railways operating rules are called 'The General Rules'. The General Rules are common for all zonal railways of Indian Railway and can be amended only by the Railway Board. Subsidiary rules are added to the General Rules by zonal railways, which does not infringe the general rule. Corrections are brought about from time to time through correction slips.

ABBREVIATIONS

ACC	Air-Conditioned coach or class
ACCC	Air-Conditioned Chair Car
ACP	Alarm Chain Pulling (!)
ADE, ADEN	Assistant Divisional Engineer
AEC	Accident Enquiry Committee
ALK	Allowance in Lieu of Kilometrage (in calculating payments for drivers)
ARMV	Accident Relief Medical Van
ART	Accident Relief Train
ARTS	Advanced Railway Ticketing System
ASM	Assistant Station Master
BG	Broad Gauge
BIO-TOIL	'Biological Toilet' - eco-friendly toilet with bacterial decomposition facility developed by ICF for use on railway coaches.
CARS	Central Accounting and Reporting System (consolidated reports of ARTS ticketing during the day)
CC	Chair Car
CCS	Chief Commercial Superintendent
CCTV	Closed-Circuit TV
CFS	Container Freight Station
COIS	Coaching Operations Information System
Conc.	Concessional fare (annotation on ticket)
CT	Control Tower
CTI	Central Training Institute
CTU	Centralized Training Unit
CVM	Coupon Validating Machine (for ticketing with prepaid coupons)
C&W	Carriage & Wagon (staff for plumbing, electricals, amenities)
DFC	Dedicated Freight Corridor
DF	Defence quota
DRM	Divisional Railway Manager
EC or ECC	Executive Chair Car
ECR	Empty Coaching Rake
EFC	Eastern Freight Corridor

EQ	Emergency Quota
ETA	Estimated Time of Arrival
FOB	Foot Overbridge (a pedestrian overpass); Fuel Oil Balance
FOIS	Freight Operation Information System
FT	Foreign Tourist (annotation on reservation charts)
G	Goods
GAL	Goods Avoiding Line
GIT	Goods Intermodal Transshipment (e.g., "GIT yard")
GM	General Manager
GR	General Rules (railway regulations and operating procedures)
GRP	Government Railway Police
HDN	High-Density Network ('Golden quadrilateral' and others)
HO	Head Office (a type of quota for tickets)
HP	Handicapped Persons quota
HSRL IR	High Speed Rail Line (or Link) Indian railway
IBP	Intermediate Block Post
IMPRESS	Integrated Multi-train Passenger REServation System
IOH	Intermediate Overhaul
IOW	Inspector of Works
IRMP	Integrated Railway Modernization Plan
IRP	Indrail Pass
IRS	Indian Railway Standard (pre-Independence railway standards body)
IRVS	Interactive Voice Response System
JOH	Junction of Head - point where the tongue rail approaches the main rail in a switch
LB	Lower Berth (annotation on ticket for sleeping accommodation)
LC	Level Crossing
LI	Loco Inspector
LQ	Ladies Quota
LRT	Light Rail Transit
MB	Middle Berth (annotation on ticket for sleeping accommodation)
MCO	Military Control Office (coordinates ticketing and accommodation for military personnel at some railway stations)

M/E	Mail/Express (on tickets)
MG	Meter Gauge, also Motor Generator
MOW	Maintenance of Way
MRT	Medical Relief Train (self-propelled medical van for accidents)
MRTC	Mobile Radio Train Communication
MSL	Mean Sea Level
NG	Narrow Gauge
NTES	National Train Enquiry System (phone-based train/reservation status)
OIGS	On India Government Service (for mail, etc.)
OSD	Officer on Special Duty
PF	Platform (sometimes P/F)
PNR	Passenger Name Record (Passenger Numeric Record?) (identifying number for ticket)
POL	Petroleum, Oil, and Lubricants (designation for oil cargo)
PQ	Pooled Quota
PQWL	Pooled Quota Waiting List
PRS	Passenger Reservation System
PSCT	Port-side Container Terminal
RAC	Reservation Against Cancellation
RCC	Railway Convention Committee (also see above)
R Fee, Res Fee	Reservation fee (annotation on ticket)
RLWL	Running Line Waiting List
RMS	Railway Mail Service
ROB	Road Over-bridge (i.e., road goes over train tracks)
ROH	Routine Overhaul
RO-RO (RORO)	Roll-on, roll-off service (auto transport)
RR RRB	Railway Receipt, Refreshment Room Railway Recruitment Board
RRF	Railway Reserve Fund
RTR	Ready-to-Run (modelling kits)
RUB	Road Under-bridge (i.e., road goes under train tracks)
S Ch, SF Ch	Superfast Charges (annotation on ticket)
SCRA	Special Class Railway Apprentice

SEB	State Electricity Board (any of the state bodies supplying electricity to IR)
Sh. CC	Shatabdi Chair Car
SIL	Safety Integrity Level - statistical measure of reliability of a safety system such as an interlocking system
SLB	Side Lower Berth (annotation on ticket for sleeping accommodation)
SM	Station Master
SR	Subsidiary Rules (for railway operation, see GR)
SS	Station Superintendent; Substation (electrification)
SSE	Senior Section Engineer
S&T	Signalling & Telecommunications
SUB	Side Upper Berth (annotation on ticket for sleeping accommodation)
TAAG	Trains At A Glance (a timetable publication)
TAR	Trans-Asian Railway (another proposed grand pan-Asian route)
TC	Trailer Car (unpowered car in EMU rake), Ticket Checker / Ticket Collector
TDR	Ticket Deposit Receipt (when surrendering ticket for cancellation / refund)
TMS	Train Management System
TRS	Traction Rolling Stock
TS	Train Superintendent
TT	Timetable
TTE	Travelling Ticket Examiner
TQ	Tatkal Quota
TXR	Train Examiner, the officer who issues the BPC and VCC (Train Inspector)
UB	Upper Berth (annotation on ticket for sleeping accommodation)
UEC	Universal Emergency Communication (a system of on-board communication in some trains)
VT	Victoria Terminus (now Chhatrapati Shivaji Terminus)
WFC	Western Freight Corridor
WL, W/L	Waiting List; Wait-Listed (ticket issued without confirmed accommodations)
WM	Works Manager
W/T	Without Ticket
ZDOT	Zero Death On Tracks (campaign to reduce fatalities from pedestrian trespassers)
ZISTU	Zonal Integrated S&T Units

ZTC	Zonal Training Centre
2T	Two-tier (as in "AC-2T" = airconditioned two-tier coach)
3T	Three-tier
NER	North Eastern Railway
NFR	Northeast Frontier Railway
ER	Eastern Railway
SER	South Eastern Railway
SCR	South Central Railway
SR	Southern Railway
CR	Central Railway
WR	Western Railway
SWR	South Western Railway
NWR	North Western Railway
WCR	West Central Railway
NCR	North Central Railway
SECR	South East Central Railway
ECoR	East Coast Railway
ECR	East Central Railway
KR	Konkan Railway
NR	Northern Railway

Physics

Physics is the branch of science which deals with the study of matter, energy, and the interaction between them.

PHYSICAL QUANTITIES– SCALARS & VECTORS

In physics, large number of physical quantities can be broadly classified into two categories– Scalars & Vectors.

- A **scalar** is a physical quantity that has only a magnitude (size) E.g. : Distance, speed, time, power, energy, etc.
- A **vector** is a physical quantity that has both a magnitude and a direction. E.g. Velocity, displacement, acceleration, force etc.

Some physical quantities like moment of **inertia**, **stress**, etc. are neither scalar nor vector. They are **tensor**.

Fundamental and Derived physical Quantities and their units

Seven Fundamental Physical Quantities and their Units

Physical Quantity	SI Unit	Symbol
Length	meter	*m*
Mass	kilogram	*Kg*
Time	second	*S*
Electric Current	ampere	*A*
Temperature	kelvin	*K*
Luminous intensity	candela	*Cd*
Amount of substance	mole	*mol*

Some Physical Quantities and their Units

NEWTON'S LAWS OF MOTION

- **First law of Motion -** *An object at rest will remain at rest or in uniform motion remains in uniform motion unless acted on by an external unbalanced force.*
  This law is often called the law of inertia. i.e., resistance to change.
- **Second law of Motion -** *The rate of change of momentum of a body is directly proportional to the unbalanced external force applied on it.*
  Impulse: If a large force acts on a body or particle for a smaller time, then impulse (J) = **product** of **force** and **time**. Then,
  J = Ft **F** = force, and t = time
  So, J = Ft = mat.
  Impulse = Change in momentum.
- **Third law of Motion -** *For every action* there is an equal and *opposite reaction.*

Instances of Newton's Laws of Motion

First law of Motion

A magician pulls a tablecloth out from under dishes and glasses on a table without disturbing them.

A person's body is thrown outward as a car rounds a curve on a highway.

Second law of Motion

Pushing a child on a swing is easier than pushing an adult on the same swing, because the adult has more inertia.

A soccer player kicks a ball with his foot and the toes are left stinging.

Two students are in a baseball game. The first student hits a ball very hard and it has a greater acceleration than the second student who bunts the ball lightly.

Third law of Motion

Rockets are launched into space using jet propulsion where exhaust accelerates out from the rocket and the rocket accelerates in an opposite direction.

CIRCULAR MOTION

- *Motion of a body along a circular path is called circular motion.*
- **Centripetal force -** while a body is moving along a circular path an external force required to act radially inward. This force is called centripetal force.

  Centripetal force $F_e = \frac{mv^2}{r}$

  where r = radius of circular path.

  A pseudo force that is equal and opposite to the centripetal force is called **centrifugal force**.

  Cream separator, centrifugal dryer, etc, work on the principle of centrifugal force.

FRICTION

Friction is a force that is created whenever two surfaces move or try to move across each other.

- Friction always opposes the motion or attempted motion of one surface across another surface.
- Friction is dependent on the texture of both surfaces.
- Friction is also dependent on the amount of contact force pushing the two surfaces together.

Instances where friction is important

1. Walking
2. Driving
3. Picking something up
4. Car brakes
5. Erosion in the environment
6. Burning up meteors in the atmosphere before they hit Earth.
7. Striking a match/building a fire.
8. Rubbing your hands together when it's cold.
9. Friction keeps knots from coming undone (like in shoelaces)

WORK & ENERGY

- **Work** refers to an activity involving a force and movement in the direction of the force.

  Work done w = Fs cosθ

  Positive work : If θ < 90°

  Zero work : If θ = 90°

  Negative work : If θ > 90°
- A force of 20 newtons pushing an object 5 meters in the direction of the force does 100 joules of work.
- The **SI unit** of work is the **joule** (J),
- Capacity of doing work is called *energy*.
- It may exist in potential, kinetic, thermal, electrical, chemical, nuclear, or other various forms.
- To do 100 joules of work, you must expend 100 joules of energy.
- Energy cannot be created or destroyed. It can only be transferred to other objects or converted into different forms. This is **Law of Conservation of energy.**
- The SI unit of energy is joule.
- It is a scalar quantity.
- The energy associated with motion is called **kinetic energy (K)**.

  $K = \frac{1}{2}MV^2$ where M is mass and V is the velocity.
- The energy associated with position is called **potential energy (U)**.

  U = mgh; where g is acceleration due to gravity and h is height of the object.

Conversion of Energy from one form to another :

Dynamo-	Mechanical Energy into Electrical Energy.
Electric Motor-	Electrical Energy into - Mechanical Energy.
Microphone-	Sound Energy into Electrical Energy.

Loud Speaker- Electrical Energy into Sound Energy.

Electric Bulb- Electrical Energy into Light and Heat Energy.

Solar Cell– Solar energy into electrical energy.

Candle- Chemical Energy into light and heat energy.

Sitar- Mechanical Energy into Sound energy.

POWER

- **Power** is the rate of doing work.
- Power = Work / time
- It is equivalent to an amount of energy consumed per unit time.
- The **SI** unit of **power** is **joule/second**.
- **One horse** power is equivalent of **746** watt.

  Board of Trade Unit (B.O.T.U.) : kwh (Kilo watt hour)

  1 kwh = 1 Unit

  $= 3.6 \times 10^6$ joule

  This is to measure domestic electric energy consumption.

GRAVITATION

- **Gravitation** is a natural phenomenon by which all physical bodies attract each other.
- On Earth, gravity gives weight to physical objects employing a downward force to keep them grounded.
- Gravitational force is always attractive. For example, earth always attracts us but never repels.
- It is **weakest force** among the four natural forces in nature i.e. electromagnetic, weak and strong nuclear force.
- If there are two objects of mass m_1 and m_2 and they are placed at distance r apart. Then force between them will be:

  $F = G(m_1m_2)/r^2$

  where G is the universal gravitational constant.

  This is called **Newton's Universal Gravitational law.**
- $G = 6.67 \times 10^{-11}\ Nm^2/kg^2$
- Gravitational force is a central and conservative force.
- They can operate over a very long distances.
- According to Newton's theory, the gravitational attraction between the planets and the sun holds the planets in elliptical orbits around the sun.
- The earth's moon and moons of the other planets are held in orbits by the attraction between the moons and the planets.
- The force of gravity depends upon the **object's mass** or the amount of matter in the object.
- The weight (w) of an object is equal to the mass of the object multiplied by the acceleration due to gravity(g).

  W = mg
- $g_{maximum}$ at poles and $g_{minimum}$ at equator.
- $g_{moon} = \frac{1}{6} g_{earth}$
- The value of 'g' decreases with altitude, depth from the earth's surface.
- **g** decreases due to rotation of earth.

Weight of a body in a lift

(i) If lift is stationary or moving with uniform speed (either upward or downward), the apparent weight of a body is equal to its true weight.

(ii) If lift is going up with acceleration, the apparent weight of a body is more than the true weight.

(iii) If lift is going down with acceleration, the apparent weight of a body is less than the true weight.

(iv) If the cord of the lift is broken, it falls freely. In this situation the weight of a body in the lift becomes **zero**. This is the situation of weightlessness.

(v) While going down, if the acceleration of lift is more than acceleration due to gravity, a body in the lift goes in contact of the ceiling of lift.

- **Escape speed (v_e)** is the minimum speed with which an object just crosses the earth's gravitational field and never comes back.
- The escape velocity of Earth is about 11.2 kilometres per second and on moon it is 2.4 km/sec.

SATELLITES

- A **satellite** is a smaller object in space which orbits around a larger object Planet in space.
- It can be either artificial, like the communication or weather satellites that orbit the Earth, or they can be natural, like our Moon.
- A **geostationary satellite** is an earth-orbiting satellite, placed at an altitude of approximately 35,800 kilometres (22,300 miles) directly over the equator.
- Geostationary satellite revolves in the same direction the earth rotates (west to east). Its time period is 24 hours.
- It is used for Communication, television broadcasting, weather forecasting , defence and intelligence.
- **Polar orbiting satellites** closely parallel the earth's meridian lines, thus having a highly inclined orbit close to 90°.
- They pass over the North and South poles each revolution.
- They are used for weather forecasting, earth-mapping, earth observation, etc.

MECHANICAL PROPERTIES OF SOLIDS AND FLUIDS

- **Atmospheric pressure** is measured by an instrument called the **barometer**.
- **Sudden fall** in barometric reading is the indication of **storm.**
- **Slow fall** in barometric reading is the indication of **rain**.
- Slow rise in the barometric reading is the indication of **clear weather.**
- The pressure exerted by liquid column at the surface given as $p = hdg$, where d is the density of liquid, h is height of liquid column.
- In a static liquid at same horizontal level, pressure is same at all the points.

Pascal's Law of Pressure: If gravitational attraction is negligible in equilibrium condition, pressure is same at all points in a liquid.

- The pressure exerted anywhere at a point of confined liquid is transmitted equally and undiminished in all directions throughout the liquid.
- **Hydraulic lift**, hydraulic **press** and hydraulic **breaks** are based on the **Pascal's law of pressure**.

Atmospheric pressure decreases with altitude.

That is why

- It is difficult to cook on the mountain.
- The **fountain pen** of a passenger leaks in aeroplane.
- **Bleeding** occurs from the nose of the man.
- It is difficult to breath on higher altitude due to less amount of air.
- **Water** starts to boil below **100°C**.

Surface Tension (T): It is the force (F) acting normally on unit length (l) of imaginary line drawn on the surface of liquid

- The surface tension **decreases** with rise in temperature and becomes zero at the critical temperature.
- Due to the surface tension, **rain drops** are spherical in shape.

Archimedes' Principle: When a body is immersed partly or wholly in a liquid, there is an apparent loss in the weight of the body, which is equal to the weight of liquid displaced by the body.

- All objects placed in a liquid experience an upward force which allows the body to float if it displaces water with weight equal to the weight of the body. This upward force is called the **buoyant force** and the law is called the **law of buoyancy**.

- The weight of water displaced by an iron ball is less than its own weight. Whereas water displaced by the immersed portion of a ship is equal to its weight. So, small ball of iron ball sink in water, but large ship float.
- **Hydrogen** filled ballon float in air because hydrogen is lighter than air.

Law of Floatation: A body floats in a liquid if

- The density of material of body is less than or equal to the density of liquid.
- When body floats in neutral equilibrium, the weight of the body is equal to the weight of displaced liquid. The centre of gravity of the body and centre of gravity of the displaced liquid should be in one vertical line for the condition.
- **Density (d):** It is the mass per unit volume.

$$d = \frac{M}{V}$$

- **Density of water** is maximum at **4°C.**
- **Capillarity:** The phenomenon of rise or fall of liquids in a capillary tubes.
- The oil in the wick of a lamp rises due to capillary action.
- **Viscosity:** The property of a fluid by virtue of which an internal frictional force acts between its different layers when it is in motion.
- **Bernoulli's theorem:** For a non-viscous, incompressible fluids flowing streamline from one point to another point, then at every point of its path, pressure, energy, potential energy and kinetic energy per unit volume remains constant.

  Blowing of roofs by storms, sprayer action of carburetor, etc. are based on Bernoulli's principle.

HEAT

- **Heat** is a form of energy which causes sensation of hotness or coldness.
  Its unit is joule or calorie.
- 1 cal = 4.2 joule
- It always flows from a substance at a higher temperature to the substance at a lower temperature.

Temperature: It indicates the degree of hotness or coldness of a body.

- Temperature is measured by **thermometer**.
- Temperature measuring units are Kelvin, °C or °F.

Relation between Temperature on different scales.

$$\frac{C-0}{100} = \frac{F-32}{180} = \frac{R-0}{80} = \frac{K-273}{100} = \frac{Ra-492}{180}$$

OR

$$\frac{C}{5} = \frac{F-32}{9} = \frac{R}{4} = \frac{K-273}{5} = \frac{Ra-492}{9}$$

- The normal temperature of a human body is 37°C or 98.6°F.
- At –40° temperature, celsius and fahrenheit thermometers read the same.
- **Thermal expansion:** Increase in length, area or volume on heating.

Methods of Heat Transfer

- **Conduction:** It is that mode of transmission of heat in solid where heat is transferred from a region of higher temperature to a region of lower temperature by the aid of particles of the body without their actual migration.
- **Convection:** It requires a medium and is the process in which heat is transferred from one place to other by actual movement of heated substance (usually molecule of fluid).
- Radiation has the following properties:

(a) Radiant energy travels in straight lines and when some object is placed in the path, its shadow is formed at the detector.

(b) It is reflected and refracted or can be made to interfere. The reflection or refraction are exactly as in case of light.

(c) It can travel through vacuum.
(d) Intensity of radiation follows the law of inverse square.
(e) Thermal radiation can be polarised in the same way as light by transmission through a nicol.

Latent Heat

- The amount of heat required to change phase (liquid to gas or liquid to solid etc.) without change in temperature is called **latent heat.** Q = mL where, L = latent heat
- Why are steam burns more severe than hot water burns. It is because latent heat of steam is more than hot water.
- Latent heat of fusion of ice is 80 cal/g
- Latent heat of steam is 538 cal/g.

Specific Heat

- The amount of heat that is required to raise the temperature of a unit mass of a substance by one degree (14.5°C to 15.5°C) is known as **Specific heat**.

Specific heat of Different materials

Material	Specific heat (J/Kg K)
Water	4200
Ice	2100
Iron	460
Kerosene oil	210
Mercury	140
Lead	130

(i) Cooking utensils are made of aluminum, brass & steel because of their low specific heat and high conductivity.
(ii) Due to low specific heat of sand, deserts are hot in day and cool in night.

Newton's law of cooling

The rate of loss of heat by a body is directly proportional to the difference in temperature between the body and its surrounding.

i.e., $\frac{dT}{dt} = E \propto (T - T_0)$

where T and T_0 are the temperature of body and surroundings.

Sublimation: It is the process of conversion of a solid directly into vapour, eg., Iodine (dark solid), Dry ice (solid CO_2), etc.

Hoar Frost: It is just the reverse process of sublimation. e.g. Frost and snowflakes.

WAVES

- A **wave** is a kind of oscillation (disturbance) that travels through space and matter.
- Wave motions transfer energy, not matter from one place to another.
- **Transverse wave**- In it the vibrations of particles are perpendicular ⊥ to the direction of travel of the wave. It has crests and troughs.
- **Longitudinal wave**:- In it the vibrations of particles are parallel to the direction of travel of wave. It has compressions and rarefactions.
- The repetition of sound due to reflection of sound waves, is called an **echo**.
- **Intensity** is defined as the amount of energy passing per unit area held around that point per unit time.
- **Quality** is that characteristics of sound which differentiate between two sounds of same intensity and same frequency.
- **Sonar:** It stands for **sound navigation** and **ranging**. It is used to measure the depth of a sea to locate the enemy submarines and shipwrecks.
- If there is a relative motion between source of sound and observer, the apparent frequency of sound heard by the observer is different from the actual frequency of sound emitted by the source. This phenomenon is called **Doppler's effect**.
- **Electromagnetic waves** differ from mechanical waves in that they do not require a medium to propagate.
- This means electromagnetic waves can travel not only through air and solid materials, but also through the **vacuum.**
- In the 1860's and 1870's, a Scottish scientist named **James Clerk Maxwell** noticed that electrical fields and

magnetic fields can couple together to form electromagnetic waves.

- He summarized this relationship between electricity and magnetism into what are now referred to as **"Maxwell's Equations."**
- **Heinrich Hertz,** a German physicist, applied Maxwell's theories to the production and reception of **radio waves**.
  Examples of electromagnetic waves are light, radio waves, X-rays etc.
- Sound is transmitted through gases, plasma, and liquids as longitudinal waves, also called **compression waves**.
- It requires a medium to propagate.
- Through solids, however, sound can be transmitted as both longitudinal waves and transverse waves.
- Audible sound for human is from **20 Hz** to about **20000 Hz**.
- **Pitch** is the property of sound that we perceive as higher and lower tones.
- Sound can be produced at a desired frequency by different methods.
- The amplitude of a sound wave is the degree of motion of air molecules within the wave which corresponds to the change in air pressure that accompanies the wave.
- The distance at which a sound can be heard depends on its intensity.
- Sounds higher than **20000 Hz** are called **ultrasonics**.
- Sounds less than 20 Hz are called **infrasonics**.
- When temperature is increased the speed of sound is increased.
- Speed of sound in air is 330 m/s.

Speed of Sound in Different Mediums

Medium	**Speed of sound (In m/s)**
Air(0°C)	332
Air (20°C)	343
Steam (at 100°C)	405
Mercury	1450
Water (20°C)	1482
Sea water	1533
Iron	5130
Glass	5640

LIGHT

- **Light** is a form of energy which produces sensation of vision on our eyes.
- Light is made of discrete packets of energy called **photons**.
- **Photons** carry momentum, have no mass, and travel at the speed of light, i.e. **300,000 km/sec**.
- All light has both particle and wave like properties. For example–
  –Particle like; use of detectors in digital camera for the detection and storage of image data.
  –Wave like; use of instrument for diffraction of light into a spectrum for analysis.
- It is a **transverse wave**.
- One of the physical properties of light is that it can be **polarized**.
- Sun's light reaches to earth in 8 **minutes** 19 seconds (i.e. 499 seconds).
- **Roemer** was the person who measured speed of light in AD 1678.
- The light reflected from moon reaches to earth in **1.28** second.
- Objects, which emit light by themselves are called **Luminous bodies**, eg. sun, stars, electric bulb, etc.
  Non-luminous bodies do not emit light themselves but reflect light falling on them, eg. planets, moon, etc.

- **Transparent, translucent and opaque matter**

Matter	**Nature**	**Example**
Transparent	It allows most of light to pass through.	glass, water, etc

Translucent	It allows a part of light falling on it to pass through.	oiled paper
Opaque	It does not allow the incident light to pass through.	mirror, metal, wood, etc.

- **Speed of light in different mediums**

Medium	Speed of light
Glass	2×10^8 m /sec
Turpentine oil	2.04×10^8 m /sec
Water	2.25×10^8 m/sec
Vacuum	3×10^8 m/sec

- **Ultraviolet radiation** is an electromagnetic radiation that has wavelength from 400 nm to 10 nm, shorter than that of visible light but longer than X-rays. It is used in water purification.
- **Infrared radiation** is emission of energy as electromagnetic waves in the portion of the spectrum just beyond the limit of the red portion of visible radiation.
- Range between 10^{-6}m and 10^{-3}m. It is used to treat muscular strain, in green house etc.
- **X-rays** are electromagnetic radiation having a shorter wavelength and produced by bombarding a target made of tungsten, with high speed electrons. Uses in medical diagonosis.
- **Microwaves** are short, high frequency waves lying roughly between very high frequency (infrared) waves and conventional radio waves.
- Their wavelength range - 10^{-3} m to 10^{-2} m. It is used in microwave oven.
- **Electromagnetic** wave and **Discoverers**.

Waves	Discoverer
γ-Rays	Henry
X-Rays	W. Roentgen
Ultra-Violet rays	Ritter
Visible radiation	Newton
Infrared rays	Herschel
Short radio waves or (Hertz Hertzian Waves)	Heinrich
Long radio waves	Marcony

Reflection of light

It is the turning back of light in the same medium.

Laws of Reflection

There are two laws of reflection :

(i) The angle of incidence is equal to the angle of reflection. ($\angle i = \angle r$)

(ii) The incident ray, the normal and the reflected ray lie in the same plane.

Position & nature of image formed by a spherical mirror

Position of object	Position of image	Size of image in comparison to object	Nature of image
Concave mirror			
At infinity	At focus	Highly diminished	Real, inverted
Between infinity and centre of curvature	Between focus and centre of curvature	Diminished	Real, inverted
At centre of curvature	At centre of curvature	Of same size	Real, inverted

Between focus and centre of curvature	Between centre of curvature and infinity	Enlarged	Real, inverted
At focus	At infinity	Highly enlarged	Real, inverted
Between focus and pole	Behind the mirror	Enlarged	Virtual, erect
Convex mirror			
At infinity	At Focus	Highly diminished	Virtual, erect
Infront of mirror	Between pole and focus	Diminished	Virtual, erect

Uses of concave mirror

(i) As a shaving mirror.
(ii) As a reflector for the head lights of a vehicle, search light.
(iii) In opthalmoscope to examine eye, ear, nose by doctors.
(iv) In solar cookers,

Uses of convex mirror

(i) As a rear view mirror in vehicle because it provides the maximum rear field of view and image formed is always erect.
(ii) In sodium reflector lamp.

Refraction of Light

The bending of the light ray from its path in passing from one medium to the other medium is called refraction of light.

- If the refracted ray bends towards the normal relative to the incident ray, then the second medium is said to be **denser** than the first medium. But if the refracted ray bends away from the normal, then the second medium is said to be **rarer** than the first medium.

Laws of Refraction

(i) The incident ray, the normal to the refracting surface at the point of incidence and the refracted ray all lie in the same plane called the plane of incidence or plane of refraction.

(ii) $\frac{\sin i}{\sin r} = \text{constant}$

For any two given media and for light of a given wavelength. This is known as **Snell's law**.

Also, $\frac{\sin i}{\sin r} = {}_1\mu_2 = \frac{\mu_2}{\mu_1} = \frac{v_1}{v_2} = \frac{\lambda_1}{\lambda_2}$

where ${}_1\mu_2$ = Refractive index of the second medium with respect to the first medium.

Some Phenomena based on Refraction

(i) **Twinkling** of stars
(ii) **Oval Shape** of sun in the morning and evening.
(iii) Rivers appear **shallow**
(iv) Coins appear **raised** in glass filled with water.
(v) Pencils appear **broken** in the beaker filled with water.
(vi) Sun appears **above horizon** at sunset and sunrise.
(vii) Writing on a paper appears **lifted** on putting glass slab on it.
(viii) An object in a denser medium appears to be **nearer** when seen from a rarer medium, eg. fish in water, a coin at the base of a water filled vessel.

Total Internal Reflection

When the angle of incidence, for a ray of light passing from a denser medium to a rarer medium, exceeds a particular value (called **critical angle** for which angle of refraction 90°), the ray reflects back in the same medium from the boundary. This phenomena is called **total internal reflection.**

Scattering of Light: Sunlight gets scattered by small particles present in the atmosphere. **Red** colour scatters least and violet most. According to **Rayleigh** the intensity of scattered light, i.e. $I \propto \frac{1}{\lambda^4}$.

Some phenomena like – **reddish** appearance of the sun at **sunrise** and **sunset**, **blue colour** of sky, white colour of clouds etc. based on scattering of light.

Some Phenomena of total Internal Reflection

(i) Endoscopy using optical fibre.
(ii) Sparkling of diamond.
(iii) Mirage in desert
(iv) Increase in duration of sun's visibility.
(v) Appearance of air bubbles in glass paper weight.
(vi) Shining of air bubbles in water.
(vii) Shining of a smoked ball or a metal ball on which lamp soot is deposited when dipped in water.

Human Eye

The normal range of vision for a healthy human eye is from 25 cm (least distance of distinct vision to infinity (for point).

Defects of Vision & Remedies

Myopia or Near(short) sightedness:

- A person suffering from Myopia can't see the far (distant) object clearly but can see nearby object clearly.

Causes:

- The eye ball is too long (i.e. elongated) so image is formed before retina.
- Lens being too curved for the length of the eye ball.
- Combination of above, i.e. elongated eyeball & curved lens.
- Shortening of focal length of eye lens.
- Over stretching of ciliary muscles.

Remedy: Concave lens is used to diverge the rays at retina.

Hyperopia or Hypermetropia (long (far) sightedness)

- A person suffering from it can't see near object clearly but can see distant object clearly.

Causes:

- The eye ball is too short so image is formed beyond the retina.
- Cornea is not curved enough,
- Eye lens is farther back in the eye.
- Increase in the focal length of eye lens.
- Stiffening of ciliary muscles.

Remedy:

- Convex lens is used to converge the rays at retina.

Target group:

- It can affects both children and adults.
- People whose parents are farsighted,
- It can be confused with presbyopia (i.e. ." after 40" vision).

Astigmatism: Astigmatism is the most common refractive problem responsible for **blurry vision**. **Cylindrical** lens is used to correct astigmatism.

Presbyopia ("after 40" vision) : After age 40, and most noticeably after age 45, the human eye is affected by presbyopia, which results in greater difficulty maintaining a clear focus at a near distance with an eye which sees clearly at a far away distance.

Cataract

- It is the clouding of the lens of the eye that prevent a person to see.
  Because light rays can't pass through the cloudy lens, Vision of a person becomes cloudy, blurry, foggy, or filmy.

Causes:

- Protein builds up in the eye lens & make it cloudy.
- Cloudy protein layers prevent rays to pass through eye lens.
- New lens cells form on the outside of the lens, making older cells compacted into the center of the lens to form cataract.

Remedy:

- It can be corrected with suitable eye glasses (lenses).
- Cataract surgery is performed when eye glass does not suit.

Dispersion of light :

The splitting of white ray of light into its seven constituents colours (VIBGYOR) is called **dispersion of light**.

- The band of seven constituents colours is called **spectrum**.

Microscope

It is used to see magnified image of a tiny objects.

Telescope

It is used to increase the visual angle of distant object.

It is used to see far off objects clearly.

ELECTRICITY

- **Electricity** is the set of physical phenomena associated with the presence and flow of electric charge.
- **Electric charge** is a property of some subatomic particles, which determines their electromagnetic interactions.
  The **SI unit** of charge is **coulomb** (c).
- **Electric current (I)** is a movement or flow of electrically charged particle electronic per unit time. Typically measured in **ampere (A).**
- Moving charges produce a magnetic field.
- Electrical currents generate magnetic fields, and changing magnetic fields generate electrical currents.
  Conductors are the substances which allow the passage of electric charge with low resistance. E.g., silver, copper etc.
  Silver is the best conductor of electricity followed by **copper.**
  Insulators are substances which do not allow passage of electric charge, rubber, wood, mica, glass, ebonite etc.
- **Ohm's law -** The electric current I flowing through a conductor is proportional to the voltage V across its ends, i.e. $V \propto I$ or $V = RI$, where R is the **resistance** of the substance.
- The **resistance** is the obstruction offered to the flow of electric current.

  Coulomb's Law: The electrostatic force of interaction (repulsion or attraction) between two electric charges q_1 and q_2 separated by a distance r, is directly proportional to the product of charges.

Electric Field: The region around an electric charge in which the electric effect (attraction or repulsion) can be experienced with another charge is called the **electric field**.

Electric cell: It is the device used to convert chemical energy into electrical energy.

Emf of cell (E): It is the potential difference across the terminals of a cell when it is not in use.

Potentiometer

It is used to measure the exact potential difference between two points of an electric circuit or electromotive force (emf) of a cell.

Internal resistance of cell : It is the resistance offered by the electrolyte.

- One **kilowatt (kW)**= 1,000 watts
- One **megawatt (MW)** = 1,000 kilowatts = 1,000,000 watts
- One **gigawatt (GW)** = 1,000 megawatts = 1 billion watts.
- **Ammeter**- Measures current
- **Voltmeter**- Measures the potential difference between two points in a circuit.
- **Fuse** is a safety device that protects an **electric circuit** from becoming overloaded.

Transformer

- Transformer is a device which converts low voltage AC into high voltage Ac and vice-versa.
- It is based on **electromagnetic induction**.

Application /uses: As voltage regulators for –

(i) T.V, refrigerator, computer, air conditioner, etc.

(ii) Induction furnaces.

(iii)for welding purposes.

AC Generator/Dynamo/Alternator

- It is an electric device used to convert mechanical energy into electrical energy.
- It works on the principle of electromagnetic induction.

D.C. Motor

- It converts direct current energy from a battery into mechanical energy of rotation.
- **Its uses :**

(i) In D.C. fans, exhaust, ceiling, table fans, etc.
(ii) In pumping water.
(iii) In running tram-cars, trains, etc.

MAGNETISM

Magnets : The material or body which attract magnetic substance like iron, cobalt, nickel, etc.

- The force of attraction of a magnet is **greater at its poles than in the middle.**
- **Similar** poles of two magnets repel each other.
- Opposite poles of two magnets attract each other.
- If a **bar magnet** is suspended by a thread and free to rotate, its South Pole will move towards the North Pole of the earth and vice versa.

Uses /Applications

- Magnets are used in making magnetic compasses which help **sailors** and **navigators** to know the **directions**.

Faraday's law of magnetic induction

When a material is placed within a magnetic field, the magnetic forces of the material's electrons will be affected. This effect on electrons is called **Faraday's law** of **electron magnetic induction**.

MAGNETIC SUBSTANCES

On the basis of magnetic behaviour, substances are divided into three categories:

(i) **Diamagnetic materials**
Those materials which have a **weak, negative** susceptibility to magnetic fields. These are **slightly repelled** by a magnetic field, egs. Bismuth, zinc, copper, silver, gold, diamond, mercury, etc.

(ii) **Paramagnetic materials**
Those materials which have a **small, positive** susceptibility to magnetic fields. These are **slightly attracted** by a magnetic field, egs. Aluminium, platinum, magnesium, sodium, oxygen, molybdenum, lithium, tantalum, etc.

(iii) **Ferromagnetic materials**
Those materials which have a **large**, **positive** susceptibility to an external magnetic field. They exhibit a strong attraction to magnetic field, egs Iron, cobalt, nickel, ferric chloride, etc.

- **Electromagnets** are used in generators, motors, loud speakers, telephones, TV sets, fans, mixers, electric bells, Maglev etc.

MODERN PHYSICS

- The nucleus of an consists of protons and neutrons together called nucleons.
- **Photoelectric effect -** It is the phenomenon of emission of electrons by metals when illuminated by light of suitable frequency.
- **Photoelectric current depends on:**
  (i) the intensity of incident light,
  (ii) the potential difference applied between the two electrodes, and
  (iii) the nature of the emitting material.

X-Rays

X-rays are electromagnetic radiations of very short wavelength (0.1 Å to 100 Å) and high energy which are emitted when fast moving electrons or cathode rays strike a target of high atomic mass.

Properties of α, β and γ particles

Properties	α-ray	β-ray	γ-ray
Origin	Nucleus	Nucleus	Nucleus
Nature	Positively charged	Negatively charged	Neutral

Composition	$_2He^4$	$_{-1}e^0$	Photon
Mass	6.4×10^{-31} kg	9.1×10^{-31}kg	zero
Charge	$+2e$	$-e$	zero
Chemical effect	Affects photographic plate	Affects photo graphic plate	Affects photographic plate
Effect of electric and magnetic field	Deflected	Deflected	No effect
Penetrating power	Minimum	In between the other two	Maximum
Ionising power	Maximum	In between the other two	Minimum
Velocity	Between 1.4×10^7 m/s to 2.2×10^7 m/s	1% to 99% of velocity of light	3×10^8 m/s

Nuclear Fission: The process of splitting of a heavy nucleus into two nuclei of comparable size and release of large energy is called **fission.**

U^{235} nucleus captures a thermal neutron. This forms a compound nucleus U^{236} in excited state.

- **Atom bomb** is based on nuclear fission.
- **Nuclear Fusion :** The process in which two or more lighter nuclei combine to form a heavy nucleus is known as nuclear fusion.

$$4\ {}_1H^1 \longrightarrow {}_2He^4 + 2_{+1}e^0 + 2v + Q$$

Important Discoveries in Physics

Discovery	Scientist	Year
Laws of motion	Newton	1687
Law of electrostatic attraction	Coulomb	1779
Atom	John Dalton	1808
Photography (On metal)	J.Neepse	1826
Law of electric resistance	G.S. Ohm	1827
Law of floatation	Archemedes'	1827
Electromagnetic induction	Michael Faraday	1831
Photography (On paper)	W.Fox Talbot	1835
Dynamite	Alfred Nobel	1867
Periodic table	Mandeleev	1888
X-Rays	Roentgen	1895
Radioactivity	Henry Becquerel	1896
Electron	J.J. Thomson	1897
Radium	Madam Curie	1898

Quantum theory	Max Plank	1900
Wireless telegram	Marconi	1901
Diode	Sir J.S. Fleming	1904
Photoelectric effect	Albert Einstein	1905
Principle of relativity	Albert Einstein	1905
Triode	Lee de Forest	1906
Atomic Structure	Neil Bohr & Rutherford	1913
Proton	Goldstein	1886
Raman effect	C.V. Raman	1928
Neutron	James Chadwick	1932
Nuclear Reactor	Anrico Fermi	1942
Law of electrolytic dissociation	Faraday	–
Thermionic emission	Edison	–-

Some more Inventions

Invention	Inventor	Country	Year
Adding machine	Pascal	France	1642
Aeroplane	Wright brothers	USA	1903
Ball-point pen	C. Biro	Hungary	1938
Barometer	E. Torricelli	Italy	1644
Bicycle	K. Macmillan	Scotland	1839
Calculating machine	Pascal	France	1642
Centrigrade scale	A. Celsius	France	1742
Cinematograph	Thomas Alva Edison	USA	1891
Clock (mechanical)	Hsing and ling-Tsan	China	1725
Diesel engine	Rudolf Diesel	Germany	1892
Dynamo	Michael Faraday	England	1831
Electric lamp	Thomas Alva Edison	USA	1879
Evolution(theory)	Charles Darwin	England	1858
Film (with sound)	Dr lee do forest	USA	1923
Fountain Pen	L.E. Waterman	USA	1884
Gramophone	T.A. Edison	USA	1878
Jet Engine	Sir Frank Whittle	England	1937
Lift	E.G. Otis	USA	1852
Match (safety)	J.E. Lundstrom	Sweden	1855
Microphone	David Hughes	USA	1878

Motor car(petrol)	Karl Benz	Germany	1885
Motorcycle	Edward Butler	England	1884
Printing Press	J. Gutenberg	Germany	1455
Radium	Marie and Pierre Curie	France	1898
Radio	G.Marconi	England	1901
Razor (safety)	K.G. Gillette USA	USA	1895
Refrigerator	J. Harrison and A. Catlin	Britain	1834
Rubber(vulcanized)	Charles Good year	USA	1841
Safety pin	William Hurst	USA	1849
Sewing machine	B. Thimmonnier	France	1830
Steam engine (piston)	Thomas Newcome	Britain	1712
Steam engine (condenser)	James Watt	Scotland	1765
Stainless Steel	Harry Brearley	England	1913
Telephone	Alexander Graham Bell	USA	1876
Television	John Logie Bared	Scotland	1926
Thermometer	Galileo Galilei	Italy	1593
Tractor	J.Froelich	USA	1892

Scientific Instruments and their uses

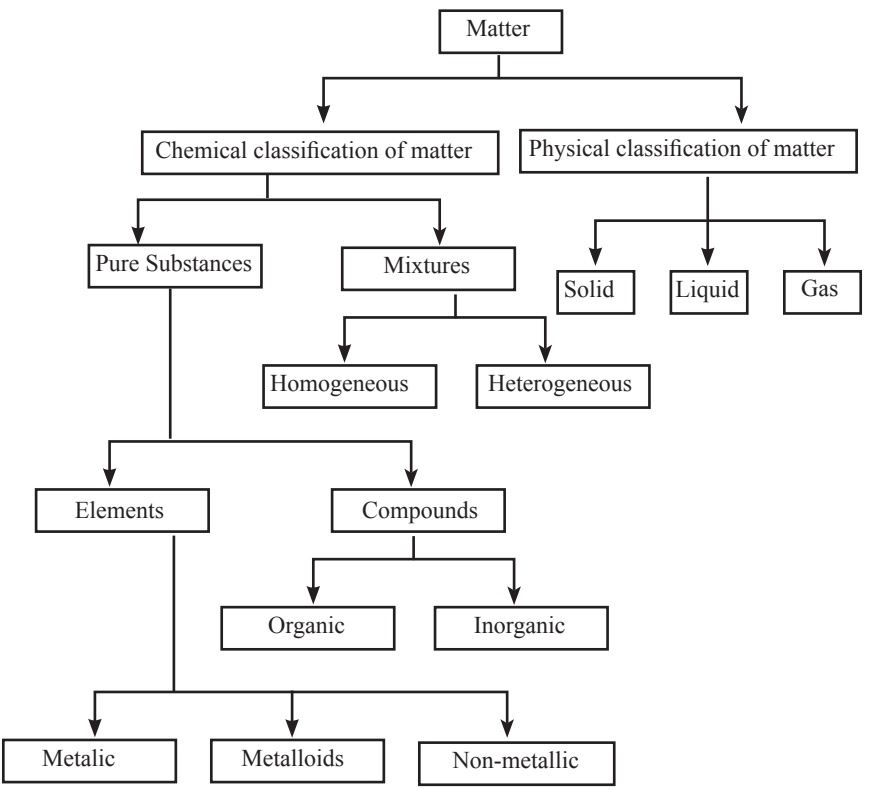
Instrument	Use
Altimeter	Measures Altitudes (in aircraft)
Ammeter	Measures electric current
Anemometer	Measures force and velocity of wind and directions
Audiometer	Measures intensity of sound
Bolometer	To measures heat radiation
Calorimeter	Measures quantities of heat
Cardiogram (ECG)	Traces movement of the heart; recorded on a Cardiograph
Chronometer	Determines longitude of a vessel at sea.
Colorimeter	Compares intensity of colours
Cryometer	A type of thermometer used to measure very low temperatures, usually close to 0°c
Dynamo	To convert mechanical energy into electrical energy
Electroencephalograph (EEC)	Records and interprets the electrical waves of the brain (brain waves) recorded on electroence-phalograms

Electroscope	Detects presence of an electric charge
Endoscope	To examine internal parts of the body
Fathometer	Measures depth of the ocean
Galvanometer	Measures electric current
Hygrometer	Measures level of humidity
Hydrophone	Measures sound under water
Hypsometer	To determine boiling point of liquids
Kymograph	Graphically records physiological movement. (e.g. blood pressure/heartbeat)
Lactometer	Measures the relative density of milk to determine purity
Machmeter	Determines the speed of an aircraft in terms of the speed of sound
Manometer	Measures the pressure of gases
Micrometer	Measure thickness, width, wavelength, diameter of hair, wool, radiation or cell or bacteria.
Microphone	Converts sound wave into electrical vibrations
Microscope	To obtain a magnified view of small objects
Periscope	To view objects above sea level (used in submarines)
Photometer	Compares the luminous intensity of the source of light
Polygraph	Instrument that simultaneously records changes in physiological processes such as heartbeat, blood-pressure and respiration; used as a lie detector
Pyrheliometer	Measures components of solar radiation
Pyrometer	Measures very high temperature
Radar	To detect the direction and range of an approaching aeroplane by means of radio waves, (Radio, Angle, Detection and Range)
Salinometer	Determines salinity of solutions
Sphygmometer	Measures blood pressure
Stereoscope	To view two-dimensional pictures
Stethoscope	Used by doctors to hear and analyze heart and lung sounds
Telemeter	Records physical happenings at a distant place.
Thermostat	Regulates temperature at a particular point
Tonometer	Measures the internal pressure of the eye to detect a disease (glaucoma)
Udometer	Rain gauge to measure the quantity of rain
Ultrasonoscope	To measure and use ultrasonic sound (beyond hearing); use to make a Ecogram to detect brain tumours, heart defects and abnormal growth
Viscometer	Measures the viscosity of liquid

Chemistry

- **Chemistry** is the branch of science which deals with study of matter and various changes it undergoes.

STATES OF MATTER



Classification of Matter

- **Matter** is defined as anything that occupies space and has mass.
- At a given temperature, an element is in one of the three states of matter- **Solid, Liquid** or **Vapour** (Gas).
- **Solids :** Solids possess definite shape and volume.
- They have strongest intermolecular interactions.
- They are generally hard and rigid.
- Examples– Metals, bricks, wood, etc

Liquids

- They possess definite volume but no definite shape.
- They have intemediate intermolecular forces between constituent particles.

- They can flow, so they are called fluids, e.g. water, milk, mercury, oil,etc.

Gases

- Gases have neither a definite volume nor definite shape.
- They takes the volume and shape of the container.
- They are highly compressible and have minimum intermolecular interactions..
- E.g.– air, oxygen, hydrogen, etc.
- **Melting point** of a substance is the temperature at which its solid form changes to a liquid.
- The melting point of water of a pressure of 1dtm or 760 mm Hg is 0 degree on the Celsius temperature scale and 32 degree on the Fahrenheit scale.
- **Boiling point** is the temperature at which the liquid form of a substance changes to a gas.
- The boiling point of water at a pressure of **one atmosphere** or **760 mm** of mercury is **100 degree** on the Celsius scale and 212 degree on the Fahrenheit scale.
- **Crystalline** materials however have a definite orderly arrangement of atoms, ions, or molecules.
- The orderly arrangement of particles or atoms in a crystal is called a **crystal lattice**. For instance, sand, salt, sugar, diamond and graphite are examples of crystalline materials.
- A physical change is a change in matter that involves no chemical reaction. In the case of a physical change a substance retains its chemical identity and molecular composition.
- The three types of physical changes are- **melting**, **evaporation** and **freezing**.
- A change in which the identify of the original substance is changed and new substances are formed is called a chemical change for example sourcing of milk, burning of paper, rusting of iron etc.

ATOM

- An **atom** is the **smallest unit** of an element.
- An atom has a central **nucleus** which is very small compared to the rest of the atom and contains majority of the atomic mass.
- The nucleus carries a **positive charge**.
- The **nucleus** of an atom consists of **protons** and **neutrons**.
- Atoms consists of protons, neutrons, and electrons.
- Electrons revolves around the nucleus.
- **Protons** have a **positive** charge.
- **Electrons** have a **negative** charge.
- **Neutrons** have **no charge**.
- In a neutral atom total charge on proton is equal in magnitude to total charge on electrons.
- Since opposite charges attract protons and electrons attract each other.

ISOTOPES AND ISOBARS

- **Isotopes** are atoms that have **same atomic number** but different mass numbers.
- Isotopes have the same atomic number because the number of protons inside their nuclei remains the same. They have different mass numbers because they have different numbers of neutrons.
- For instance, $_{17}{}^{35}Cl$ and $_{17}{}^{37}Cl$ are isotopes.
- **Isobars** are atoms that have **same atomic mass** but different atomic numbers.
- Isobars have different atomic numbers because they have different numbers of protons. They have the same atomic mass because they have just enough neutrons to make the same total of nucleons.
- For instance, $_{32}{}^{76}Ge$ and $_{34}{}^{76}Se$ are isobars.

ELEMENTS AND COMPOUNDS

- Everything in the universe is made of a combination of a few basic substances called **elements**.
- The element is the simplest form of matter composed of atoms having

identical number of protons in each nucleus.

Elements of the periodic table are majorly divided into s-block, p-block, *d*-block and *f*-block

- A compound is made up of different elements but looks and behaves quite differently.
- A **compound** is a pure substance that contains atoms of two or more chemical elements in definite proportions that cannot be separated by physical means and are held together by chemical bonds.

EXAMPLES OF COMPOUNDS

Formulas	Common Names
H_2O	Water
$C_6H_{12}O_6$	Glucose
NaCl	Salt
C_2H_6O	Ethanol
$C_2H_4O_2$	Vinegar
NH_3	Ammonia
$C_2H_4O_2$	Acetic Acid
C_4H_{10}	Butane
H_2SO_4	Sulphuric Acid
CH_4	Methane
$C_{12}H_{22}O_{11}$	Sucrose (sugar)
C_3H_8	Propane
$NaHCO_3$	Baking Soda
N_2O	Dinitroen oxide
$C_6H_8O_7$	Citric Acid
C_8H_{18}	Octane
$C_{10}H_{16}O$	Camphor

AIR AND WATER

Air is colorless, odorless, tasteless, gaseous mixture, mainly contains nitrogen (approximately 78 percent) and oxygen (approximately 21 percent) with lesser amounts of argon, carbon dioxide, hydrogen, neon, helium, and other gases.

- **Water** consists of hydrogen and oxygen in the ratio of 2:1 by volume and 1:8 by mass.
- **Hard water** has bicarbonates, chlorides sulphates of Ca and Mg. This water is unfit for washing and use in industrial boilers.
- **Heavy water** is **deuterium oxide** (D_2O), molecular mass = 20). It is called heavy due to the presence of deuterium, the heavy hydrogen.

SUBSTANCES & CHEMICAL COMPOSITIONS

Common Name	Chemical Name	Composition	Formula
Alum	Potash	Potassium, Sulphur, Aluminium, Hydrogen and Oxygen	$K_2SO_4Al_2(SO_4)_3$
Bleaching Powder	Calcium hypochlorite	Calcium, Chlorine and Oxygen	CaCl(OCl)
Blue Vitriol	Copper sulphate	Copper, Sulphur and Oxygen	$CuSO_4.5H_2O$
Caustic Potash	Potassium hydroxide	Potassium Hydrogen, and Oxygen	KOH
Chalk	Calcium carbonate	Calcium, Carbon and Oxygen	$CaCO_3$
Caustic Soda	Sodium hydroxide	Sodium, Hydrogen and Oxygen	NaOH
Baking Soda	Sodium bicarbonate	Sodium, Hydrogen, Carbon and Oxygen	$NaHCO_3$

Common Salt	Sodium chloride	Sodium and Chlorine	NaCl
Epsom Salt	Magnesium sulphate	Magnesium, Sulphur, and Oxygen	$MgSO_4.7H_2O$
Galena	Lead sulphide	Lead and Sulphur	PbS
Green Vitriol	Iron sulphate	Iron, Sulphur and Oxygen	$FeSO_4.7H_2O$
Glauber's salt Gypsum	Sodium sulphate Calcium Sulphate dihydrate	Sodium, Sulphur, Oxygen and hydrogen	$Na_2SO_4.10H_2O$ $CaSO_4.2H_2O$
Laughing gas	Nitrous oxide	Nitrogen and Oxygen	N_2O
Lime water	Calcium hydroxide	Calcium, Hydrogen, and Oxygen	$Ca(OH)_2$
Litharge	Lead monoxide	Lead and Oxygen	PbO
Plaster of Paris	Calcium sulphate hemihydrate	Calcium, Sulphur, Hydrogen and Oxygen	$2CaSO_4.H_2O$
Quartz	Sodium silicate	Sodium, Silica and Oxygen	Na_2SiO_3
Quick lime	Calcium oxide	Calcium and Oxygen	CaO
Red lead	Triplumbic	Lead and Oxygen	Pb_3O_4
Sal ammoniac	Ammonium Chloride	Nitrogen, Hydrogen and chlorine	NH_4CI
Soda ash or washing soda	Sodium carbonate	Sodium, Carbon, Hydrogen and Oxygen	$Na_2CO_3.10H_2O$
Soda bicar bonate	Sodium bicarbonate	Sodium hydrogen, Carbon and Oxygen	$NaHCO_3$
White vitriol	Zinc sulphate	Zinc, Sulphur, Hydrogen and Oxygen	$ZnSO_4.7H_2O$

METALS AND NON-METALS

- There are two types of elements- metals and non- metals.
- About 80% known elements are metals.

Metals

- Elements which are hard, ductile, brittle, and malleable, possess lustre and conduct heat and electricity are termed **metals.**
- Except **Mercury and gallium**, all metals are solid.
- **Metals** have usually high melting points and boiling points.

Non-Metals

- Non metals are electronegative elements which have a tendency to gain one or more electrons to form negative ions called **anions.**
- Non metals are **non lustrous** and bad conductors of heat and electricity.

Occurrence of Metals

- **Minerals** are naturally occurring chemical compounds of fixed composition and characteristics, physical form and properties.
- The most common groups of minerals are **silicates**, **oxides**, **sulphides**, and **carbonates** etc.

Uses of Some Metals and Non-Metals Compounds

(i) **Silver Nitrate** ($AgNO_3$) is called lunar caustic and is used to prepare the ink used during voting.

(ii) **Hydrogen Peroxide** (H_2O_2) is used as an oxidishing agent, bleaching agent,

as an insecticide and for washing old oil paintings.

(iii) **Ferrous Oxide** (FeO) is used to prepare ferrous salts and green glass.

(iv) **Ferric Oxide** (Fe_2O_3) is used in jeweller's rouge.

(v) **Silver Iodide** (AgI) is used for artificial rain.

(vi) **Mercuric Chloride** ($HgC1_2$) is used to prepare calomel and as a poison.

Catalyst

A catalyst is a material that is added to a reaction mixture to accelerate the process but is itself not consumed.

Fuels

- The substance, which produce heat and light on combustion are called **fuels**.
- **LPG** (Liquified petroleum gas) is a mixture of hydrocarbons containing three or four carbon atoms, such as propane, butane and pentane.

Calorific Value

S. No.	Fuel	Calorific Value (kJ/g)
1.	Hydrogen	150
2.	Methane	55
3.	Petrol	50
4.	LPG	50
5.	Natural gas	35-50
6.	Kerosene Oil	48
7.	Diesel	45
8.	Bio Gas	35-40
9.	Coal	25-32
10.	Ethanol	30
11.	Wood	17
12.	Cow dung	6-8

Coal is made up of carbon.

- The common varieties of coal are **anthracite**, **bitumen**; **lignite** and **peat** containing 95, 70, 40 and 10-20 percent carbon respectively.
- CNG, gasoline or diesel is obtained by fractional distillation of crude oil.

ACIDS, BASES SALTS AND pH SCALE

- **Acids** are chemical compounds that **taste sour**, turn blue litmus red, and often react with some metals to produce hydrogen gas.
- Acids- HNO_3, HNO_2, H_2SO_4, H_3PO_4, H_3PO_3, H_2CO_3, etc.
- **Bases** are chemical compounds that **taste bitter**, turn red litmus blue and feel **slippery**. Base: (NaOH), $(Ca(OH)_2)$, (KOH), (RbOH), etc.
- When aqueous (water) solutions of an acid and a base are combined, a neutralization reaction occurs.
- The **pH** of a solution measures the hydrogen ion concentration in that solution.
- Anything above pH 7 is alkaline, anything below pH 7 is considered acidic.
- **Human blood** pH should be slightly **alkaline** (7. 35 - 7. 45).

Uses of Some Acids And Bases

Acids	Uses
Nitric acid, oxalic acid	Photography
Sulphuric acid	Petroleum exploration
Hydrochloric acid	Leather industry
Benzoic acid, formic acid, citric acid, acetic acid etc.	Preservation for food stuff
Bases	
Calcium hydroxide and calcium oxide	Manufacture of bleaching powder
Magnesium hydroxide	antacid in sugar industries

Sodium hydroxide	manufacture of hard soaps and drugs, paper and textile industry, Petroleum refining
Potassium hydroxide	manufacture of soft soaps

Sources of Some Naturally Occurring Acids

Acid	Source
Citric acid	Lemon, orange, grapes
Maleic acid	Unripe apple
Tartaric acid	Tamarind
Acetic acid	Vinegar
Lactic acid	Milk
Hydrochloric acid	Stomach
Oxalic acid	Tomato

Acidic & basic nature of some household substances

Acidic	Basic (Alkaline)
1. Bathroom acid	1. Milk of magnesia (Antacids)
2. Vitamin C tablets (Ascorbic acid)	2. Toothpaste
3. Lemon juice	3. Soap solution or detergent solution.
4. Orange juice	4. Solution of washing soda.
5. Tomato juice	5. Slaked lime & white wash
6. Vinegar	
7. Fizzy drinks (Colas & Sodawater)	

pH VALUE OF SOME IMPORTANT SUBSTANCES

Sodium Hydroxide: Alkaline	14. 0
Ammonia	11. 0
Baking Soda	8. 3
Human Blood	7. 4
Pure Water: Neutral	7. 0
Milk: Acid	6. 6
Tomatoes	4. 5
Wine and Beer	4. 0
Apples	3. 0
Vinegar	2. 2
Lemon Juice	2. 0
Battery Acid	1. 0
Urine(Human)	5. 5 to 7. 5
Tears	7. 4
Sea water	8. 5
Milk (Cow)	6. 3 to 6. 6
Coffee	5.0
Tooth paste	9.0

PLASTICS AND POLYMERS

- **Plastics** consist of very long molecules, each composed of carbon atoms linked into chains.
- Polythene is composed of over 200000 carbon atoms.
- Although some plastics are made from plant oils, the majority are made from fossil fuels.
- **Polymers** are large long chain like molecules formed by the chemical linking of many smaller molecules.
- The small molecular building units are called **monomers**.
- **Monomers** are joined into chains by a process of repeated linking known as **polymerization**.
- **Starch** and **wool**- Natural polymers
- **Nylon** and polyethylene- Synthetic polymers

- Natural **rubber** is obtained from milky white fluid **Latex**.
- The simplest unit of rubber is **isoprene** (C_5H_8).
- **Vulcanization** gives strength, hardness, and elasticity to rubber.

Some common man-made polymers and their uses

Polymer	Use
Polythene	Packaging material, carry bags, bottles etc.
Polypropene	Bottles, Crates etc.
Polyvinyl chloride (PVC)	Pipes insulation
Nylon (Polyester)	Fibres, ropes etc.
Teflon	Nonstick kitchen wares
Vinyl rubber	Rubber erasers
Polystyrene	Foam Thermocole
Poly (Styrene buta-diene)	Rubber bubble gum
Bakelite	Electrical insulation buttons
Lexan	Bullet proof glass
Melamine	Crockery

RADIOACTIVITY

- **Radioactivity** is discovered by French physicist **Henry de Becquerel** in 1896, who observed that uranium mineral gave off invisible radiation.
- **Pierre and Madam Curie** showed similar phenomenon in other metals like polonium, francium and radium.
- Radiations are of three kinds: Alpha, Beta and Gama

NUCLEAR REACTIONS AND ATOMIC ENERGY

- A nuclear reaction is a process in which two nuclei or nuclear particles collide, to produce different nuclei than the initial particles.
- Nuclear reactions are of two types : Nuclear **fission** and Nuclear **fusion**.
- **Nuclear fission** is the fragmentation of a large nucleus into two smaller nuclei and the liberation of a large amount of energy.
- **Atom bomb** is based on nuclear fission. U^{235} and P_u^{239} are used as fissionable material.
- Atom bomb was discovered by **Otto Hahn**.
- On **6 august 1945**, an atom bomb was dropped on **Hiroshima** city in Japan. The second was dropped on **Nagasaki**. The bomb was made of **Plutonium** -239
- **Nuclear Fusion**
  It is a nuclear reaction in which lighter nuclei fuse to form a nucleus of greater mass. In this reaction also an enormous amount of heat is produced.
- **Hydrogen bomb** is based on nuclear fusion.
- **Atomic energy** Energy produced by nuclear fission and nuclear fusion is called nuclear energy or Atomic energy.
- In this process the loss of mass is converted into energy.

ELECTROPLATING

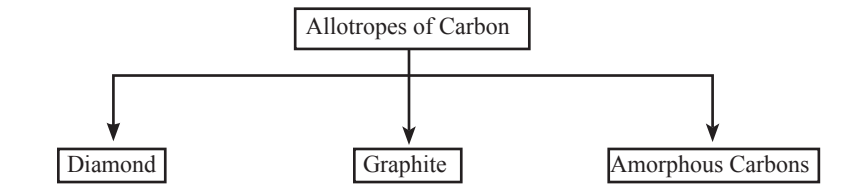
- It is a process of plating one metal onto another by **electrolysis**, most commonly for **decorative purposes** or to prevent **corrosion** of a metal.
- **Types of electroplating** capsopper plating, silver plating, and chromium plating, etc.

CARBON AND ITS COMPOUNDS

- All organic compounds contain carbon, and the vast majority also contains hydrogen bonded to carbon.
- It is non-metal.
- Its atomic number is 6 & A mass is 12.
- Carbon which formed the back bone of organic chemistry exhibit allotropy.

Allotropes

- Allotropes are substances which have same chemical properties but different physical properties.
- They have different crystalline modifications.
- Above properties of substances are called allotropy.



- It has crystalline structure.
- It is purest form of carbon.
- It is hardest natural substance.
- It is highly transparent
- It is bad conductor of electricity & heat.
- It has very high refractive index.
- It is chemically inert.
- It forms tetrahedral crystals.
- It has high melting point & density
- It is used in jewellry & industries.

- It has crystalline structure
- It is called black lead
- It is soft, dark grey etc.
- It is good conductor of electricity & heat.
- It is chemically more reactive than diamond.

Uses : It is used in making –
(a) pencils,
(b) moderator in nuclear reactor
(c) lubricant in machinery.

- They does not have crystalline structure.
- They are product of pyrolysis.
- Pyrolysis is the process of decomposing a substance on heating
- Coal & Soot (carbon black) are the examples.

Graphene

- It is allotrope of carbon
- It is a single layer graphite.
- It has extra-ordinary electrical/ thermal & physical properties
- It can replace silicon in electronics

- **Diamond, graphite, charcoal, coke, coal** etc. are different forms of carbon.

GLASS

Glass is a mixture of an alkali silicate with the silicate of a base, that is, silica, sodium silicate and calcium or lead silicate.

Type & Uses

(i) **Milky Glass** is prepared by adding tin oxide (SnO_2), calcium phosphate [$(Ca_3(PO_4)_2$] or cryolite (Na_3AlF_6) to the melt glass.

(ii) **Flint Glass** contains lead oxide (PbO) and used in optical instruments like lenses, prisms.

(iii) **Soda or Soft Glass** is sodium calcium silicate ($Na_2O.\ CaO.\ 6SiO_2$). It is the ordinary glass and used for making bottles, window panes, etc.

(iv) **Potash Glass or Hard Glass** contains potassium carbonate (K_2CO_3). It has higher softening temperature. It is used for making beakers, flasks, funnel, etc.

(v) **Crown Glass** contains potassium oxide (K_2O), Barium oxide (BaO), boric oxide (B_2O_3) and silica (SiO_2). It is used for **optical** apparatus.

(vi) **Crook's Glass** contains cesium oxides. It is used for **spectacles** as it absorbs UV rays.

(vii) **Glass Laminates** is made by fixing polymer sheet between layers of glass. It is used to make windows and screens of cars, trains and aircraft.

(viii) **Jena Glass** contains B_2O_3 and alumina. It is resistant to acids and alkalies. It is used for making laboratory bottles, for keeping acids and alkalies.

CHEMICAL NAME OF SOME COMMON COMPOUNDS

Common name	Chemical name
Acid of sugar	Oxalic acid
Alcohol,	Ethyl alcohol
Alum	Potassium aluminium sulphate
Alumina	Aluminium oxide
Aqua regia	Nitrohydrochloric acid
Aspirin	Acetylsalicylic acid
Baking soda	Sodium bicarbonate
Banana oil (artificial)	Isoamyl acetate
Bicarbonate of soda	Sodium hydrogen carbonate or sodium bicarbonate
Black ash	Crude form of sodium carbonate
Bleaching powder	Chlorinated lime; calcium hypochlorite
Bone ash	Crude calcium phosphate
Borax	Sodium tetraborate Decahydrate
Brine	Aqueous sodium chloride solution
Calomel	Mercury chloride; mercurous chloride
Carbolic acid	Phenol
Caustic potash	Potassium hydroxide
Caustic soda	Sodium hydroxide
Chalk	Calcium carbonate
Chile saltpeter	Sodium nitrate
Chile nitre	Sodium nitrate
Copperas	Ferrous sulfate
Cream of tartar	Potassium bitartrate
Ethanol	Ethyl alcohol
Fixed white	Barium sulfate
Galena	Natural lead sulfide
Glauber's salt	Sodium sulfate
Green verditer	Basic copper carbonate
Green vitriol	Ferrous sulfate crystals
Gypsum	Natural calcium sulfate
Hypo (photography)	Sodium thiosulfate solution
Laughing gas	Nitrous oxide
Lime	Calcium oxide
Lunar caustic	Silver nitrate
Methanol	Methyl alcohol

Milk of magnesium	Magnesium hydroxide
Oil of vitriol	Sulfuric acid
Oil of wintergreen (artificial)	Methyl salicylate
Orthophosphoric acid	Phosphoric acid
Paris blue	Ferric ferrocyanide
Paris green	Copper acetoarsenite
Paris white	Powdered calcium carbonate
Pear oil (artificial)	Isoamyl acetate
Pearl ash	Potassium carbonate
Permanent white	Barium sulfate
Plaster of paris	Calcium sulfate
Precipitated chalk	Calcium carbonate
Quicklime	Calcium oxide
Quicksilver	Mercury
Rock salt	Sodium chloride
Saltpeter	Potassium nitrate
Soda ash	Sodium carbonate
Soda nitre	Sodium nitrate
Sugar	Sucrose
Vinegar	Impure dilute acetic acid
Vitamin c	Ascorbic acid
Vitriol	Sulfuric acid
Washing soda	Sodium carbonate
Water glass	Sodium silicate
White caustic	Sodium hydroxide
White lead	Basic lead carbonate
White vitriol	Zinc sulfate crystals
Yellow prussiate of potash	Potassium ferrocyanide
Yellow prussiate of soda	Sodium ferrocyanide
Zinc vitriol	Zinc sulfate
Zinc white	Zinc oxide

SOME CHEMICAL SUBSTANCES AND THEIR USES

Soaps and Detergents: Soaps are the sodium or potassium salts of fatty acids. They are made by the saponification of fats. Detergents are made from some petroleum products.

Antibiotic: Medicinal compounds produced by moulds and bacteria, capable of destroying or preventing the growth of bacteria in animal systems. For example penicillin, chloramphenicol etc.

Antibody: Kinds of substances formed in the blood, tending to inhibit or destroy harmful pathogens, etc.

Antigen : Substance capable of stimulating formation of antibodies in a host. It is the foreigne substance which enters the host and use its system to sustain. For example bacteria, virus etc.

Antipyretic: A substance used to lower body temperature.

Pesticides: They are used to kill pests. Pests are living organism, who destroy crops or eat away grains.

Insecticides: They are used to kill insects for example D.D.T aluminium phosphate gammexene.

Fungicide: They are used to kill fungus. For example. Copper sulphate, Bordeax mixture.

Rodenticides: They are used to kill rodents. For example, Aluminium phosphide, Thalium sulphate.

Herbicides: They are used to kill weeds Benzipram, benzadox.

Sulphadrugs: Alternatives of antibiotics, sulphanilamide, sulphadiazine, Sulpha gunamidine.

Antacids: Substances which neutralise the excess acid and raise the pH to appropriate level in stomach are called antacids.

Epsom salt: Hydrated magnesium sulphate ($MgSO_4 \cdot 7H_2O$), used in medicines to empty bowels.

Chloroform: A sweetish, colourless liquid. It is used as a solvent and anaesthetic.

Saccharin: A white crystalline solid which is 550 times sweeter than sugar, but does not have any food value. It is used by diabetic patients.

DDT: Dichloro diphenyl tricholoro ethane, a white powder used as an insecticide.

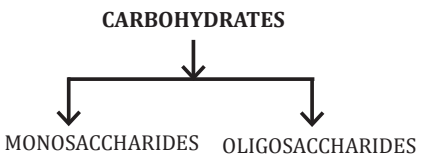
GENERAL ORGANIC CHEMISTRY

CARBOHYDRATES

Carbohydrates are defined as the optically active polyhydroxy aldehydes or ketones or substances which yield these on hydrolysis.

Classification of Carbohydrates

Based on Molecular Size



Based on Nature

Carbohydrates are also classified as reducing and non-reducing sugars depending on whether they reduce Fehlings and Tollen's reagent or not.

Based on Taste

Carbohydrates with sweet taste are called sugars while those without a sweet taste are called non-sugars.

LIPIDS

Lipids are organic compounds soluble in non-polar fat solvents such as acetone, ether, chloroform, benzene, etc. and insoluble in water. The most important role of lipids is that of biological fuel. Lipids supply more energy than carbohydrates, excess of lipids is stored in the body and used at the time of starvation.

PROTEINS

Proteins are highly complex, natural compounds, composed of a large number of different α–amino acids joined together with peptide linkage, i.e., they are naturally occurring polypeptides. The biological importance of proteins can be judge by the fact that the animals can live for a long time without fat or carbohydrate, but not without protein.

NUCLEIC ACIDS

Nucleic acids are colourless, complex, amorphous, compounds made up of three units: bases, sugar and phosphoric acid. These are macro-molecules of high molecular weight and are present in every living cell.

BRANCHES OF SCIENCE

Acarology	–	study of mites
Adenology	–	study of glands
Angiology	–	study of blood flow and lymphatic system
Apiology	–	study of bees
Arthrology	–	study of joints
Astheniology	–	study of diseases of weakening and aging
Auxology	–	science of growth
Barology	–	study of gravitation
Biometrics	–	study of biological measurement
Bromatology	–	study of food
Ctetology	–	study of the inheritance of acquired characteristics
Cacogenics	–	study of racial degeneration
Carcinology	–	study of cards and other crustaceans
Carpology	–	study of fruits and seeds
Catacoustics	–	science of echoes or reflected sounds
Cetology	–	study of whales and dolphins

Chemistry	–	study of properties of substances
Chirography	–	study of handwriting or penmanship
Coprology	–	study of pornography
Cosmology	–	study of the universe
Craniology	–	study of the skull
Dactylography	–	the study of fingerprints
Dactylology	–	study of sign language
Demography	–	study of population.
Demology	–	study of human behaviour
Dermatology	–	study of skin
Ecology	–	study of environment
Edaphology	–	study of soils
Emetology	–	study of vomiting
Emmenology	–	the study of menstruation
Endocrinology	–	study of ductless glands
Entomology	–	study of insects
Entozoology	–	study of parasites that live inside larger organisms
Epidemiology	–	study of diseases; epidemics
Euthenics	–	science concerned with improving living conditions
Geochemistry	–	study of chemistry of the earth's crust
Geogony	–	study of formation of the earth
Geology	–	study of earth's crust
Geoponics	–	study of agriculture
Graminology	–	study of grasses
Gynaecology	–	study of women's physiology
Halieutics	–	study of fishing
Helminthology	–	study of worms
Hematology	–	study of blood
Hepatology	–	study of liver
Herpetology	–	study of reptiles and amphibians
Histology	–	study of the tissues of organisms
Horology	–	science of time measurement
Horticulture	–	study of gardening
Hyetology	–	science of rainfall
Hygienics	–	study of sanitation; health
Hygiastics	–	science of health and hygiene
Hypnology	–	study of sleep; study of hypnosis
Insectology	–	study of insects
Ichthyology	–	study of fish
Irenology	–	the study of peace
Kalology	–	study of beauty
Kinematics	–	study of motion
Kinetics	–	study of forces producing or changing motion
Karyology	–	study of cell nuclei
Laryngology	–	study of larynx
Lepidopterology	–	study of butterflies and moths

Leprology	–	study of leprosy
Magnanerie	–	art of raising silkworms
Magnetics	–	study of magnetism
Malacology	–	study of molluscs
Malariology	–	study of malaria
Mammalogy	–	study of mammals
Mastology	–	study of mammals or mammary glands or breast diseases
Meteoritics	–	study of meteors
Meteorology	–	study of weather
Metrology	–	science of weights and measures
Microbiology	–	study of microscopic organisms
Microclimatology	–	study of local climates
Microphytology	–	study of very small plant life
Morphology	–	study of forms and the development of structures
Myology	–	study of muscles
Magirics	–	art of cookery
Nasology	–	study of the nose
Neonatology	–	study of newborn babies
Nephology	–	study of clouds
Nephrology	–	study of the kidneys
Obstetrics	–	study of midwifery
Odontology	–	study of teeth
Oncology	–	study of tumours
Oology	–	study of eggs
Optics	–	study of light
Ornithology	–	study of birds
Osteology	–	study of bones
Otology	–	study of the ear
Paedology	–	study of children
Palaeontology	–	study of fossils
Parasitology	–	study of parasites
Pathology	–	study of disease
Pharmacology	–	study of drugs
Physiology	–	study of processes of life
Psychology	–	study of mind
Pyretology	–	study of fevers
Rheumatology	–	study of rheumatism
Radiology	–	study of X-rays and their medical applications.
Seismology	–	study of earthquakes
Sociology	–	study of society
Tectonics	–	science of structure of objects, buildings and land forms
Toxicology	–	study of poisons
Urology	–	study of urine; urinary tract
Virology	–	study of viruses
Xylology	–	study of wood
Zoiatrics	–	veterinary surgery
Zoology	–	study of animals

Biology

INTRODUCTION

Biology is the study of life and living organism, including their structure, function, evolution, distribution, identification and Taxonomy

- **Aristotle** is often called "the father of biology".
- **Leeuwenhoek** invented a simple microscope and studied living cells.
- **Alexander Flemming** discovered Penicillin.
- **Carolus Linnaeus** introduced Binomial Nomenclature for naming plants and animals.
- **Charles Robert Darwin** proposed the theory of Pangenesis to explain inheritance and also proposed Origin of species by Natural Selection.
- **Gregor Johann Mendel** discovered principles of inheritance.
- **Lamarck** discarded the idea of fixity of species.
- **Louis Pasteur** proposed 'Germ theory of disease. He also proposed pasteurization for sterilization.
- **Robert Hooke** assembled a compound microscope and discovered cells in cork.
- **William Harve**y discovered blood circulation.
- **T.H. Morgan** laid foundation of gene theory.
- **David Baltimore** is known for his discovery of reverse transcriptase.
- **Charles Darwin** is famous for the theory of Natural selection.
- **Hippocrates** is considered to be the *"father of western medicine"*.
- **Edward Jenner** is famous for creating the first effective vaccine for smallpox-(*father of immunology*)
- **Joseph Lister** is famous for using antiseptics for cleaning and sterilizing wounds.
- **Robert Brown** discovered the cell nucleus.
- **William Watson (1909)** introduced the term Genetics.
- **Watson and Crick** gave the model of DNA.
- **In 1866 Ernst Haeckel** coined word "ecology"
- **Hippocrates and Aristotle** laid the foundation of ecology.
- **Camillo golgi** discovered golgi body.
- **Salim Ali** known as the "*birdman of India*"
- **Har Gobind Khorana** is a biochemist who won the Nobel Prize in 1968 for demonstrating how the *nucleotides in nucleic acids control the synthesis of proteins*.

CELLS

- All living organism are constituted of structural and functional units called cells.
- *Robert Hook* coined the term '*cell*' in 1665.
- Cells are grouped into tissues, tissues into organ and organs into organ system.
- Smallest cells- Mycoplasmas.
- Largest isolated single cell- egg of an ostrich

Prokaryotic Cells

- Morphologically most primitive cells.
- It is without nucleus.

- A single membrane surrounds the cell.
- It is found in bacteria, blue green algae, mycoplasma.
- The plasma membrane is semi permeable in nature.
- Many prokaryotes have small circular DNA molecules called *plasmids*.
- Cell devision occurs by fission or budding.

Eukaryotic Cells

- The eukaryotic cells occur in all protists, fungi, plants and the animals.
- Eukaryotic cells are typically composed of plasma membrane, cytoplasm and its organelles viz. mitochondria, endoplasmic reticulum, golgi complex a true nucleus, etc.

Cell Wall

- Cell wall is present in plants.
- Cell division occurs by mitosis and meiosis.
- Cell wall is unique feature of plant cell which is made up of *cellulose* and is totally absent in animals.

Cell Membrane

- Cell membrane is composed of lipids.
- The function of plasma membrane is the transport of the molecules across it.
- **Lysosomes** these are popularly called "*suicide bags*"

Nucleus

- It is centrally located spherical and largest component of all eukaryotic cell. Nucleolus is present in nucleus.
- *Robert Brown* named it Nucleus.

Mitochondria

- These are also called "*Powerhouse of cells*".

Genetics

- Study of genes is known as **genetics**.

Gene

- It is a segment of DNA and *basic unit of heredity*. These are located on chromosomes.
- **DNA** is found in nucleus, and also found in mitochondria and chloroplast.
- It stands for **deoxyribonucleic acid (DNA)**.
- It is double stranded.
- It consists of Nitrogenous bases- **Adenine, Thymine, Cytosine** or **Guanine**, 5-carbon sugar and a phosphate molecule.
- **RNA** is single stranded.
- It consists of phosphate, ribose sugar, nitrogenous bases- **Adinine**, **Uracil**, **Cytosine**, and **Guanine**.
- **Mendel** conducted cross hybridization experiments on green pea plant (*Pisum sativum*).

Mutation

- Sudden change in the sequence of DNA is known as mutation.

Sex Determination

- X and Y are the sex chromosomes which are responsible for the determination of sex. 46 chromosomes are present in human body cell. In which 22 pairs of these are *autosomes* & 23nd is sex chromosomes, ie. *x* & *y*.

Genetic disorder

- It is caused due to abnormality in an individual DNA.

Some Human Body Disorder

Disorder	Symptom	Defect
Cystic fibrosis	Mucus clogs lungs, liver, and pancreas	Failure of chloride ion transport mechanism
Sickle-cell anemia	Poor blood circulation	Abnormal hemoglobin molecules
Tay-Sachs disease	Deterioration of central nervous system in infancy	Defective enzyme (hexosaminidase A)
Phenylketonuria	Brain fails to develop in infancy	Defective enzyme (phenylalanine hydroxylase)

Hemophilia	Blood fails to clot	Defective blood-clotting factor VIII
Huntington's disease	Brain tissue gradually deteriorates in middle age	Production of an inhibitor of brain cell metabolism
Muscular dystrophy (Duchenne)	Muscles waste away	Degradation of myelin coating of nerves stimulating muscles
Congenital hypothyroidism	Increased birth weight, puffy face, constipation, lethargy	Failure of proper thyroid development
Hypercholesterolemia	Excessive cholesterol levels in blood, leading to heart disease	Abnormal form of cholesterol cell surface receptor

Blood Group

- **Karl Landsteiner** (1900) discovered the blood group in human.
- There are four groups of blood A, B, AB and O.
- **Universal Donor :** '*O*' blood group person is '**universal donor**', i.e can give blood to all the four blood groups (O, A, B, and AB).
- **Universal Recipient :** '*AB*' blood group person is **universal recipient**', i.e can take blood from all the four groups (AB, A, B, O).

PLANT PHYSIOLOGY

Photosynthesis

- It is the process by which plants makes their food in the presence of sunlight, CO_2, water and chlorophyll.

$$6CO_2 + 12H_2O \xrightarrow[\text{Chlorophyll}]{\text{Light}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

Respiration

- It is the process of oxidation which occurs in three steps. Glycolysis, Krebs Cycle and Electron transport system.
  It occurs in Cytoplasm (Glycolysis) and rest cycle in Mitochondria.

$$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$$

Transpiration

- Loss of water in the form of water vapour from plant through a small pore **stomata** is known as Transpiration.
- Plants obtains nitrogen from soil in the form of nitrites, nitrates and salts.

HUMAN PHYSIOLOGY

Animals & their teeth

Man (Child)	20
Man (adult)	32
Horse	44
Dog	42

Cow & Sheep	32
Cat	30
Rabbit	28
Mouse	16

Digestion of Food

Name of the Digestive juice	Name of the enzymes	Substrate	End product
Saliva	Ptyalin (Salivary amylase)	Starch	Maltose
Pancreatic juice	Amylopsin (pancreatic amylase)	Starch, Glycogen	Maltose and Glucose
Intestinal juice	Sucrase (invertase), Maltase, Lactase	Sucrose; Maltose, Lactose	Glucose and fructose, Glucose, and galactose
Gastric Juice	Pepsin, Rennin	Proteins, Casein	Proteoses and peptones, Calcium caseinate
Pancreatic Juice	Trypsin, Chymotrypsin, Carboxyl peptidases	Proteins, Peptides	Proteoses and Peptides Amino acid.
Intestinal juice	Amino peptidase, Dipeptidase	Peptides	Amino acids

Vitamin required by the body

Vitamin	Chemical Name	Function in Body	Deficiency Disease	Sources
B_1	Thiamine pyrophosphate	Part of coenzyme for respiration	**Beri-beri:** nerve and heart disorders	Found in whole grain cereals, etc.
B_2	Riboflavin	Part of coenzyme FAD needed for respiration	**Ariboflavinosis:** skin and eye disorders	Milk, yogurt, etc.
B_{12}	Cyanoco-balamin	Coenzyme needed for making red blood cells, etc.	**Pernicious anaemia**	Animal products etc.
B_5	Nicotinic acid ('niacin')	Part of coenzymes NAD, NADP used in respiration	**Pellagra:** skin, gut and nerve disorders	Widespread in foods.
C	Ascorbic acid	Not precisely known	**Scurvy:** degeneration of skin teeth and blood vessels.	Lemon, orange, etc.
A	Retinol	Visual pigment, rhodopsin	**Xeropthalmia:** 'dry eyes'	Milk, eggs, etc.

D	Cholecalciferol	Stimulates calcium absorption by small intestine, needed for proper bone growth	**Rickets:** bone deformity	Found in dairy products, etc.
E	Tocopherol	Not precisely known	**Infertility**	Found primarily in plant oils, green, leafy vegetables, etc.
K	Phylloquinone	Involved in blood clotting	**Possible haemorrage**	Green, leafy vegetables, etc.

Minerals required by the body

Minerals	Source	Function
Sodium (Na)	Table salt large amounts is present in processed foods, etc.	for proper fluid balance, etc.
Chloride	Table salt, large amounts is present in processed foods, etc.	for proper fluid balance, etc.
Potassium	Meats, milk, etc.	for proper fluid balance, etc.
Calcium	Milk and milk products, etc.	Important for healthy bones and teeth, etc.
Phosphorus	Meat, fish, poultry, eggs, milk, processed foods.	Important for healthy bones and teeth, etc.
Magnesium	Nuts and seeds; etc.	Found in bones, etc.
Sulfur	Occurs in foods as part of protein, meats, etc.	Found in protein molecules.
Iron	Organ meats; etc.	found in red blood cells.
Iodine	Seafood, foods grown in iodine-rich soil, etc.	Found in thyroid hormone.

Protein Deficiency Diseases

- **Marasmus** is produced by a simultaneous deficiency of proteins and calories.
- **Kwashiorkar** is produced byprotein deficiency.

Respiratory System

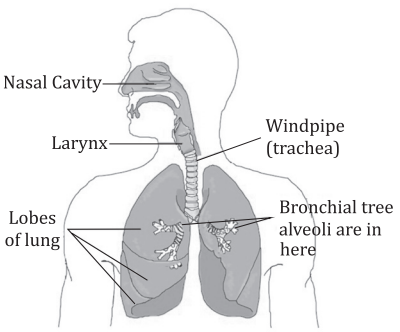
The organ system which aids in the process of respiration is called the Respiratory system.

Organs of Respiration in Animals

Respiratory Organ	Animals
Lungs	Mammals, Birds, Reptiles and Amphibians
Gills	Fish, Crabs, Tadpole larva of Frog
Skin	Earthworm, Leech, Amphibians
Trachea	Insects

Human Respiratory System

- Human respiratory system consists of external nostrils, nasal cavity, nasopharynx, larynx, trachea, bronchiole and lungs.
- Human respiratory system consists of external nostrils, nasal cavity, nasopharynx, larynx, trachea, bronchiole and lungs.



Transport of gases

- 97% of oxygen is transported from the lungs to the tissues in combination with haemoglobin ($Hb + O_2 \longrightarrow HbO_2$, oxyhaemoglobin). 3% is transported in dissolved condition by the plasma.

There are three ways of transport of CO_2.

- 5%–7% (approximately) of CO_2 is transported, being dissolved in the plasma of blood.
- CO_2 react with the water to form *carbonic acid* (H_2CO_3) by the enzyme carbonic anhydrase (present in RBC).
- CO_2 reacts with amine radicals (NH_2) of haemoglobin molecule and forms a carbamino – haemoglobin ($HbCO_2$) molecule. Nearly 23% of CO_2 is transported through this mode.

Circulatory System

- These are of two types open circulatory system and closed circulatory system.

Open Circulatory System

- Generally present in arthopods and molluscs.

Closed Circulatory System

- Annelids and chordates have a closed circulatory.

Heart beat and pulse

- The human heart beats at the rate of about 72-80 per minute in the resting condition.

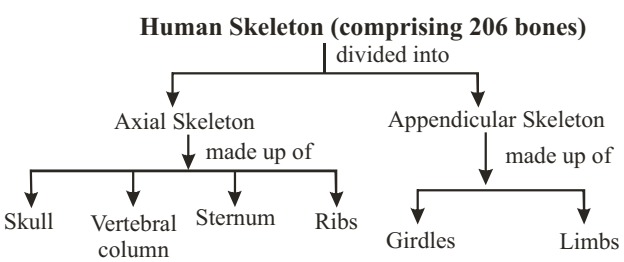
Electrocardiograph

- ECG stands for Electrocardiogram. It is the graphic record of electronic current produced by the excitation of cardiac muscles.

Excretion

- It is process of removal of undigested wastes from the body.
- Kidney plays a major role in the elimination of water waste in the form of urine.
- Urine contains ammonia, urea, uric acid, etc.

Skeletal System



Axial Skeleton: Skeleton which occurs in the mid axial or longitudinal part of the body.

(i) **Skull** is made up of 29 bones. It is composed of

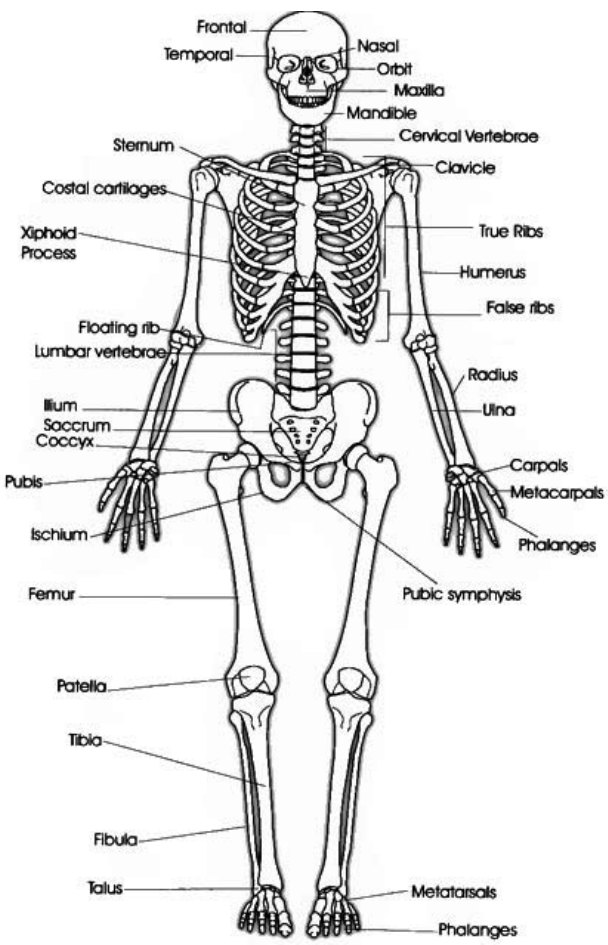
- **Cranium (8 bones):** Frontal -1; Parietal-2; Occipital-1; Temporal - 2; Sphenoid - 1; Ethmoid - 1.
- **Facial bones (14 in number):** Nasal-2; Maxillae - 2; Zygomatic -2; Lacrymals-2; Mandibles - 1; Inferior turbinals-2; Vomer-1; Palatines-2. Hyoid Tongue bone-1
- **Ear ossicles (6 bones):** Malleus -2; Incus - 2; Stapes - 2.

(ii) **Vertebral column:** 33 in babies, 26 in adults. Grouped into 5 categories :

- Cervical-7; Thoracic-12; Lumber-5; Sacral - 5; Coccygeal - 4 (fused in adults).

(iii) **Sternum:** Composed of 3 parts → Manubrium, body of sternum and xiphoid process .

(iv) **Ribs:** They are twelve pairs. First seven pairs are true ribs. The 8th, 9th and 10th ribs are called false ribs or vertebrochondrial ribs. The last 11th and 12th pairs are called floating ribs.



Appendicular Skeleton: Present laterally or attached to the axial skeleton.

(i) **Girdles :** 2 types - pectoral and pelvic.
Pectoral girdle: made of two parts - clavicle and scapula.
Pelvic girdle: made of three bones - ilium, pubis and ischium.

(ii) **Limb bones:** Hind limbs and fore limbs - both made up of 30 bones each.
Fore limbs: Humerus (1); Radius-Ulna (2); Carpals (8); Metacarpals (5); Phalanges (14); Phalanges formula = 2, 3, 3, 3,

(iii) **Hind limbs:** Femur (1); Tibia-Fibula (2); Patella (1); Tarsals (7); Metatarsals (5); Phalanges (14).

IMPORTANT FACTS OF HUMAN BODY

Blood volume	5 to 5.5 L (in 70 kg body)
Blood platelets	200000-400000 per cubic mm
Blood clotting time	2-5 minutes
Universal blood donor	O Rh-(ve)
Universal blood recipient	AB
Longest bone	Femur (Thigh bone)
Smallest bone	Ear-ossicle and stapes
Normal body temperature	98.6° F or 37°C
Weight of brain	1424 g
Total number of bones in the human body	206
Total number of muscles in the body	639
WBC	5000-7000/cub.ml
RBC	5m/cub.ml OR 50,00000/cub.ml
Largest muscle in the body	Gluteus maximus (Buttock muscle)
Largest organ of human body	Skin
Largest endocrine gland	Thyroid
Menopause age	40-50 years
Minimum regeneration power	In brain cells
Thinnest skin	Conjunctiva
Number of cells in body	75 trillion
Hb (Hemoglobin) content in body	(i) 12-17 g/dl (male) (ii) 12-15 g/dl (Female) (iii) New born: 14-24 g/dl (vi) Child: 11-16g/dl
Normal BP	120/80 mm Hg
Pulse rate	72/minute
Breathing rate	16-20/minute
ESR (Erythrocyte Sedimentation Rate)	4-10 mm/hour
Normal sperms count	200-350 million/ejaculation & 40-300 million/ml

Functions of different regions of the brain

Region	Functions
Forebrain	Sense of smell.
├ **Olfactory lobes**	Thinking, memory, learning and emotions.
├ **Cerebrum**	Speech, facial muscular activities and higher mental activities.
│ ├ Frontal lobe	Hearing.
│ ├ Temporal lobe	Sight.
│ ├ Occipital lobe	Touch, taste, smell, temperature and conscious association.
│ └ Parietal lobe	Controls hunger, thirst, fatigue, sleep, body temperature, sweating and emotions.
└ **Diencephalon**	Connects the forebrain and hind brain, controls reflex movements of head, neck, and trunk in response to visual and auditory stimuli.
Mid brain	Maintains posture, equilibrium and muscle tone.
Hind brain	Controls respiration.
├ Cerebellum	Controls heart beat, breathing movements, regulates blood pressure, swallowing, coughing, sneezing and vomiting.
├ Pons varoli	
└ Medulla oblangata	

Disease and Defence Mechanism

Pratozoan diseases

Disease	Pathogen
1. Malaria	Plasmodium
2. Amoebiasis	Enta moeba histolytica
3. Giardiasis	Giardia Lambia
4. Sleeping Sickness	Trypanosoma
5. Leshmanis	Leishmania
6. Trichomoniasis	Trichomonas Vaginalis

Fungal diseases

Disease	Pathogen
1. Aspergillosis	Aspergillus fumigatuo
2. Candidiasis	Candida albicens
3. Ringworm	Trichoplyton
4. Blastomycosis	Blasto myces dermatitidis
5. Sporotnichosis	Sporothrix Schenckii

Immunity

- The term **immunity** refers to the specific resistance exhibited by the host towards infections by micro-organisms (*pathogens*) and their products.

Innate immunity

- It is developed in an individual without having the disease or immunization, e.g.,

Acquired Immunity

- The resistance against infectious disease that an individual acquires during life is known as acquired immunity.

MERS: Middle East Respiratory Syndrome (MERS) is new viral disease related to respiratory illness.

Ebola: Ebola hemorrhagic fever (Ebola HF) is a severe, often-fatal disease in humans and non-human primates (monkeys, gorillas, and chimpanzees).
AIDS: Acquired Immuno Deficiency Syndrome (AIDS) is caused by Human Deficiency Virus (HIV).

Common Heart diseases

- **Coronary artery disease or Arthrosclerosis:**
- **Angina** (angina pectoris)**:**
- **Heart Failure** (congestive heart failure):

Common Lung diseases

- **Asthma**
- **Bronchitis (Inflammation of the Bronchi):**

Common Brain diseases

- **Epilepsy**: Epilepsy is a condition where a person has recurrent seizures, abnormal discharge of electrical activity in the brain cells

Cancer : Cancer is a complex genetical disease which occurs due to the environmental factors. Cancer causing agent *(carcinogen)* may be present in food and water, in air in sunlight and in chemicals.

BACTERIAL DISEASES

Disease	Pathogen	Affected Organ	Symptom
Anthrax	Bacillus anthracis	Skin and intestine	Skinulcer, sore throat, nausea, fever, breathlessness
Cholera	Vibrio cholerae	Intestine	Vomiting, acute diarrhoea, muscular cramps, dehydration etc.
Diphtheria	Corynebacterium diphtheriae	Respiratory tract	Difficulty in respiration (mainly in child of age 2-5 yrs).
Gonorrhoea (sexual disease)	Neisseria gonorrhoea	Urinary tract	Swelling in urinary tract.
Leprosy or Hansen's disease	Mycobacterium leprae	Chronic infection of skin and nerve	Ulcers, nodules, scaly scabs (the infected part of the body becomes senseless).
Plague (i) Bubonic plague	Pasteurella, Yersinia pestis	Blood disease	High fever, weakness and haemorrhage which turn black.
(ii) Pneumonic plaque	"	Lungs	Haemorrhage of bronchi, lungs.
(iii) Septicemic plague	"	Blood	Anaemia, fever, chills leading to death with in two days.
Tetanus (lock jaw)	Clostridium tetani	Central nervous system	Painful contraction of neck and jaw muscles followed by paralysis of thoracic muscles.
Tuberculosis	Mycobacterium tuberculosis	Lungs	Repeated coughing, high fever.

Whooping cough or Pertussis	Bacillus pertussis	Respiratory system	Continuous coughing.
Pneumonia	Diplococcus pneumoniae	Lungs	Sudden chill, chest pain, cough, high fever.
Typhoid	Salmonella typhi	intestine	High fever, diarrhoea and headache.

VIRAL DISEASES

Disease	Pathogen	Affected Part	Symptom
AIDS (Acquired Immuno Deficiency Syndrome)	HIV (Human Immuno Deficiency Virus)	White blood cells	Weak immune system.
Chicken pox	Vericella virus	Whole body	High fever, reddish eruption on body
Small pox	Variola virus	Whole body	Light fever, eruption of blood on body
Dengue fever	RNA containing dengue virus	Whole body, particularly head, eyes and joints	High fever, backache, headache, retro-orbital pain behind the eye ball.
Ebola virus disease	Ebola Virus (filovirus)	Whole body	Fatal hemorrhagic fever, liver and kidney disfunction vomiting, headache.
Hepatitis (Epidemic Jaundice) (i) Hepatitis - A (ii) Hepatitis - B	Hepatitis virus Hepatitis - A virus Hepatitis - B virus	Liver	Loss of appetite, nausea, whitish stool and jaundice. Not fatal Fatal
Herpes	Herpes virus	Skin	Swelling of skin.
Influenza (flu)	Influenza virus	Whole body	Inflammation of upper respiratory tract, nose throat and eyes.
Measles German	Rubella virus	Whole body	Loss of appetite, reddish eruption on the body.
Polio or poliomyelitis	Polio virus	Throat, backbone and nerve	Fever, backbone and intestine wall cells are destroyed. It leads to paralysis.
Rabies (hydrophobia)	RNA virus called rabies virus	Nervous system	Encephalitis, fear of water, high fever, headache, spasm of throat and chest leading to death
Swine influenza (flu)	H_1N_1 flu virus	Whole body (muscles)	Headache, tiredness, sore throat, vomiting, breathing problems.

PROTOZOAN DISEASES, THEIR VECTORS AND AFFECTED PART DISEASES

Disease	Pathogen (Causative agent)	Vector	Parts Affected and Symptoms
African trypanosomiasis	*Trypanosoma gambienes*	Tsetse fly (Glossina palpalis)	Blood and nervous tissue. Man feels sleepy, may cause death.
Amoebic dysentery (Amoebiasis)	*Entamoeba histolytica*	None, Infection by contamination	Colon (intestine). Develop loose motion with blood, pain in abdomen
Diarrhoea	*Giardia*	None, infection by contamination	Digestive system causes loose motions, vomitting
Filaria or elephantiasis	*Wuchereria bancrofti*	Culex mosquito	Swelling of legs, testes and other body parts.
Kala azar or dumdum fever	*Leishmania donovani*	Sand flies (Phlebotomus)	Spleen and liver enlarge and high fever develops.
Malaria	*Plasmodium vivax.*	Female Anopheles mosquito	Periodical attacks of high fever, pain in joints accompanied by chill, heavy perspiration and fast pulse.

FUNGAL DISEASES IN HUMAN BEINGS

Disease	Pathogen (fungi)	Symptoms
Asthma or aspergillosis	*Aspergillus fumigatus*	Obstruction in the functioning of lungs.
Baldness	*Tinea capitis*	Hair fall
Athlete's foot	*Tinea pedis*	Skin disease, cracking of feet.
Ringworm	*Tricophyton Verrucosum*	Round red spot on skin
Scabies	*Acarus scabiei*	Skin itching and white spot on the skin.

SOME VIRAL DISEASES IN ANIMALS

Animal	Virus	Disease
Buffalo	Pox virido orthopox	Small pox
Cow	Herpes virus	Herpes
Cow	Variola vera	Small pox
Cow	Blue tongue virus	Blue tongue
Dog	Street rabies virus	Rabies

BLOOD

- **Blood** is a liquid connective tissue.
- Blood has a fluid matrix called plasma.
- **Plasma** is a pale coloured fluid which contributes 55% of blood volume. Plasma contains 90 to 92 % of water.
- Blood corpuscles are of three types: Red blood corpuscles (RBCs) ,white blood corpuscles(WBCs) and Blood platelets.
- RBC's are formed in the red bone-marrow.
- RBC lack, nucleus.
- **Life span of RBCs** (Erythrocytes) is about 120 days.
- **WBCs (Leueocytes)** are responsible for immunity.
- **WBCs** are manufactured in bone marrow.
- **Neutrophils** and monocytes are phagocytic cells (destroy foreign bodies)
- **Basophils** are involved in inflammatory reactions.
- **Eosinophils** are associated with allergic reactions.
- **Lymphocytes** are responsible for immune response.
- **Platelets** (thrombocytes) are responsible for clotting of blood during accidents.
- For a healthy adult person the average **systolic/diastolic pressure** is 120/80 mm of Hg in arteries near heart.
- **Blood pressure** is measured by sphygmomanometer.
- **The Rh factor** is a type of protein on the surface of red blood cells. Most people who have the **Rh factor** are **Rh**-positive. Those who do not have the **Rh factor** are **Rh**-negative.

VACCINES AND THEIR DOSES

Age	Vaccination	Dose
Birth to 12 months	• **DPT** (triple vaccine, against diptheria, whooping cough/pertussis and tetanus) • **Polio** (Sabin's oral, previously Salk's injectible) • **BCG** (Bacillus Calmette Guerin)	• Three doses (commonly oral) at intervals of 4-6 weeks. • Three doses at intervals of 4-6 weeks. • Intradermal and one vaccine
8-24 months	• **DPT** • **Polio** (oral) • **Cholera** vaccine (can be repeated every year before summer)	• Booster dose • Booster dose • One
9-15 months	• **Measles** vaccine (MMR or Measles, Mumps and Rubella)	• one dose
5-6 years	• **DT** (Bivalent vaccine against diphtheria and tetanus) • **TAB** (vaccine against Salmonella typhi, S. paratyphi A and S paratyphi B) or Typhoid Paratyphoid vaccine	• Booster dose • Two doses at intervals of 1-2 months
10 years	• Tetanus, TAB (typhoid)	• Booster dose
16 years	• Tetanus, TAB	• Booster dose

VACCINES AND INVENTORS

Vaccine	Developed by	Country	Year
Small Pox	Edward Jenner	England	1796
Cholera	Louis Pasteur	France	1880
Diphtheria and Tetanus	Emil Adolf Von Behring and Shibasaburo Kitasato	Germany/ Japan	1891
TB Vaccine	Albert Calmette and Camille Guerin	France	1922
Polio Vaccine	Jonas E. Salk	US	1952
Oral Polio Vaccine	Albert Bruce Sabin	US	1955
Measles Vaccine	John F. Enders, Thomas peeble	US	1953
Rabies Vaccine	Louis Pasteur	France	1885
Typhus Vaccine	Charles Nicolle	France	1909
Rubella Vaccine	Paul D.Parkman & Harry M. Meyer jr		1966
Scurvy vaccine	James Lind		1753

MEDICAL SCIENCE DISCOVERIES

Invention	Inventor	Year
• Adhesive plaster-covered bandages. Penicillin	Paul Beiersdorf Alexander Fleming (scotland)	1882 1928
• Anesthetic	William Morton	1846
• Anthrax vaccine	Louis Pasteur	1881
• Antiseptic	Joseph Lister (Scotland)	1867
• Artificial heart	Denton Cooley	1969
• Artificial hip	John Charnley	1972 (perfected)
• Artificial skin	Dr. John F. Burke and Ioannis Yannas	1979
• Bacteria (discovered)	Anton van Leeuwenhoek	1674
• Birth control pill	Gregory Pincus, John Rock and Min-Chueh Chang	1960 (approved by FDA)
• Cholera and T.B. Germs	Robert Koch (Germany)	1883
• Blood	William Harvey (Britain)	1628 (published)
• Blood transfusion (modern)	Dr. Thomas Blundell	1818
• Cholera vaccine	Louis Pasteur	1880
• Contact lenses (glass)	Adolf Fick	1887

• Corneal transplants	Eduard Zirm	1905
• Cough drops	James Smith and sons	1847
• Dental drill (motor-driven)	George Fellows Harrington	1864
• Disposable syringe	Colin Murdoch	1956
• DNA (structure discovered)	Frances Crick, James Watson and Rosalind Franklin	1953
• Electrocardiograph	Willem Einthoven	1903
• Gas mask	Garrett Augustus Morgan	1912
• Genetics	Johann Gregor Mendel	1865
• Heart transplant	Christiaan Barnard	1967
• Hypodermic syringe	Charles Gabriel Pravaz and Alexander Wood	1853
• Insulin (discovery)	Frederick Banting and Charles Best	1921
• Iron lung	Philip Drinker	1929
• Microscope (compound)	Hans Janssen	1590
• Morphine	Friedrich Wilhelm Adam Serturner	1803
• Ophthalmoscope	Charles Babbage Hermann Ludwig von Helmholtz	1847 1851
• Pacemaker (human)	Wilson Greatbatch	1960 (first use)
• Pasteurisation	Louis Pasteur	1864
• Pathology	Giovanni Battista Morgagni	1761
• Penicillin	Alexander Fleming	1928
• Plastic surgery	Archibald Hector McIndoe	1940s
• Polio vaccine	Jonas Salk	1953
• Quinine	Pierre Joseph Pelletier and Joseph Bienaime Caventou	1820
• Stethoscope	René Laënnec	1819
• Thermometer (medical)	Thomas Allbutt	1866
• X-rays	Wilhelm Roentgen	1895

Genetically Modified Plants

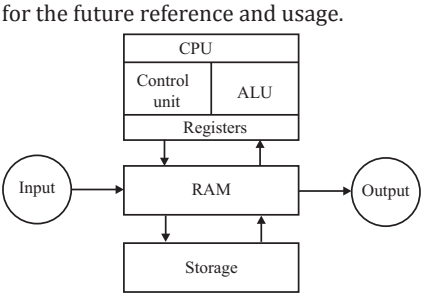
- Golden Rice: It is a genetically modified variety of Rice.
- Bt Cotton : Bacillus *thuringiensis*
- Flavr savr variety of tomato: Flavr savr is the first genetically engineered crop in which tomatoes have longer shelf life.

Computers

C - Commonly; O - Oriented; M - Machine; P - Particularly;
U - Used; T - for Trade; E - Education; R - and Research.
In this age of computers there is no such activity that cannot be achieved without computers. Computer has become an indispensable and multipurpose tool. We are breathing in the computer age and gradually computer has become such a desire necessity of life that it is difficult to imagine life without it. This chapter will help you to gain an understanding of the basic as well as advanced concepts of computers.

CONCEPT OF COMPUTER SYSTEM

A computer is an advanced electronic device that takes raw data as input from the user and processes this data under the control of set of instructions (called program) and gives the result (output) and saves output for the future reference and usage.



A basic computer system

To know about the working of a computer, first need to understand various terms such as Data, Processing and Information. First of all, lets start with three basic terms:

1. **Data: Data** is a collection of basic facts and figure without any sequence. This data is also called as raw data.
2. **Processing: Processing** is the set of instructions given by the user to the related data that was collected earlier to output meaningful information. The computer does the required processing by making the necessary calculations, comparisons and decisions.
3. **Information: Information** is the end point or the final output of any processed work. This meaningful output data is called information.

CHARACTERISTICS OF COMPUTER

The major characteristics of computers are the following:

- **Speed:** A powerful computer is capable of executing about 3 million calculations per second.
- **Accuracy:** A computer's accuracy is consistently high; if there are errors, they are due to errors in instructions given by the programmer.
- **Reliability:** The output generated by the computer is very reliable as long as the data is reliable.
- **Memory/Storage Capacity:** The computer can store large volumes of data and makes the retrieval of data an easy task.
- **Versatility:** The computer can accomplish many different things. It can accept information through various input-output devices, perform arithmetic and logic operations, generate a variety of outputs in a variety of forms, etc.
- **Automation:** Once the instructions are fed into computer it works automatically without any human intervention.
- **Diligence :** A computer will never fail to perform its task due to distraction or laziness.
- **Convenience :** Computers are usually easy to access, and allow people to find information easily that without a computer would be very difficult.

- **Flexibility :** Computers can be used for entertainment, for business, by people who hold different ideals or who have varied goals. Almost anyone can use a computer, and computers can be used to assist with almost any goal.

GOALS OF COMPUTERS

1. Problem-solving techniques using the computer.
2. Analysis of complex problems and the synthesis of solutions.
3. Comprehension of modern software engineering principles.
4. A vast breadth and depth of knowledge in the discipline of computer science.

HISTORY OF THE DEVELOPMENT

In beginning, there were no computers. To add or subtract, man used his fingers and toes. **Abacus** is known to be the first mechanical calculating device. The main purpose of abacus was that additions and subtraction could be performed quickly. Abacus was developed by the **Egyptians** in the 10th century B.C, but the final structure was given in the 12th century A.D. by the **Chinese** educationists. Abacus is made up of a frame in which rods are fitted across with rounds beads sliding on the rod.

Napier

Napier's Bones in an Abacus invented by John Napier. Napier used the bone rods for counting purpose where numbers were printed on them. With the help of these rods, one could do addition, subtraction, multiplication and division speedily.

Pascal's calculator called 'Pascaline'

In the year 1642, **Blaise Pascal** a French **scientist** invented an adding machine called Pascal's calculator, which represents the position of digit with the help of gears in it. Though these machines were early forerunners to computer engineering, the calculator failed to be a great commercial success.

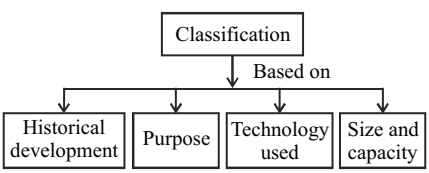
Leibniz Calculator

Leibniz was successfully introduced a calculator into the market in the year 1646. It was designed further in 1673 but it took until 1694 to complete. The calculator could perform the basic mathematical operations such as add, subtract, multiply, and divide. Wheels were placed at right angles which could be displaced by a special stepping mechanism.

Analytical Engine "The first Computer"

This analytical engine, the first fully-automatic calculating machine, was constructed by British computing pioneer **Charles Babbage** (1791-1871), who first conceived the idea of an advanced calculating machine to calculate and print mathematical tables in 1812. This Analytical Engine incorporated an arithmetic logic unit, control flow in the form of conditional branching and loops, and integrated memory, making it the first design for a general-purpose computer that could be described in modern terms as Turing-machine and could execute a program stored in memory step by step.

CLASSIFICATION OF COMPUTERS



First Generation of Computers (1942-1955)

The beginning of commercial computer age is from UNIVAC (Universal Automatic Computer). The first generation computers were used during 1942-1955. They were based on vacuum tubes. Examples of first generation computers are **ENIVAC** and **UNIVAC-1.**

Advantages

- Vacuum tubes were the only electronic component available during those days.
- Vacuum tube technology made possible to make electronic digital computers.
- These computers could calculate data in millisecond.

Disadvantages

- The computers were very large in size.
- They consumed a large amount of energy.
- Non-portable.

- Limited commercial use.
- Very slow speed.
- Used machine language only.
- Used magnetic drums which provide very less data storage.

Second Generation Computers (1955-1964)

The **second generation computers** used transistors. The size of the computers was decreased by replacing vacuum tubes with transistors. The examples of second generation computers are **IBM 7094 series, IBM 1400 series and CDC 164** etc.

Advantages

- Smaller in size as compared to the first generation computers.
- Used less energy and were not heated.
- Better speed and could calculate data in microseconds.
- Used faster peripherals like tape drives, magnetic disks, printer etc.
- Used Assembly language instead of Machine language.

Disadvantages

- Cooling system was required.
- Constant maintenance was required.
- Only used for specific purposes.
- Costly and not versatile.

Third Generation Computers (1964-1975)

The **Third generation computers** used the integrated circuits (IC). The first IC was invented and used in 1961. The size of an IC is about ¼ square inch. A single IC chip may contain thousands of transistors. The computer became smaller in size, faster, more reliable and less expensive. The examples of third generation computers are **IBM 370, IBM System/360, UNIVAC 1108** and **UNIVAC AC 9000** etc.

An integrated circuit (IC), sometimes called a chip or microchip, is a semiconductor wafer on which thousands or millions of tiny resistors, capacitors, and transistors are fabricated.

Advantages

- Smaller in size as compared to previous generations.
- More reliable.
- Used less energy.
- Better speed and could calculate data in nanoseconds.

Disadvantages

- Air conditioning was required.
- Highly sophisticated technology required for the manufacturing of IC chips.

Fourth Generation Computers (1975-Present)

The **fourth generation computers** started with the invention of Microprocessor. The Microprocessor contains thousands of ICs. The LSI (Large Scale Integration) circuit and VLSI (Very Large Scale Integration) circuit was designed. It greatly reduced the size of computer. The size of modern Microprocessors is usually one square inch. It can contain millions of electronic circuits. The examples of fourth generation computers are **Apple Macintosh & IBM PC.**

Advantages

- More powerful and reliable than previous generations.
- Small in size
- Fast processing power with less power consumption
- Fan for heat discharging and thus to keep cold.
- Cheapest among all generations.
- All types of High level languages can be used in this type of computers.

Disadvantage

- The latest technology is required for manufacturing of Microprocessors.

Fifth Generation Computers (Present & Beyond)

Scientists are working hard on the **5th generation computers** with quite a few breakthroughs. It is based on the technique of Artificial Intelligence (AI). Computers can understand spoken words & imitate human reasoning. IBM Watson computer is one example that outsmarts Harvard University Students.

TYPES OF COMPUTER

Computers can be classified according to the following types:

BASED ON WORK

Analog

The analog computers are computer systems that measure variations in quantities such as temperature, voltage,

speed, etc. Analog computers are known to measure the data that varies continuously. Other examples of analog computers include Voltmeter and Ammeter.

Digital

Digital computers are the computer systems that count things by manipulation of certain discontinuous numbers and letters through representation of binary digits (also called bits) in contrast to analog computers that measures the variations in quantities). In other words texts and graphics are treated numerically. Today the digital computers have replaced the analog ones. Examples of digital computers are desktop, personal computers, workstations, tablet etc.

Hybrid

Hybrid computers as the name suggests are a good mix of analog as well as digital computers, using an analog computer front-end, which is then fed into a digital computer's repetitive process. Hybrid computers are used for scientific calculations, in defence and systems.

BASED ON PURPOSE

On the basis of purpose, computers are categorised as following :

General Purpose

These computers are designed to work on different types of applications. In these types of computers the programs are not stored permanently rather programs are input at the time of their execution. Personal computers, including desktops, notebooks, smart phones and tablets, are all examples of general-purpose computers. Various tasks can be accomplished by using general purpose computers : For example writing and editing (word processing), manipulating different facts and figures in various databases, tracking manufacturing inventory, making scientific calculations, controlling organization's security system, electricity consumption, building temperature etc.

Special Purpose

Special-Purpose computers are task specific computers and are designed to solve a particular problem. They are also known as dedicated computers, because these computers are dedicated to perform a single particular task repetitively. Examples of such computer systems include the traffic control system ,they are also used in video games ,navigational systems in an aircraft, weather forecasting, satellite launch tracking, oil exploration, and in automotive industries, keeping time in a digital watch, or Robot helicopter.

BASED ON MEMORY SIZE AND PERFORMANCE

Computers can be generally classified by size and power as follows –

Micro Computer

A microcomputer is a computer that uses a microprocessor as its central processing unit. Microcomputers are physically smaller in size as compared to mainframe and minicomputers. Many microcomputers when equipped with a keyboard and screen for input and output respectively can be used as personal computers (in the generic sense). Microcomputers are easier to use and also inexpensive as the memory used by them i.e. microprocessors and semi conductors have become cheaper in the last few years.
E.g. The various micro computers widely available are IBM pcs, APPLE mac etc. the small types of pcs like the palmtop and handheld are now becoming available.

Minicomputer

It is a midsize computer. In the past few years the difference between large minicomputers and small mainframes has decreased significantly just like the distinction between small minicomputers and workstations. A minicomputer can support upto 200 users at the same time.
E.g. The various machines widely available are vax series 8200 and 8300, honeywell (xps-100), icl's series 36 level 20,50,60 galaxy-21, hcl-4, nelco-5000 and others.

Mainframe

Mainframe computers known as the "Big Iron" are computers that are used primarily by corporate and governmental organizations. Modern mainframe design is generally defined by the following features:

- High reliability and security
- Extensive input-output facilities with the ability to off load to separate engines
- Strict backward compatibility with older version of software

Tower model

This model of personal computer refers to a computer in which the power supply, motherboard, and other mass storage devices are stacked on top of each other in a cabinet.

Desktop model

Desktop model means computer that are designed to fit comfortably on top of a desk, with the monitor sitting on top of the computer. Desktop model computers as compared to the tower model are broad and low, whereas tower model computers are narrow and tall.

Notebook computer

Also called ultra book. These are extremely popular because they are extremely lightweight and portable. Because of their small size, typically less than 6 pounds or lesser than that,they have become so popular. These flat-panel technologies can produce a lightweight and non-bulky display screen. The quality of notebook display screens also differs considerably. Modern notebook computers are very similar to personal computers in terms of computing power.

Laptop computer

Laptop are now a days also called notebook computers .These are small and portable .You can make them sit on your lap and work on them.

Subnotebook computer

Subnotebook computers are portable computers that are even lighter and smaller than a full-sized notebook computer. They are light weight because they use a small keyboard and screen as compared to a notebook computer.

Hand-held computer

These computers are portable enough to be carried in one's hand. They are extremely convenient for use but due to extremely small size of their keyboards and screens they have still not succeeded in to replacing notebook computers.

Palmtop

These computers as the name suggest fit in your palm. Due to extremely small size their use is limited to phone books and calendars .

PDA

PDA's have electronic pens rather than keyboards for inputs unlike laptop. They also incorporate handwriting recognition features. and voice recognition technologies that can also react to voice input . PDAs are also called palmtops, hand-held computers and pocket computers.

Smart phones

Smart phones are cellular phones that function both as a phone and a small pc. They may use a pen or may have a small keyboard. They can be connected to the internet wirelessly. Apple, Samsung, Sony are some manufacturers of smart phones.

SOFTWARE

Software is a general term which is used to describe the instructions that are given to a computer. These instructions can be either a single programme or a group of programmes.

Types of Software

Software is generally classified into three specific categories in the computer world:

1. System software
2. Application software
3. Utility software

1. System software

This consists of all the programmes, languages and documentation supplied by the manufacturer of the computer. This type of software is required to use the computer efficiently and conveniently. These programmes allow the application developer to write and develop their own programmes.

2. Application software

These programmes are developed by the user in order to perform some specific function for the organisation. For example, a payroll system to compute the salaries of the employees of an organisation is termed as an application software.

3. Utility software

Utility software may be considered as an application software or a system software which is very often used in the development of a programme.

BASIC COMMUNICATION MODES OF OPERATION

There are three basic modes of operation that can exist for any network connection, communications channel, or interface.

1. **Simplex Operation :** In simplex operation, a network cable or communications channel can only send information in one direction; it's a "one-way street".
2. **Half-Duplex Operation :** Technologies that employ half-duplex operation are capable of sending information in both directions between two nodes, but only one direction or the other can be utilized at a time. This is a fairly common mode of operation when there is only a single network medium (cable, radio frequency and so forth) between devices.
3. **Full-Duplex Operation :** In full-duplex operation, a connection between two devices is capable of sending data in both directions simultaneously. Full-duplex channels can be constructed either as a pair of simplex links (as described above) or using one channel designed to permit bidirectional simultaneous transmissions. A full-duplex link can only connect two devices, so many such links are required if multiple devices are to be connected together.

INTERNET CONNECTIONS

- **Broadband :** This high-speed Internet connection is provided through either cable or telephone companies. One of the fastest options available, broadband Internet uses multiple data channels to send large quantities of information. The term broadband is shorthand for broad bandwidth. Broadband Internet connections such as DSL and cable are considered high-bandwidth connections. Although many DSL connections can be considered broadband, not all broadband connections are DSL.
- **DSL:** DSL which stands for Digital Subscriber Line, uses existing 2-wire copper telephone line connected to one's home so service is delivered at the same time as landline telephone service. Customers can still place calls while surfing the Internet.
- **Cable:** Cable Internet connection is a form of broadband access. Through use of a cable modem, users can access the Internet over cable TV lines. Cable modems can provide extremely fast access to the Internet.
- **Wireless (WiFi):** wireless fidelity (wifi) allows high speed internet connections without use the use of cable or wires radio frequency bands are used in place of telephone or cable networks. One of the greatest advantages of wireless Internet connections is the "always-on" connection that can be accessed from any location that falls within network coverage. Wireless connections are made possible through the use of a modem, which picks up Internet signals and sends them to other devices.
- **Mobile:** Many cell phone and smart phone providers offer voice plans with Internet access. Mobile Internet connections provide good speeds and allow you to access the Internet on the go.
- **Hotspots:** Hot-spots are sites that offer Internet access over a wireless local area network (WLAN) by way of a router that then connects to an Internet service provider. Hot-spots utilize Wi-Fi technology, which allows electronic devices to connect to the Internet or exchange data wirelessly through radio waves. Hotspots can be phone-based or free-standing, commercial or free to the public.

- **Satellite:** In certain areas where broadband connection is not yet offered, a satellite Internet option may be available. Similar to wireless access, satellite connection utilizes a modem.
- **ISDN:** ISDN (Integrated Services Digital Network) allows users to send data, voice and video content over digital telephone lines or standard telephone wires. The installation of an ISDN adapter is required at both ends of the transmission—on the part of the user as well as the Internet access provider.

VARIOUS INTERNET RELATED TERMS

EBCDIC

EBCDIC is an IBM code for representing characters as numbers. Although it is widely used on large IBM computers, most other computers, including PCs and Macintoshes, use ASCIIcodes.

Baud

When transmitting data, the number of times the medium's state changes per second. For example a 14,400 baud modem changes the signal it sends on the phone line 14,400 times per second. Since each change in state can correspond to multiple bits of data, the actual bit rate of data transfer may exceed the baud rate.

Bit

(Binary Digit) A single digit number in base-2, in other words, either a 1 or zero. The smallest unit of computerized data. Bandwidth is usually measured in bits-per-second. See also: Bandwidth, Bps, Byte, Kilobyte, Megabyte.

Bits per second (bps)

The speed at which bits are transmitted over a communication medium.

Cyberspace

The term originated by author William Gibson in his novel "Neuromancer", the word cyberspace is currently used to describe the whole range of information resources available through computer networks.

Cookie

A cookie, also known as an HTTP cookie, web cookie, Internet cookie, or browser cookie, is a small piece of data sent from a website and stored in a user's web browser while the user is browsing that website. Every time the user loads the website, the browser sends the cookie back to the server to notify the website of the user's previous activity.

Chat

Real-time communication between two users via computer. Once a chat has been initiated, either user can enter text by typing on the keyboard and the entered text will appear on the other user's monitor. Most networks and online services offer a chat feature.

Freenet A organization to provide free Internet access to people in a certain area, usually through public libraries. Host

Any computer on a network that is a repository for services available to other computers on the network. It is quite common to have one host machine provide several services, such as WWW and USENET.

IP Number Sometimes called a "dotted quad". A unique number consisting of four parts separated by dots, e.g. 202.54.1.1 is a IP number of one of the servers. Every machine that is on the Internet has an unique IP number - if a machine does not have an IP number, it is not really on the Internet. Most machines also have one or more Domain Names that are easier for people to remember.

ISO The International Organization for Standardization; An organization that has defined a different set of network protocols, called the ISO/OSI protocols. In theory, the ISO/OSI protocols will eventually replace the Internet protocols. When and if this will actually happen is a hotly debated topic.

INTERNET SERVICE PROVIDER (ISP)

An organization that provides connections to a part of Internet. If you want to connect you company's network, or even your personal computer, to the Internet, you have to talk to a "service provider". Also commonly known as ISP (Internet Service Provider).E.g. Airtel, MTNL etc.

Leased line

A permanently-connected private telephone line between two locations. Leased lines are typically used to connect a moderate-sized local network to an Internet service provider.

Network Information Center – Generally, any office that handles information for a network a network. The most famous of these on the Internet is the InterNIC, which is where new domain names are registered.

Network File System – A set of protocols that allows you to use files on other network machines as if they were local. So rather than using FTP to transfer a file to your local computer, you can read it, write it or edit it on the remote computer – using the same commands that you'd use locally. NFS was originally developed by SUN Microsystem, Inc. and is currently in widespread use.

Network – Anytime you connected two or more computers together so that they can share resources you have a computer network. Connect two or more network together you have internet.

Octet – Internet standard-monger's lingo for a set of 8 bits, i.e., a byte.

Packet – A bundle of data. On the Internet, data is broken up into small chunks, called "packet"; each packet traverses the network independently. Packet sizes can vary from roughly 40 to 32,000 bytes, depending on network hardware media, but the packets are normally less than 1500 bytes long.

Password

A code used to gain access to a locked system. Good passwords contain letters and non-letters and are not simple combinations such as "shanti8". A good password might be: Albert12@45$

PPP

(Point to Point Protocol) – most well known as a protocol that allows a computer to use a regular phone line and a modem to make a TCP/IP connection and thus be really and truly on the Internet. PPP is gradually replacing SLIP for this purpose.

SEARCH ENGINE

An automatized way to index and find documents on the internet. Search engines will "crawl," or explore, the internet and index every file they find. Examples of search engines are www.google.com and www.bing.com.

TELNET

The command and program used to login from one Internet site to another. The Telnet command/program gets you to the "login" prompt of another host.

UDP

(The User Datagram Protocol) – Another of the protocols on which the Internet is based. For the techies, UDP is a connectionless unreliable protocol. If you're not techie don't let the word "unreliable" worry you.

USENET

A world wide system of discussion groups, with comments passed among hundreds of thousands of machines. Not all Usenet machines are on the Internet, may be half. Usenet is completely decentralized, with over 15,000 discussion areas, called news groups.

PROGRAMMING LANGUAGES

A programming language is a set of commands, instructions, and other syntax use to create a software program. Languages that programmers use to write code are called "high-level languages." This code can be compiled into a "low-level language," which is recognized directly by the computer hardware.

(a) Low Level Languages

Low level computer languages are machine codes or close to it. Computer cannot understand instructions given in high level languages or in English. It can

only understand and execute instructions given in the form of machine language i.e. language of 0 and 1. There are two types of low level languages:

I. Machine Language

The set of instructions executed directly by a computer's central processing unit (CPU) is called Machine code .In machine language each and every instruction performs specific operation. The machine code is in the form a numerical code (i.e. not assembly code) and is the lowest-level representation of a compiled and/or assembled computer program .Machine language is also called as a primitive and hardware-dependent programming language. Writing programs directly in numerical machine code is tedious task.

II. Assembly Language

A personal computer has a microprocessor of its own that manages the computer's arithmetical, logical and control activities. All these operations are managed through a set of instructions by each family of processors. These operations are handled by getting input from keyboard and displaying information on screen and performing various other jobs. These set of instructions are called machine language instructions.

Machine language instructions are in the form of strings of 1's and 0's. Machine language is quite obscure and complex for using in software development. For this very reason low-level assembly language is designed for representation of all the instructions in a symbolic code yet in a more understandable form for a specific family of processors.

(b) High-Level Language

Earlier languages that were developed ,during the development of computers required knowledge of the internal workings of the computer, hence attempts were made to ease the programming where the knowledge on the the internal workings of the computer was not required . High-level programming languages allowed the specification of writing a program closer to those used by human beings. With the advent of high level languages ,programming became far easier, less error-prone and also removed the programmer from having to know the details of the internal structure of a particular computer.

- **Assembler:** It is used to convert the assembly language into machine language (i.e. 0 or 1). This language consists of mnemonic codes which are difficult to lean and is machine dependent.
- **Compiler -** Compiler is a special program which reads a program in source language and translates into an equivalent other language. Also it reports the errors in the source program to its user, if there are any.

  Types of Error. Errors are either syntactic or semantic:
  Syntax errors are errors in the program text.
  Semantic errors are mistakes concerning the meaning of a program construct.
- **Interpreter:** A high-level programming language translator that translates and runs the program at the same time. It converts one program statement into machine language, executes it, and then proceeds to the next statement. This differs from regular executable programs that are presented to the computer as binary-coded instructions. Interpreted programs remain in the source language the programmer wrote in, which is human readable text.
- **Loader:** In loading, a routine of a program is not loaded until it is called by the program. All routines are kept on disk in a re-locatable load format. The main program is loaded into memory and is executed. Other routines methods or modules are loaded on request. Dynamic loading makes better memory space utilization and unused routines are never loaded.

- **Linker:** Linking as the name suggests is the process of combining various pieces of code and data together to form a single executable that can be loaded in memory. Linking can be done at compile time, load time (by loaders) and at run time (by application programs) too.
- **Debugging :** In computers, debugging is the process of locating and fixing or bypassing bugs (errors) in computer program code or the engineering of a hardware device.

Language	Application Area	Developer
COBOL(Common Business Oriented Language)	Business applications	Grace Hopper in 1959
FORTRAN (Formula Translation)	Engineering & Scientific Applications	IBM in 1957
PASCAL	General use and as a teaching tool	Niklaus Wirth in 1972
C & C++	General Purpose - currently most popular	C/C++ Bjarne Stroustrup in 1983. Dennis Ritchie in 1972
LISP (List Processing)	Artificial Intelligence	John Mc carthy in 1958
JAVA	General Purpose - Internet Oriented Programming	James Gosling in 1995

DATA BASE MANAGEMENT SYSTEM

Database Management Systems (DBMS) are specially designed software which is used to create and maintain a database. It acts as an interface between users and a database or multiple databases. DBMS is comprised of tables that made up of rows called records and columns called fields.
The important processes catered by existing DBMS are as below:

- Defining or constructing a data structure which is also called as data definition such as creating a table, deleting a table or modifying the existing one.
- Updating like inserting a record into a table, deleting or modifying a record.
- Retrieval or extracting information from the database by user queries for user applications, reporting or any other business purposes.
- Administration includes the activities like enforcing data security, maintaining data integrity, data backup and recovery, granting & revoking accesses, performance monitoring, disaster management, etc. These activities are generally carried out by a DBA (database administrator).

THERE ARE VARIOUS DBMS:

Microsoft Access

This is the database management system developed by Microsoft. It stores data in its own format based on the **Access Jet Database Engine**. It also has the facilities like importing or linking directly to data stored in other databases and applications.

MySQL

MySQL is open source database management system, one of the most popular **DBMS** on the web. It is reliable, fast and also flexible.

Oracle

Developed by Oracle Corporation. It is object relational database management system. The original version of Oracle software was developed by Software Development Laboratories (SDL). Oracle is regarded to be one of the safe DBMS.

Microsoft SQL Server

Microsoft developed this relational database server. The primary function of this software is to store and retrieve the data as requested by other applications, whether those applications are on the same computer or running on other computers across the network (including internet).

MEMORY ORGANISATION

Computer Organisation

It is the way in which the components are built in computers whereas Computer architecture is the science of integrating those components to achieve a level of functionality and performance this chapter. We shall study a high level view of computer architecture that may be concerned with how the central processing unit (CPU) acts and how it uses computer memory.

Computer Architecture

It is the field of study of selecting and interconnecting hardware components to create computers that satisfy functional performance and cost goals. It refers to those attributes of the computer system that are visible to a programmer and have a direct effect on the execution of a program.

Computer Architecture

It concerns with machine Organization, interfaces, application, technology, measurement & simulation that Includes:

- Instruction set
- Data formats
- Principle of Operation
- Features (organization of programmable storage, registers used, interrupts mechanism, etc.)

In short, it is the combination of Instruction Set Architecture, Machine Organization and the related hardware.

INTERCONNECTION OF UNITS

Bus

CPU sends data, instructions and information to the components inside the computer as well as to the peripherals and devices attached to it. **Bus** is a set of electronic signal pathways that allows information and signals to travel between components inside or outside of a computer.

The features and functionality of a bus are as follows:

- A bus is a set of wires used for interconnection, where each wire can carry one bit of data.
- A computer bus can be divided into two types; **internal bus** and **external bus**.
- The **internal bus** connects components inside the motherboard like, CPU and system memory. It is also called the **system bus**.
- The **external bus** connects the different external devices; peripherals, expansion slots, I/O ports and drive connections to the rest of computer. It is also referred to as the **expansion bus**.
- The command to access the memory or the I/O device is carried by the **control bus**.
- The address of I/O device or memory is carried by the address bus. The data to be transferred is carried by the **data bus**.

INSTRUCTIONS FORMAT

Computer understand instructions only in terms of 0s and 1s, which is called the **machine language**. A computer program is a set of instruction that describe the steps to be performed for carrying out a computational task. The processor must have two inputs *instructions* and *data.*

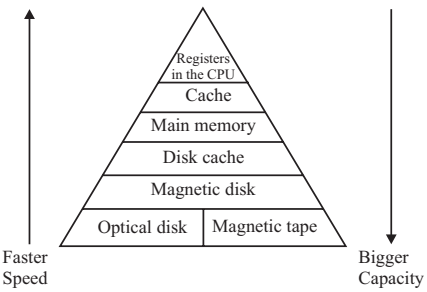
The instruction tell the processor what actions are needed to be performed on the data. An instruction is divided into two parts; *operation* (*op-code*) and *operand*.

The op-code represents action that the processor must execute and the operand defines the parameters of the action and depends on the operation.

Memory Hierarchy

The hierarchical arrangement of storage in current computer architectures is called the memory hierarchy. It is designed to take advantage of memory locality in computer programs. Each level of the hierarchy is of higher speed and lower latency, and is of smaller size, than lower levels.

Following diagram shows memory hierarchy in a modern computer system



Computer memory is the storage space in computer where data is to be processed and instructions required for processing are stored. The memory is divided into large number of small parts. Each part is called cell. Each location or cell has a unique address, which varies from zero to memory size minus one.

Memory is primarily of two types:

1. Primary Memory/Main Memory
2. Secondary Memory

Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which computer is currently working. It has limited capacity and data gets lost when power is switched off.

It is generally made up of semiconductor device. These memories are not as fast as registers. The data and instructions required to be processed earlier reside in main memory.

It is divided into two subcategories: **RAM** and **ROM.**

COMPARISON BETWEEN RAM & ROM

Description	RAM	ROM
Definition	Random Access Memory (RAM) is a form of data storage that can be accessed randomly at any time, in any order and from any physical location, allowing quick access and manipulation.	Read-only memory (ROM) is also a form of data storage that can not be easily altered or reprogrammed. Stores instructions that are not necessary for rebooting up to make the computer operate when it is switched off. They are hard wired.
Use	RAM allows the computer to read data quickly to run applications. It allows reading and writing.	ROM stores the program required to initially boot the computer. It only allows reading.
Volatility	RAM is volatile i.e. its contents are lost when the device is powered off.	It is non-volatile i.e. its contents are retained even when the device is powered off.
Types	The two main types of RAM are static RAM and dynamic RAM.	The types of ROM include PROM, EPROM and EEPROM.

(i) RAM (Random Access Memory)

There are two types of Random Access Memory or RAM, each has its own advantages and disadvantages compared to the other.

A. SRAM (Static RAM)

B. DRAM (Dynamic RAM)

COMPARISON BETWEEN SRAM (STATIC RANDOM ACCESS MEMORY) AND DRAM (DYNAMIC RANDOM ACCESS MEMORY):

	SRAM	DRAM
Definition	It is a type of RAM. SRAM essentially uses latches to store charge.	It is also a type of RAM. DRAM makes use of capacitors to store bits in the form of charge.
Speed	Faster	Slower
Size	Bigger	Smaller
Cost	More expensive per bit	Less expensive per bit
Capacity (same technology)	Less	5 to 10 times more than SRAM
Applications	Generally in smaller applications like CPU cache memory and hard drive buffers	Commonly used as the main memory in personal computers
Types	Asynchronous SRAM Synchronous SRAM Pipeline Burst SRAM	Fast Page Mode DRAM Extended Data Out DRAM Synchronous DRAM
Power Consumption	Less	More

(ii) ROM (Read Only Memory)

ROM has further classified into three types. Each type has unique characteristics, but all types of ROM memory have two things in common they are:

Data stored in these chips is non-volatile i.e it is not lost when power is removed.

Data stored in these chips is either unchangeable or requires a special operation to change.

A. **Programmable Read-Only Memory (PROM):** This form of ROM is initially blank. The user or manufacturer can write data/program on it by using special devices. However, once the program or data is written in PROM chip, it cannot be changed. If there is an error in writing instructions or data in PROM, the error cannot be erased. PROM chip becomes unusable.

B. **Erasable Programmable Read-Only Memory (EPROM):** This type of ROM can have its contents erased by ultraviolet light and then reprogrammed by user/manufacturer. This procedure can be carried out many times; however, the constant erasing and rewriting will eventually render the chip useless.

C. **Electrically Erasable Programmable Read-Only Memory (EEPROM):** This type of ROM works in a similar way to Flash memory in that it can its contents can be 'flashed' for erasure ad then written to without having to remove the chip from its environment. EEPROMs are used to store a computer system's BIOS, and can be updated without returning the unit to the factory. In many cases, BIOS updates can be carried out by computer users wishing a BIOS update.

Secondary Memory (Auxillary Memory)

The size of the main memory is very small if large data need to be stored in it. Further, the main memory is volatile in nature i.e. the contents are lost when power supply is stopped. To overcome these another memory is used in a computer system called secondary memory or the auxiliary memory. This is large as well as non-volatile in nature. This type of memory is also known as external memory or non-volatile. It is slower than main memory. These are used for storing Data/ Information permanently.

CPU directly does not access these memories, instead they are accessed via input-output routines. Contents of secondary memories are first transferred to main memory and then CPU can access it. For example, disk, CD-ROM, DVD, etc.

SECONDARY MEMORY DEVICES:

A. Magnetic Disks

Magnetic disks play two roles in computer systems:

- Long-term, nonvolatile storage for files, even when no programs are running.
- A level of the memory hierarchy below main memory used as a backing store for virtual memory during program execution.

A magnetic disk consists of a collection of platters (generally 1 to 12), rotating on a spindle at 3,600 to 15,000 revolutions per minute (RPM). These platters are metal or glass disks covered with magnetic recording material on both sides, so 10 platters have 20 recording surfaces. The disk surface is divided into concentric circles, called tracks. Each track in turn is divided into sectors. A sector is the smallest unit that can be read or written.

B. Optical Disks

Optical disks are another type of secondary memory. Many types of optical disks are available in the market like CD(Compact disks), DVD (Digital versatile disks) etc. CD-R are write once CDs i.e. data can be written to them only once. CD-RW on the other hand are rewritable CDs i.e. data can be written and erased many times. Similar variations DVD-R and DVD-RW are also available in the market.

C. Magnetic Tape

Magnetic tape is a long and narrow strip of plastic that thin magnetic material is coated on. Nearly all recording tape is of this type, whether used for recording audio or video or computer data storage.

Magnetic tape recording uses magnetic tape which moves on a recording head. Electrical signals are fed to the recording head, inducing a pattern of magnetization similar to the signal. A playback head can then pick up the changes in magnetic field from the tape and convert it into an electrical signal.

D. Floppy diskette

A Floppy Disk Drive is a computer disk drive that helps a user to save data to removable diskettes. 8 inch disk drives were first made available in 1971, which were later replaced with 3 ½ inch floppy disk drives. Due to the limited capacity and reliability of floppy diskettes in many computers they are no longer used with floppy disk drives. They are being replaced with CD-R, other writable discs, and flash drives.

E. CD-ROM disc

Compact Disc-Read Only Memory, CD-ROM drives or optical drives are CD players inside computers that can have speeds in the range from 1x and beyond, and have the capability of playing audio CDs and computer data CDs.

F. CD-R and CD-RW disc

It is also called as a CD writer, CD-WO (Write once), WORM (Write Once Read Many) drive. CD-R is used for CD-Recordable and is a writable disc and drive that is capable of having information written to the disc once and then having that disc read many times after that. If the data is not written to the disc properly, has errors, or has the incorrect information that disc or portions of that disc cannot be erased and is often jokingly referred to as a coaster.

G. Recordable DVD (Digital video Disk) drives

These DVD drives are alternatively referred to as a **DVD writer, recordable DVD drives**. The recordable DVD drives are capable of creating DVD discs. They are different from recordable CD drives as they have many different competing standards for creating DVD discs. For example, DVD-R, DVD-RW, DVD + R, DVD + RW, DVD + R DL (DVD + R9), and DVD-RAM are all different competing standards.

MEMORY MANAGEMENT TABLE

Approximate/Actual Values

Unit	Abbreviation	Approximate	Actual
Bit	b (common 'b')		0 or 1
Byte	B (Capital 'B')		8 bites
Kilobytes	KB	1000 bytes	1024 bytes
Megabyte	MB	1 million bytes	1024 KB
Gigabyte	GB	1 billion bytes	1024 MB
Terabyte	TB	1 trillion bytes	1024 GB
Petabyte	PB	1015 Bytes	1024 TB
Exa Byte	EB	1018 Bytes	1024 PB
Zetta Byte		1024 EB	
Yotta Byte			1024 ZB
Bronta Byte			1024 YB

All upper case

IMPORTANT MEASUREMENT

1 Bit = Binary digit
The term 'Bit' is short for Binary digit.
1 Nibble = 4 Bits
8 bits = 1 Byte = 2 Nibble

KEYBOARD SHORTCUTS FOR WINDOWS

To	Press
Displays the properties of the selected object.	ALT+Enter
"Close the active item, or quit the active program.	ALT+F4
Switch between open items.	ALT+TAB
Carry out the corresponding command or select the corresponding option in a dialog box.	ALT+Underlined letter
Display the corresponding menu.	ALT+Underlined letter in a menu name
Select a button if the active option is a group of option buttons in a dialog box.	Arrow keys
View the folder one level up in My Computer or Windows Explorer.	BACKSPACE
Open a folder one level up if a folder is selected in the Save As or Open dialog box in a dialog box.	BACKSPACE
Copy selected item.	CTRL while dragging an item
Select all.	CTRL+A
Copy.	CTRL+C

To	Press
Move the insertion point to the beginning of the next paragraph.	CTRL+DOWN ARROW
Display the Start menu.	CTRL+ESC
Close the active document in programs that allow you to have multiple documents open simultaneously.	CTRL+F4
Move the insertion point to the beginning of the previous word.	CTRL+LEFT ARROW
Move the insertion point to the beginning of the next word.	CTRL+RIGHT ARROW
Highlight a block of text.	CTRL+SHIFT with any of the arrow keys
Move backward through tabs in a dialog box.	CTRL+SHIFT+TAB
Move forward through tabs in a dialog box.	CTRL+TAB
Paste.	CTRL+V
Cut.	CTRL+X
Undo.	CTRL+Z
Delete.	DELETE
Display the bottom of the active window.	END
Carry out the command for the active option or button in a dialog box.	ENTER
Cancel the current task.	ESC
Display Help in a dialog box.	F1
Activate the menu bar in the active program.	F10
Rename selected item.	F2
Search for a file or folder.	F3
Display the Address bar list in My Computer or Windows Explorer.	F4
Display the items in the active list in a dialog box.	F4
Refresh the active window.	F5
Cycle through screen elements in a window or on the desktop.	F6
Display the top of the active window.	HOME
Open the next menu to the left, or close a submenu.	LEFT ARROW
Collapse current selection if it's expanded, or select parent folder.	LEFT ARROW
Display the items in the active list in a dialog box.	F4
Refresh the active window.	F5
Cycle through screen elements in a window or on the desktop.	F6
Display the top of the active window.	HOME
Open the next menu to the left, or close a submenu.	LEFT ARROW
Collapse current selection if it's expanded, or select parent folder.	LEFT ARROW
Display the items in the active list in a dialog box.	F4
Refresh the active window.	F5
Cycle through screen elements in a window or on the desktop.	F6
Display the top of the active window.	HOME

To	Press
Open the next menu to the left, or close a submenu.	LEFT ARROW
Collapse current selection if it's expanded, or select parent folder.	LEFT ARROW
Display the shortcut menu for the selected item.	Menu key
Display all subfolders under the selected folder.	NUM LOCK+ASTERISK on numeric keypad (*)
Collapse the selected folder.	NUM LOCK+MINUS SIGN on numeric keypad (-)
Display the contents of the selected folder.	NUM LOCK+PLUS SIGN on numeric keypad (+)
Open the next menu to the right, or open a submenu.	RIGHT ARROW
Display current selection if it's collapsed, or select first subfolder.	RIGHT ARROW
Display the items in the active list in a dialog box.	F4
Refresh the active window.	F5
Cycle through screen elements in a window or on the desktop.	F6
Display the shortcut menu for the selected item.	Menu key
Collapse the selected folder.	NUM LOCK+MINUS SIGN on numeric keypad (-)
Display the contents of the selected folder.	NUM LOCK+PLUS SIGN on numeric keypad (+)
Open the next menu to the right, or open a submenu.	RIGHT ARROW
Display current selection if it's collapsed, or select first subfolder.	RIGHT ARROW
Delete selected item permanently without placing the item in the Recycle Bin.	SHIFT+DELETE
Display the shortcut menu for the selected item.	SHIFT+F10
Move backward through options in a dialog box.	SHIFT+TAB
Select or clear the check box if the active option is a check box in a dialog box.	SPACEBAR
Move forward through options in a dialog box.	TAB
Display or hide the Start menu.	Windows Key
Lock your computer if you are connected to a network domain, or switch users if you are not connected to a network domain.	Windows Key+ L
Show the desktop.	Windows Key+D
Open My Computer.	Windows Key+E
Search for a file or folder.	Windows Key+F
Display Windows Help.	Windows Key+F1
Minimize all windows.	Windows Key+M
Open the Run dialog box.	Windows Key+R
Restores minimized windows.	Windows Key+Shift+M
Opens Utility Manager.	Windows Key+U

MICROSOFT WORD SHORT CUTS

SHORTCUT	DESCRIPTION
Ctrl + 0	Adds or removes 6 pts of spacing before a paragraph.
Ctrl + A	Select all contents of the page.
Ctrl + B	Bold highlighted selection.
Ctrl + C	Copy selected text.
Ctrl + D	Open the font preferences window.
Ctrl + E	Aligns the line or selected text to the center of the screen.
Ctrl + F	Open find box.
Ctrl + I	Italic highlighted selection.
Ctrl + J	Aligns the selected text or line to justify the screen.
Ctrl + K	Insert link.
Ctrl + L	Aligns the line or selected text to the left of the screen.
Ctrl + M	Indent the paragraph.
Ctrl + P	Open the print window.
Ctrl + R	Aligns the line or selected text to the right of the screen.
Ctrl + S	Save the open document. Just like Shift + F12.
Ctrl + T	Create a hanging indent.
Ctrl + U	Underline the selected text.
Ctrl + V	Paste.
Ctrl + X	Cut selected text.
Ctrl + Y	Redo the last action performed.
Ctrl + Z	Undo last action.
Ctrl + Shift + L	Quickly create a bullet point.
Ctrl + Shift + F	Change the font.
Ctrl + Shift + >	Increase selected font +1pts up to 12pt and then increase font +2pts.
Ctrl +]	Increase selected font +1pts.
Ctrl + Shift + <	Decrease selected font -1pts if 12pt or lower; if above 12, decreases font by +2pt.
Ctrl + [	Decrease selected font -1pts.
Ctrl + <left arrow>	Moves one word to the left.
Ctrl + <right arrow>	Moves one word to the right.
Ctrl + <up arrow>	Moves to the beginning of the line or paragraph.
Ctrl + <down arrow>	Moves to the end of the paragraph.
Ctrl + Del	Deletes word to right of cursor.
Ctrl + Backspace	Deletes word to left of cursor.
Ctrl + End	Moves the cursor to the end of the document.
Ctrl + Home	Moves the cursor to the beginning of the document.
Ctrl + Spacebar	Reset highlighted text to the default font.
Alt + Ctrl + F2	Open new document.
Ctrl + F2	Display the print preview.
Ctrl + Shift + F12	Prints the document.
F1	Open Help.
F4	Repeat the last action performed

SHORTCUT	DESCRIPTION
F5	Open the Find, Replace, and Go To window in Microsoft Word.
F7	Spellcheck and grammar check selected text or document.
F12	Save As.
Shift + F3	Change the text in Microsoft Word from uppercase to lowercase or a capital letter at the beginning of every word.
Shift + F12	Save the open document. Just like Ctrl + S.
Shift + Enter	Create a soft break instead of a new paragraph.
Shift + Insert	Paste.
Shift + Alt + D	Insert the current date.
Shift + Alt + T	Insert the current time.

MOUSE SHORTCUT

In addition to the above shortcut keys, users can also use their mouse to perform some common actions. Below some are examples of mouse shortcuts.

MOUSE SHORTCUTS	DESCRIPTION
Click, hold, and drag	Selects text from where user click and hold to the point user drag and let go.
Double-click	If double-clicking a word, selects the complete word.
Double-click	Double-clicking on the left, center, or right of a blank line makes the alignment of the text left, center, or right aligned.
Double-click	Double-clicking anywhere after text on a line will set a tab stop.
Triple-click	Selects the line or paragraph of the text that the mouse triple-clicked on.
Ctrl + Mouse wheel	Zooms in and out of document.

MICROSOFT EXCEL SHORTCUTS

Below is a listing of all the major shortcut keys usable in Microsoft Excel. See the computer shortcut page if user are looking for shortcut keys used in other programs.

SHORTCUT	DESCRIPTION
F2	Edit the selected cell.
F3	After a name has been created, F3 will paste names.
F4	Repeat last action. For example, if user changed the color of text in another cell, pressing F4 will change the text in cell to the same color.
F5	Go to a specific cell. For example, C6.
F7	Spell check selected text or document.
F11	Create chart from selected data.
Ctrl + Shift + ;	Enter the current time.
Ctrl + ;	Enter the current date.
Alt + Shift + F1	Insert New Worksheet.
Alt + Enter	While typing text in a cell, pressing Alt + Enter will move to the next line, allowing for multiple lines of text in one cell.
Shift + F3	Open the Excel formula window.
Shift + F5	Bring up search box.

Ctrl + 1	Open the Format Cells window.
Ctrl + A	Select all contents of the worksheet.
Ctrl + B	Bold highlighted selection.
Ctrl + I	Italic highlighted selection.
Ctrl + K	Insert link.
Ctrl + S	Save the open worksheet.
Ctrl + U	Underline highlighted selection.
Ctrl + P	Bring up the print dialog box to begin the printing process.
Ctrl + Z	Undo last action.
Ctrl + F3	Open Excel Name Manager.
Ctrl + F9	Minimize current window.
Ctrl + F10	Maximize currently selected window.
Ctrl + Page up	Move between work sheets in the same document.
Ctrl + Page down	Move between work sheets in the same document.
Ctrl + Tab	Move between Two or more open Excel files.
Alt + =	Create a formula to sum all of the above cells.
Ctrl + ‘	Insert the value of the above cell into the cell currently selected.
Ctrl + Arrow key	Move to next section of text.
Ctrl + Space	Select entire column.
Shift + Space	Select entire row.
Ctrl + -	Delete the selected column or row.
Ctrl + Shift + =	Insert a new column or row.
Ctrl + Home	Move to cell A1.

IMPORTANT TERMS

Access Time: Access time is the time from the start of one access of the storage device to the time when the next access can be started.

Accessory: An Accessory is a device attached to a host computer, but not part of it, and is more or less dependent on the host. It expands the host’s capabilities, but does not form part of the core computer architecture.

Examples are computer printers, image scanners, tape drives, microphones, loudspeakers, webcams, and digital cameras.

Active Cell: The cell that continues the value being used or modified in a spreadsheet program, and that is highlighted by the cell pointer. Also known as current cell.

Active Window : The window in Microsoft Windows with which the user may interact.

Accumulator: The computer register in which the result of an arithmetic or logic operation is formed (related to arithmetic and logic unit).

Algorithm: Algorithm gives the computational steps for the particular problem that take some finite input and give the desired output.

Analog: A continuous waveform signal that can be used to represent such things as a sound, temperature, and velocity.

Analog Computer: A computer in which numerical data are represented by measurable physical variables, such as electrical.

Antivirus: Computer antivirus refers to a software program that can protect your computer from unwanted viruses and remove any that penetrate your computer’s defenses.

Arithmetic Logic unit (ALU): An arithmetic-logic unit (ALU) is the part of a computer processor (CPU) that carries out arithmetic and logic operations on the operands in computer instruction words.

Artificial Intelligence: Artificial intelligence (AI) is the intelligence of machines and the branch of computer science that aims to create it. AI textbooks define the field as "the study and design of intelligent agents" where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success.

ASCII (American Standard Code for Information Interchange): ASCII, a code for information exchange between computers made by different companies; a string of 7 binary digits represents each character; used in most microcomputers. ASCII are two type : 1. ASCII-7, 2. ASCII-8

Assembly Language: A programming language that is once removed from a computer's machine language. Machine languages consist entirely of numbers and is almost impossible for humans to read and write. Assembly languages have the same structure and set of commands as machine language, but they enable a programmer to use names instead of numbers.

Auxilliary Memory: A high-speed memory bank used in mainframes and supercomputers. It is not directly addressable by the CPU; rather, it functions like a disk. Data are transferred from auxiliary memory to main memory over a high-bandwidth channel.

Backup: A backup or the process of backing up means making copies of data which may be used to restore the original data after a data loss event.

Bandwidth: In computer networking and computer science, bandwidth, network bandwidth, data bandwidth or digital bandwidth is a bit rate measure of available or consumed data communication resources expressed in bits/second or multiples of it (kilobits/s, megabits/s etc.).

BIOS: Basic Input Output System. This is the basic set of instructions that tell the computer how to act. Most computers have these instructions built into a chip that plugs into the motherboard.

Bar Code: A bar code (often seen as a single word, barcode) is the small image of lines (bars) and spaces that is affixed to retail store items, identification cards, and postal mail to identify a particular product number, person, or location.

Binary: Computers are based on the binary numbering system, which consists of just two unique numbers, 0 and 1.

Biometric Device: Biometrics (or biometric authentication) consists of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits.

Bitmap: In computer graphics, a bitmap or pixmap is a type of memory organization or image file format used to store digital images.

Bluetooth: Bluetooth is a proprietary open wireless technology standard for exchanging data over short distances (using short wavelength radio transmissions in the ISM band from 2400-2480 MHz) between fixed and mobile devices, creating personal area networks (PANs) with high levels of security.

Booting: To boot (as a verb; also "to boot up") a computer is to load an operating system into the computer's main memory or random access memory (RAM).

Browse: In database systems, browse means to view data. Many database systems support a special browse mode, in which you can flip through fields and records quickly. Usually, you cannot modify data while you are in browse mode.

Bug: A software bug is the common term used to describe an error, flaw, mistake, failure, or fault in a computer program or system that produces an incorrect or unexpected result, or causes it to behave in unintended ways.

Byte: Byte is a unit of digital information in computing and telecommunications that most commonly consists of eight bits.

CD ROM (Compact Disk- Read Only Memory): It is a type of optical disk capable of storing large amounts of data up to 1GB, although the most common size is 700 MB (megabytes).

CD-R (Compact Disk-Recordable): a type of CD disk that enables you to write onto it in multiple sessions.

Central Processing Unit (CPU): The CPU is the computer's control center. Think of it as the brain that does all the thinking (computation); thus it is called the Central

Processing Unit. The actual CPU is about 4 cm square, yet it is the most critical part of the computer. Having a fast CPU (speed measured in MegaHertz or Gigahertz) greatly aids in the overall speed of your computer.

CMOS: Acronym for "Complimentary Metal Oxide Semiconductor". A CMOS computer ciruit consumes very little power and is used in computers to keep track of the system setup information, data, time, type of disk and hard drives, etc, that a computer has installed.

Compressed File: Computer files that have been reduced in size by a compression program. Such programs are available for all computer systems.

Central Processing Unit (CPU): The Central Processing Unit (CPU) is an electronic component that interprets and carries out the instructions of any application that runs on a computer. It is the place where all the computing is done.

Data: Representation of **Raw** facts. The raw material of information.

Database: The integrated data resource for a computer-based information system.

DDR: This is a new type of RAM called Double Data Rate RAM. It is used in some of video cards such as the Nvidia GeForce cards.

Desktop: The screen in Windows upon which icons, windows, a background, and so on are displayed.

Desk Top Publishing (DTP): Software that allows users to produce near-typeset-quality copy for newsletters, advertisements, and many other printing needs, all from the confines of a microcomputer.

Dial up: A dial-up Internet account allows you to use a computer with a modem and appropriate software to connect to the Internet through an Internet Service Provider (ISP). The software "dials" the ISP's access numbers and you can then send e-mail, browse the World Wide Web or engage in other Internet activities.

Digital: Term used to describe any information that has been translated into a corresponding series of 1s and 0s; any information text, sound, image, color etc. may be digitized.

Digital Computer: A computer that performs calculations and logical operations with quantities represented as digital usually in the binary number system.

Digital Video/ Versatile Disk (DVD): The successor technology to the CD-ROM, that can store up to 10 gigabytes or more.

Disk: A magnetically encoded storage medium in the form of a plate (also called a platter).

Disk Operating System (DOS): A disk operating system manages disks and other system resources. It is a subset of OSes, sort of an archaic term for the same. MS-DOS is the most popular program currently calling itself a DOS. CP/M was the most popular prior to MS-DOS.

Domain Names: A name given to a host computer on the Internet; E-mail domain names are good examples of domain names (for example in bijendra@kbscontent.com, the domain name is 'kbscontent.com').

Downloading: Retrieving a file or group of files from the Internet so that they can be stored on a local hard drive. By accessing a page, you have, in fact, downloaded all the information on the page so that it can be viewed and interpreted by your web browser.

Electronic Mail: When a message is sent, the message is sent first to the SMTP server, which acts as an "outbox" for users. The message is then relayed to the appropriate mail server, which can be found listed after the @ symbol in the recipient's E-mail address. The message then waits on that server until the recipient accesses the message.

Ethernet: A transport method (protocol) used to connect computers to a LAN (Local Area Network) and exchange data.

File: (1) A collection of related records. (2) A named area on a disk-storage device that contains a program or digitized information (text, image, sound, and so on). (3) A component of an overall program or application.

Font: In a simplistic sense, a font can be thought of as the physical description of a character set. While the character set will define what sets of bits map to what letters, numbers, and other symbols, the

font will define what each letter, number, and other symbol looks like.

Format: (1) Noun: The logical or physical arrangement of the tracks and sectors on a floppy diskette or a hard disk. To be usable, a disk must be formatted so that the tracks and sectors are laid out in a manner compatible with the operating system in use.

(2) Verb: To prepare a disk or diskette, dividing it into sectors so that it is ready to receive data.

Gigahertz: One gigahertz is equivalent to 1000 megahertz, or 1,000,000,000 hertz.

Hacker: An individual with vast experience with security protocols who attempts to illegally access secure servers in an attempt to download private information, damage systems, or act in some other way to "free information".

Hard Copy: A readable printed copy of computer output.

Hard Disk: Hard disk (internal) is a permanent file and data storage device housed in a computer case.

Hardware: Collective term for any computer-related object that can be touched physically.

Hexadecimal Number System: A numeric notation system with a base of 16 different symbols frequently used to specify addresses in computer memory. In hexadecimal notation, the decimal numbers 0 through 15 are represented by the decimal digits 0 through 9 and the alphabetic "digits" A through F(A = decimal 10, B = decimal 11, etc.). Can be formed as two 4-bit binary numbers from an 8-bit binary number split into two parts.

Home Page: The Web page which is the starting point for accessing information at a site or in a particular area.

Host: A computer, attached to a network which provides services to another computer beyond simply storing and forwarding information.

Hyper Text Markup Language: This is the code by which web pages are created so they can be graphically organized in various ways. The web browser downloads the text of the HTML file, and then decodes the text into what you can see here. Many books and online manuals are available to anyone wishing to learn this code.

Acronyms for "Hyper Text Mark-up Llanguage" which is used to format information so that it can be structured and made accessible to the World Wide Web.

HTTP: Acronym for "Hypertext Transfer Protocol" The protocol that forms the basis of World Wide Web technology. HTTP is the set of rules governing the software that transports hyperlinked files along the Internet.

Information Technology (IT): including ICT (Information and Communication Technology) is the application of appropriate (enabling) technologes to information processing.

Input/output (I/O): A generic reference to input and/or output to a computer.

IP: Acronym for "Internet Protocol". The standard protocol used by systems communicating across the Internet.

IP Address: A digital code that precisely locates a computer connected to the Internet.

Inkjet Printer: A non-impact printer in which the print head contains independently controlled injection chambers that squirt ink droplets on the paper to form letters and images.

Integrated Services Digital Network (ISDN): A digital telecommunications standard for data delivery over twisted-pair lines with transmission speeds up to 128 Kbps (two 64 Kbps line pairs).

Interface: (1) A specific hardware or software connection. (2) Making two devices capable of communication. Used most often to refer to the design of hardware and software that allows connection of network components and transfer of information.

Internet: Internet is the largest wide area network in the world which links millions of computers. Through internet information can be shared, business can be conducted and research can be done.

IP Address (Internet Protocol Address): A unique numerical Internet address identifying any piece of equipment hooked up to the Internet.

Intranet: An Internet-like network whose scope is restricted to the networks within a particular organization.

Java: Java is a programming language and has a "sandboxed" code interpreter which permits programs to be downloaded to PC's from the Web, but isolates these applications from access to other applications running on the PC.

JPEG (Joint Photographic Experts Group): A bit-mapped file format that compresses image size.

Jukebox: A storage device for multiple sets of CD-ROMs, tape cartridges, or disk modules enabling ready access to vast amounts of online data.

Keyboard: is one of computer components which used to input data to a computer. It is called an input device.

Laptop: Laptop is a small and lightweight computer in which all the main parts are fitted into single unit. It is designed to be carried around. Particularly, it is ideal for travelers, journalists, commentators and professionals who want to work both at the office and home.

LCD: Acronym for "Liquid Crystal Display". It is the technology used for displays in notebooks and monitors for computers.

Linux: An open source spinoff of the UNIX operating system that runs on a number of hardware platforms and is made available for free over the Internet.

Local Area Network (LAN): Many multiple-computer homes have found ways to link their computers through a central device called a "hub". This way, each computer can share information directly, without the need to transfer data via a portable storage device, like a floppy disk. A properly set up LAN can also permit the connected computers to access the Internet through a single Internet account.

Log on & Log off: Each server that is accessed must have some way to ensure security of their sensitive information. Thus, servers restrict access by forcing users to "log on" with either personal access codes or anonymously. Anonymous access usually requires the individual's e-mail address, and the user's IP address is also logged. Once the desired information has been obtained, the user can "log off", disconnecting access to the server.

MAC: Short for " Macintosh"; the other type of personal computer, manufactured by Apple Computer.

Machine Language: Machine language consists of the raw numbers that can be directly understood by a particular processor. Each processor's machine language will be different from other processors' machine language. Although called "machine language", it is not usually what people think of when talking about computer languages. Machine language dressed up with mnemonics to make it a bit more human-readable is called assembly language.

Mainframe Computer: A large computer that can service many users simultaneously in support of enterprise-wide applications.

Memory: One of the essential components of a computer's central processing unit. Memory is the area where information and programs are actively processed.

Microcomputer: A small computer; for instance a Personal Computer or a laptop.

Microprocessor: A computer on a single chip. The central processing component of a microcomputer.

Modem: Modem is a telecommunication device that converts digital signals to analog and vice versa. It is used in dial-up internet connection to connect a telephone line to a computer.

Monitor: The high-resolution TV-like device that displays your computer's output. Today's monitors have much better quality displays than any TV is capable of producing.

Motherboard: It is the core of a computer system. It is the circuit board where all other parts connect. It communicates and controls the overall system. No motherboard means no computer system.

MP3: This stands for "MPEG I Audio Layer- 3" and is a digital compressed music file (their file names always end with an mp3 extension). MP3 files are often downloaded or exchanged between people online.

MPEG: Acronym for "Motion Picture Experts Group" A video file compression system which is used on the web.

Mouse: A small, handheld device attached to a computer; includes one or more buttons that allow the user to select graphics or text onscreen.
Multimedia application: Computer applications that involve the integration of text, sound, graphics, motion video, and animation.
Multitasking: The concurrent execution of more than one program at a time.
Offline: Pertaining to data that is not accessible by, or hardware devices that are not connected to, a networked computer system.
Online (a) Noun: Pertaining to data and/or hardware devices accessible to and under the control of a networked computer system.
(b) Adverb: Connected. You are online if you are working on your computer while it is connected to another computer. Your printer is online if it is connected to your computer and ready to accept data.
Operating System or Platform: Operating systems create an environment in which a user and hardware interact to each other. These terms refer to the software that your computer uses to operate (otherwise known as your OS) and not to a manufacturer or company. Windows 2000, Windows XP, and OSX (Mac) are common platforms.
Password: Password is a series of characters, digit and special symbol used to protect resources in a computer from unauthorized access. It is one of the ways to secure computer information from unauthorized users.
Peripheral: A physical device (such as a printer, scanner, or disk subsystem) that is externally attached to a workstation or to the network.
Plugin: A helper application that works within a browser. It adds more functionality to a browser; commonly associated with the Netscape Navigator browser software.
Personal Computer: A small computer designed for use by an individual, a microcomputer.
Processor: The logical component of a computer system that interprets and executes program instructions.
Program: (1) Noun: Computer instructions structured and ordered in a manner that, when executed, causes a computer to perform a particular function.
(2) Verb: The act of producing computer software to perform some application.
Programming: The act of writing a computer program.
Programming language: A language programmers use to communicate instructions to a computer.
RAM: Acronym for "Random Access Memory". Random Access memory, the computer's "short term" memory is used whenever an action is performed by a program. It is also called the "active memory". RAM is what the computer uses to run all applications. RAM is usually specified in Megabytes or MB. (The other kind of memory dealers refer to is "storage" memory or hard drive size. it is usually specified in Gigabytes or GB.)
ROM: Acronym for "Read Only Memory", in which information is saved once and can never be altered For example. CD-ROM drives read information saved on compact disks (CD's). A CD-ROM drive can read that information, but cannot make changes to it. For that you need a CD- RW drive. Some ROM is built into your computer to help it get started when you turn it on.
Scanner: A scanner is a piece of hardware that will examine a picture and produce a computer file that represents what it sees. A digital camera is a related device. Each has its own limitations.
Search Engine: A tool used which matches key words you enter with titles and description on the Internet. It then displays the matches allowing you to easily locate a subject. Similar to a card catalog, but not as efficient. Common search engines are Webcrawler, Yahoo, Alta Vista, Infoseek, Google and Lycos.
Server: A computer or its software that "serves" other computers by administering network files and network operations. Three types of Internet servers are Web servers, e-mail servers, and Gopher servers.
Surfing: The random, aimless exploration of web pages achieved through following links that look interesting within a document

Software: Software is the set of instructions developed by programming language which tells a computer what to do.

System software : It controls the overall operation of a computer. Some of the activities include managing system memory, controlling system resources, executing computer hardware functions and interfacing a user with computer hardware and applications.

Unix: UNIX is a family of OSes, each being made by a different company or organization but all offering a very similar look and feel.

Upload: The process of transferring information from one computer to another, generally from a client to a server. For example, you upload a file from your computer to a server or the internet.

USB: Acronym for "Universal Serial Bus". This is a style of port connection that is used by many peripheral devices such as Palm Pilots, phones, scanners, printers etc. This type of connection is much faster than more traditional kinds of connections such as serial and parallel ports.

URL: Acronym for "Uniform Resource Locator". The specific path to a World Wide Web file, including filename and extension.

UPS: "Uninterruptible Power Supply". An uninterruptible power supply (UPS) is a device that allows your computer to keep running for at least a short time when the primary power source is lost.

Virus: A virus is a program that will seek to duplicate itself in memory and on disks, but in a subtle way that will not immediately be noticed. A computer on the same network as an infected computer or that uses an infected disk (even a floppy) or that downloads and runs an infected program can itself become infected.

WAN: Acronym for "Wide Area Network". A larger computer network that is geographically dispersed, such as one that stretches across a university campus.

Web Page: A single screen (document) on a Web site.

Webcasting: "Webcasting" is a term that describes the ability to use the Web to deliver delayed versions of sound or video broadcasts.

Website: The location of published hypertext content. Physically, a Website can occupy an entire Web server or a part of a server; or it can be spread out among different servers as long as its sections are all linked directly, to the same home page.

WLAN: Acronym for "Wireless Local Area Network". In a wireless local area network (WLAN), an access point is a station that transmits and receives data, sometimes refered to as a transceiver.

World Wide Web or WWW: This is the part of the Internet that you acces. The World Wide Web is so named because each page in the WWW has links to other pages, which have links to other pages, and so on, creating what could visually be seen as a web-like network of links.

Kernel: The nucleus of an operating system. It is the closest part to the machine level and may activate the hardware directly or interface to another software layer that drives the hardware. The kernel orchestrates the entire operation of the computer by slicing time for each system function and each application as well as managing all the computer's resources. It typically resides in memory at all times.

Shell: The outer layer of a program that provides the user interface, or way of commanding the computer. The term originally referred to the software that processed the commands typed into the Unix operating system . For example, the Bourne shell was the original command line processor, and C shell and Korn shell were developed later. In DOS, the default shell was COMMAND.COM

Fork: Fork creates a new process by duplicating the calling process. The new process, referred to as the child, is an exact duplicate of the calling process, referred to as the parent, except for the following points.The child has its own unique process ID, and this PID does not match the ID of any existing process group .The child's parent process ID is the same as the parent's process ID.

Thread: Thread of execution is the smallest sequence of programmed instructions that can be managed independently by a scheduler (typically as part of an operating system). The implementation of threads

and processes differs from one operating system to another, but in most cases, a thread is a component of a process. Multiple threads can exist within the same process and share resources such as memory, while different processes do not share these resources.

Deadlock: A condition that occurs when two processes are each waiting for the other to complete before proceeding. The result is that both processes hang. Deadlocks occur most commonly in multitasking and client/server environments. Ideally, the programs that are deadlocked, or the operating system, should resolve the deadlock, but this doesn't always happen.

Multiprocessing: Multiprocessing is the use of two or more central processing units (CPUs) within a single computer system. The term also refers to the ability of a system to support more than one processor and/or the ability to allocate tasks between them.

Personal Area Network (PAN)

A Personal Area Network or simply PAN, is smallest network which is very personal to a user. PAN has connectivity range up to 10 meters. PAN may include wireless computer keyboard and mouse, Bluetooth enabled headphones, wireless printers and TV remotes for examples.

Metropolitan Area Network (MAN)

MAN, generally expands throughout a city such as cable TV network. It can be in form of Ethernet, Token-ring, ATM or FDDI. Metro Ethernet is a service which is provided by ISPs. This service enables its users to expand their Local Area Networks.

Virtual Private Network (VPN)

VPN is a network that is constructed by using public wires usually the Internet to connect to a private network, such as a company›s internal network.

Network Repeater

Network repeaters regenerate incoming electrical, wireless or optical signals. With physical media like Ethernet or Wi-Fi, data transmissions can only span a limited distance before the quality of the signal degrades.

Network Bridge

It reads the outermost section of data on the data packet, to tell where the message is going only the outermost hardware address of the packet. It reduces the traffic on other network segments, since it does not send all packets. Bridges can be programmed to reject packets from particular networks Bridging occurs at the data link layer of the OSI model. Bridge cannot read IP addresses. Bridge can read the ethernet data which gives the hardware address of the destination address. Bridges forward all broadcast messages.

Network Router

It is a network device with interfaces in multiple networks whose task is to copy packets from one network to another. Router gives path to data packet to destination. Routers provide connectivity inside enterprises, between enterprises and the Internet, and within an Internet Service Provider (ISP). It operates at Layer 3 (Network Layer) of the OSI Model.

Network Switch

Network Switch is a small hardware device that joins multiple computers together within one local area network (LAN).

Gateway

A gateway is an interconnecting device which joins two different network together they are also known as protocol converters. It accepts packet formed for one protocol and converts the formated packet into another protocol.

CSU/DSU (Channel Service Unit/ Data Service Unit)

CSU/DSU is a hardware device about the size of an external modem that converts a digital data frame from the communications technology used on a local area network (LAN) into a frame appropriate to a wide-area network (WAN) and vice versa.

MODEM

Modem is a device that converts digital signal to analog signal (modulator) at the sender's end and converts back analog signal to digital signal (demodulator) at the receiver's end. A modem is always

placed between a telephone line and a computer. A modem links home network to the Internet through **Internet Service Provider (ISP).** The high speed types of data outside your home aren't suitable for your direct use, so modems convert the data into digital Ethernet, which all the network equipment in your home can use.

Ethernet Card

An Ethernet card is one kind of network adapter. These adapters support the Ethernet standard for high-speed network connections via cables. Ethernet cards are sometimes known as network interface cards (NICs).

ABBREVIATIONS

ABR:	AVAILABLE BIT RATE
ADC:	ANALOG - TO - DIGITAL CONVERTER
AJAX:	ASYNCHRONOUS JAVA SCRIPT AND XML
ALGOL:	ALGORITHMIC LANGUAGE
ALU:	ARITHMETIC AND LOGIC UNIT
AMD:	ADVANCED MICRO DEVICES
API:	APPLICATION PROGRAMMING INTERFACE
ASCII:	AMERICAN STANDARD CODE FOR INFORMATION INTER CHANGE
ASP:	APPLICATION SERVICE PROVIDER
ATM:	ASYNCHRONOUS TRANSFER MODE
BASIC:	BEGINNER'S ALL-PURPOSE SYMBOLIC INSTRUCTION CODE
BCD:	BINARY CODED DECIMAL
BER:	BIT ERROR RATE
BFD:	BINARY FILE DESCRIPTOR
BGP:	BORDER GATEWAY PROTOCOL
BIN:	BINARY
BINAC:	BINARY AUTOMATIC COMPUTER
BIOS:	BASIC INPUT OUTPUT SYSTEM
BIT:	BINARY DIGIT
BLOB:	BINARY LARGE OBJECT
BLOG:	WEB LOG
BMP:	BIT MAPPED
BOOTP:	BOOTSTRAP PROTOCOL
BPS:	BITS PER SECOND
CAD:	COMPUTER- AIDED DESIGN
CAE:	COMPUTER- AIDED ENGINEERING
CAI:	COMPUTER- AIDED INSTRUCTION
CAT:	COMPUTER- AIDED TRANSLATION
CC:	CARBON COPY
CD:	COMPACT DISC
CD-R:	COMPACT DISC RECORDABLE
CD-ROM:	COMPACT DISC READ-ONLY MEMORY
CD-RW:	COMPACT DISC REWRITABLE
CG:	COMPUTER GRAPHICS
CGA:	COLOUR GRAPHICS ARRAY
CGI:	COMMON GATEWAY INTERFACE
CIFS:	COMMON INTERNET FILE SYSTEM
CLI:	COMMAND LINE INTERFACE
CNC:	COMPUTER NUMERICAL CONTROL
COBOL:	COMMON BUSINESS-ORIENTED LANGUAGE
CPU:	CENTRAL PROCESSING UNIT
CRT:	CATHODE RAY TUBE
CSI:	COMMON SYSTEM INTERFACE
CT:	COMPUTERISED TOMOGRAPHY
CTCP:	CLIENT-TO-CLIENT PROTOCOL
CTL:	COMPUTATIONAL TREE LOGIC
CTS:	CLEAR TO SEND
DAC:	DIGITAL-TO-ANALOG CONVERTER
DAP:	DIRECTORY ACCESS PROTOCOL
DB:	DATABSE
DBA:	DATABASE ADMINISTRATOR
DBMS:	DATABASE MANAGEMENT SYSTEM
DCC:	DIRECT CLIENT-TO-CLIENT
DDR:	DOUBLE DATA RATE
DES:	DATA ENCRYPTION STANDARD
DFD:	DATA FLOW DIAGRAM
DFS:	DISTRIBUTED FILE SYSTEM

DHTML:	DYNAMIC HYPER TEXT MARKUP LANGUAGE
DLL:	DYNAMIC LINK LIBRARY
DLP:	DIGITAL LIGHT PROCESSING
DMA:	DIRECT MEMORY ACCESS
DOS:	DISK OPERATING SYSTEM
DPI:	DOTS PER INCH
DSL:	DIGITAL SUBSCRIBER LINE
DVD:	DIGITAL VERSATILE DISC
DVD:	DIGITAL VIDEO DISC
DVD-R:	DIGITAL VERSATILE DISC-REWRITABLE
DVI:	DIGITAL VISUAL INTERFACE
DVR:	DIGITAL VIDEO RECORDER
EAP:	EXTENSIBLE AUTHENTICATION PROTOCOL
EBCDIC:	EXTENDED BINARY CODED DECIMAL INTERCHANGE CODE
EEPROM:	ELECTRONICALLY-ERASABLE PROGRAMMABLE READ-ONLY MEMORY
EGA:	ENHANCED GRAPHICS ARRAY
EGP:	EXTERIOR GATEWAY PROTOCOL
EID:	ELECTRONIC ID CARD
ELF:	EXECUTABLE AND LINKABLE FORMAT
EPROM:	ERASABLE PROGRAMMABLE READ-ONLY MEMORY
EXE:	EXECUTABLE
FAT:	FILE ALLOCATION TABLE
FAQ:	FREQUENTLY ASKED QUESTIONS
FDC:	FLOPPY DISK CONTROLLER
FDD:	FLOPPY DISK DRIVE
FIFO:	FIRST IN FIRST OUT
FPU:	FLOATING POINT UNIT
FS:	FILE SYSTEM
FTP:	FILE TRANSFER PROTOCOL
FXP:	FILE EXCHANGE PROTOCOL
GB:	GIGABIT
GB:	GIGABYTE
GIF:	GRAPHICS INTERCHANGE FORMAT
GIGO:	GARBAGE IN, GARBAGE OUT
GPU:	GRAPHICS PROCESSING UNIT
GUI:	GRAPHICAL USER INTERFACE
HDD:	HARD DISK DRIVE
HD DVD:	HIGH DEFINITION DVD
HDL:	HARDWARE DESCRIPTION LANGUAGE
HTML:	HYPERTEXT MARKUP LANGUAGE
HTTP:	HYPERTEXT TRANSFER PROTOCOL
IBM:	INTERNATIONAL BUSINESS MACHINES
ICMP:	INTERNET CONTROL MESSAGE PROTOCOL
ICP:	INTERNET CACHE PROTOCOL
IE:	INTERNET EXPLORER
IM:	INSTANT MESSAGING
IMAP:	INTERNET MESSAGE ACCESS PROTOCOL
I/O:	INPUT/OUTPUT
IP:	INTERNET PROTOCOL
IRC:	INTERNET RELAY CHAT
IRQ:	INTERRUPT REQUEST
ISO:	INTERNATIONAL ORGANISATION FOR STANDARDISATION
ISP:	INTERNET SERVICE PROVIDER
ISR:	INTERRUPT SERVICE ROUTINE
IT:	INFORMATION TECHNOLOGY
ITU:	INTERNATIONAL TELECOMMUNICATION UNION
JPEG:	JOINT PHOTOGRAPHIC EXPERTS GROUP
JUG:	JAVA USERS GROUP
KB:	KILOBIT
KB:	KILOBYTE
KHZ:	KILOHERTZ
LAN:	LOCAL AREA NETWORK
LIFO:	LAST IN FIRST OUT
LSB:	LEAST SIGNIFICANT BIT
MAN:	METROPOLITAN AREA NETWORK
MB:	MEGABIT
MB:	MEGABYTE
MBR:	MASTER BOOT RECORD
MICR:	MAGNETIC INK CHARACTER RECOGNITION
MIPS:	MILLION INSTRUCTIONS PER SECOND
MIME:	MULTIPURPOSE INTERNET MAIL EXTENSIONS
MMX:	MULTI-MEDIA EXTENSIONS
MNG:	MULTIPLE-IMAGE NETWORK GRAPHICS
MPEG:	MOTION PICTURES (CODING) EXPERTS GROUP

MSB:	MOST SIGNIFICANT BIT
MS-DOS:	MICROSOFT DISK OPERATING SYSTEM
NFS:	NETWORK FILE SYSTEM
NOS:	NETWORK OPERATING SYSTEM
NT :	(WINDOWS) NEW TECHNOLOGY
OOP:	OBJECT- ORIENTED PROGRAMMING
OS:	OPERATING SYSTEM
OSS:	OPEN- SOURCE SOFTWARE
P2P:	PEER-TO- PEER
PAN:	PERSONAL AREA NETWORK
PAP:	PASSWORD AUTHENTICATION PROTOCOL
PC:	PERSONAL COMPUTER
PCI:	PERIPHERAL COMPONENT INTERCONNECT
PGA:	PIN GRID ARRAY
PIC:	PROGRAMMABLE INTERRUPT CONTROLLER
PINE:	PROGRAM FOR INTERNET NEWS & EMAIL
PIO:	PROGRAMMED INPUT/OUTPUT
PNP:	PLUG-AND- PLAY
PPP:	POINT-TO-POINT PROTOCOL
PSU:	POWER SUPPLY UNIT
QOS:	QUALITY OF SERVICE
RAID:	REDUNDANT ARRAY OF INDEPENDENT DISKS
RAM:	RANDOM ACCESS MEMORY
RDBMS:	RELATIONAL DATABASE MANAGEMENT SYSTEM
ROM:	READ ONLY MEMORY
RTOS:	REAL TIME OPERATING SYSTEM
SAN:	STORAGE AREA NETWORK
SATA:	SERIAL
SCSI:	SMALL COMPUTER SYSTEM INTERFACE
SDL:	SIMPLE DIRECT MEDIA LAYER
SDRAM:	SYNCHRONOUS DYNAMIC RANDOM ACCESS MEMORY
SMTP:	SIMPLE MAIL TRANSFER PROTOCOL
SPI:	SERIAL PERIPHERAL INTERFACE
SQL:	STRUCTURED QUERY LANGUAGE
TCP:	TRANSMISSION CONTROL PROTOCOL
TCP/IP:	TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL
TTF:	TRUE TYPE FONT
TTY:	TELETYPE
UAC:	USER ACCOUNT CONTROL
UART:	UNIVERSAL ASYNCHRONOUS RECEIVER TRANSMITTER
UEFI:	UNIFIED EXTENSIBLE FIRMWARE INTERFACE
UI:	USER INTERFACE
UL:	UPLOAD
UPS:	UNINTERRUPTIBLE POWER SUPPLY
URI:	UNIFORM RESOURCE IDENTIFIER
USB:	UNIVERSAL SERIAL BUS
VAR:	VARIABLE
VB:	VISUAL BASIC
VBA:	VISUAL BASIC FOR APPLICATIONS
VBS:	VISUAL BASIC SCRIPT
VFS:	VIRTUAL FILE SYSTEM
VGA:	VIDEO GRAPHICS ARRAY
VLAN:	VIRTUAL LOCAL AREA NETWORK
VM:	VIRTUAL MEMORY
VOD:	VIDEO ON DEMAND
VOIP:	VOICE OVER INTERNET PROTOCOL
VPN:	VIRTUAL PRIVATE NETWORK
VT:	VIDEO TERMINAL
WAN:	WIDE AREA NETWORK
WAP:	WIRELESS APPLICATION PROTOCOL
WI-FI:	WIRELESS FIDELITY
WIMAX:	WORLDWIDE INTEROPERABILITY FOR MICROWAVE ACCESS
WLAN:	WIRELESS LOCAL AREA NETWORK
WOL:	WAKE-ON-LAN
WOM:	WAKE-ON-MODEM
WWW:	WORLD WIDE WEB
XHTML:	EXTENSIBLE HYPERTEXT MARKUP LANGUAGE
XML:	EXTENSIBLE MARKUP LANGUAGE
Y2K:	YEAR TWO THOUSAND
ZIFS:	ZERO INSERTION FORCE SOCKEt

Indian Panorama

INDIAN STATES & UNION TERRITORIES										
India/State	**Capital**	**Area/ Sq.Km**	**Language**	**Established Year**	**Sex Ratio /1000**	**Literacy Average %**	**P. Density Sq. Km**	**Festivals**	**Dance**	**Tribes**
INDIA	New Delhi	3.3 Million	No National Language	15-08-1947	940	73%	382	G.Jayanti, I.Day. & R. Day	–	–
1. Andhra Pradesh	Hyderabad	160205	Telugu, Urdu	01-10-1953	992	67.7%	308	Sankranti, Ugadi	Kuchi pudi	Andh, Bagata, Bhil, Konda
2. Arunachal Pradesh	Itanagar	83,743	English	20-02-1987	920/ 1000	66.95%	17	Losar" or The New Year	Bardo Chham	Abor, Aka, Apatani
3. Assam (Asom)	Dispur	78,550	Assamese, Bengali	1st April 1912	–	–	397	Bihu	Ankia Naat (Onkeeya)	Mikirs, Khasis, Nagas, Boro
4. Bihar	Patna	99,200	Bhojpuri, Maithili	1st April 1936	916	63.4%	1,102	Chhath	Bidesia Kajari	Gonda, Mundas, Gaur
5. Chhattisgarh	Raipur	135,194	Chattisgarhi, Hindi	1-11-2000	991	71.04%	189	Bastar Dussere, Bhoramdeo	Panthi, Rawat Nacha	Agariya, Andh, Baiga, Bhaina,
6. Goa	Panaji	3,702	Konkani	30-05- 1987	968	88.70%	394 per sq km.	Ganesh Chaturthi	Dekhnni, Fugdi	Dhodia, Dubla (Halpati)
7. Gujarat	Gandhinagar	196,204	Gujarati	01-05-1960	918	79.31%	310/	Makar Sankranti	Rass-garba	Bhils, Barda, Bavacha

8. Haryana	Chandigarh	44,212	Punjabi, Haryanvi	01-11-1966	877	76.64%	573	Haryali Teej, Lohri,	Saang, Dhamal	Meo, Ror
9. Himachal Pradesh	Shimla	55,673	Pahari, Kangri	25-01-1971	974	83.78%	123	Kullu, Shoolini	Losar Shona Chuksam	Bhot, Bodh, Gaddi, Gujjar
10. J & K	Srinagar	222,236	Kashmiri, Urdu	26-10-1947	883	66.7%	56	Hemis, Urs	Dumhal, Rouff	Balti, Beda, Bot, Boto
11. Jharkhand	Ranchi	79,714	Santhali, Mundari, Ho	15-11-2000	947	67.6%	414	Jhumar, Paika, Chau, Agni	Karam, Vat savitri	Asur, Agaria, Baiga, Banjara
12. Karnataka	Bengaluru	191,791	Kannada	01-11-1956	968	75.60%	320	Mysore Dasara, Ugadi	Bharatanatyam, Bolak-aat	Adiyan, Barda, Bavacha, Bhil
13. Kerala	Thiruvananthapuram	38,863	Malayalam, English	01-07-1949	1,084	93.91%	860	Onam	Kathakali	Adiyan, Arandan
14. Madhya Pradesh	Bhopal	308,245	Hindi	01-11-1956	930	70.60%	236	Shivratri, Bahgoriya	Badhai, Rai, Saira	Bhil, Bhunjia, Biar, Binjhwar
15. Maharashtra	Mumbai	307,713	Marathi	01-05-1960	929	82.9%	370	Vijayadashami or Dasara	Lavani, Koli	Andh, Baiga, Barda,
16. Manipur	Imphal	22,327	Meeteilon	21-01-1972	987	79.21%	120	Lui-ngai-ni Ningol Chakouba, Yaoshang	Manipuri	Aimol, Anal, Angami
17. Meghalaya	Shillong	22,429	Khasi,Garo	21-01-1972	986	75.84%	130	Nongkrem, Wangala	Nongkrem`	Chakma, Dimasa, Garo
18. Mizoram	Aizawl	21,087	Mizo	20-02-1987	975	91.58%	52	Chapchar Kut, Thalfavang Kut	Cheraw, Khuallam	Chakma, Dimasa, Garo
19. Nagaland	Kohima	16,579	English	01-12-1963	931	80.11%	119	Hornbill, Sekrenyi	Zeliang	Naga, Kuki, Mikir, Garo
20. Odisha	Bhubaneshwar	155,820	Odia, English	01-04-1936	978	73.45%	270	Ganesh Chaturthi	Odissi	Agata, Bathudi, Birhor
21. Punjab	Chandigarh	50,362	Punjabi	15-08-1947	893	76.68%	550	Bandi Chhor, Vaisakhi, Lohri	Bhangra, Giddha	–

22. Rajasthan	Jaipur	342,239	Hindi, Rajasthani	01-11-1956	926	67.68%	201	Gangaur, Teej, Gogaji	Ghoomar	–
23. Sikkim	Gangtok	7,096	Nepali, Bhutia	16-5-1975	889	82.2%	86	Maghe, Losar	Singhi Chham	Bhutia, Lepcha, Limboo
24. Tamil Nadu	Chennai	130,058	Tamil	26-01-1950	995	80.33 %	550	Pongal	Bharata-natyam	Adiyan, Aranadan,
25. Telangana	Hyderabad	114,840	Telugu, Urdu	02-06-2014	–	66.50%	310	Ugadi	Kuchipudi	Andh, Konda
26. Tripura	Agartala	10,491.69	Bengali , Kokborok	21-01-1972	961	94.65%	350	–	Goria, Jhum	Bhil, Bhutia, Chaimal
27. Uttarakhand	Dehradun	53,483	Garhwali, Kumaoni	9-11-2000	963	79.63%	189	Kandali, Ramman,	Langvir Nritya	Bhotia, Buksa, Jaunsari, Raji
28. Uttar Pradesh	Lucknow	243,286	Hindi, Urdu	01-04-1937	908	69.7%	820	Makar Sankranti, Chhath	Kathak	Bhotia, Buksa, Tharu, Baiga
29. West Bengal	Kolkata	88,752	Bengali and English	15-08-1947	947	77.08%	1,000	Durga Puja, Kali Puja	Chau dance	Asur, Baiga, Bedia, Chero
Union Territory										
1. Andaman and Nicobar Islands	Port Blair	8,073	English, Hindi	01-11-1956	878	86.27%	46	–	–	Andamanese, Chariar, Chari
2. Chandigarh	Chandigarh	114	Punjabi	01-11-1966	818	81.9%	9,300/	Lohri	Bhangra	–
3. Dadra and Nagar Haveli	Silvassa	102	English, Gujarati	11-08-1961	775	77.65%	698	Pongal	Tarpa, Bhavada	Warlis, dublas
4. Daman and Diu	Daman	102	Gujarati, Marathi	30-05-1987	618	87.07%	2169	Garba	Mando, Vira	Dhodia, Dubla (Halpati)
5. Lakshadweep	Kavaratti	32	English, Malayalam	01-11-1956	946	92.28%	2013	Eid-Ul-Fitr, Muharram	Lava, Kolkali	Koya, Malmi
6. NCT of Delhi	New Delhi	1,484.0	Hindi	01-02-1992	866	86.34%	11,297	Diwali, Eid Ul-Fitr	–	–
7. Puducherry	Pondicherry	492	Malayalam, Tamil	07-01-1963	1,038	86.34%	2,500	Pongal	Garadi	Grulas, Villi

FOUNDATION DAY OF STATES

1st January	Nagaland Day
21st January	Manipur, Meghalaya and Tripura Day
6th Febuary	Jammu and Kashmir Day
20th February	Mizoram and Arunachal Pradesh day
11th March	Andaman and Nicobar Islands Day
22nd March	Bihar Day (Bihar Diwas)
30th March	Rajasthan Day
1st April	Utkal (Odisha) Day
14th April	Tamil Nadu Day
15th April	Himachal Pradesh Day
1st May	Gujarat and Maharashtra Day
16th May	Sikkim Day
2nd June (2014)	Telangana Day
1st November	Chhattisgarh
9th November	Uttaranchal (Now Uttarakhand) Day
15th November	Jharkhand Day (Jharkhand Diwas)

NATIONAL SYMBOLS OF INDIA

National Flag	The national flag consists of a horizontal rectangular tricolour with saffron at the top, white in the middle and India green at the bottom. The centre has a navy blue wheel with twenty-four spokes, known as the Ashoka Chakra. The flag is designed by Pingali Venkayya.
National Emblem	The national emblem is the Lion Capital of Asoka at Sarnath which was adopted on 26th January 1950. The motto inscribed on the emblem is in Devana gari script: "Satyameva jayate" which means Truth Alone Triumphs.
National Anthem	The anthem was composed by Rabindranath Tagore; adopted by the Constituent Assembly 24th January 1950.
National Song	Vande Mataram was composed by Bankim Chandra Chatterjee. It was adopted as the National song of India in 1950.
National Flower	Indian lotus is the national flower. It is the representation of purity as it remains flawless despite growing in mud and water.
National Fruit	Mango, also known as the 'King of Fruits', is the National Fruit of India.
National River	Ganga is the national river of India. It is also the longest river of the country.
National Tree	The Indian Banyan (Ficus bengalensis) is the national tree.
National Bird	Indian peacock (Pavo cristatus) is the national bird of India.
National Animal	The Tiger known as the Lord of the Jungle is the national animal of India.
National Calendar	Saka calendar was introduced as the National calendar by the Calendar Committee in 1957.

AWARDS AND HONOURS

National Awards

Param Vir Chakra: The highest Gallantry Award

Mahavir Chakra: The second highest Gallantry Award

Vir Chakra: The third highest Gallantry Award

Ashok Chakra: The highest peacetime Gallantry award

Kirti Chakra: For conspicuous Gallantry
Shaurya Chakra: For an act of Gallantry
Bharat Ratna: The highest civilian award of India.

- The first three recipients of Bharat Ratna: C. Rajagopalchari, Dr. S. Radhakrishnan and DR. C.V.Raman (1954)

Padma Awards:

- Padma Vibhushan : The second highest civilian award given for exceptional and distinguished service.
- Padma Bhushan : The third highest civilian award given for distinguished service of a high order.
- Padma Shri : The fourth highest civillian award given for distinguished service.

OTHER NATIONAL AWARDS

Bharatiya Jnanpith Award

- Instituted in 22 May, 1961, carries a cash prize of ₹ 5 lakh, a citation and a bronze replica of Vagdevi (Saraswati).
- This award is given for the best literary writing by an Indian citizen in a language listed in eight schedule of the Indian Constitution.

Gandhi Peace Prize

- Established in 2 October, 1994. It carries a cash prize of ₹ 1 crore.

Indira Gandhi Prize for Peace, Disarmament and Development

- Instituted in 1985, this prestigious award is regarded as 'Nobel' and over the years it has been awarded to those persons who have done outstanding work for international peace, disarmament and development.

Borlaug Award

- Instituted in 1973, carries a cash prize of ₹ 1 lakh.
- Instituted to honour outstanding agricultural scientists.

Sahitya Akademi Award

- Awarded for outstanding literary work and carries a cash prize of ₹ 1 lakh.
- Sahitya Academi gives 22 awards for literary works in the languages which has recognized works.

IMPORTANT BOOKS AND AUTHORS

Transcendence: My Spiritual Experiences with Pramukh Swamiji: Abdul Kalam
Unbelievable – Delhi to Islamabad: Prof Bhim Singh
Two Years Eight Months and Twenty Eight Nights: Salman Rushdie
Globalisation, Democratization and Distributive Justice: Professor Mool Chand Sharma
Making India Awesome: Chetan Bhagat
Flood of fire: Amitav Ghosh
Neither a Hawk nor a Dove: Khurshid M Kasuri
The Red Sari: Javier Moro
Sourav Ganguly: Cricket, Captaincy and Controversy: Saptarshi Sarkar
China – Confucius in the Shadows: Poonam Surie
Mrs Funnybones: Twinkle Khanna
R.D. Burman: The Prince of Music: Khagesh Dev Burman
Beyond Doubt: A Dossier on Gandhi's Assassination: Teesta Setalvad
Benazir Bhutto: A Multidimensional Portrait: Dr Anna Suvorova
Modi - Incredible emergence of a star: Tarun Vijay
The Accidental Prime Minister – The making and unmaking of Manmohan Singh: Sanjaya Baru
Hard Choices (Autobiography): Hillary Rodham Clinton
I am Malala (Autobiography): Malala Yousafzai
And Then One Day: Naseerudin Shah
Playing It My Way: Sachin Tendulkar
The Narrow Road To the Deep North: Richard Flangan
Go Set a Watchman: Harper Lee
Super Economies: Raghav Bahl
Family Life: Akhil Sharma
Lucknow Boy: A Memoir: Late Vinod Mehta
A Brief History of Seven Killings: Marlon James
Beyond 2020: A Vision for Tomorrow's India: A. P. J. Abdul Kalam and Y. S. Rajan
Leading: Alex Ferguson With Michael Moritz

The Outsider: Frederick Forsyth
The Courage to Act – A Memoir of a Crisis and Its Aftermath: Ben S. Bernanke
Ruled or Misruled: Story and Destiny of Bihar: Santosh Singh
Hungry Bengal: War, Famine, Riots and the End of Empire: Janam Mukherjee
To the Brink and Back: India's 1991 Story: Jairam Ramesh
The Pakistan Paradox: Christrophe Jaffrelot
Crusader or Conspirator: P.C. Parakh
Born Again On the Mountain: Arunima Sinha
The China Model: Daniel A bell
Scion of Ikshvaku: Amish Tripathi
Purity: Jonathan Franzen
God Help the Child: Toni Morrison
Love + Hate: Stories and Essays: Hanif Kureishi
The Heart Goes Last: Margaret Atwood
Deep South: Paul Theroux
The Country of First Boys: Amartya Sen
A Strangeness in My Mind: Orhan Pamuk
Autumn of the Matriarch: Indira Gandhi's Final Term in Office: Diego Maiorano
Gods of Corruption: Promilla Shankar
Restart: The Last Chance for the Indian Economy: Mihir S. Sharma
The Tears of the Rajas: Ferdinand Mount
The Z factor - My journey as the wrong man at the Right Time : Subhash Chandra
Nathuram Godse - The Story of an Assassin : Anup Ashok Sardesai
The turbulent year - 1980-1996 (Volume II) : Pranab Mukherjee.
Jawaharlal Nehru and The Indian Polity is Perspective : Prof (Dr) P.J. Alexander
The Kiss of life - How a superhero and my son defeated cancer : Emraan Hashmi

SPACE SCIENCE

Space mission 1975-2016		
Satellite	**Launch Date**	**Launch Vehicle**
Aryabhata	19-Apr-75	u-11 Interkosmos
Bhaskara-I	7-Jun-79	C-1 Interkosmos
Rohini Technology Payload	10-Aug-79	SLV-3
Rohini RS-1	18-Jul-80	SLV-3
Rohini RS-D1	31-May-81	SLV-3
Ariane Passenger Payload Experiment	19-Jun-81	Ariane-1 (V-3)
Bhaskara -II	20-Nov-81	C-1 Intercosmos
INSAT-1A	10-Apr-82	Delta 3910 PAM-D
Rohini RS-D2	17-Apr-83	SLV-3
INSAT-1B	30-Aug-83	Shuttle [PAM-D]
Stretched Rohini Satellite Series (SROSS-1)	24-Mar-87	ASLV
IRS-1A	17-Mar-88	Vostok
Stretched Rohini Satellite Series (SROSS-2)	13-Jul-88	ASLV
INSAT-1C	21-Jul-88	Ariane-3
INSAT-1D	12-Jun-90	Delta 4925
IRS-1B	29-Aug-91	Vostok
INSAT-2DT	26-Feb-92	Ariane-44L H10
Stretched Rohini Satellite Series (SROSS-C)	20-May-92	ASLV
INSAT-2A	10-Jul-92	Ariane-44L H10
INSAT-2B	23-Jul-93	Ariane-44L H10+
IRS-1E	20-Sep-93	PSLV-D1
Stretched Rohini Satellite Series (SROSS-C2)	4-May-94	ASLV
IRS-P2	15-Oct-94	PSLV-D2

INSAT-2C	7-Dec-95	Ariane-44L H10-3
IRS-1C	29-Dec-95	Molniya
IRS-P3	21-Mar-96	PSLV-D3
INSAT-2D	4-Jun-97	Ariane-44L H10-3
IRS-1D	29-Sep-97	PSLV-C1
INSAT-2E	3-Apr-99	Ariane-42P H10-3
Oceansat-1 (IRS-P4)	26-May-99	PSLV-C2
INSAT-3B	22-Mar-00	Ariane-5G
GSAT-1	18-Apr-01	GSLV-D1
Technology Experiment Satellite (TES)	22-Oct-01	PSLV-C3
INSAT-3C	24-Jan-02	Ariane-42L H10-3
Kalpana-1 (METSAT)	12-Sep-02	PSLV-C4
INSAT-3A	10-Apr-03	Ariane-5G
GSAT-2	8-May-03	GSLV-D2
INSAT-3E	28-Sep-03	Ariane-5G
RESOURCE-SAT-1 (IRS-P6)	17-Oct-03	PSLV-C5
EDUSAT	20-Oct-04	GSLV-F01
HAMSAT	5-May-05	PSLV-C6
CARTOSAT-1	5-May-05	PSLV-C6
INSAT-4A	22-Dec-05	Ariane-5GS
INSAT-4C	10-Jul-06	GSLV-F02
CARTOSAT-2	10-Jan-07	PSLV-C7
Space Capsule Recovery Experiment (SRE-1)	10-Jan-07	PSLV-C7
INSAT-4B	12-Mar-07	Ariane-5ECA
INSAT-4CR	2-Sep-07	GSLV-F04
CARTOSAT-2A	28-Apr-08	PSLV-C9
IMS-1 (Third World Satellite – TWsat)	28-Apr-08	PSLV-C9
Chandrayaan-1	22-Oct-08	PSLV-C11
RISAT-2	20-Apr-09	PSLV-C12

ANUSAT	20-Apr-09	PSLV-C12
Oceansat-2 (IRS-P4)	23-Sep-09	PSLV-C14
GSAT-4	15-Apr-10	GSLV-D3
CARTOSAT-2B	12-Jul-10	PSLV-C15
StudSat	12-Jul-10	PSLV-C15
GSAT-5P / INSAT-4D	25-Dec-10	GSLV-F06
RESOURC-ESAT-2	20-Apr-11	PSLV-C16
Youthsat	20-Apr-11	PSLV-C16
GSAT-8 / INSAT-4G	21-May-11	Ariane-5 VA-202
GSAT-12	15-Jul-11	PSLV-C17
Megha-Tropiques	12-Oct-11	PSLV-C18
Jugnu	12-Oct-11	PSLV-C18
RISAT-1	26-Apr-12	PSLV-C19
SRMSAT	26-Apr-12	PSLV-C18
GSAT-10	29-Sep-12	Ariane-5 VA-209
SARAL	25-Feb-13	PSLV-C20
IRNSS-1A	1-Jul-13	PSLV-C22
INSAT-3D	26-Jul-13	Ariane-5
GSAT-7	30-Aug-13	Ariane-5
Mars Orbiter Mission (MOM)	5-Nov-13	PSLV-C25
GSAT-14	5-Jan-14	GSLV-D5
IRNSS-1B	4-Apr-14	PSLV-C24
IRNSS-1C	10-Nov-14	PSLV-C26
GSAT-16	7-Dec-14	Ariane-5
IRNSS-1D	28-Mar-15	PSLV-C27
GSAT-6	27-Aug-15	GSLV-D6
Astrosat	28-Sep-15	PSLV-C30
GSAT-15	11-Nov-15	Ariane 5 VA-227
IRNSS-1E	20-Jan-16	PSLV-C31
IRNSS-1F	10-Mar-16	PSLV-C32
IRNSS-1G	28-Apr-16	PSLV-C33
Corbo Set-2C	22-Jun-16	PSLV-C34

DEFENCE & SECURITY

Defence of India

The supreme commander of the Indian Armed Forces is the President of India.

1. Army Command and Headquarters

Command	Headquarters	Command	Headquarters
Western Command	Chandimandir	Eastern Command	Kolkata
Northern Command	Udhampur	Southern Command	Pune
Army Training Comm.	Shimla	Central Command	Lucknow
South Western Comm.	Jaipur		

2. Navy Command and Headquarters:

Command	Headquarters	Command	Headquarters
Eastern Command	Visakhapatnam	Southern Command	Kochi
Western Command	Mumbai		

3. Air Force Command and Headquarters:

Command	Headquarters	Command	Headquarters
Eastern Air Comd.	Shillong	Western Air Comd.	New Delhi
South-West Air Comd.	Gandhinagar	Central Air Comd.	Allahabad
Southern Air Comd.	Thiruvananthapuram		
Maintenance Comd.	Nagpur	Training Comd.	Bangalore

RANKS OF INDIAN ARMY, NAVY & AIR FORCE

Indian Army	Indian Navy	Indian Air Force
Field Marshal	Admiral of the Fleet	Marshal of the 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	Lieutenant	Flight Lieutenant
Lieutenant	Sub-Lieutenant	Flying Officer

Internal Security of India

Organization	Year	Headquarters
Central Reserve Police Force (CRPF)	1939	New Delhi
National Cadet Corps (NCC)	1948	New Delhi
Indo-Tibetan Border Police (ITBP)	1962	New Delhi
Border Security Force (BSF)	1965	New Delhi
Central Industrial Security Force (CISF)	1969	New Delhi

Defence Training Institutions of India

National Defence Academy (NDA), Khadakwasla (near Pune)
National Defence College (NDC), New Delhi
Rashtriya Indian Military College (RIMC), Dehradun
Armed Forces Medical College (AFMC), Pune
Air Force School, Sambra (Belgaum)
College of Air Warfare, Secunderabad
Air Force Academy, Hyderabad
I.N.S. Chilka, Chilka
I.N.S. Mandovi, Goa
Indian Naval Academy, Ezhimala

Research Centres of India

Indian Agricultural Research Institute	New Delhi
Central Rice Research Institute	Cuttack
Central Potato Research Institute	Shimla
Central Forest Research Institute	Dehradun
IINRG, Indian Institute of Natural Resins and Gums	Ranchi
National Diary Research Institute	Karnal
Central Mining Research Institute	Dhanbad
Central Jute Technological Research Institute	Kolkata
National Geophysics Research Institute	Hyderabad
Tata Institute of Fundamental Research	Mumbai
High Altitude Research Laboratory	Leh
Centre for Cellular and Molecular Biology	Hyderabad

Nuclear and Space Research Centres in India

India Rare Earths Limited	Mumbai
Uranium Corporation of India	Singhbhum
Bhabha Atomic Research Centre (BARC)	Trombay (Mumbai)
Saha Institute of Nuclear Physics	Kolkata
Vikram Sarabhai Space Centre	Thiruvantha-puram
Indian Space Research Organisation (ISRO)	Bangalore
Space Applications Centre	Ahmedabad

Missiles of India

Astra- Air-to-air missile
Prithvi I- Surface to Surface
Prithvi II- Surface to Surface
Prithvi III- Surface to Surface
Dhanush- Surface to Surface
Agni I- Surface to Surface
Shaurya- Surface to Surface
Trishul- Surface-To-Air Missile
Akash- Surface-To-Air Missile
Maitri- Surface-To-Air Missile
Barak2- Surface-To-Air Missile
BrahMos- Supersonic Cruise Missile
BrahMos II- Hypersonic Cruise Missile
K-15 Sagarika- Submarine Launched Ballistic Missile
Nag - Anti-Tank Guided Missile
Helina - Anti-Tank Guided Missile
Nirbhay- Subsonic Cruise Missile
Agni V- Intercontinental ballistic Missile
Astra- Air-to-air missile

Nuclear Power Plant of India

Power station	State	Type	Operator	Total capacity (MW)
Kaiga	Karnataka	PHWR	NPCIL	660
Kalpakkam	Tamil Nadu	PHWR	NPCIL	440
Kakrapar	Gujarat	PHWR	NPCIL	440
Rawatbhata	Rajasthan	PHWR	NPCIL	1180
Tarapur	Maharashtra	BWR (PHWR)	NPCIL	1400
Narora	Uttar Pradesh	PHWR	NPCIL	440
Total				4560

ATOMIC & NUCLEAR SCIENCE
ATOMIC RESEARCH

India's atomic research programme is committed to peaceful uses only, for example, atomic power, generation of electricity, development of agriculture and industry, medical science application, etc.

First Nuclear Explosion

Carried out on 18 May 1974 at pokhran in Rajasthan (Thar) desert. **Bhabha Atomic Research Centre (BARC)** Established in 1957, it is located at Trombay (Maharashtra), and is India's largest atomic research centre, for R&D.

NUCLEAR POWER PLANTS

Nuclear power is the fourth-largest source of electricity in India after thermal, hydroelectric and renewable sources of electricity. India has 21 nuclear reactors in operation in 7 nuclear power plants, having an installed capacity of 5308 MW and producing a total of 30,292.91 GWh

POWER STATION IN INDIA

Power station	Operator	Establishment Date	Location	State
Tarapur Atomic Power Station	NPCIL	1969	Tarapur	Maharashtra
Rajasthan Atomic Power Station	NPCIL	1973	Rawatbhata	Rajasthan
Kakrapar Atomic Power Station	NPCIL	1993	Kakrapar	Gujarat
Kudankulam Nuclear Power Plant	NPCIL	2013	Kudankulam	Tamil Nadu
Kaiga Nuclear Power Plant	NPCIL	2000	Kaiga	Karnataka
Madras Atomic Power Station	NPCIL	1984	Kalpakkam	Tamil Nadu
Narora Atomic Power Station	NPCIL	1991	Narora	Uttar Pradesh
Gorakhpur Atomic Power Station	NPCIL		Fatehabad	Haryana
Talcher Super Thermal Power Station	NTPC	1995	Kaniha	Odisha
Sipat Thermal Power Plant	NTPC	2008	Sipat	Chhattisgarh
Vindhyachal Super Thermal Power Station	NTPC	2013	Singrauli	Madhya Pradesh
Mundra Ultra Mega Power Project	Tata Power	2009	Mundra	Gujarat
Korba Super Thermal Power Plant	NTPC	1983	Jamani Palli	Chhattisgarh

Bhusawal Thermal Power Station	MAHAGENCO	1968	Deepnagar	Maharastra
Satpura Thermal Power Station	MPPGCL	1967	Sarni	Madhya Pradesh
Sterlite Jharsuguda Power Station	Vedanta	2006	Jharsuguda	Odisha
Durgapur Thermal Power Station	DVC	1996	Durgapur	West Bengal

FOUR ENDS OF INDIA

End Points	Places
Northern most	Siachen Glacier
Southern most	Kanya Kumari District (Cape Comorin)
Eastern most	Kibithu Village, Arunachal Pradesh
Western most	Guhar Moti in Kutch, Gujarat

FIRST IN INDIA (MALE)

First governor of Bengal	Lord Clive(1758-60)
Last governor of Bengal	Warren Hastings(1772-74)
The first British Governor General of Bengal	Lord Warren Hasting(1774-1885)
The first British Governor General of India	Lord William Bentinck(1833-1835)
The first British Viceroy of India	Lord Canning(1856-62)
The first Governor General of free India	Lord Mountbatten(1947-1948)
The first and the last Indian to be Governor General of free India	C. Rajgopalachari(1948-1950)
The first President of Indian Republic	Dr. Rajendra Prasad
The first Prime Minister of free India	Pt. Jawahar Lal Nehru
The first Indian to win Nobel Prize	Rabindranath Tagore
The first President of Indian National Congress	W.C. Banerjee
The first Muslim President of Indian National Congress	Badruddin Tayyabji
The first Muslim President of India	Dr. Zakir Hussain
The first man who introduced printing press in India	James Hicky
The first Indian to join the I.C.S	Satyendra Nath Tagore
India's first man in Space	Rakesh Sharma
The first Prime Minister of India who resigned without completing the full term	Morarji Desai
The first Indian Commander-in-Chief of India	General Cariappa
The first Chief of Army Staff	Gen. Maharaj Rajendra Singhji
The first Indian Member of the Viceroy's executive council	S.P.Sinha
The first President of India who died while in office	Dr. Zakhir Hussain
The first Muslim President of Indian Republic	Dr. Zakhir Hussain
The first Prime Minister of India who did not face the Parliament	Charan Singh
The first Field Marshal of India	S.H.F. Manekshaw
The first Indian to get Nobel Prize in Physics	C.V.Raman

The first Indian to receive Bharat Ratna award	Dr. Radhakrishnan
The first Indian to cross English Channel	Mihir Sen
The first Person to receive Jnanpith award	Sri Shankar Kurup
The first Speaker of the Lok Sabha	Ganesh Vasudeva Mavalankar
The first Vice-President of India	Dr. Radhakrishnan
The first Education Minister	Abdul Kalam Azad
The first Home minister of India	Sardar Vallabh Bhai Patel
The first Indian Air Chief Marshal	S. Mukherjee
The first Indian Naval Chief	Vice Admiral R.D. Katari
The first chief of Army staff	K.M. Cariappa
The first Judge of International Court of Justice	Dr. Nagendra Singh
The first person to reach Mt. Everest without oxygen	Sherpa Anga Dorjee
The first person to get Param Vir Chakra	Major Somnath Sharma
The first Chief Election Commissioner	Sukumar Sen
The first person to receive Magsaysay Award	Acharya Vinoba Bhave
The first person of Indian origin to receive Nobel Prize in Medicine	Hargovind Khurana
The first Chinese traveller to visit India	Fa-hein
The first person to receive Stalin Prize	Saifuddin Kitchlu
The first person to resign from the Central Cabinet	Shyama Prasad Mukherjee
The first person to receive Nobel Prize in Economics	Amartya Sen
The first Chief Justice of Supreme Court	Justice Hirala J. Kania
The first Indian Pilot	J.R.D. Tata (1929)

FIRST IN INDIA (FEMALE)

The first lady to become Miss World	Reita Faria
The first woman judge in Supreme Court	Mrs. Meera Sahib Fatima Bibi
The first woman Ambassador	C.B. Muthamma
The first woman Governor of a state in free India	Sarojini Naidu
The first woman Speaker of a State Assembly	Shanno Devi
The first woman Prime Minister	Indira Gandhi
The first woman Minister in a Government	Rajkumari Amrit Kaur
The first woman to climb Mount Everest	Bachhendri Pal
The first woman to climb Mount Everest twice	Santosh Yadav
The first woman President of Indian National Congress	Annie Besant
The first woman pilot in Indian Air Force	Harita Kaur Dayal
The first woman Graduates	Kadambini Ganguly and Chandramukhi Basu, 1883
The first woman Airline Pilot	Durga Banerjee
The first woman Honours Graduate	Kamini Roy, 1886
The first woman Olympic medal Winner	Karnam Malleswari, 2000

The first woman Asian Games Gold Medal Winner	Kamlijit Sandhu
The first woman Lawyer	Cornelia Sorabjee
The first woman President of United Nations General Assembly	Vijaya Laxmi Pandit
The first woman Chief Minister of an Indian State	Sucheta Kripalani
The first woman Chairman of Union Public Service Commission	Roze Millian Bethew
The first woman Director General of Police	Kanchan Chaudhary Bhattacharya
The first woman Judge	Anna Chandy (She became judge in a district court in 1937)
The first woman Cheif Justice of High Court	Leela Seth (Himachal Pradesh High Court)
The first woman Judge in Supreme Court of India	Kumari Justice M. Fathima Beevi
The first woman Lieutenant General	Puneeta Arora
The first woman Air Vice Marshal	P. Bandopadhyaya
The first woman chairperson of Indian Airlines	Sushma Chawla
The first woman IPS officer	Kiran Bedi
The first and last Muslim woman ruler of India	Razia Sultan
The first woman to receive Ashoka Chakra	Neerja Bhanot
The first woman to receive Gyanpith Award	Ashapurna Devi
The first woman to cross English Channel	Arati Saha
The first woman to receive Nobel Prize	Mother Teresa
The first woman to receive Bharat Ratna	Indira Gandhi

FIRST IN OTHERS

First Wax statue of a Living Indian	Mahatma Gandhi at Madame Tussaud's in 1939
First Exclusive internet magazine	Bharat Samachar
First Miss India to participate in Miss Universe	Indrani Rehman
First Judge in International Court of Justice	Dr. Nagender Singh
First Graduate in Medicine	Soorjo Coomar Goodeve Chukerbutty
India's First University	Nalanda University
India's First Open University	Andhra Pradesh Open University
India's First Lok Sabha Member to be elected with a record maximum number of votes	P.V.Narasimha Rao
First Indian to reach Antarctica	Lt. Ram Charan
First British to Visit India	Hawkins
First Test tube baby of India	Indira (Baby Harsha)
First Post Office Opened in India	Kolkata(1727)

SUPERLATIVES : INDIA

Structures

- **Highest Tower** (Minaret) – Qutub Minar
- **Higher Gateway** – Buland Darwaza at Fatehpur Sikri near Agra. Built by Akbar (53.5 m /175 ft High)
- **Highest Dam** – Bhakra Dam
- **Highest Bridge** – Chenab Bridge
- **Highest Airport**- Leh Air Port in Ladakh (3256 m/ 16080 ft high)
- **Highest Hydel Power Station**- Rongtong Hydel Project in Kinnaur district of Himachal Pradesh.
- **Highest Mountain Peak**- Kanchenjunga
- **Highest Road**- Road at Khardungla in the Leh-Manali Sector
- **Highest Waterfall**- Jog Waterfall, Karnataka
- **Largest Residence** – Antilia Bhawan built by Mukesh Ambani
- **Largest Cinema Hall** – Prasad Max, Hyderabad
- **Largest Museum** – National Museum Delhi
- **Largest River Barrage** – Farakka Barrage
- **Biggest Auditorium (Mumbai)** – Sri Shanmukhanand Hall
- **Largest zoo** – Arignar Anna Zoological Park
- **Largest Cave Temple** – Ellora
- **Largest Gurudwara** – Golden Temple, Amritsar
- **Largest Mosque** – Taj-ul-Masjid at Bhopal(M.P) with area-430,000 sq. ft, & capacity 1.75 lakh people.
- **Largest Man-made Lake** – Govind Sagar (Bhakra)
- **Largest Dome** – Gol Gumbaz (Karnataka)
- **Largest Cantilever Bridge** – Howrah Bridge
- **Longest Railway Tunnel**- Pir Panjal Railway Tunnel (11 km)
- **Longest Road Tunnel** - 9.2 km long tunnel on Jammu-Srinagar National Highway
- **Largest Public Sector Bank**- State Bank of India
- **Largest Botanical Garden** - National Botanical Garden in Kolkata
- **Largest Church**- Se Cathedral at Old Goa, 10 km from Panaji.
- **Largest Delta**- Sunderbans (75,000 sq km) formed by the Ganga and Brahmaputra in West Bengal and Bangladesh
- **Largest Stupa**- Kesariya Stupa in Bihar
- **Largest Library**- National Library, Kolkata
- **Largest Planetarium**- Birla Planetarium, Kolkata.
- **Largest Prison**- Tihar Jail, Delhi
- **Largest Concentration of Scheduled Tribes**- Madhya Pradesh
- **Largest Scheduled Caste Community**- Santhal
- **Longest River Bridge** – Bandra-Worli sea link which is 5.6 km.
- **Largest Corridor** – Rameshwaram Temple Corridor
- **Largest irrigation Canal**-Indira Gandhi Canal or Rajasthan Canal (959 km long)
- **Longest Dam**-Hirakund Dam on Mahanadi river in Odisha (24.4 km long)
- **Longest Glacier**-Siachen Glacier on the Indo-Pakistan border (75.6 km long and 2.8 km wide)
- **Longest Railway Bridge** – Nehru Setu Bridge (4.62 km) long
- **Fastest Train**- Gatimaan Express which runs between Delhi and Agra (166 km/hr)
- **Tallest Statues** – Statue of Jain Saint Gomateswara at Sravanabelagola in Karnataka
- **Oldest Church**- St. Thomas Church at Palayar in Trichur district in Kerala built in 52 AD.
- **Oldest Monastery**- Buddhist Monastery, (situated at an altitude of 3,048 m /10,000 ft) at Tawang in Arunachal Pradesh.
- **Largest mall**- Lulu Mall Kochi
- **Most Populous City**- Mumbai

Natural

- **Longest River** – Ganges
- **Largest Desert** – Thar (Rajasthan)
- **Largest Fresh Water Lake**-Kolleru in Andhra Pradesh
- **Largest Cave**- Amarnath (about 44 km from Pahalgam in Jammu and Kashmir)

FOUNDERS OF INDIAN INSTITUTIONS

- **Arya Samaj**-Swami Dayanand Saraswathi
- **Athmiya Sabha**-Raja Ram Mohan Roy
- **Brahma Samaj**-Raja Ram Mohan Roy
- **Deccan Education Society**-G.G.Agarkar, M.G.Ranade, V.G.Gibhongar
- **Dharma Sabha**-Radhakanthadev
- **Indian Brahma Samaj**-Keshav Chandra Sen
- **Manavadharma Sabha**-Durgaram Manjaram
- **Prarthana Samaj**-Athmaram Pandurang
- **Pune Sewa Sadan**-Smt.Remabhai Ranade, G.K.Devdhar
- **Ramakrishna Mission**-Swami Vivekananda
- **Sadharan Brahma Samaj**-Shivananda Sashtri, Anand Mohan Bose
- **Servants of India Society**-Gopalakrishna Gokhale
- **Sewa Sadan**-Bahuramji M.Malabari
- **Sewa Samithi**-H.N.Kunsru
- **Social Service League**-N.M.Joshi
- **Thathwabodhini Sabha**-Debendranatha Tagore
- **Theosophical Society**-Madam H.P. Blavadski, Col.H.L.Olkott

FOUNDERS OF TOWNS IN INDIA

- Agra- Sikkandar Lodhi
- Ahmedabad - Ahmed Shah
- Ajmeer- Ajaypal Chauhan
- Allahabad- Akbar
- Culcutta- Job Charnok
- Delhi- Anankapalan
- Fathepur Sikri - Akbar
- Hisar- Ferozshah Tuglaq
- Hyderabad - Quli Qutabshah
- Jodhpur- Rao Jodha
- Mahabalipuram - Narasimhawarman
- Siri- Alaudden Khilji
- Vijayanagaram - Hariharan 1

SOBRIQUETS

A sobriquet is a nickname, Occasionally assumed and often given by anther. It is usually a familiar name. This significant distinctive is a ample familiarity that the sobriquet can become more familiar than the original name.

Person	Primary Names
Anna	C N Annadurai
Badshah Khan/ Frontier Gandhi	Abdul Ghaffar Khan
Buddha	Siddhartha Gautama
Chacha/Panditji	Jawaharlal Nehru
Grand Old Man of India	Dadabhai Naoroji
Gurudev	Rabindranath Tagore
Guruji	M S Gohlwalkar
Kaviguru	Rabindranath Tagore
Lokmanya	Bal Gangadhar Tilak
Loknayak	Jayaprakash Narayan
Man of Peace	Lal Bahadur Shastri
Manitas de Plate	Flamenco guitarist Ricardo Baliardo
Netaji	Subhash Chandra Bose
Punjab kesari	Lala Lajpat Rai
Rajaji	C Rajagopalachari
Saint of the Gutters	Mother Teresa
Haryana Hurricane	Kapil Dev
Prince of Kolkata	Saurav Ganguly
Places	**Primary Names**
Bengal's Sorrow	Damodar Rever, India
Blue Mountain	Niligiri Hills, India
City of Golden Temple	Amritsar, India
City of Palaces	Kolkata, India
Diamond City in India	Surat, Gujarat
Garden City of India	Bengaluru
Garden of India	Kashmir
Gateway of India	Mumbai
God's Own Country	Kerala
Land of Five Rivers	Punjab, India
Pink City	Jaipur, India
Queen of Arabian Sea	Kochi, India
Spice Garden of India	Kerala
The City of Joy	Kolkata, India
The City of Palaces	Kolkata, India
Venice of East	Alleppey, India
Queen of Arabian Sea	Kochi, India
Garden City of India	Bangalore
Blue Mountains	Niligiri Hills, India

CREMATORIUM OF FAMOUS PERSONS

Rajghat	Mahatma Gandhi	Shanti Van	Jawahar Lal Nehru
Vijay Ghat	Lal Bahadur Shastri	Shakti Sthal	Indira Gandhi
Kishan Ghat	Ch. Charan Singh	Abhay Ghat	Morarji Desai
Veer Bhumi	Rajiv Gandhi	Samata Sthal	Jagjivan Ram
Ekta Sthal	Giani Zail Singh	Karma Bhumi	Dr. Shankar Dayal Sharma
Uday Bhoomi	K.R. Narayanan	Mahaprayan Ghat	Dr. Rajendra Prasad

FAMOUS NICKNAMES OF EMINENT PERSONS

Nickname	Person
Father of the Nation, Bapu	Mahatma Gandhi
Iron Man of India	Sardar Vallabhbhai Patel
Napoleon of India	Samudragupta
Shakespeare of India	Kalidasa
Mahamana	Pt. Madan Mohan Malaviya
Deshbandhu	Chittaranjan Das
Deenabandhu	C.F.Andrews
Punjab Kesari	Lala Lajpat Rai
Nightingale of India	Sarojini Naidu
Lady with the lamp	Florence Nightingale
Tota-e-Hind (Parrot of India)	Amir Khushro
Shri Guruji	M.S.Golwalkar

FAMOUS PLACES ASSOCIATED WITH EMINENT PERSONS

Place	Person	Place	Person
Corsica	Napoleon Bonaparte	Belur Math	Ramakrishna Paramhansa
Kapilvastu	Gautam Buddha	Jerusalem	Jesus Christ
Macedonia	Alexander, the Great	Mecca	Prophet Mohammad
Jeeradei	Dr. Rajendra Prasad	Porbandar	Mahatma Gandhi
Anand Bhawan	Jawaharlal Nehru	Fatehpur Sikri	Akbar, the Great
Sabarmati	Mahatma Gandhi	Puducherry	Aurobindo Ghosh
Sitab Diara	Jai Prakash Narayan	Pawapuri	Mahavira
Shantiniketan	Rabindra Nath Tagore		

World Panorama

COUNTRIES : CAPITAL, LANGUAGE & THEIR CURRENCY

Country	Capital	Chief Language	Currency
Afghanistan	Kabul	Pushtu Dari	Afghani
Algeria	Algiers	Arabic, French	Algerian Dinar
Argentina	Buenos Aires	Spanish	Argentine Peso
Australia	Canberra	English	Australian Dollar
Azerbaijan	Baku	Azeri	Manat
Bahrain	Manama	Arabic, English	Bahraini Dinar
Bangladesh	Dhaka	Bangla	Taka
Belgium	Brussels	Flemish (Dutch), French, German	Euro
Bhutan	Thimphu	Dzongkha	Ngultrum
Bolivia	La Paz; Sucre	Aymara Spanish, Quechua	Boliviano
Bosnia and Herzegovina	Sarajevo	Serbo-Croatian	Conv.Mark
Brazil	Brazilia	Portuguese	Real
Bulgaria	Sofia	Bulgarian	Lev
Burkina Faso	Ouagadougou	French	Franc
Cambodia	Phnom-Penh	Khmer	Riel
Canada	Ottawa	French, English	Canadian Dollar
Chile	Santiago	Spanish	Peso
China	Beijing	Chinese (Mandarin)	Yuan
Colombia	Bogota	Spanish	Peso
Congo Formerly Zaire	Kinshasa	French	Congolese Franc
Costa Rica	San Jose	Spanish	Colon
Croatia	Zagreb	Croatian	Kuna
Cuba	Havana	Spanish	Peso
Czech Republic	Prague	Czech	Koruna
Denmark	Copenhagen	Danish	Krone
Ecuador	Quito	Spanish	United States dollar
Egypt	Cairo	Arabic	Egyptian Pound
Ethiopia	Addis Ababa	Amharic	Birr
Fiji	Suva	English	Fijian Dollar
Finland	Helsinki	Finnish, Swedish	Euro
France	Paris	French	Euro

Country	Capital	Chief Language	Currency
French Guiana	Caine	French	Euro
Georgia	Tbilisi	Georgian	Lari
Germany	Berlin	German	Euro
Ghana	Accra	English	Ghana Cedi
Greece	Athens	Greek	Euro
Guatemala	Guatemala City	Spanish	Quetzal
Guyana	Georgetown	English	Guyana Dollar
Haiti	Port-au-Prince	French	Gourde
Honduras	Tegucigalpa	Spanish	Lempira
Hong Kong	Victoria	English, Chinese	Hong Kong Dollar
Hungary	Budapest	Hungarian	Forint
India	New Delhi	Hindi (official), English and 22 officially recognised regional languages	Rupee
Indonesia	Jakarta	Bahasa Indonesian, Dutch, English Javanese	Rupiah
Iran	Teheran	Persian (Farsi), Turk, Kurdish, Arabic	Rial
Iraq	Baghdad	Arabic, Kurdish	Iraqi Dinar
Ireland	Dublin	Irish, English	Euro
Israel	Jerusalem	Hebrew, Arabic	Shekel
Italy	Rome	Italian	Euro
Japan	Tokyo	Japanese	Yen
Jordan	Amman	Arabic, English	Jordan Dinar
Kazakhstan	Astana	Kazakh, Russian, German	Tenge
Kenya	Nairobi	Kiswahili, English, Kikuyu	Shilling
Korea, North	Pyongyang	Korean	Won
Korea, South	Seoul	Korean	Won
Kuwait	Kuwait city	Arabic, English	Kuwait Dinar
Lebanon	Beriut	Arabic, French, English	Pound
Libya	Tripoli	Arabic	Libyan Dinar
Luxembourg	Luxembourg	French, German, English, Luxembourgish	Euro
Malaysia	Putrajaya (formerly Kuala Lumpur)	Malay, English, Chinese, Tamil	Ringgit
Mauritius	Port Louis	English, French, Creole, Hindustani	Rupee Mauritian
Mexico	Mexico city	Spanish, Amerindian languages	Mexico Peso
Mongolia	Ulan Bator	Mangolian	Togrog
Myanmar	Naypyidar or Pyinmana (formerly Yangon)	Burmeses and tribal languages	Kyat

Country	Capital	Chief Language	Currency
Netherlands	Amsterdam	Dutch	Euro
New Zealand	Wellington	English and Maori dialect	New Zealand Dollar
Nigeria	Abuja	English, Hansa, Ibo, Yoruba	Naira
Norway	Oslo	Norwegian	Krone
Oman	Muscat	Arabic	Omani Rial
Pakistan	Islamabad	Urdu, Punjabi, Sindhi, Pusthu, Baluchi, Brahvi, English	Pakistani Rupee
Peru	Lima	Spanish, Quechua, Aymara	Nuero Sol
Philippines	Manila	Filipino, English, Spanish	Peso
Poland	Wrsaw	Polish	Zloty
Portugal	Lisbon	Portuguese	Euro
Qatar	Doha	Arabic, English	Riyal (QAR)
Russia	Moscow	Russian	Russian ruble
Saudi Arabia	Riyadh	Arabic	Rial (SAR)
Serbia	Belgrade	Serbo-Croatian (official), Albanian	Dinar
Singapore	Singapore city	Malay, Chinese, Tamil, English	Singapore Dollar
Somalia	Mogadishu	Arabic, English, Italian	Somali Shilling
South Africa	Capetown	Afrikaans, English	Rand
Spain	Madrid	Spanish, Catalan, Basque, Galician	Euro
Sri Lanka	Colombo	Sinhala, Tamil, English	Sri Lankan Rupee
Sudan	Khartoum	Arabic, English, Dinka, Nubian	Sudanese Pound
Sweden	Stockholm	Swedish	Krona
Switzerland	Berne	German, French, Italian, Romansch	Swiss Franc
Syria	Damascus	Arabic, Kurdish, Armenian	Syrian Pound
Taiwan	Taipei	Mandarian Chinese, Taiwan, Hakka dialects	New Taiwan Dollar
Thailand	Bangkok	Thai, Chinese, English, Malay	Thai Baht
Tunisia	Tunis	Arabic, French	Dinar
Turkey	Ankara	Turkish, Kurdish, Arabic	Turkish Lira
Uganda	Kampala	Englsih, Luganda, Swahili	Ugandan Shilling
United Arab Emirates	Abu Dhubi	Arabic	Dirham
United Kingdom	London	English, Welsh, Scots, Gaelic	Pound Sterling
United States of America	Washington D.C.	English	Dollar
Venezuela	Caracas	Spanish	Bolivar
Vietnam	Hanoi	Vietnamese, French, English, Chinese	Dong
Yemen	Sana'a	Arabic	Rial
Zimbabwe	Harare	English, Shona, Ndebela	Dollar (ZWD)

GEOGRAPHICAL DISCOVERIES

- **Amundsen (Norwegian)-**Discovered South Pole in 1912.
- **Byrd-American aviator and polar explorer.** Flew over the North Pole in 1926 and made the first flight over the South Pole in 1929. Discovered Edsel Ford mountains and Morei Byrd land.
- **Cabot (Venetian)-**Discovered New Foundland in 1494.
- **Captain Cook (English)-**Discovered Sandwich (now Hawaiian) Isles in 1770.
- **Columbus-**Discovered West Indies in 1492 and South America in 1498.
- **Copernicus-**Discovered Solar System in 1540. Propounded the astronomical system which bears his name.
- **David Livingstone-**Discovered course of the Zambesi, the Victoria Falls and Lake Nyasa in Africa.
- **Edmund Hillary-**Joint conqueror of Mount Everest with Tenzing. He also led a Trans-Atlantic expedition and reached South Pole on January 3, 1958.
- **Ferdinand de Lesseps-**Conceived the plan of the Suez Canal on which work was completed in 1869 through his efforts.
- **Francis Younghusband-**Explored the frontier regions of India, China and Tibet.
- **Kepler-**Discovered the Laws of Planetary Motion in 1609.
- **Lindbergh-**Performed the first solo-flight across the Atlantic in 1927 from New York to Paris.
- **Magellan-**Commanded the first expedition in 1519 to sail round the world. Discovered passage to the Pacific from the Atlantic through Straits afterwards named after him.
- **Marco Polo-**Venetian traveller who explored China, India, South Eastern countries and published the record of his various explorations. He was the first European to visit China.
- **Nansen-**Norwegian explorer who explored across Greenland and reached the highest altitude in the North Polar Region, till then attained.
- **Peary, Robert-**First to reach the North Pole in 1909.
- **Pedro Alvares Cabral (Portuguese) -** Discovered Brazil in 1500.
- **Shackleton-**Arctic explorer, reached within 160 km of the South Pole.
- **Iksman-**Dutch navigator, discovered the Tasmania Island and New Zealand in 1642.
- **Tenzing (Indian)-**First to reach Mount Everest on 29th May, 1953 along with Edmund Hillary. The expedition was led by Col. Sir John Hunt.
- **Vasco da Gama (Portuguese)-**Rounded the Cape of Good Hope and discovered the sea route to India in 1498.

NATIONAL ANIMALS OF THE MAJOR COUNTRIES

Country	Animals	Country	Animal
Afghanistan	Snow Leopard	Nepal	Cow
Albania	Golden Eagle	New Zealand	Kiwi
Australia	Kangaroo	Pakistan	Markhor
Bangladesh	Royal Bengal tiger	South Africa	Springbok
Brazil	Macaw	Spain	Bull
Canada	North American beaver	United Kingdom	Barbary Lion
China	Panda, Red Crowned Crane	United States	Bald Eagle
Denmark	Mute Swan	India	Bengal Tiger
Japan	Green Pheasant	Kuwait	Camel
Myanmar	Tiger	Belgium	Lion

OFFICIAL BOOKS
Blue Book : An official report of the British Government
Green Book : An official publication of Italy and Persia
Grey Book : An official reports of the Government of Japan and Belgium
Orange Book : An official Publications of the Government of Netherlands
White Book : An official Publications of China, Germany and Portugal
Yellow Book : French official Book
White Paper : An official paper of the Government of Britain and India on a particular issue
Red Data Book: Russian official book which contains lists of species whose continued existence is threatened

WORLD'S MOST POWERFUL INTELLIGENCE AGENCIES

Detective Agency	Country	Detective Agency	Country
Ministry of State Security	China	VAJA	Iran
Australian Secret Intelligence Service (ASIS)	Australia	MOSSAD	Israel
FSB	Russia	Egyption Homeland Security	Egypt
State Security Agency	South Africa	PSIA	Japan
Inter Service Intelligence (ISI)	Pakistan	Iraqi National Intelligence Service	Iraq
MI (Military Intelligence) 5 and 6, Special Branch, Joint Intelligence org.	UK	Central Intelligence Agency (CIA), Federal Bureau of investigation (FBI)	USA
Research and Analysis Wing (RAW), Intelligence Bureau (IB)	INDIA	DGSE (Direction General Dela Securite Exterieure	France

INTERNATIONAL AWARDS

Nobel Prize

- It was set up in 1895 under the will of **Alfred Nobel.**
- The Nobel prizes are presented annually on 10 December (The death anniversary of the founder).
- It is given in the fields of **Peace**, **Literature**, **Physics**, **Chemistry**, **Physiology** or **Medicine** (from 1901) and **Economics** (from 1969).

Nobel Prize (Indian/ Indian origin)

1913: Literature: Rabindranath Tagore; was also the first Asian to win the prize
1930: Physics: C. V. Raman
1968: Medicine: Har Gobind Khorana; US citizen of Indian origin
1979: Peace: Mother Teresa; Indian citizen of Albanian origin
1998: Economics: Amartya Sen
2009: Chemistry: Venkatraman Ramakrishnan; US citizen of Indian origin
2014: Peace: Kailash Sathyarthi

Pulitzer Prize

- Instituted in 1917 and named after US publisher **Joseph Pulitzer**.
- It is conferred annually in the United States for the accomplishments in journalism, literature and music.

Magsaysay Awards

- Instituted in 1957. Named after **Ramon Magsaysay**, the former President of Philippines.

- The award is given annually on August 31, the birth anniversary of Magsaysay, for outstanding contributions in Public service, Community Leadership, Journalism, Literature & Creative Arts and International Understanding.

Man Booker Prize

- Instituted in 1968, is the highest literary award of the world, setup by the **Booker Company** and the British Publishers Association along the lines of the Pulitzer Prize of USA.

Right Livelihood Award

- The Right Livelihood Award was established in 1980.
- It is also referred as "Alternative Nobel Prize".
- It is given to persons to honour those "working on practical and exemplary solutions to the most urgent challenges facing the world today."

Oscar Awards

- Instituted in 1929, are conferred annually by the **Academy of Motion Pictures**, **Arts** and **Sciences**, USA, in recognition of outstanding contribution in the various fields of film making.

UN Human Rights Award

- Instituted in 1966, this award is given every 5 years for individual contributions to the establishment of human rights.

UNESCO Madanjeet Singh Prize

- Instituted by UNESCO (1995) for the promotion of tolerance and non-violence on the occasion of the UN Year of Tolerance and the 125th bir th Anniversary of Mahatma Gandhi funded by a donation from Madanjeet Singh.

FATHER OF VARIOUS FIELDS

Field	Father	Field	Father
Atom Bomb	Dr. Robert Oppenheime	Computer	Charles Babbage
Aviation	Sir George Cayley	Biology	Aristotle
Chemistry	Robert Boyle	Microbiology	Louis pasteur and Robert koch
Comedy	Aristophanes	Political Science	Aristotle
Economics	Adam Smith	Modern Philosphy	Rene Descartes
English Poetry	Geoffrey Chaucer	Psychology	Wilhelmam Wundt
Greek Tragedy	Aeschylus	Modern Observational Astronomy	Galileo Galilei
Immunology	Edward Jenner	Modern Physics Science	Galileo Galilei
Modern Chemistry	Antoini Lavoisier	Modern Science	Galileo Galilei
Nuclear Physics	Ernest Rutherford	Nano technology	Richard Smalley
Sanskrit Grammar	Panini	Indian Nuclear Science	Homi Jehangir Bhabha
Geography	Eratosthenes	Anatomy	Andreas Vesalius
Sociology	Auguste Comte	Geometry	Euclid
Mathematics	Archimedes	Internet	Vinton Cerf

SOBRIQUETS

A sobriquet is a nickname, Occasionally assumed and often given by another. The sobriquet can become more familiar than the original name.

Sobriquets Person	Primary Names
Angel of Death	Josef Mengele
Bard of Avon	William Shakespeare
Bard of Twickenham	Alexander Pope
Bloody Mary	Mary I of England
Bonnie Prince Charlie	Charles Edward Stuart
Caligula	Gaius Julius Caesar Augustus Germanicus
Desert Fox	Erwin Rommel
Diamond Dave	David Lee Roth, Singer
Digger	Australian soldier
Dr. Death	Jack Kevorkian, proponent of assisted suicide
Dubya	George W. Bush
EI Caudillo	Francisco Franco
Father of his country	George Washington
Fuhrer	Adolf Hitler
Genghis Khan	Temüjin
Grand Old Man of Britain	Willian Ewart Glandstone
Honest Abe	Abraham Lincoln
Iron Duke	Duke of Wellington
Iron Lady	Margaret Thatcher
King James	LeBron James, American basketball player
Lady with the Lamp	Florence Nightingale
Little Richard	Rev. Richard Wayne Penniman, a prominent figure in rock n' roll.
Madge	Madonna
Madiba	Nelson Mandela
Maid of Orleans	Joan of Arc
Man of Blood and Iron	Otto Von Bismark
Man of Destiny	Napolean Bonaparte
Old Blood and Guts	George S. Patton
Old Blue Eyes	Frank Sinatra, entertainer
Old Hickory	Andrew Jackson, 7th President of the United States
Old Kinderhook (OK)	Martin Van Buren, 8th President of the United States
Old Nick	Santa
Old Rough and Ready	Zachary Taylor
Old St. Nick	Santa
Prince of the Humanists	Desiderius Erasmus
Qaid-e-Azam	Mohammad Ali Jinnah
Saint Jimmy	Billie Joe Armstrong
Satchmo	Louis Armstrong
Slick Willy	U.S. President Bill Clinton
Slowhand	Eric Clapton
The Bard	William Shakespeare
The Bird	Mark Fidrych, Baseball pitcher
The Boss	Bruce Springsteen
The Cincinnatus of the Americans	George Washington
The Duke	John Wayne
The Fab Four	The Beatles
The Godfather of Soul	James Brown
The Golden Bear	Jack Nicklaus
The Greatest	Muhammad Ali, Boxer
The King (of golf)	Arnold Palmer
The King of Pop	Michael Jackson
The Man from Tennessee	Andrew Jackson
The Material Girl	Madonna
The Red Baron	Manfred von Richthofen, World War I, German flying ace

Sobriquets Person	Primary Names
The Rock Chemeleon	David Bowie
The Tiger of France	Georges Clemenceau
Tricky Dick	Richard Nixon, 37th President of the United States
Uncle Sam	The U.S.A. or sometimes the government
Wizard of the North	Walter Scott

FIRST IN THE WORLD

The first person to reach Mount Everest	Sherpa Tenzing, Edmund Hillary
The first person to reach North Pole	Robert Peary
The first person to reach South Pole	Amundsen
The first religion of the world	Hinduism
The first country to print book	China
The first country to issue paper currency	China
The first country to commence competitive examination in civil services	China
The first President of the U.S.A	George Washington
The first Prime Minister of Britain	Robert Walpole
The first Governor General of the United Nations	Trygve Lie
The first country to win football World cup	Uruguay
The first country to prepare a constitution	U.S.A
The first Governor General of Pakistan	Mohd. Ali Jinnah
The first country to host NAM summit	Belgrade (Yugoslavia)
The first European to attack India	Alexander, The Great
The first European to reach China	Marco Polo
The first person to fly aeroplane	Wright Brothers
The first person to sail round the world	Magellan
The first country to send man to the moon	U.S.A
The first country to launch Artificial satellite in the space	Russia
The first country to host the modern Olympics	Greece
The first city on which the atom bomb was dropped	Hiroshima (Japan)
The first person to land on the moon	Neil Armstrong followed by Edwin E. Aldrin
The first shuttle to go in space	Columbia
The first spacecraft to reach on Mars	Viking-I
The first woman Prime Minister of England	Margaret Thatcher
The first Muslim Prime Minister of a country	Benazir Bhutto (Pakistan)
The first woman Prime Minister of a country	Mrs. S. Bandamaike (Sri Lanka)
The first woman to climb Mount Everest	Mrs. Junko Tabei (Japan)
The first woman cosmonaut of the world	Velentina Tereshkova (Russia)
The first woman President of the U.N. General Assembly	Vijaya Lakshmi Pandit
The first man to fly into space	Yuri Gagarin (Russia)
The first batsman to score three test century in three successive tests on debut	Mohd. Azharuddin
The first man to have climbed Mount Everest twice	Nawang Gombu
The first U.S. President to resign Presidency	Richard Nixon

SUPERLATIVES

Tallest Animal on (land)	Giraffe
Fastest Bird	Swift
Largest Bird	Ostrich
Smallest Bird	Humming Bird
Longest Bridge (Railway)	Lower Zambeji (Africa)
Tallest Building	Burj khalifa, Dubai (U.A.E)
Tallest office Building	Patronas Twin Towers Kuala Lampur (Malaysia)
Longest Big Ship Canal	Seuz Canal (Linkin red sea & Mediterranean)
Busiest Canal (Ship)	Baltic White Sea Canal (152 miles)
Largest Continent	Asia
Smallest Continent	Australia
Largest Coral Formation	The Great Barrier Reef (Australia)
Largest Dam	Grand Coulee- Concrete Dam (U.S.A)
Longest Day	June 21 (in Northern Hemisphere)
Shortest Day	Dec. 22(in Northern Hemisphere)
Largest Delta	Sundarbans, India (8000 sq. miles)
Longest Desert (World)	Sahara, Africa (84, 00,000 sq. km.)
Largest Diamond	The Cullinan (over 1 ½ 1b.)
Biggest Dome	Gol Gumbaz (Bijapur), (Old archi) 144 ft. diameter.
Longest Epic	The Mahabharata
Largest Island	Greenland (renamed Kalaallit Nunaat)
Largest Lake (Artificial)	Lake Mead (Bouler)
Deepest Lake	Baikal (Siberia); average depth2300 ft.
Highest Lake	Titicaca (Bolivia) 12645 ft. above sea level.
Largest Lake (Fresh Water)	Lake Superior, U.S.A
Largest Lake (Salt Water)	Caspian Sea 3, 71,000 sq. km.)
Largest Mosque	Masjid-al-Haram (Mecca-Saudi Arabia) Surrounds the Kaaba.
Highest Mountain peak (World)	Himalayas
Longest Mountain Range	Andes (S.America) 5,500 miles in length
Tallest Minaret (Free Standing)	Qutub Minar, Delhi 238 ft.
Tallest Minaret	Great Hassan Mosque, Casablanca, Morocco
Deepest & Biggest Ocean	The Pacific
Largest Palace	Imperial Palace (Gugong), Beijing (China)
Coldest Place or Region	Verkhoyansk (Syberia), Temperature – 85° C
Driest Place	Death Valley (California); rainfall 1 ½ inch.
Hottest Place (World)	Al-Aziziyah (Libya, Africa) 136°F
Highest Plateau	Pamir (Tibet)
Longest Platform (Railway)	Kharagpur W.B, India (833m)
Largest Platform (Railway)	Grand Central terminal, New York (U.S.A)
Largest Port	Port of New York & New Jersey (U.S.A)
Busiest Port	Rotterdam (the Netherlands)

Longest Railway	Trans-Siberian Railway (6,000 miles Long)
Longest River	Nile (6690 km), Amazon (6570 km.)
Longest River Dam	Hirakund Dam (Orissa), India 15.8 miles.
Largest sea-bird	Albatross
Largest Sea (inland)	Mediterranean
Tallest statue	Statue of Liberty, New York (U.S.A), 150 ft. high.
Longest Swimming Course	English Channel
Tallest Tower	C.N Tower Toronto (Canada)
Longest Train nonstop	Flying Scoutsman
Longest Tunnel (Railway)	Seikan Rail Tunnel (Japan), (53.85 km.)
Longest & Largest Canal Tunnel	Le Rove Tunnel (South of France)
Longest Tunnel (Road)	Laerdal, Norway
Highest Volcano	Ojos Del Salado, Andes Argentine-Chile (6,885 m.)
Largest Volcano	Mauna Lao (Hawaii)
Longest Wall	Great Wall of China (1500 miles)
Highest Waterfall	Salto Angel Falls (Venezuela)
Longest Strait	Tartar Strait (Sakhalin Island & the Russian mainland)
Broadest Strait	Davis Straits (Greenland & Baffin Island, (Canada)
Narrowest strait	Chaliks-45 yards (Between the Greek mainland the island of Euboea in the Aegean Sea)

Largest Bay	Hudson Bay, Canada (Shore line 7623 miles)
Largest Gulf	Gulf of Mexico,(shoreline 2100 miles)
World Rainiest Spot	Cherrapunji (Mawsynram), India
Lightest gas	Hydrogen
Hardest Substance	Diamond
Longest Animal	Blue Whale, (recorded length 106 ft. weight-195 tons)
Longest Life Span of an Animal	190 to 200 years, (Giant tortoise)
Largest Land Animal	African Bush Elephant
Fastest Animal	Cheetah (Leopard) 70 m.p.h
Longest Jump Animal	Kangaroo
Longest wing Spread Bird	Albatross
Slowest Animal	Snail
Fastest Dog	Persian Grey Hound (speed 43 m.p.h)
Longest poisonous snake	King cobra
Biggest Flower	Raffesia (Java)
Largest Stadium	Strahov stadium in Prague, (the Czech Republic)
Largest Church	Basilica of st. Peter, Vetican city, Rome Italy
Largest Temple	Angkor Vat (Combodia)
Largest Diamond mine	Kimbarley (S.Africa)
Largest River in volume	Amazon, Brazil
Highest Straight Dam	Bhakhra Dam
Highest Capital City	La Paz (Bolivia)

Largest Asian Desert	Gobi, Mongolia
Largest Democracy	India
Longest Thoroughfare	Verazano-Narrows, New York City Harbour
Largest Neck Animal	Giraffe
Largest Animal of the Cat Family	Lion
Most Intelligent Animal	Chimpanzee

WORLD FAMOUS LANDMARKS

1. The Statue of Liberty in New Your: USA
2. The Eiffel tower in Paris: France
3. St. Basil's Cathedral in Moscow : Russia
4. The Great Sphinx at Giza, The Pyramids of Giza: Egypt
5. Neptune and the Place of Versailles: France
6. The Great wall of China : China
7. The Taj Mahal in Agra : India
8. Christ the Redeemer: Rio de Janeiro
9. Mecca: Saudi Arabia
10. Brandenburg Gate in Berlin: Germany
11. Acropolis of Athens: Greece
12. Niagara Falls : Border of Ontario (Canada) and New York (USA)
13. Angkor Wat : Cambodia
14. St. Peter's Cathedral : Vatican City
15. Mount Rushmore: South Dakota
16. The Grand Canyon : Arizona
17. Sydney Opera House : Australia
18. Forbidden City : Beijing
19. The Colosseum: Rome, Italy
20. The Empire State Building : New York
21. Abu Simbel : Egypt
22. Tower of Pisa : Italy
23. The Burj al Arab Hotel : Dubai
24. Stonehenge: Wiltshire, United Kindom
25. Big Ben : London

THE NATIONAL EMBLEMS OF DIFFERENT COUNTRIES

Country	Emblem	Country	Emblem
Australia	Kangaroo	**Bangladesh**	Water Lily
Barbados	Head of a Trident	**Belgium**	Lion
Canada	White Lily	**Chile**	Candor & Huemul
Denmark	Beach	**Dominica**	Sisserou Parrot
France	Lily	**Germany**	Corn Flower
Guyana	Canje Pheasant	**Hong Kong**	Bauhinia (Orchid Tree)
India	Lioned Capital	**Iran**	Rose
Ireland	Shamrock	**Israel**	Candelabrum
Italy	White Lily	**Ivory Coast**	Elephant
Japan	Chrysanthemum	**Lebanon**	Cedar Tree
Luxembourg	Lion with Crown	**Mongolia**	The Soyombo
Netherlands	Lion	**New Zealand**	Southern Cross, Kiwi, Fern
Norway	Lion	**Pakistan**	Crescent
Papua New Guinea	Bird of paradise	**Spain** **Sierra Leone**	Eagle Lion
Sri Lanka	Lion	**Sudan**	Secretary Bird
Syria	Eagle	**Turkey**	Crescent & Star
U.K.	Rose		

IMPORTANT DAYS OF THE YEAR

10th January: World Laughter Day
2nd February: World Wetlands Day
4th February: World Cancer Day
13th February: World Radio Day
14th February: St. Valentine's Day
21st February: International Mother Language Day
8th March: International Women's Day and Mother's day
15th March: World Consumer Rights Day
22nd March: World Water Day
23rd March: World Meteorological Day
24th March: World Tuberculosis Day
27th March: World Theatre Day
2nd April: World Autism Awareness Day
7th April: World Health Day
18th April: World Heritage Day
22nd April: World Earth Day
25th April: World Malaria Day
30th April: World Jazz Day
1st May: International Labour Day
3rd May: World Asthma Day
5th May: World Athletics Day
8th May: International Red Cross Day
17th May: World Telecommunications Day
20th May: World Refugee Day
24th May: Commonwealth Day
31st May: World No Tobacco Day
1st June: World Milk Day
5th June: World Environment Day
8th June: World Ocean Day
20th June: International Refugee Day
21st June: International Yoga Day
23rd June: International Olympic Day
27th June: World Diabetes Day
1st July: World Doctor's Day Van Mahotsav Week (1st July to 7th July)
11th July: World Population Day
28th July: World Hepatitis Day
29th July: International Tiger Day
30th July: International Day of Friendship
6th August: Hiroshima Day
12th August: International Youth Day
19th August: World Humanitarian Day
8th September: International Literacy Day
15th September: World Engineer's Day
16th September: World Ozone Day
18th September: International Day of Peace
21st September: Biosphere Day
25th September: Social Justice Day, World Maritime Day
27th September: World Tourism Day
1st October: International Music Day
2nd October: Gandhi Jayanti, International Non-Violence Day
3rd October: World Habitat Day
9th October: World Postal Day National Postal Week (9th October to 14th October)
12th October: World Sight Day
16th October: World Food Day
7th November: World Cancer Awareness Day
21st November: World Fisheries Day, World Hello Day, World Television Day
25th November: International Day for the Elimination of Violence against Women
3rd December: World Conservation Day
5th December: World Soil Day
9th December: International Day against Corruption, National Immunization Day
10th December: World Human Rights Day, International Broadcasting Day
11th December: UNICEF Day

LIST OF PARLIAMENT OF DIFFERENT COUNTRIES

Country	Parliament Name	Country	Parliament Name
India	Sansad/Parliament	Maldeep	Majlis
Pakistan	National Assembly	Span	Cortes
Bangladesh	Jatiya Sansad	Nepal	Rastriya Panchayat
China	National Peoples Congress	Russia	Duma

Bhutan	Tsondu	France	National Assembly
Srilanka	Parliament of Sri Lanka	Iran	Majlis
Afganistan	Shora	Malasiya	Diwan Nigara
England	Parliament	Switzerland	Fedral Assembly
Canada	Parliament	Turkey	Grand National Assembly
Australia	Parliament		
USA	Congress		
Germany	Wondstag		
Taiwan	Yuan		
Japan	Diet		
Israil	Neset		

Arms Control Treaties

Limited Test Ban Treaty (LTBT): Banned nuclear weapon tests in the atmosphere, in outer space and under water. Signed by the US, UK and USSR in Moscow on 5 August 1963. Entered into force on 10 October 1963.

Nuclear Non-Proliferation Treaty (NPT): Allows only the nuclear weapon states to have nuclear weapons and stops others from aquiring them. There are five nuclear weapon states: US, USSR (later Russia), Britain, France and China.

Strategic Arms Limitation TalksI (SALT-I): The first Talks began in November 1969.

Strategic Arms Limitation Talks II (SALT-II): The second round started in November 1972. The US President Jimmy Carter and the Soviet leader Leonid Brezhnev signed the Treaty on 18 June 1979.

Strategic Arms Reduction TreatyI (START-I): Treaty signed by the USSR President Mikhail Gorbachev and the US President George Bush (Senior) on 31 July 1991.

Strategic Arms Reduction Treaty II (START-II): Treaty signed by the Russian President Boris Yeltsin and the US President George Bush (Senior) on 3 January 1993.

UNITED NATIONS

Quick Facts

- Membership: 193 Member States
- Established: 24 October 1945
- Official languages: Arabic, Chinese, English, French, Russian, Spanish.
- United Nations Day, 24 October
- Based on five principal organs (formerly six–the Trusteeship Council suspended operations in 1994, upon the independence of Palau, the last remaining UN trustee territory); the General Assembly, the Security Council, the Economic and Social Council (ECOSOC), the Secretariat, and the International Court of Justice.
- General Assembly: 193 Member States
- Security Council: 5 permanent members and 10 non-permanent

The Permanent Members of the Security Council

- The Peoples' Republic of China;
- The Republic of France;
- The United Kingdom of Great Britain and Northern Ireland;
- The Russian Federation; and
- The United States of America.

The UN Flag and the Emblem

The UN General Assembly adopted the UN flag on 20 Oct. 1947. The white UN emblem is super-imposed on a light blue back ground.

Aims and Objectives

The Main objectives of the UN are :

(1) To maintain peace and security in the world.

(2) To work together to remove poverty, disease and illiteracy and encourage respect for each other's rights of basic freedom.

(3) To develop friendly relations among nations.

(4) To be a centre to help nations achieve these common goals.

NON-PERMANENT MEMBERS OF UNSC

Country	Term Began	Terms Ends
Angola	2015	2016
Egypt	2016	2017
Japan	2016	2017
Malaysia	2015	2016
New Zealand	2015	2016
Senegal	2016	2017
Spain	2015	2016
Ukraine	2016	2017
Uruguay	2016	2017
Venezuela	2015	2016

SECRETARY GENERALS OF UNO AND THEIR TENURE

Name	Country	Tenure
Trigve Lie	Norway	1946-1952
Dag Hammarskjoeld	Sweden	1953-1961
U-Thant	Myanmar (Burma)	1961-1971
Kurt –Waldheim	Austria	1972-1982
Javier Perez de Cuellar	Peru	1982-1991
Boutros Boutros Ghali	Egypt	1992-1996
Kofi Annan	Ghana	1997-2006
Ban-Ki-moon	S. Korea	2007- continued

WORLD ORGANISATIONS AND THEIR HEADQUARTERS

Asian Development Bank (ADB)	Manila (Philippines)
ASEAN (Association of South –East Asian Nations)	Jakarta (Indonesia)
NATO (North Atlantic Treaty Organisation)	Brussels (Belgium)
African Union (AU)	Addis-Ababa (Ethiopia)
SAARC (South Asian Association for Regional Corporation)	Kathmandu (Nepal)
United Nations Environment Programme (UNEP)	Nairobi (Kenya)
International Atomic Energy Agency (IAEA)	Vienna (Austria)
United Nations Industrial Development Organisation (UNIDO)	Vienna (Austria)
UNCTAD (United Nations Conference on Trade and Development)	Geneva, Switzerland
WWF (World Wildlife Fund)	Gland (Switzerland)
International Olympic Committee (IOC)	Lausanne
OPEC (Organisation of Petroleum Exporting Countries)	Vienna
OECD (Organisation for Economic Co- operation and Development)	Paris
Commonwealth of Nations	London
United Nations Centre for Human Settlements (UNCHS)	Nairobi
United Nations International Children's Emergency Fund (UNICEF)	New York
United Nations Fund for Population Activities (UNFPA)	New York
United Nations Development Programme (UNDP)	New York
United Nations Institute for Training and Research (UNITAR)	Geneva
United Nations Research Institute for Social Development (UNRISD)	Geneva

World Food Programme (WFP)	Rome (Italy)
International Civil Aviation Organisation (ICAO)	Montreal (Canada)
International Fund for Agricultural Development (IFAD)	Rome
International Labour Organisation (ILO)	Geneva
International Monetary Fund (IMF)	Washington

Universal Postal Union (UPU)	Berne (Switzerland)
World Health Organisation (WHO)	Geneva
World Intellectual Property Organisation (WIPO)	Geneva
World Meteorological Organisation (WMO)	Geneva
Woman Aid International	London
European Free Trade Association (EFTA)	Geneva

INT'L GROUPS/ORGANISATION

Acronym	Full Name	H.Q.	Establishment
NAM	Non-Aligned Movement	Belgrade	1961
CHOGM	The Commonwealth Heads of Government Meeting		
EU	The European Union	Brussels, Belgiwn	1993
SAARC	The South Asian Association for Regional Cooperation	Kathmandu, Nepal.	1985
NATO	The North Atlantic Treaty Organization	Brussels	4 April 1949
SEATO	The Southeast Asia Treaty Organization	Manila	September 8, 1954
INTERPOL	The International Criminal Police Organization	Lyon, France	1923
G-8	GROUP OF 8	France	1975
G-77	Group of 77	Geneva	15 June 1964
G-15	GROUP OF 15	Belgrade	September 1989
G-20	Group of 20		1999
ADB	Asian Development Bank		22 August 1966
AL	Arab League	Cairo	22 March 1945
ASIAN	The Association of Southeast Asian Nations		8 August 1967
OPEC	The Organization of the Petroleum Exporting Countries	Vienna	1965
APEC	Asia-Pacific Economic Cooperation		1989
OECD	The Organisation for Economic Co-operation and Development		1961
Amnesty International	Amnesty International	London	28 May 1961
Red Cross	Red Cross		1864
BRICS	Brazil, Russia, India, China, and South Africa	No. H.Q.	2008
MDG – 2015	Millenium Development Goal		2000

CENSUS 2011

- It is the 15th National Census survey conducted by the Census Organization of India.
- Mr. C. Chandramouli -Commissioner & Registrar General of the Census 2011.
- Survey has been conducted in 2 phases - house listing and population.
- **Population of India** – 1,210,193,422 with 623, 724, 248 males and 586,469, 174 females.
- **Total literacy rate:** 74.04%.
- **Density of population:** 382 persons/ sq.km
- **Sex ratio:** 940 females per 1000 males
- **Child sex ratio:** 914 females per 1000 males

HIGH POPULATION		
1	Uttar Pradesh	199,812,341
2	Maharashtra	112,374,333
3	Bihar	104,099,452
4	West Bengal	91,276,115
5	Andhra Pradesh	84,580,777

MOST POPULATED METROS		
1	Mumbai	18,414,288
2	Delhi	16,314,838
3	Kolkata	14,112,536
4	Chennai	8,696,010
5	Bangalore	8,499,399

TOP GROWTH RATE		
1	Dadra and Nagar Haveli	55.88 %
2	Daman and Diu	53.76 %
3	Puducherry	28.08 %
4	Meghalaya	27.95 %
5	Arunachal Pradesh	26.03 %

TOP LITERATE STATES		
1	Kerala	94.00 %
2	Lakshadweep	91.85 %
3	Mizoram	91.33 %
4	Goa	88.70 %
5	Tripura	87.22 %

BEST SEX RATIO		
1	Kerala	1084
2	Puducherry	1037
3	Tamil Nadu	996
4	Andhra Pradesh	993
5	Manipur	992

Indian History

ANCIENT HISTORY

SOURCES OF ANCIENT INDIAN HISTORY

- **Pliocene deposits** in Siwaliks. It is known as Ramapitheus, a type of early **hominid**.
- **Inscriptions** either on stone or on metal plates are old records of ancient India. The study of inscriptions is called **epigraphy.**
- **Coins:** The study of coins is called **numismatics**.
  - The **Punch Mark Coins** (silver & copper) are the earliest coins of India.
- **Monuments:** Monuments reflect the material prosperity and development of culture e.g. Taxshila monuments about Kushans and Stupas, Chaityas and Vihars about Maurya.
- **Vedas:** Vedas point out features and development of different dynasties, e.g. **Rigveda** deals with Archery and known as "**The first testament of mankind**."
  - **Samveda** says about the art of music (i.e. melodies)
  - **Yajurveda:** It is known as ritual Veda.
  - **Atharvaveda:** It is the latest of the four. It is about beliefs and superstitions.
- **Upanishad:** It is anti-ritualistic in nature. It deals about the theories of creation of the universe and doctrine of action.
- **Sutras:** Sutras deal about rituals, Sanskaras, social life, Medical science etc.
- **Puranas:** Puranas describe the genealogies of various royal dynasties, i.e. Maurya, Andhra, Shishunag, Gupta, etc.
- **Jatak Kathas:** These are the parts of art and literature of 3rd century B.C.
- **Arthashastra:** It is the analysis of political and economic conditions of the Mauryas, composed by Kautilya (Chanakya).
- **Mudrarakshasa:** It tells about the establishment of the Maurya dynasty, the fall of Nanda, Ramgupta, etc.
- **Rajtarangini:** It was written by Kalhana in 12th century A.D. It is about the rulers of Kashmir. It is considered the, "*first historical book of India*."
- **Foreign travellers** wrote about the information of India. For examples –
  Megasthenes: He wrote book, "INDICA" about the dynasty of Maurya.
  Fahien: He wrote about the Gupta Emperor.
  Hieun-Tsang: He wrote about the Buddhist record of the western world during period of Harshavardhan.
  Albiruni: He wrote ' Tarikh-ul-Hind.'
  Ibna-Batuta: He wrote about India under the rule of Muhammad Tughlaq.

PRE-HISTORIC PERIOD

- **Pre - historic period** is divided into three sections- **Stone age, Bronze age** and **Iron age**.
- **Stone age** is divided into three periods, i.e. Palaeolithic Age, Mesolithic Age and Neolithic Age.
- **Chalcolithic Age** is marked by the use of copper as **copper age**.
- The **Iron age** is usually associated with the **Painted Grey Wares (P.G.W.)**.

Indus Valley Civilization

- The **Indus Valley Civilization (IVC)** was a unique Bronze Age civilization.
- The Civilization flourished around the Indus river basin and its tributaries, consisting of modern Pakistan and northwestern India.
- Lothal, Balakot, Suktagendor and Allahdin (Pakistan) in the cities of the Harappan civilization were the major ports.
- In the valley of the Indus people used irrigation-based agriculture.

Indus Valley Sites – Excavators

Harappa - 1921- Dayaram Sahni
Mohenjodaro- 1922- R.D.Banerjee
Sutkagendor- 1927- Aurel Stein, George
Dalesamri - 1929- M.G.Majumdar
Chanhudaro- 1931- M.G.Majumdar
Rangpur - 1931- M.S.Vats
Kot Diji- 1935- Fazal Khan
Dabarkot- 1935- Maichke
Kili Ghul Mohammad- 1950- Fairservis
Kalibangan- 1953- A. Ghosh
Ropar - 1953- Y.D.Sharma
Lothal - 1957- S.R.Rao
Surkotada- 1964- Jagatpati Ghosh
Dholvira- 1967- J.P. Joshi

THE VEDIC PERIOD

- The **Vedic Period** or the Vedic Age refers to the period when the Vedic Sanskrit texts were composed in India.
- Literally '**Aryans**' means - the 'best' or 'eminent'.
- The Aryans are supposed to have migrated from Central Asia into the Indian Subcontinent in Several stages during 2000 to 1500 B.C.
- **The Rigveda** (1500–1000 BC) consists of 1028 hymns. These hymns were sung in honour of various gods and were recited by Hotri.
- The **Gaytri Mantra** had been discovered from the Rig Veda.
- The Sindhu and its tributaries are called **Sapta Sindhu.**
- The **Yajur Veda** is a book of sacrificial prayers. It is written in both verse and prose.
- The **Sama Veda** consists of **1549** hymns.
- It is a book of **chants** for singing during sacrifices.

LATER VEDIC PERIOD (1000-500 BC)

- The **later Vedic** society came to be divided into four varnas called the Brahmanas, rajanyas or kshatriyas, vaisyas and shudras, each varna was assigned with its duty.

Kingdoms of the Later Vedic Period

Kingdom		Location
1. Panchal	-	Bareilly, Badayun & Farrukhabad in U.P.
2. Kushinagar	-	Northern region of Uttar Pradesh
3. Kashi	-	Modern Varanasi
4. Koshal	-	Faizabad in Uttar Pradesh
5. Southern Madra	-	Near Amritsar
6. Uttara Madra	-	Kashmir
7. Eastern Madra	-	Near Kangra
8. Kekaya	-	On the bank of Beas river east of Gandhar kingdom
9. Gandhar	-	Rawalpindi & Peshawar

Chronology of Foreign Invasion

- 518–486 B.C.: King Darius or Darus invaded India.
- 326 B.C. : Alexander invaded India.
- 190 B.C. : India-Greeks or Bactrians invaded India.
- 90 B.C. : Sakas invaded India.
- A.D. 1st Century : Pahlavas invaded India.
- A.D. 45 : Kushanas or Yue-chis invaded India.

Summary of Alexander's Invasion

- Alexander marched to India through the **Khyber Pass in 326 B.C**.
- **Ambi**, the ruler of Taxila, submitted to Alexander.
- He was resisted first strongest by **Porus** at **Jhelum**.
- In **325 B.C.**, he began his homewardjourney.
- In **324 B.C.**, he reached Susa in Persia and died the next year, i.e. 323 B.C.
- The Greek invasion of India opened the trade route between north-west India and Western Asia.

RELIGIOUS MOVEMENTS

- Came into existence around 600 B.C.
- The main cause being reaction against domination of Brahmins and spread of agricultural economy in North-East.

Jainism

- Founder – **Rishabhadeva** (First Tirthankara).
- **Mahavira** was the last of the 24 tirthankaras.
- Jainism was divided into two sects: **Shwetambaras** and **Digambaras**.
- The **First Council** was held at **Pataliputra** by **Sthulabahu** and Second at Valabhi.

Teachings

- Jainism was based on 5 doctrines :
  (i) Ahinsa, i.e. non-violence; (ii) do not speak a lie, (iii) do not steal. (iv) do not acquire property, and (v) observe **continence** (**Brahmacharya**) introduced by Mahavira.

Three Gems of Jainism (Ratnatrya)

(i) Right faith (Samyak Vishwas)
(ii) Right knowledge (Samyak Gyan)
(iii) Right conduct/action (Samyak Karma)

Buddhism

- Gautam Buddha was the founder of Buddhism.
- His real name was **Siddhartha**.
- His father was a king named **Suddodana Tharu** and Mother was **Mahamaya**.
- He was born at **Lumbini**.
- He discovered enlightenment under the peepal tree (**Bodhi Vriksha**) in Gaya, Bihar at the age of 35.
- He gave his first sermon at the **Deer Park in Sarnath**.
- It was divided into three main sects: Hinayana, Mahayana and Vajrayana.

Buddhist Councils

First at Rajgir, Second at Vaishali, Third at Patliputra & Fourth in Kashmir.

IMPORTANT DYNASTIES IN ANCIENT INDIA

The Haryanaka dynasty (544 – 412 B.C.)

- **Bimbisara** was the first ruler and founder of Haryanka dynasty. The capital of the kingdom was **Rajagriha**.
- **Ajatasatru** who killed his father and seized the throne for himself.
- He was contemporary to Lord Mahavira and Lord Buddha and a follower of Buddhism.
- Ajatasatru was succeeded by **Udayin**.

Shishunaga dynasty (412 - 344 B.C.)

- The last Haryanka ruler, Nagadasaka, was killed by his courtier Shishunaga in 430 B.C, who became the king and founded the Shishunaga dynasty.

Nanda dynasty (344-321 B.C.)

- Mahapadmananda established the Nanda dynasty into a powerful empire.
- Last ruler of Nanda dynasty was Dhanananda. He was contemporary of Alexander.
- **Alexander** invasion of India took place in 326 B.C. during the reign of Dhanananda.

The Mauryan empire (322 – 185 B.C.)

- Founder— **Chandragupta Maurya**
- He defeated the king Dhanananda with the help of Chanakya .
- Its capital was **Pataliputra**.
- Megasthene (Greek Ambassador) came to his court.
- **He** embraced **Jainism** and at **Sravanbelagola**
- He died at **Sravanbelagola**
- The war of Kalinga (BC 261) was the turning point of Ashoka's life. The mass death of the war changed his mind and he became a follower of **Buddhism**.
- **Ashok Stambh** of **Sarnath** was adopted as national emblem of India.
- **Sanchi Stupa** was built by Ashoka.
- **Ashoka's Dhamma** was a code of conduct (a set of principles like respect to elders, mercy to slaves & emphasis on truth, non-violence & tolerance).

Number	Name of Emperor	Period
1	Chandragupta Maurya	322 BC - 298 BC
2	Bindusara	298 BC - 272 BC
3	Ashoka	274 BC - 232 BC
4	Dasaratha	232 BC - 224 BC
5	Samprati	224 BC - 215 BC
6	Salisuka	215 BC - 202 BC
7	Devavarman	202 BC - 195 BC
8	Satadhanvan	195 BC - 187 BC
9	Brihadatha	187 BC - 185 BC

Sunga Dynasty (185 to 73 B.C.)

- Pushyamitra Sunga was the senapati of last king of Mauryan empire Brihadratha. He killed Brihadratha and founded the Sunga dynasty in 187 B.C.
- Its capital was Pataliputra but later Vidhisha was the capital of Sunga rulers.

Kanva Dynasty (73-28 B.C.)

- Founder- Vasudeva Kanva.
- Other Sunga Rulers: Bhumimitra, Narayana, Susarman.

Satvahana Dynasty

- It ruled in the Deccan and Central India after Mauryans.
- Founder- Simuka
- Most powerful Satavahana king - Gautamiputra Satakarni (A.D. 106-130)

OTHER DYNASTIES

- **Kharavela** was the greatest king of Chedi Dynasty.
- Source of information: **Hatigumpha** Pillar inscription (created by Kharavela)
- He opposed Demetrius of Bactria and defeated them.
- The **Indo-Greeks** were the first to issue gold coins in India.
- The **Sakas** were a group of nomadic tribes of Iranian origin or Scythian tribes, who lived in Central Asia.
- **Kanishka** is considered to have conflicted with the Pataliputra and had taken Asvaghosa, the Buddhist Monk to Purushpura.
- Founder of **Pallava** Dynasty- **Simhavishnu**, Capital – **Kanchi**.

The Sangam Kingdom

The Tamil Sangam was an academy of poets and bards.

Sangam	Place of Organisation	Chairman	Kingdom
First	Thenmadurai	Agastya	Pandiya
Second	Kapatapuram	Earlier- Agastya Later- Tolkappiyar (a disciple of Agastaya)	Pandiya
Third	North Madurai	Nakkirar	Pandiya

- Founder of **Chera Dynasty**: Utiyan Cheralatan.
- Founder of **Chola Dynasty**: Vijayalaya Capital – **Kaveripattanam**.
- Most powerful kings of Chola Dynasty - Rajaraja (985-1014) and his son, Rajendra I.

Temples & their locations

The Kailash Temple	Ellora
The Hoysala temple	Belur and Halebid
The Chennakesava temple	Belur
The Hoysaleswara temple	Halebid
The Ratha and Shore temple	Mahabali-puram,
The Brihadeshwara temple	Tanjavur
The Vithala temple	Harmpi
The Meenakshi Temple	Madurai

The Gupta Empire (AD 320-467)

- Founder - Sri Gupta
- **Nalanda University** was built by Kumargupt.
- The great Mathematician **Aryabhata lived** during this age. He discovered the number "**0**" and value of **Pi**. He wrote "**Aryabhatiya**" and "Suryasiddhanta".

- **Kalidas** the great poet also belonged to this period.
- **Chandragupta (320-335 AD)** was the son of Ghatotkacha and grandson of Sri Gupta.
- **Sumudragupta** (AD 335-375) Harisena described him as the "Hero of a Hundred Battles."
- **Prayag Prashasti** (Written by **Harisen**) is the main source of information on his reign.
- **Samundragupta** was succeeded by his son Chandragupta Vikramaditya II.
- **Kumaragupta (AD 415-455)** is the son of Chandragupta II.

Ruler of Gupta Dynasty	
Srigupta I	270 AD - 290 AD
Ghatotkacha	290 AD - 319 AD
Chandragupta I	319 AD - 335 AD
Samudragupta	335 AD - 375 AD
Chandragupta II	375 AD - 414 AD
Kumaragupta I	415 AD - 455 AD
Skandagupta	455 AD - 467 AD

- Gupta Period is also known as the **'Golden Age of Ancient India'.**

The Post Gupta Period (550 AD – 647 AD)

NORTHERN INDIA

- The **Pushyabhuti dynasty** came in power in **Thaneswar** (Karnal in Haryana) in the beginning of the 6th century AD.
- The first important king of this dynasty was **Prabhakaravardhan** (580-605 AD).
- **Harshavardhana** (AD 606–647) was the last Hindu king of North India.
- Harsha himself wrote the **Ratnavali**, Naganandam and Priyadarshika plays in Sanskrit.

SOUTHERN INDIA

- Capital of **Chalukyas** (AD 543-753)-**Badami** (Bagalkot district of North Karnataka)
- **Pulakeshin I** is generally attributed to be the first Chalukyan king.
- Narasimhavarman completed the beautiful temples of **Mahablipuram.**

Rashtrakutas (AD 753–973)

- Founded by **Dantidurg**; Krishna I built **Kailasha** temple at **Ellora**. Amoghavarsha, who is compared to Vikramaditya, wrote the first Kannada poetry Kaviraj Marg.

Gangas

Ruled Orissa; Narsimhadeva constructed **Sun Temple** at Konark; Anantvarman built the **Jagannath Temple** at Puri; and Kesaris who used to rule before Gangas built the **Lingaraja Temple** at Bhubaneshwar.

Pallavas (AD 600-757)

Founder-**Simhavishnu**; capital-**Kanchi**; greatest king **Narsimhavarman** who founded the town of Mamallapuram (**Mahabalipuram**) and built rock-cut raths or even pagodas.

- **Palas** dynasty was founded by Gopala I, who was elected as king of people.
- **Palas** with capital at **Monghyr** is known for Dharmapala, their second king, who founded **Vikramashila University** and revived Nalanda University.
- The greatest ruler of **Pratiharas** was Bhoja (also known as Mihir, Adivraha).
- Khajuraho temples were built during the reign of **Chandellas** of Bundelkhand.

The Cholas (AD 985-1279)

- Founder **Vijayalaya**, Capital **Tanjore**.
- **Aditya I** Chola wiped out Pallavas and weakened Pandayas.
- **Purantaka I** captured Madurai, but defeated by Rashtrakuta ruler Krishna III at the **Battle of Takkolam**.

Ancient Indian Books and Authors

Buddhacharita	- Asvaghosha
Kirtarjuniya	- Bharavi
Ravanavadha	- Bhatti
Ratnavali	- Harshavardhana
Priyadarshika	- Harshavardhana
Uttar Ramacharita	- Bhavabhuti
Brihat Katha Manjari	- Kshemendra
Katha Sarita Sagara	- Somadeva
Charak Samhita	- Charak

MEDIEVAL HISTORY

EARLY MEDIEVAL PERIOD

North India (AD 800 – 1200)

- After the death of Harshavardhan three dynasties came into existence in the northern part of India and Deccan. Palas, Gurjara-Partiharas and Rashtrakutas.
- The **Palas** (750-1150 AD) ruled in **Bihar** and **Bengal** from the 8th to the 12th century. They supported Buddhism
- The Gurjara-Pratiharas were Rajputs who ruled in Gujarat and Rajasthan and later Kanauj.
- **Bhoja-I** (836-885 AD) adopted the title of **Adivaraha**.

Tripartite Struggle

- Tripartite conflict was fought among the Gurjara-Pratiharas, Rashtrkutas and Palas for the control over Kannauj.

The Rajputs

- The period between 647 A.D. and 1192 A.D., i.e. 500 years is known as the Rajput period in the history of India.
- The most powerful Rajputs: **Gahadavalas** (Kanauj), the **Paramaras** (Malwa), and the **Chauhans** (Ajmer).
- **Prithviraj Chauhan's** (1178-92 AD) empire included Punjab, Haryana, Rajasthan and Uttar Pradesh.
- His court's poet **Chand Bardai** wrote Prithviraj Chauhan's biography "**Prithviraj Raso**".
- He defeated **Shahabuddin Muhammad Ghori** in the first battle of **Tarrain** in **1191**.
- In the **Second battle of Tarrain** (1192) Muhammad Ghori won and killed Prithviraj Chauhan.
- **Jayachandra** was the king of Kannauj. Muhammad Ghori defeated and killed Jayachandra in the Battle of Chadawar in 1194.
- Rana Kumbha was the ruler of Mewar, a state in western India.
- **Dilwara temples** at **Mount Abu**, the Vimala Vasahi and the Luna Vasahi were built by Solankis of Gujarat.

South India

- The founder of **Chola Kingdom**: **Vijayalaya**.
- **Rajaraja Chola** (985-1014 AD) was one of the imperialistic and greatest Chola rulers.

MEDIEVAL INDIA

The Delhi Sultanate (1206 – 1526 AD)

Dynasties of Delhi Sultanate

(i) Slave Dynasty : 1206-1290 AD
(ii) Khilje " : 1290-1320 AD
(iii) Tughlaq " : 1320-1414 AD
(iv) Sayyid " : 1414-1451 AD
(v) Lodhi " : 1451-1526 AD

- **Sources of Medieval Indian History**: Tarikh i Firoze Shahi (Ziauddin barani); Tuzuk-i-Mubarak Shahi (Yahaya bin Ahmed Sirhindi); Futuhat-i-Firoze Shahi (Firoze Shah Tughluq), etc.
- **Mahmud of Ghazni** targeted the North Indian temple cities for wealth and iconoclastic fervour.
- **Muhammad Ghori** nominated his trusted and prominent **slave, Qutubuddin Aibak** as his representative to govern the newly conquered regions in India. It was the beginning of slave dynasty.

The Mamluk dynasty or The Slave Dynasty (1206-1290 AD)

Ruler	Reign
Qutbuddin Aibek	(1206–1210 AD)
Aram Shah	(1210–1211 AD)
Shamsuddin Iltutmish	(1211–1236 AD)
Ruknuddin Firuz	(1236 AD)
Raziyatuddin Sultana	(1236–1240 AD)
Muizuddin Bahram	(1240–1242 AD)
Alauddin Masud	(1242–1246 AD)
Nasiruddin Mahmud	(1246–1266 AD)
Ghiyasuddin Balban	(1266–1286 AD)
Muizuddin Qaiqabad	(1286–1290 AD)
Kayumars	(1290 AD)

- **Qutubuddin Aibak** also began the construction of **Qutub Minar,** in the honour of famous Sufi Saint **Khwaja Qutubuddin Bakhityar Kaki**.
- **Shamsuddin Iltutmish** was a slave of Qutubuddin Aibak.
- **Iltutmish** stopped the Mongol attack in 1221 A.D led by **Chenghiz Khan**.
- Iltutmish nominated **his daughter Razia** as the successor.
- She was the first and only Muslim lady that ever ruled in India.
- She further offended the nobles by her preference for an **Abyssian slave Yakut.**
- In 1240 A.D, **Razia** was the victim of a conspiracy and was killed near **Kaithal** (Haryana).
- **Jalaluddin Khilji** founded Khilji dynasty.
- **Alauddin Khilji** was the nephew and son-in-law of Jalaluddin Khilji.
- He killed Jalaluddin Khilji and took over the throne in 1296.
- He was the first **Turkish Sultan of Delhi** who **separated religion from politics**.
- He appointed **Diwan-i-Riyasat** and **Shahna-i-Mandi** to regulate the fixed price market.
- He abolished **Iqtas** of royal troopers and the payment of their salaries in cash.
- He constructed monuments like **Alai-Darwaza** and **Sirifort** in Delhi.
- **Ghazi Malik** with the name of Ghiyasuddin Tughluq became the Sultan of Delhi in 1320.
- **Mohammad-bin-Tughlaq** organised better **postal system.**
- **Ghiyasuddin Tughlaq** ascended the throne in 1325.
- **Firoz Shah Tughlaq** established Diwan-i-Khairat (department for poor and needy people), and Diwan-l-Bundagan (department of slaves).
- **Khizr Khan** was the first Sultan of the **Sayyed Dynasty**.
- The other rulers of this dynasty were Mubarak Shah (1421-1434), Muhammad Shah (1434-1443), Alam Shah (1443-1451).
- **Bahlol Lodhi** (1451-88 A.D.) was an **Afghan Sardar** who founded the Lodhi dynasty.
- **Sikandar Lodhi** shifted his capital from Delhi to Agra and conquered Bihar and Western Bengal.
- **Ibrahim Lodhi** was the last king of Lodhi dynasty and the last Sultan of Delhi.
- At last **Daulat Khan Lodhi**, the governor of Punjab invited Babur to overthrow Ibrahim Lodhi, Babur accepted the offer and inflicted a crushing defeat on Ibrahim Lodhi in the **first battle of Panipat** in 1526.

Vijaynagar Empire (1336-1565 AD)

- The **Vijayanagar Empire** was a South Indian dynasty based in the **Deccan** on the South bank of **Tungabhadra** River.
- There were four dynasties ruled over Vijaynagar —Sangama Dynasty, Saluva Dynasty, Tuluva Dynasty and Aravidu Dynasty.

Bahmani Kingdom

- The Bahmani Kingdom of Deccan's capital was **Gulbarga**.
- It was founded by Hasan Gangu (original name–Ismail Mukh).
- He took the tittle of Alauddin Hasan, Bahaman Shah.

RELIGIOUS MOVEMENTS

Bhakti Movement

- **Bhakti** means personal devotion to God. It stresses the Union of the individual with God.
- **Bhakti movement** originated in South India between the 7^{th} and the 12^{th} centuries AD.
- **Ramananda** was disciple of Ramunaja. He was the first reformer to preach in Hindi.
- **Kabir** was an ardent disciple of Ramananda. He wanted unity between the Hindus and the Muslims.
- **Namdeva** was a waterman by birth. He composed beautiful hymns in Marathi.
- **Nanak** was the founder of the Sikh religion.
- Nanak's teachings were in the form of verses. They were collected in a book called the **Adi Granth**.

- Later Adi Grantham was written in a script called **Gurmukhi**.
- **Chaitaniya**, a great devotee of Lord Krishna, was a saint from Bengal.
- **Tulsidas** composed the famous **Ramcharitamanas** in Hindi, expounding the various aspects of Hindu dharma.
- **Surdas** was a devotee of Lord Krishna and Radha. His works include **Sursagar**, **Sahitya Ratna** and Sur Sarawali.
- **Dadu Dayal** was a disciple of Kabir. His followers were known as Dadu Panthis.
- **Eknath** was a devotee of Vithoba. He wrote commentary on verses of the Bhagavad Gita.

The Sufi Movement

- **Sufism** is basically a religion based on the truth of life. The **mystics of Islam** are called **Sufis**.
- It emerged in India in 11th & 12th century A.D.
- It established brotherhood between Hindus and Muslims.
- The founders of the most important Sufi lineage Chisti, Suhrawardi, Qadiri, Naqshbandi originally came from central and west Asia.
- The prominent sufi saints were Khwaja Nizamuddin Aulia, Ganj-e-Shakar Fariduddin, Qutubuddin Bakhtiyar Kaki and Hamuddin Nagori .
- **Hazrat Nizam-ud-Din** was the disciple of Fariduddin Ganj-i-Shakkar.

Khwaja Moinuddin Chishti (1142-1236 AD)

- The Chisti order of Sufism was founded in **village Khwaja** Chishti near **Herat** in Persia, i.e. Iran.
- In India, Chisti silsila was founded by Khwaja Moinuddin Chishti (born 1142 AD).
- He came to India around AD 1192.
- He made **Ajmer** the main centre for his teachings. He died in Ajmer in 1236.
- **Qutbuddin Bakhtiar Kaki** was the disciple and the spiritual successor of Moinuddin Chishti.

The Mughals (1526-1540 and 1555-1857)

EMPERORS OF MUGHAL DYNASTY

Ruling Period	Name
1526 - 1530	Zahiruddin Muhammad Babur
1530 - 1540 and 1555 - 1556	Humayun
1556 - 1605	Akbar
1605 - 1627	Jahangir
1628 - 1658	Shah Jahan
1658 - 1707	Mohamamed Aurangzeb
1707 (Mar 14 - Apr 27)	Qutib-ud-din A'zam Shah
1707 - 1712	Shah Alam Bahadur Shah-I
1712 - 1713	Mohammad
1713 - 1719	Furrukhsiyar
1719 (Mar 1 - Jun 7)	Rafi ul Darjat
1719 (Mar 30 - Aug 13)	Mohamamd Shah Nikusiyar
1719 (Jun 8 - Sep 6)	Mohammad Shah Jahan Sani
1719 - 1748	Mohammad Shah
1720 (Oct 12 - Nov 19)	Mohammad Ibrahim
1748 - 1754	Ahmad Shah Bahadur
1754 (Jun 3 - Nov 29)	Alamgir II
1759 (Dec 11 - Dec 25)	Shah Jahan III
1759 - 1806	Shah Alam II
1806 - 1837	Mohammad Akbar Shah II
1837 - 1857	Bahadur Shah Zafar

- The **Mughul era** began with the Babur's victory over Ibrahim Lodi in the First Battle Of Panipat in 1526.'
- **Babur** was from the princely **family of mixed Mongol and Turkish blood**.

- He died in 1530.
- **Babur** wrote his biography **Baburnama** i.e. **Tuzk-e Babri.**
- **Humayun** succeeded Babur at the young age of 23 in 1530.
- He was defeated in the Battle of Chausa (1539) and Battle of Kanauj (1540) by **Sher Shah Suri** who became the ruler of Agra and Delhi.
- The Humayun's Tomb was built by his widow Haji Begum in Delhi.
- Humayun's sister **Gulbadan Begum** wrote **Humayunnama**.
- He died in 1556.
- The real name of **Sher Shah** was **Farid**.
- During the siege of the fort of **Kalinjar** one of the cannons accidentally went off killing him on 26th of May 1535.
- He was buried in **Sasaram** (Bihar).
- He built **Purana Qila** in Delhi.
- **Bairam Khan** became the Wakil of the kingdom with the title of Khan-i-Khana.
- **Akbar** was crowned at **Kalanaur** at the age of 13 years in 1556.
- Akbar reoccupied Delhi and Agra in the second battle of Panipat with Hemu, a general of Adil Shah in 1556.
- **Akbar** built many buildings like **Agra Fort** (1565), **Lahore Palace** (1572), Fatehpur Sikri, Buland Darwaza and Allahabad Fort (1583).
- He died in 1605.

Nine Jewels or Nav-Ratnas of Akbar
Abdul Rahim – Hindi Scholar
Abdul Fazal – Chief Advisor
Birbal – Wittiness
Tansen – Singer
Todar Mal – Finance Minister
Mullah Do Piaza – Advisor
Raja Man Singh – General (Senapati)
Faizi – Poet
Hamim Humam – Physician

Jahangir (AD 1605-1627)

- The real name of **Jahangir** was **Salim**.
- Jahangir married **Mehr-un-Nisa** who assumed the title of **'Nur Jahan'** (Light of the world)
- His son **Khurram** (Shah Jahan) rebelled against him at the end of his reign.
- **Shah Jahan** became emperor in 1627.
- He was married to the daughter of **Asaf Khan** named **Arjumand Bano Begum,** also known as **Mumtaz Mahal**.
- He built the **Taj Mahal** in Agra and the Jama Masjid (sand stone) in Delhi.

Auranzeb (AD 1658-1707)

- **Aurangzeb** was also called as **Zinda Pir** (the living saint).
- The **Mughul** conquest reached its climax during his reign.
- The second coronation of Aurangzeb took place when he defeated Dara (1659).
- He **forbade inscription of Kalma on the coins** and banned music in the court.
- He died in 1707 AD.

The Later Mughals

- **Muazzam** ascended the Mughal throne with the title of **Bahadur Shah**.
- **Farrukhsiyar** ascended the throne with help of Sayyid brothers, Abdullah Khan and Hussain Khan.
- **Nadir Shah** raided India in 1738-39 and took away the **peacock throne** and **Kohinoor diamond** during the reign of Mohammad Shah (1719-48).
- The **Battle of Buxar** (1764) was fought during the reign of Shah Alam II.
- **Bahadur Shah Zafar** was the last Mughal king.

Mughal Buildings & Builders
Humayun's Tomb (Delhi) : Bega Begum
Buland Darwaza (Fatehpur Sikri) : Akbar
Shalimar Bagh (Srinagar) : Jahangir
Akbar's Tomb (Sikandara, Agra) : Started by Akbar and finished by Jahangir.
Tomb of Itmaduddaula (Agra) : Nur Jahan
Tomb of Jahangir (Shahdara Bagh, Lahore) : Shah Jahan
Taj Mahal (Agra) : Shah Jahan
Red Fort (Delhi) : Shah Jahan

Name of the Book- Author
Tuzk-i-Babari : Babar
Humayun Namah : Gulbadan Begum
Akbarnama, Aini Akbari : Abul Fazl
TuzkiJahangiri : Jahangir

Shah Jahan Namah : Inayat Khan

Padshah Namah (about Shah Jahan): Abdul Hamid Lahori

Alamgirnama (about Aurangzeb) : Mirza Muhammad Kazim

Battles Fought Between

1st Battle of Panipat (1526) : Babur and Ibrahim Lodhi

Battle of Khanwa (1527) : Babur and Rana Sunga.

Battle of Chausa (1539) : Sher Shah Suri and Humayun

2nd Battle of Panipat (1556) : Akbar and Hemu

Battle of Haldighati (1576) : Raja Maan Singh (Mughal army) and Rana Pratap

Battle of Samugarh (1658) : Aurangzeb and Dara Shikoh

Battle of Khanwa (1659) : Aurangzeb and brother Shah Shuja

Battle of Karnal (1739) : Nadir Shah and Muhammad Shah(Mughal)

Foreign Travellers		Reign
1.	**Marco Polo**	Pandya kingdom
2.	**Ibn Batuta**	Muhammad bin Tughlaq
3.	**Nicolo Conti**	Deva Raya I
4.	**Abdur Razaq**	Deva Raya II
5.	**Nikitin**	Bahmani kingdom
6.	**Nuniz**	Krishna Deva Raya

Maratha State (1674-1818)

- **Shivaji** was born at Shivner, Poona and died on April 3, 1680 in Rajgarh.
- He was founder of the Maratha kingdom of India.
- **Shahji Bhonsle** was the father and Jija Bai was the mother of Shivaji.
- In 1659, **Shivaji killed Afzal Khan** who was deputed by Adil Shah to suppress him.

Sikh Gurus

- **Nanak** (1469-1539) founded Sikh religion.
- **Angad** (1538-52) invented **Gurmukhi**.
- **Amardas** (1552-74) struggled against **sati system** and **purdah system** and established 22 Gadiyans to propagate religion.
- **Ramdas** (1574-81) founded Amritsar in 1577. Akbar granted the land.
- **Arjun** (1581-1606) founded **Swarn Mandir** (Golden Temple) and composed Adi Granth.
- **Hargobind Singh** (1606-45) established **Akal Takht** and fortified Amritsar.
- **Har Rai** (l645-66)
- **Harkishan** (1661-64)
- **Tegh Bahadur** (1664-75)
- **Gobind Singh** (1675-1708) was the last Guru who founded the **Khalsa**. After him Sikh guruship ended.

MODERN HISTORY

ARRIVAL OF EUROPEANS IN INDIA

Portuguese

- On 17th May 1498, **Vasco da Gama**, a Portuguese navigator, came to **Calicut**.
- He found new trade route from Europe to Asia via **Cape of Good Hope**.
- His second visit in 1502 established Portuguese Trading Centres at Calicut, Cannanore and Cochin.
- **Cochin** was the first capital of the Portuguese in India which was shifted to Goa later on.

Dutch

- Dutch arrived in India as a beginning of Portuguese decline in 1605.
- The Dutch East India company of Netherlands was formed in 1592 to trade with East Indies.
- **Cornelis Houtman** was the first Dutch who came to India.

French

- In AD 1664 French came to India as a last European Community.
- The French East India Company was founded by **Jean Baptiste Colbert.**

- In 1667, the first French Factory was established at Surat.

Danes

- In 1616 the Danes came to India.
- They established at **Tranquebar (Tamil Nadu)** in 1620 and Serampore (Bengal) in 1676.

EAST INDIA COMPANY

- **Company rule** in India effectively began in 1757 after the **Battle of Plassey**.
- Company was granted the diwani, or the right to collect revenue, in Bengal and Bihar in 1765.
- **Siraj-ud-Daula** was the last independent Nawab of Bengal who succeeded Alivardi Khan to the throne.
- **Mir Jafar Ali Khan Bahadur**, commonly known as Mir Jafar, (c. 1691–February 5, 1765) was the **first Nawab of Bengal under Company rule** in India.
- After Siraj decline Mir Jafar was installed as the Nawab in 1757 by the British East India Company.
- **Mir Qasim** (May 8, 1777) was the Nawab of Bengal from 1760 to 1763.
- The **Battle of Buxar** was fought on 23 October **1764** between East India Company led by **Hector Munro** and the combined army of **Mir Qasim**, the Nawab of Bengal: the **Nawab of Awadh** and the **Mughal King Shah Alam II.**

Rule of the British Governors and Governor Generals

- After the victory of the English in Buxar, Clive was appointed the governor and **commander-in-chief** of the English possessions in Bengal.
- **Warren Hastings** was appointed the Governor of Bengal in 1772.
- In 1773 **the Regulating Act** was passed which provided for the setting up of a supreme court to try all British subjects.
- **Lord Wellesley** is considered to be one of the most brilliant Governor Generals of Bengal.
- He **introduced the Subsidiary Alliance system** to undo with the French influence and bring the Indian states within the purview of the British power of Jurisdiction.
- **Lord Minto-I (AD 1807-13)** was followed by Lord Hastings who governed from 1813 to 1823.
- **Marquess of Hastings (AD 1813-1823)–** He was the first to appoint Indians to the highest posts of responsibility. The **first vernacular newspaper Samachar Patrika** published during his time.
- **Lord William Bentinck (AD 1828-35)–** Charter Act of 1833 was passed and he was made the first Governor General of India; Abolition of sati in 1829.
- **Lord Dalhousie (AD 1848-56)– Doctrine of Lapse**, The Second Burmese war, The Second Anglo Sikh War, Shimla made the summer capital, **First railway line was laid from Bombay to Thane, in 1853.**
- **Lord Canning (AD 1856-58)** - Annexation of Avadh, enactment of Hindu Widow Remarriage Bill, 1857, **establishment of universities at Calcutta, Madras and Bombay, revolt of 1857**.
  - Following the Queen's recommendation in 1858, transferring the Government from the company to the British Crown, **Lord Canning** was made the **first Viceroy** of India.
- **Lord Mayo (AD 1869-72)–** Organised **first census** which was held **in 1871.**
- **Lord Lytton (AD 1876-80)–** The Delhi Durbar, January 1, 1877 and the Ver**nacular Press Act,** 1878.
- **Lord Ripon (AD 1880-84) –** First Factory Act of 1881. **Local Self-Government was introduced in 1882.** Repeat of Vernacular Press act.
- **Lord Curzon (AD 1899-1905)** - Famine Commission, Agriculture Research Institute at Pusa, **Partition of Bengal** in 1905.
- **Lord Minto II (AD 1905-10)–** Minto-Morley Reforms in 1909. Swadeshi movement (1905-08), foundation of Muslim League (1906), Surat session and split in the congress (1907).

➢ **Capital of country was announced to be shifted from Calcutta to Delhi.**

- **Lord Chelmsford (1916-21)–** Government of India Act 1919 (Montague-Chelmsford Reforms), enactment of Rowlatt Act (1919), **Jallianwala Bagh Tragedy (1919),** beginning of the Non-co-operation Movement.
- **Lord Irwin (AD 1926-31)–** Appointment of **Simon commission** in 1928. Gandhi-Irwin Pact in 1931; First Around Table Conference (1930).
- **Lord Willington (AD 1931-36)–** The Second Round Table Conference 1931, The communal award, 1932, the Poona pact, Third Round Table Conference, 1932.
- **Lord Wavell (AD 1944-47)-** Wavell Plan and Shimla Conference, Cabinet Mission (Lawrence, Cripps and Alexander), Direct Action Day" on August 16, 1946, Attlee's Declaration,
- **Lord Mountbatten, (March 1947-June 1948) Last Viceroy of British India** and **first-Governor general of free India.** Partition of India in third week of June, 1947; Indian Independence Act, Partition of the country between two independent states of India and Pakistan. He was **succeeded by C. Rajagopalachari.**

Some Important rulers in India (1720-1949)

Ruler	Period	Place
1. Sadat Khan Burhan-ul-Mulk	1722-39	Awadh
2. Safdar Jung	1739-54	Awadh
3. Shuja-ud-daulah	1754-75	Awadh
4. Asaf-ud-daulah	1775-97	Awadh
5. Wazir Ali	1797-98	Awadh
6. Nizam-ul-Mulk Asaf Jah	1724-48	Hyderabad
7. Nasir Jung	1748-50	Hyderabad
8. Muzaffar Jung	1750-51	Hyderabad
9. Salabat Jung	1751-60	Hyderabad
10. Nizam Ali	1760-1803	Hyderabad
11. Sikandar Jah	1803-29	Hyderabad
12. Nasir-ud-daulah	1829-57	Hyderabad
13. Afjal-ud-daulah	1857-69	Hyderabad
14. Mahabat Ali Khan	1869-1911	Hyderabad
15. Osman Ali Khan	1911-49	Hyderabad
16. Hyder Ali	1761-82	Mysore
17. Tipu Sultan	1782-99	Mysore
18. Ranjit Singh	1792-1839	Punjab

Some important Nawabs of Bengal (1717-1772)

Nawabs	Period
1. Murshid Quli Khan	1717-27
2. Suf-ud-din	1727-39
3. Sarfraz Khan	1739-40
4. Alivardi Khan	1740-56
5. Siraj-ud-daulah	1756-57
6. Mir Jafar	1757-60
7. Mir Qasim	1760-63
8. Mir Jafar	1763-65
9. Najm-ud daulah	1765-72

THE REVOLT OF 1857

- **Political Causes:** The policy of Doctrine of Lapse.
- **Nana Sahib** was refused pension, as he was the adopted son of Peshwa Baji Rao I.
- **Military Discrimination:** Discrimination between the Indian and the British soldiers.
- **Religious Discrimination:** The introduction of Enfield rifle, the cartridge of which was greased with animal fat, provided the spark.
- On March 29, 1857, a soldier named **Mangal Pandey** attacked and fired at his senior at Barrackpur in Bengal (in 19th and 34th Native infantry).
- Mutiny spread throughout UP along with some other parts of the country.
- **Mughal emperor Bahadur Shah II** was proclaimed the Emperor of India.
- **Causes of Failure of the Revolt:** Lack of planning, organization and leadership.

- Some Indians supported the British in suppressing the revolt as **Scindia of Gwalior, the Holkar of Indore**, the **Nizam of Hyderabad, the Raja of Jodhpur, the Nawab of Bhopal, the rulers of Patiala, Sindh and Kashmir and the Rana of Nepal.**

SOCIAL AND CULTURAL REFORMS

- **Raja Rammohan Roy** established the **Brahmo Samaj** at Calcutta in 1828 in order to purify Hinduism and to preach **monotheism**.
- He established the **Atmiya Sabha** in 1815.
- Raja Rammohan Roy is most remembered for helping Lord William Bentinck to declare the **practice of Sati** a punishable offence in **1829**.
- **Henry Vivian Derozio** was the founder of the Young Bengal Movement.
- The **Arya Samaj** was founded by Swami Dayanand **Saraswati** at Bombay in 1875.
- The original name of **Swami Vivekananda** was Narendranath Dutta (1863-1902).
- He was famous disciple of Shri **Ramkrishna Paramahamsa**.
- Swami Vivekananda participated at the Parliament of Religions held in Chicago (USA) on **September 11,1893** and raised the prestige of India and Hinduism very high.
- The **Theosophical Society** was founded in New York (USA) in 1875 by **Madam H.P. Blavatsky,** a Russian lady, and **Henry Steel Olcott,** an American colonel.
- The **Aligarh Movement** was started by **Sir Syed Ahmad Khan** (1817-98) for the social and educational advancement of the Muslims in India.

SOME IMPORTANT ORGANIZATION

Name of the Organization	Founder	Year	Place
Atmiya Sabha	Ram Mohan Roy	1815	Calcutta
Brahmo Samaj	Ram Mohan Roy	1828	Calcutta
Dharma Sabha	Radhakanta Dev	1829	Calcutta
Tattvabodhini Sabha	Debendranath Tagore	1839	Calcutta
Nirankaris	Dayal Das, Darbara Singh, Rattan Chand etc.	1840	Punjab
Manav Dharma Sabha	Durgaram Manchharam	1844	Surat
Parmahansa Mandali	Dadoba Panderung	1849	Bombay
Namdharis	Ram Singh	1857	Punjab
Radha Swami Satsang	Tulsi Ram	1861	Agra
Brahom Samaj of India	Keshab Chandra Sen	1866	Calcutta
Dar-ul-Ulum	Maulana Hussain Ahmed	1866	Deoband
Prarthna Samaj	Dr. Atmaram Pandurung	1867	Bombay
Arya Samaj	Swami Dayanand Saraswati	1875	Bombay
Theosophical Society	Madame HP Blavastky and Col H. S. Olcott	1875	New York (USA)
Sudharam Brahmo Samaj	Anand Mohan Bose	1878	Calcutta
Deccan Education Society	G. G. Agarkar	1884	Pune (Poona)
Muhammadan Educational Conference	Sir Syed Ahmad Khan	1886	Aligarh
Indian National Conference	M. G. Ranade	1887	Bombay
Deva Samaj	Shivnarayan Agnihotri	1887	Lahore

Nadwah-ul-Ulma	Maulana Shibli Numani	1894	Lucknow
Ramakrishna Mission	Swami Vivekanand	1897	Belur
Servants of Indian Society	Gopalakrishan Gokhale	1905	Bombay
Poona Seva Sadan	Mrs Ramabai Ranade and G.K. Devadhar	1909	Pune (Poona)
Social Service League	N. M. Joshi	1911	Bombay
Seva Samiti	H. N. Kunzru	1914	Allahabad

THE FREEDOM STRUGGLE

- The **Indian National Congress** was founded on 28 December 1885 by Allan Octavian Hume.
- **Womesh Chandra (W.C.) Bonnerjee** was the **first President of the INC.**
- The **first session of the INC was** held **from 28–31 December 1885, and was attended by 72 delegates.**
- Bengal was reunited in 1911.
- **Surat Split** is mainly known for separation of Congress partymen into moderates and extremists at the Surat session of Congress in 26 December 1907.
- The **All-India Muslim League** was founded on 30 December **1906.**
- The founding president of **Ghadar Party** was Sohan Singh Bhakna and Lala Hardayal was the co-founder of this party.
- In 1916, two **Home Rule Movements** were launched in the country: one under the leadership of Bal Gangadhar Tilak and the other under Annie Besant.
- **August Declaration (1917)**
  The British aimed at "increasing association of Indians in every branch of the administration for progressive realisation of responsible government in India as an integral part of the British empire".
- On February 5, 1922, in the **Chauri Chaura** the police chowki was set on fire by the mob, killing 22 of the police occupants.
- The **Lahore protest** was led by Indian nationalist Lala Lajpat Rai, was severely beaten by local police. He died on November 17, 1928.

First Round Table Conference (November 1930 – January 1931).
Second Round Table Conference (September – December 1931)
Third Round Table Conference (November – December 1932)

- The name "Pakistan" had been proposed by Choudhary Rahmat Ali in his Pakistan Declaration.
  In 1940 at the **Lahore Session** of the Muslim League, the **demand for a separate state of Pakistan was made.**
- It was based on the two-nation theory.
- Gandhiji gave the slogan "**Do or Die**".
- The **Indian National Army** was an armed force formed by Indian nationalists in 1942 in Southeast Asia during World War II.
- **Cabinet Mission** was composed of three Cabinet Ministers of England: **Sir Pethick Lawrence**, **Sir Stafford Cripps**, and **Alexander.**

Summary of Freedom Movement

S. No.	Event	Year	Significance
1.	Sepoy Mutiny	1857	First War of Independence due to dissatisfaction of the Indian soldiers
2.	Indian National Congress	1880	Initiated by A. O. Hume; first president, W. C. Bannerjee
3.	Swadeshi Movement	1905	Boycott of foreign goods
4.	Home Rule Movement	1916	Led by Dr (Mrs) Annie Besant

5.	Lucknow Pact	1916	Hindu-Muslim unity which weakened the British
6.	Khilafat Movement	1920	Mohd Ali and Shaukat Ali led the movement for restoration of Khilafat, alienating Muslims from the British
7.	Chauri-Chaura incident	1922	Mob clashed with police, killing 22 policemen. Gandhiji called off the civil disobedience movement.
8.	Non-cooperation Movement	1920-1922	With Gandhiji's support of the Khilafat movement, Hindus and Muslims launched the non-cooperation movement
9.	Swaraj party	1922	Ghandhiji's decision to call off the civil disobedience movement, led to the formation of the Swaraj party Initiated by Motilal Nehru.
10.	Dandi March	1930	Gandhiji launched the movement to break the salt law
11.	Civil Disobedience	1930	Non-violent non-cooperation movement led by Gandhiji
12.	Quit India Movement	1942	Led by Gandhiji; asking the British to leave India
13.	Direct Action Campaign	1946	Launched by Muslim league, resulted in heavy riots.

Newspapers and Journals

Newspaper/Journal Name	Founder
Bengal Gazette (1780) (India's First News-paper)	James Augustus Hickey.
Kesari	B.G.Tilak
Amrita Bazar Patrika	Sisir Kumar Ghosh and Motilal Ghosh
Hindu	Vir Raghavacharya and G.S. Aiyar
Hindustan	M.M. Malviya
Mooknayak	B.R. Ambedkar
Comrade	Mohammad Ali
Tahzib-ul-Akhlaq	Sir Syed Ahmed Khan
Al-Hilal	Abul Kalam Azad
Independent	Motilal Nehru
Punjabi	Lala Lajpat Rai
New India (Daily)	Annie Besant
Pratap	Ganesh Shankar Vidyarthi
Young India	M.K Ghandhi
Hindustan Times	K.M. Pannikar

World History

WORLD HISTORY

Ancient

Mesopotamian Civilization (5000-900 BC)
- Egyption Civilization (500-30 BC)
- Greek Civilization (776-388 BC)
- Roman Civilization (753 BC-476 AD)

Medieval
- Europian Civilization
- African Civilization
- Arab Civilization
- Chinese Civilization

Modern
- Renaissance
- Reformation
- Glorious Revolution
- Industrial Revolution
- American Revolution
- French Revolution
- Russian Revolution

WORLD ANCIENT HISTORY

Mesopotamian Civilization

Time Period	Events
5000-3500 BC	The first city built by Sumerian people in southern Mesopotamia.
3500 BC	Writing started with pictogram based script and took about a thousand year to be evolved in full cuneiform script.
2300 BC	The first akkadian ruler Sargon started to conquer Sumerian cities
2112-2095 BC	The central city of Ur was built by Ur-Nammu and called as the third dynasty of Mesopotamian.
1792-49 BC	Development of Babylonian civilization by king Hammurabi along Euphrates River.
1530 BC	Kassite came into being in Hammurabi's rule in 1750 BC and categorized into minorities of Mesopotamia.
1500 BC	Northern Mesopotamia is conquered by an Indo-European ruler called Mittani. He has also conquered Syria and Asia Minor.
1200 - 900 BC	Assyria started to lose its importance due to political instability engulfing Anatolia, Syria, and the Levant coast.

Egyptian Civilization

Time Period	Events
5000 BC	Farming started along the bank of Nile River.
3500-3000 BC	Starting of Pre dynastic period which was characterized by permanent settlement.
2650 BC	Old kingdom began to flourish which was known to be the era of dynamic development of Egyptian art.
1539 BC	With the expulsion of the Hyksos and reunification of Egypt, it became the leading power in the Middle East.

1344-1328 BC	The first ever instance of monotheism had been illustrated by the religious reforms of pharaoh Akhenaton.
525 BC	Persians started ruling the Egypt.
332 BC	Alexander the great conquered Egypt.
305 BC	A greek-speaking dynasty was established by one of the generals of Alexander the Great.
30 BC	The last queen of independent Egypt died and Roman empire occupied Egypt.

Greek Civilization

Time Period	Events
776 BC	The first official date of Olympic Games
750BC	Greek started planting colonies on the Mediterranean coast
490-479	Athens and Sparta took lead for defending their land against invasion from the huge Persian Empire
399	Socrates, the famous philosopher of Athens was sentenced to death as he was questioning conventional ideas
338	The Greek city-states were defeated by King Phillip II of Macedon

Roman Civilization

Time Period	Events
753 BC	Rome was founded
509BC	Roman republic was built
390BC	Rome was sacked by the Gauls
117AD	Roman Empire became the largest empire of its time
312AD	Constantine the Great got converted to Christianity
410AD	Goths sacked Roman Empire
476AD	The last Roman emperor was thrown out by German Tribes

WORLD MEDIEVAL HISTORY

Medieval Europe Civilization

Time Period	Events
500-600AD	• A monastery was built in Italy. • Christianity was introduced in England. • The foundation stone of Roman Catholic Church was laid by Gregory the Great.
650-700AD	History of the English Church and People was written by Bede
800AD	Charlemagne, the King of the Franks, was crowned as Holy Roman Emperor.
850-900AD	First Russian states founded at Kiev and Novgorod
1150-1200 AD	Construction of the cathedral of Nutre Dame
1200-1250 AD	• St Francis of Assisi sets up a monastic order, emphasizing austerity and compassion • Rebellion against the king by the Lords of England as he signed the Magna Carta, accepting to rule according to law.
1250-1300 AD	Establishment of the Habsburg dynasty that continued to rule Austria till 1918

AFRICAN CIVILIZATION

Time Period	Events
830AD	Ghana Empire was created
1050-1100AD	Expansion of Almoravid kingdom from Ghana to southern Spain
1100-1150AD	Emergence of Zimbabwe as a centre for producing gold and copper artifacts and long distance trade.
1200-1250 AD	• Christian churches established in Ethiopia • Kingdom of Mali was established in West Africa, with Timbuktu as a centre of learning

ARAB CIVILIZATION

Time Period	Events
571AD	• The great Prophet Mohammad of Islam, was born in Mecca • With the rise of new religion Islam, the Arab civilization started expanding its realm
632AD	After the death of Mohammad his successors continued to spread his teachings and were known as Caliphs or Khalifas
13th Century AD	The Islamic Empire came to an end with the defeat of Abbasids by Seljuq Turks

Islam in Arab Civilization

- Hazrat Prophet Muhammad Saheb founded the Islam as a religion.
- He was born on Monday, April 22nd, 571 A.D. (12th Rabi Al Awwal) in Mecca.
- His father was Abdulsah & mother was Aminah.
- His grand father was Abdul Mullahib.
- His mother died when he was 6 year and grandfather died 2 years later.
- Hijri Era started on 24th September 622 when he migrated to Medina.
- He attained enlightment, i.e. the first revelation came to him on Monday, August 10th, 610 AD (21st of Ramadan) at 40 years of age at **Gaare-Hira** (Hira cave).
- Prophet Muhammad died on Monday, 8th June, 623 AD and was buried at Medhina.
- Eid-milad-un-Nabi is celebrated as his birthday of the prophet.

Christianity

- It was founded by Jesus Christ (i.e. Merriah).
- He was born on 25th December to Mother Mary (Marium) in Bethlehem (Nr. Jerusalam)
- Bible is the holy book of Christians.
- His crucifixion (hanging) on cross was happened in about AD 33.

Zoroastrianism (Parsi)

- Prophet Zoroaster founded the Parsi religion.
- The holy book of Parsi is Avesta.
- Parsis believe in one God-Ahur.

Medieval China

- From the early 7th century, China was ruled by the Tang dynasty.
- The rule of Tang dynasty (618 AD — 906 AD) was followed by the Sung dynasty for about 300 years.
- After this, for about 100 years China was ruled by the Mongols.
- In 1644, China was conquered by the Manchus who continued to rule until 1911 AD.

WORLD MODERN HISTORY

Renaissance

The European era between 14th to 17th centuries AD was designated as the Age of Renaissance generally known for **"Revival of Learning".** The Florence city of Italian region **Tuscany was well known as the birth place of Renaissance.**

Reformation: It was a social movement, started by **Martin Luther** in Wittenburg, Germany in 1517 by publically protesting against the sale of **letters of Indulgence** (as passport to heaven).

- It was against Roman Catholic Church.

- As a result Western Europe was divided between Catholic & Protestant countries.
- Other leader was Caloin of Switzerland. So the movement was a challenge to the authority of Pope.

Glorious Revolution : It was glorious because of Bloodless Revolution focussed on securing freedom of worship from Catholics and unifying **whigs** and **Tories** of Anglican church against the Roman Catholic ruler James-II.

Industrial Revolution : It was the process of change in earning livelihood by adopting industrial processes rather than agriculture in 18th century in Britain.

American Revolution : It was the mutiny of people leaving in 13 colonies of England in North America in late 18th century.

French Revolution :

- It put an end to French monarchy.
- It started in 1789 and ended in 1799.
- It was carried out by Napoleon in later expansion of French Empire.

Russian Revolution :

- It was based on the Marxism ideology.
- It took place in 1917.

World Wars- I & II and other Wars

War	Countries	Duration	Causes	Consequences
I	Germany, Austria-Hungary, Bulgaria, Turkey (i.e Central powers) **Vs.** France, Russia, Britain, US, Italy (i.e. **Allies** or **Entente** Powers)	28-07-1914 to 11-11-1918	1. Murder of Austrian King A. Ferdin and 2. Militarism ...	1. End of German, Russian, Ottoman, etc. empires 2. Formation of league of Nation
II	Britain, France, USSR, US, (i.e. **Allies** or **Entente Powers**) vs. Germany, Italy & Japan (i.e. **Axis** or **Central Powers**)	01-09-1939 to 02-09-1945	1. Conflict between German & Poland 2. Treaty of Versailles (1919)	1. Collapse of Nazi Germany 2. Fall of Japanese & Italian Empires
Trojan War	City of Troy Vs. City of Sparta	10 years	Kidnapping of Queen Helen	Victory of Greek & destruction of Troy
Persian War	Greek vs. Persia	499 BC to 449 BC	Darius I of Persia attacked Athens	Victory of Greek over Persia
Hundred Years War	France vs. England	1453 B.C. to 1337 B.C.	King Edward III & England invaded France	Victory of France over England
Russo-Japanese War	Russia vs. Japan	1904 to 1905 AD	For imperial authority over Manchuria & Korea	Japanese won the war
Vietnam War	Vietnam with Soviet union vs. China	1955 to 1975	To check spread of communism all over South-Asia	• Victory of North Vietnam • American forces backed out from China
Iraq-Iran War	Iran vs. Iraq	1980 to 1988 AD	Border disputes between them	Iranian invasion failed

Indian Polity

THE PREAMBLE

- The Preamble to Indian Constitution is **based on "Objective Resolution"** of Nehru. Jawaharlal Nehru introduced an objective resolution on December 13, 1946 and it was adopted by Constituent Assembly on 22 January, 1947.
- Initially, the Preamble was drafted by **Sh. B. N. Rau** in his memorandum of May 30, 1947 and was later reproduced in the Draft of October 7, 1947.

THE PREAMBLE 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 citizen:

JUSTICE, social, economic and political;

LIBERTY of thought, expression, belief, faith and worship;

EQUALITY of status and of 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 26th day of November 1949, do hereby ADOPT, ENACT and GIVE TO OURSELVES THIS CONSTITUTION.

CONSTITUTION OF INDIA

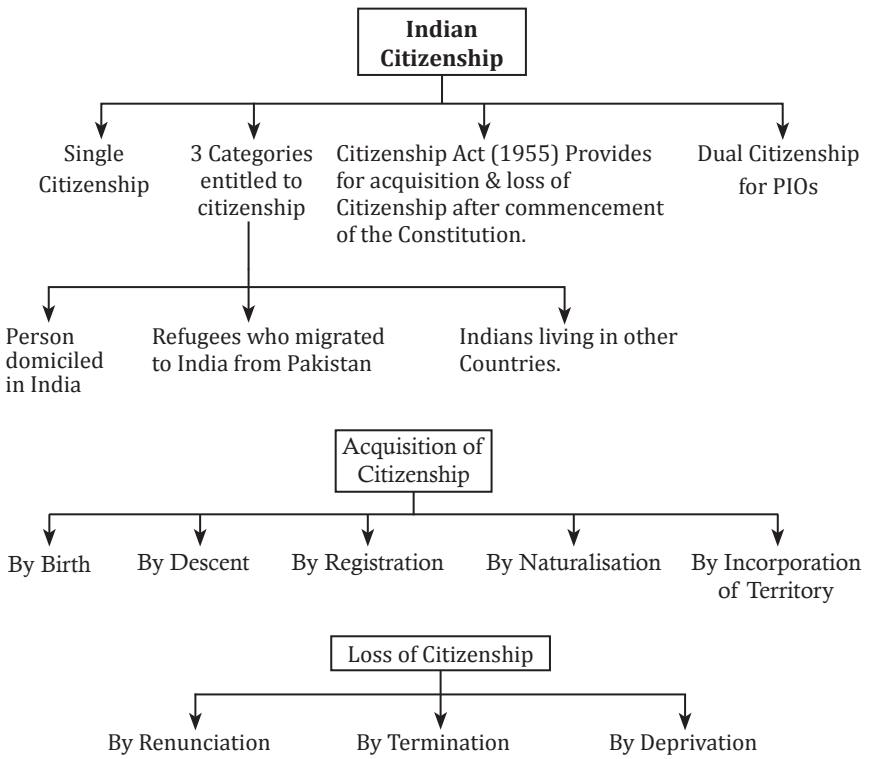
- **Originally** our Constitution contained **395 Articles divided in 22 Parts and 8 Schedules**.
- The Constitution, in **its current form,** consists of **a Preamble, 24 Parts containing 448 articles, 12 schedules.**
- It makes India Sovereign, Socialist, Secular, Democratic Republic.
- **India is a union of 29 States and 7 Union Territories.**
- It abolishes **untouchability** in India.
- It guarantees **Fundamental Rights** to all citizens of India.
- It lays down Directive Principles of State Policy for the guidance of Legislature and the Executive of the country.
- It establishes independence of judiciary from the executive.

IMPORTANT ARTICLES OF INDIAN CONSTITUTION

Article	Importance
Article 12-35	Specify the Fundamental Rights available.
Article 36-50	Specify the Directive Principles of State Policy.
Article 51A	Specifies the Fundamental Duties of every citizen.
Article 80	Specifies the number of seats for the Rajya Sabha.
Article 81	Specifies the number of seats for the Lok Sabha.
Article 343	Hindi as official language.
Article 356	Imposition of President's Rule in states.
Article 370	Special status to Kashmir.
Article 395	Repeals India Independence Act and Government of India Act, 1935.

THE UNION & ITS TERRITORY

- **Article 1** stipulates that **India, that is Bharat, shall be Union of states**.
- The country is described as '**Union**' because it is **indestructible**.
- Under Articles 2 & 3, Parliament has the power to establish new States, form a new State.
- **First Linguistic State** – Andhra Pradesh.
- States Reorganisation Act 1956 was adopted by the Government. of India that resulted in the formation of new states & UTs.

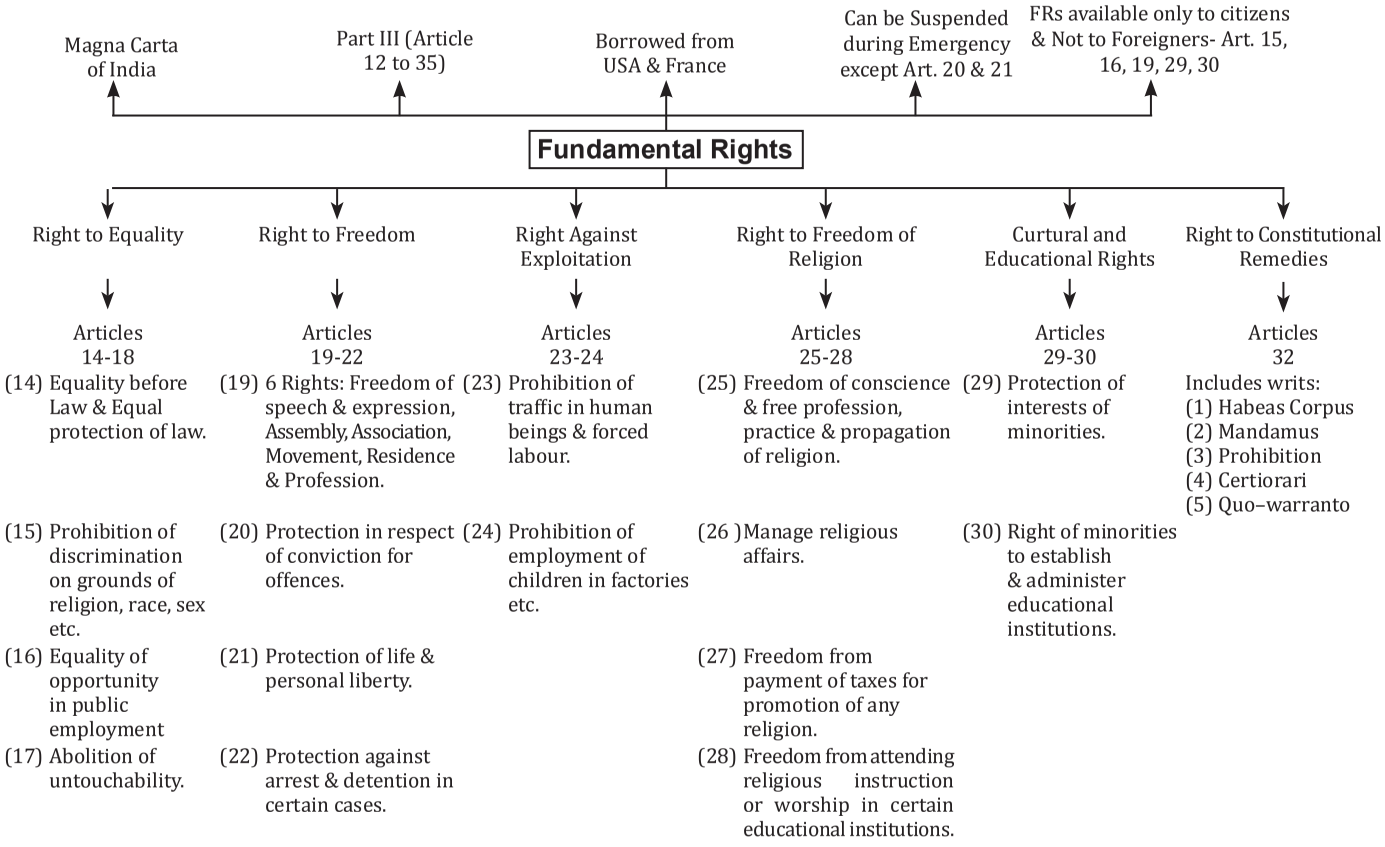


Fundamental Rights

Part-III of the Constitution

Article (12-35)

- Justiciable in nature (i.e. they are legally enforceable by the court of law).
- It promotes political democracy.
- Not absolute in nature & have some restrictions.
- Parliament can amend them but not those provisions that form the "basic" structure of the Constitution.
- Suspended during National Emergency (Except Article 20 & 21).



DIRECTIVE PRINCIPLES OF STATE POLICY

PART IV ARTICLE (36 – 51)

- These Principles are in the nature of instruments of instruction and guidelines to the government.
- Directives are not enforceable in the Courts and do not create any justiciable rights in favour of the individuals.
- In case of a conflict between Directive Principles and Fundamental Rights of the Constitution, the latter shall prevail.

FUNDAMENTAL DUTIES

Part IV-A–Article 51-A, added by 42nd Amendment, 1976

It says that it shall be the duty of every citizen of India (there are **eleven such duties,** after the 86th Constitution Amendment Act, 2002):

THE UNION (ARTICLE 51-151)

The President of India

- **Article 52** says that "There shall be a President of India."
- **Article 53** says that the executive power of the Union shall be vested in the President.

Election

The Electoral College consists of

(a) elected members of both Houses of Parliament, and

(b) elected members of Legislative Assembly of States.

Article 57: The President is eligible for re-Election to that office.

Tenure (Article 56)

The President shall hold office for a **term of 5 years.** The President can resign from his office any time by addressing the **resignation letter to the Vice-President of India**.

Executive Powers - Article 53

All executive powers of the Union are vested in him.

- President appoints the Prime Minister and other ministers; and they hold office during his pleasure.
- He appoints the **Attorney General of India, Comptroller** and **Auditor General of India**, the **Chief Election Commissioner** and other Election Commissioners, the Chairman and Members of the UPSC, the Governors of the states, the Chairman and the members of the Finance Commissions, etc.

The Legislative Powers

- The President can summon or end a session of the Parliament and dissolve the Lok Sabha.

National Emergency

- National emergency is caused by **war, external aggression** or **armed rebellion** in the whole of India or a part of its territory.
- President can declare national emergency only on a written request by the Cabinet Ministers headed by the Prime Minister and the proclamation must be approved by the Parliament within one month.

State Emergency or President's Rule

A State Emergency can be imposed via the following:

1. If that State failed to run Constitutionally, i.e. constitutional machinery has failed - Article 356
2. If that State is not working according to the given direction of the Union Government – Article 365
3. Such an emergency must be approved by the Parliament within a period of two months.

Veto Powers

The President of India is vested with three-absolute veto, suspensive veto and pocket veto.

In 1986, President Zail Singh exercised the pocket veto with respect to the Indian Post Office (Amendment) Bill.

THE VICE-PRESIDENT (ART. 66-73)

- Article 63 says that there should be a Vice-President of India.
- The Vice-President shall be the ex-officio Chairman of Rajya Sabha (Article 64).
- The Vice-President can be removed from office by a resolution of the Council of States (Rajya Sabha), passed by a majority of its members at that time and agreed to by the House of the People (Lok Sabha). (Article 67)

Council of Ministers

- **Art 74 (1):** It provides that, "There shall be a Council of Ministers with the Prime Minister as its head to aid and advise the President who shall in exercise of his/her functions act in accordance with such advice.
- If the Lok Sabha passes a **'no confidence motion'**, the entire Council of Ministers including PM has to resign.

THE PRIME MINISTER

Prime Minister is the real executive authority.

- **Art 75 (1) :** The Prime Minister shall be appointed by the President and other Ministers shall be appointed by the President on the advice of the Prime Minister.
- He allocates & reshuffles various portfolios among the Ministers.
- Prime Minister is the key link between the Cabinet and the Parliament and keystone of Cabinet architecture.

UNION LEGISLATURE

- **Part V** of the Constitution deals with Parliament. According to Article 79, there shall be a Parliament for the Union, which shall consists of:
- President of India.
- Two houses consists of Council of States (Rajya Sabha or Upper House) and Lok Sabha or Lower House.

RAJYA SABHA (COUNCIL OF STATES)

- Its **first sitting was held on April 3, 1952**.
- Article 80 of the Constitution lays down the **maximum strength** of Rajya Sabha as **250**, out of which 12 members are nominated by the President, 238 are representatives of the States and of the two Union Territories.
- The present strength of Rajya Sabha, however, is 245, out of which 233 are representatives of the States and Union Territories of Delhi and Puducherry and 12 are nominated by the President.
- The Rajya Sabha is not subject to dissolution. **The members of the Rajya Sabha are elected for 6 years. One-third of the members retire every two years.**

LOK SABHA (PEOPLE'S HOUSE)

- Its **first sitting** took place on **May 13, 1952**
- All the members of the Parliament are popularly elected, except not more than **two** members of the **Anglo-Indian** community, who are nominated by the President.
- **In the Constitution, the strength of the Lok Sabha was provisioned to be not more than 552 : 530 from the States, 20 from the Union Territories and 2 nominated from the Anglo-Indian community.**

- Under the current laws, the strength of Lok Sabha is 545, including the two seats reserved for members of the Anglo-Indian community.

BILLS

The bill can broadly be categorised as:

(a) Ordinary bills
(b) Money bills

Ordinary Bills

- All the Bills other than Financial Bills
- Money Bills and the Constitutional Amendment Bills are Ordinary Bills.
- Such Bills can be **introduced in either House of the Parliament** (in Lok Sabha or the Rajya Sabha) **without the recommendation of the President**, except those Bills under Article 3 (i.e., Bills related to reorganisation of the territory of a State).

Money Bills

- Money Bill is defined in Art. 110 of the Constitution.
- As per the Article, any Bill dealing with all or any of the matters enumerated from (a) to (g) of the same Article shall be a Money Bill.
- Money Bills are: imposition, abolition, remission, alteration or regulation of any tax.

Financial Bills

A Financial Bill **cannot be introduced without the President's recommendation, and it can only be introduced in the Lok Sabha.**

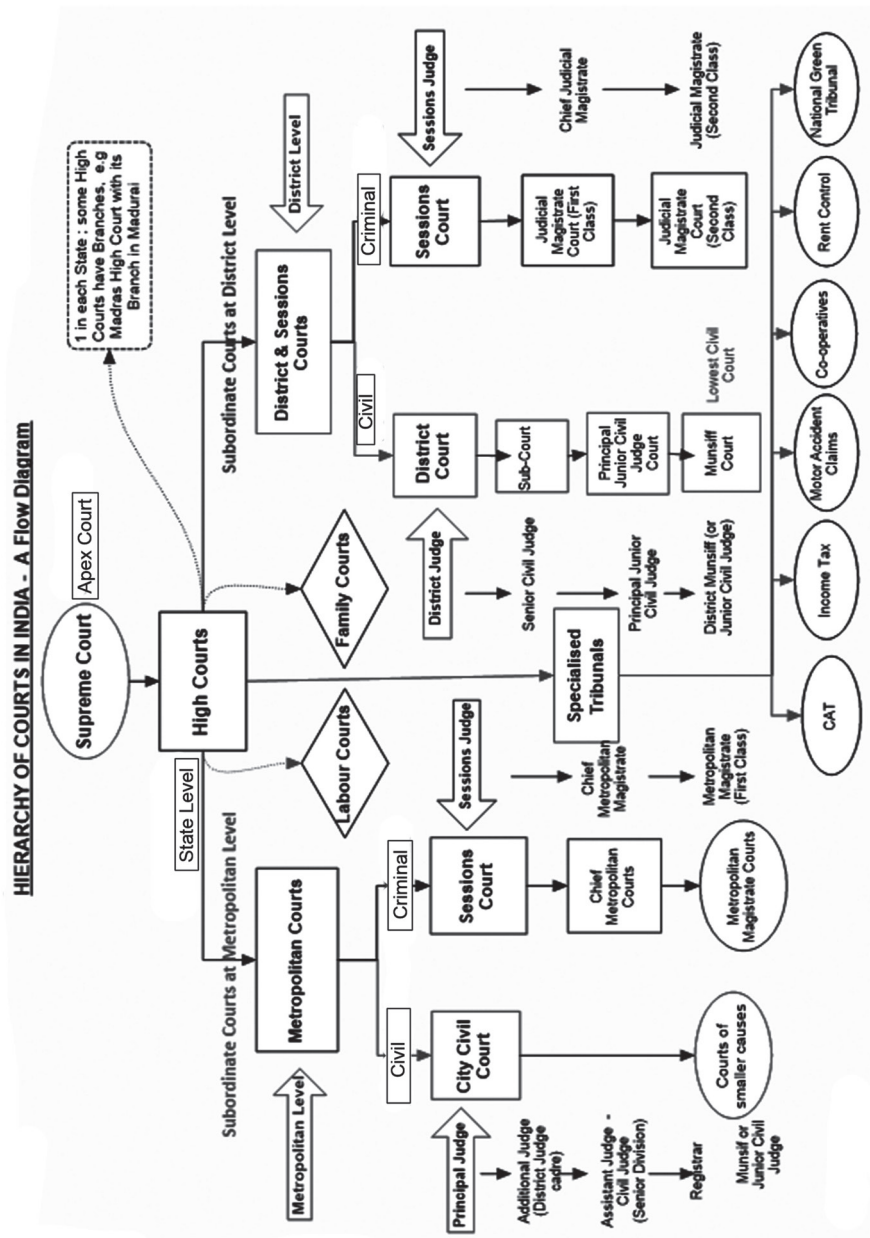
Constitutional Amendment Bills

- **Art. 368** deals with the power of the Parliament to amend the Constitution, and the procedure thereof.
- A Bill for this can be introduced in either House (the Lok Sabha or the Rajya Sabha) of the Parliament.

SPEAKER OF THE LOK SABHA

- After formation of a new Lok Sabha the President appoints a **Speaker pro-tem** who is the senior most member of the House.
- A Deputy Speaker is also elected to officiate in the absence of the Speaker.
- **The Speaker is the Chief Presiding Officer of the Lok Sabha.**
- The Speaker and the Deputy Speaker may be **removed from their offices by a resolution passed by the House with an effective majority of the House after a prior notice of 14 days to them.**

Meira Kumar is the first woman Speaker of the Lok Sabha (2009-2014)
GMC Balyogi is the first speaker to die in the office (1998-2002)
Dr Balram Jakhar was the longest serving Speaker (1980-1989)
M A Ayangar was the first Deputy Speaker (1952-1956)
GV Mavlankar was the first Speaker of the Lok Sabha (1952-1956)
Sumitra Mahajan is the present Speaker of 16th Lok Sabha since June, 2014.



THE SUPREME COURT

- The Supreme Court of India is the highest judicial forum and final court of appeal under the Constitution of India with the power of constitutional review.
- **It comprises the Chief Justice of India and 30 other judges**.

Tenure and Qualification and Salary

- Judges of Supreme Court are appointed by the President of India, and serve till the age of 65 years.

Impeachment

- A judge of the Supreme Court can be removed under the Constitution only on grounds of proven misconduct or incapacity and by an order of the President of India, after a notice signed by at least 100 members of the Lok Sabha or 50 members of the Rajya Sabha is passed by a two-third majority in each House of the Parliament.

- The first woman judge of the Supreme Court was **Justice Fatima Beebi** in 1987.
- The second woman justice was **Gyan Sudha Mishra** in 2010
- The first Chief Justice of India was **HJ Kania** (1950-50)
- The shortest tenure so far is of **KN Singh** (Nov.25-1991-Dec. 12, 1991.

Comptroller and Auditor General (CAG) (Article 148-151)

- **CAG is appointed by the President of India** under Article 148 of the Constitution and shall only be removed from the office in the like manner as a Judge of the Supreme Court.
- The **first CAG of India was V Narahari Rao**

Attorney General of India

- According to Article 76 the Attorney General of India is the Government's chief legal advisor, and its primary lawyer in the Supreme Court of India.
- The First Attorney General was **M.C. Setalvad.**
- **Mukul Rohatgi** is the incumbent Attorney General of India.

THE STATES (ARTICLE 152-237)

The Governor (Article 153-162)

- The **Governor of a State is appointed by the President of India** (Article 155).
- The same Governor can act as Governor of more than one State (Article 153-162).

Legislative Assembly (Vidhan Sabha)

- It is the lower and popular house of the State. Members are chosen by direct election
- According to Article 172, duration of Assembly is normally **5 years**. But it may be dissolved earlier by the Governor.

Legislative Council (Article 169)

- It is the upper house.
- Parliament may by law create or abolish Legislative Council.
- It can be created, if the Legislative Assembly of the State passes a resolution to the effect by special majority.

High Courts (Article 214-232)

- There shall be a High Court for each State Article-214.
- The Judiciary in the states consist of a High Court and subordinate courts.
- **There are 24 High Courts in India**
- The **Calcutta High Court** is the **oldest** of all which was established in **1862**. The Bombay and Madras High Courts were established in the same year.
- Chhatisgarh, Uttarakhand (Nainital) and Jharkhand (Ranchi) High Courts were established in the year 2000.

The Panchayati Raj (Article 243-O)

- **Rajasthan is the first state in India**, where Panchayati Raj was implemented after the **73rd Amendment Act, 1992**.
- It gave Constitutional status to Panchayati Raj system.
- After Amendment Panchayati Raj added to the **11th Schedule of the Constitution**

The Three Tire System of Local Governance

- **Gram Panchayat** at Village Level
- **Panchayat Samiti** at Block Level
- **Zila Parishad** at District Level

The Municipalities (Article 243P-243 ZG)

- **PART IX A added by 74th Amendment Act 1992**, gives a constitutional foundation to the local self government units in urban area.
- **Nagar Panchayat**, is for an area being transformed from a rural area to an urban.
- **Municipal Council is for a smaller urban area**.
- **Municipal Corporation is for a larger urban area**. The Municipal Corporation is the topmost urban local government.

ELECTION COMMISSION (ARTICLE 324-329)

Article 324 says that the superintendence, direction and control of elections shall be vested in the Election Commission.
Article 325 provides for a single electoral roll for every constituency.
Article 326 stipulates that elections shall be held on the basis of adult suffrage.

Political Parties

- As per the provisions of the Peoples Representation Act, 1951 political parties are registered with the Election Commission of India.
- The **Anti-defection law**, passed in 1985, prevents the MPs or the MLAs elected as candidates from one party forming or joining a new party, unless they comprise more than one-third of the original party, in the Legislature.

Recognition and Reservation of Symbols

- A party registered with the Election Commission may be granted recognition as a National or a State party on the basis of its performance in polls.

National Parties

S. No.	Name	Symbol	Year of Foundation	Current leader(s)	Current Lok Sabha Seats
1.	Bharatiya Janata Party	Lotus	1980	Amit Shah	282 / 543
2.	Indian National Congress	Hand	1885	Sonia Gandhi	44 / 543
3.	Communist Party of India (Marxist)	Hammer, Sickle and Star	1964	Sitaram Yechury	9 / 543
4.	Communist Party of India	Ears of Corn and Sickle	1925	Suravaram Sudhakar Reddy	1 / 543
5.	Bahujan Samaj Party	Elephant (In all States/ U.T.s except in the State of Assam, where its candidates will have to choose a symbol.	1984	Mayawati	0 / 543
6.	Nationalist Congress Party	Clock	1999	Sharad Pawar	
7.	All India Trunamue Congress	Jora Ghas Phul	1998	Mamta Banerjee	32/545

IMPORTANT PARLIAMENTARY TERMS

- **Calling Attention:** Moved to call the attention of a Minister to matters of public importance.
- **Interim Government:** This Government is formed during the transitional phase of the history of the country.
- **Ordinance:** An ordinance is a law promulgated by the head of the State in a situation of urgency when the Legislature cannot frame the law because either it is not in session or it is dissolved.

- **Question Hour:** The first one hour period (usually 11: 00 a. m. to 12: 00 a. m.) each day during the meetings of the Parliament is allotted for asking the questions by the members to be replied by the Ministers, is called the Question Hour.
- **Quorum:** It refers to the required presence of the minimum member of members of a body to hold its meetings and conduct its business.
- **Whip:** This is an official appointed by a political party to regulate and monitor the behaviour of its members in the Legislature.
- **Zero Hour:** It is a period which follows after the Question Hour when the members raise any issue of public importance on very short or even without any notice.

Adjournment motion	• To draw attention of Parliament to a matter of urgent public importance. • Motion needs the support of 50 members for admission. • Rajya Sabha cannot move this motion.
No Confidence Motion	• Moved to prove the confidence of Lok Sabha in the Council of Ministers. • If No Confidence Motion is passed, Council of Ministers has to resign. • No Confidence Motion needs the support of 50 members to be admitted. • Can be moved only in Lok Sabha.

UNION PUBLIC SERVICE COMMISSION

- The Union Public Service Commission consists of **a Chairman and other** members appointed by the President and they hold office for a **period of 6 years** from the date of their appointment.
- It conducts examinations for appointment to the Services of the Union.
- Age of retirement for a member of **UPSC is 65** years and for a member of **PSC of a State** or a Joint Commission is **62 years**.

NITI AAYOG

- NITI Aayog or **National Institution for Transforming India Aayog** is a policy think-tank of Government of India that replaces Planning Commission and aims to involve the States in economic policy-making in India.
- It will be providing strategic and technical advice to the Central and the State Governments. **The Prime Minister heads the Aayog as its chairperson.**

NATIONAL DEVELOPMENT COUNCIL (NDC)

- The National Development Council **was formed in 1952,** to associate the States in the formulation of the plans.
- All members of the Union Cabinet, Chief Minister of States, the Administrators of the Union Territories and members of NITI Ayog are members of the NDC.

FINANCE COMMISSION

- As per **Article 280 of** the Constitution of India the Finance Commission is established.
- It is a **quasi-judicial** body.
- It consists of a chairman and four other members.

LOKPAL

In India, the institution of Ombudsman (**Swedish word** meaning **Commissioner**) has given the name of Lokpal & use it as an anti-corruption institution.

LOKAYUKTA

The anti-corruption institution of Lokayukta is set up at the state level. He is appointed by the Governor of the State. In most of the States, the term of office fixed for Lokayukta is **of 5 years duration or 65 years of age,** whichever is earlier.

ADVOCATE GENERAL

Each State shall have an Advocate General. He has the **right to address & take part in the proceedings of the House of the State** Legislature. But **he has no right to vote.** His functions are similar to those of the Attorney – General.

ARTICLE 370

Under Article 370 of the Indian Constitution, Jammu & Kashmir is granted autonomy. It is a 'temporary provision' that accords special status to the State.

How J & K Different from Other States?

- Directive Principles of State Policy (DPSP) are not applied to J&K but applied to other States.
- President can't declare financial emergency (salaries and allowances reduction, etc.) in relation to J&K.
- High Court of J&K can issue writs only for enforcement of Fundamental Rights.
- Right to property is still guaranteed in J&K.
- Permanent residents of J&K have some special fundamental rights.
- Although Supreme Court, EC and CAG are applicable to J&K along with all other States.

AMENDMENTS OF THE CONSTITUTION (ARTICLE 368)

There are three types of bills that seek to amend the Constitution:

1. Bills that are passed by Parliament by **Simple Majority**.
2. Bills that have to be passed by Parliament by **Special Majority**.
3. Bills that have to be passed by **Special Majority** and also to be **ratified by not less than one-half of the State Legislatures**.

Important Amendments

- **The first Amendment Act** to the Indian Constitution was made in the year 1951. Ninth Schedule was added.
- **The Constitution (24th Amendment) Act, 1971:** It affirmed the power of the Parliament to amend any part of the Constitution.
- **The Constitution (39th Amendment) Act, 1975:** The Act places beyond challenge in courts the election to Parliament of a person holding the office of Prime Minister or Speaker and the election of President and Vice-President.
- **The Constitution (42nd Amendment) Act, 1976:** It was enacted during the period of National Emergency.
- **The Constitution (43rd Amendment) Act, 1978:** It restores civil liberties by deleting Article 3ID which gave powers to Parliament to curtail even legitimate trade union activity under the guise of legislation for the prevention of anti-national activities.
- **The Constitution (44th Amendment) Act, 1978:** Fundamental Rights guaranteed by Articles 20 and 21 cannot be suspended during a national emergency.
- **The Constitution (61st Amendment) Act, 1989:** It lowered the voting age from 21 to 18.
- **The Constitution (73rd Amendment) Act, 1992:** To ensure direct election to all seats in Panchayats.
- **The Constitution (74th Amendment) Act, 1992:** was made to ensure direct election to all seats in Nagarpalikas and Municipalities.

E-Governance

E-governance means technology drive operation. The 11th report of the Second Administrative Reforms Commission, entitled to promoting e-Governance.

Five models of e-Governance

- G2C (Government to citizen)
- G2B (Government to business)
- G2E (Government to Employees)
- G2G (Government to Governments)
- C2G (Citizens to Government)

National e-Governance Plan

National e-Governance Plan (NeGP) is a plan of the Government of India to make all government services available to the citizens of India via electronic media.

Economy

INTRODUCTION

- It's a developing economy with agriculture being its backbone.
- The growth rate is estimated to be around 7.6% per cent in the year 2015-16.
- World's fourth largest in terms of real GDP after USA, China and Japan.

HISTORY OF PLANNING IN INDIA

- **1934:** First attempt to **initiate** economic planning in India was made by **Sir M.Visvesvarayya**, through his book **'Planned Economy For India'.**
- **1938:** 'National Planning Commission' was set up under the chairmanship of **J.L. Nehru** first time.
- **1944: 'Bombay Plan'** was presented by 8 leading industrialists of Bombay.
- **1944: 'Gandhian Plan'** was given by S. N. Agarwal.
- **1945: 'People's Plan'** was given by **M. N. Roy**.
- **1950: 'Sarvodaya Plan'** was given by **J. P. Narayan.**

The Planning Commission

- It was set up on **March 15, 1950** under the chairmanship J.L. Nehru, by a **resolution** of Union Cabinet.
- It is an extra-constitutional, **non-statutory body.**
- Prime Minister is the ex-officio Chairman, one deputy-Chair appointed by the PM and some full time members.
- In January **2015**, Cabinet **resolution replaced the Planning Commission by NITI Aayog.**

PLANS

First Plan (1951 - 56)

- Based on **Harrod-Domar Model.**
- Community Development Program launched in 1952
- Focus on **agriculture, price stability, power** and **transport**.

Second Plan (1956 - 61)

- Also called **Mahalanobis Plan.**
- Focus - **rapid industrialization**

Third Plan (1961 - 66)

- Target Growth: 5.6% ; Actual Growth: 2.4%
- Agriculture was given to priority to support the exports and industry.
- Aimed to make India a '**self-reliant**' and '**self-generating**' economy.

Three Annual Plans (1966-69) Plan holiday for 3 years

- The main reasons for plan holidays were the war, lack of resources, and increase in inflation.
- Policy of Green Revolution was adopted.

Fourth Plan (1969 - 74)

- Target growth rate was 5.6%, actual growth rate was 3.3%.
- Main emphasis was on growth rate of agriculture to enable other sectors to move forward

Fifth Plan (1974 - 79)

- The fifth plan was prepared and **launched by D.D. Dhar**.
- Target growth rate was 4.4% and the actual growth rate was 5.0%.
- It proposed to achieve two main objectives: **'removal of poverty'** (Garibi Hatao) and **'attainment of self reliance'.**

Rolling Plan (1978 - 80)

- There were two Sixth Plans. Janta Government put forward a plan for 1978-1983. However, the government lasted for only 2 years. Congress Govt. returned to power in 1980 and launched a different plan.

Sixth Plan (1980 - 85)

- Target growth rate was 5.2% and the actual growth rate was 5.4%.
- It was a great success and marked the beginning of **economic liberalisation**.

Seventh Plan (1985 - 90)

- Target growth rate was 5.0% and the actual growth rate was 6.01%.

Eighth Plan (1992 - 97)

- It was postponed by two years because of political uncertainty at the Centre.
- **Modernization of industries was a major highlight.**
- Target growth rate: 5.6%; Average growth rate: 6.78%

Ninth Plan (1997- 2002)

- Target growth was 7.1% and the actual growth was 6.8%.

Tenth Plan (2002 - 2007)

- Target growth: 8.1%
  Growth achieved: 7.7%
- **20 point program was introduced.**
  - It targetted a GDP growth of 8% per annum.

Eleventh Plan (2007 - 2012)

- Accelerate GDP growth from 8% to 10%.
- Reduce Total Fertility Rate to 2.1
- Increase agriculture growth to 4%.

Twelfth Five Year Plan (2012-2017)

Major objective: Faster, Sustainable and More Inclusive Growth.

The main points of the Twelfth Plan are:

Resource Allocation Priorities in 12th plan

- Health and Education received less than projected in Eleventh Plan.
- Infrastructure, including irrigation and watershed management and urban infrastructure, will need additional 0.7 percentage point of GDP over the next 5 years.

National Income of India

- National Income is the money value of all the final goods & services which produced by a country during one year.
- India is now the world's 3rd largest economy in terms of real prices and purchasing power.

Measures/Concepts of National Income

1. **Gross Domestic Product (GDP):**
   GDP is the total money value of all final goods & services produced within the geographical boundaries of the country (produced by resident citizens + foreign nationals) during a given period of time, generally one year.

   $$GDP = Q \times P,$$

   Q = Total quantity of final goods & services.
   P = Price of final goods & services.
2. **Gross National Product (GNP):** GNP is the money value of total output or production of final goods & services produced by the nationals of a country during a given period of time, generally a year. In this case, the income of all the resident & non-resident citizens of a country is included whereas the income of foreign nationals who reside within the geographical boundary of the country is excluded.

   $$GNP = GDP + (X - M)$$

   X = Export of goods & services
   M = Import of goods & services
   X – M = Net Factor Income from Abroad (NFIA)

   So, $GNP = GDP + NFIA$
3. **Net National Product (NNP): can be calculated in 2 ways:-**
   (i) NNP at market price:

   $$NNP = GNP - Depreciation$$

   Depreciation means wear & tear of goods produced.
   NNP at market price includes Indirect taxes and excludes subsidies.
   (ii) NNP at factor cost: NNP at factor cost calculates National Income only on the basis of cost incurred to produce the goods & services. This cost is the payment made to the factors of production.

$$NNP_{fc} = NNP_{mp} - \text{Indirect Taxes} + \text{Subsidy}$$

When NNP is obtained at factor cost, it is known as National Income.
Likewise, GDP at factor cost also can be calculated.

$$GDP_{fc} = GDP_{mp} - \text{Indirect Taxes} + \text{Subsidy}$$

4. **Personal Income :** It is that income which is actually obtained by nationals in one year.
   P.I. = National Income – Undistributed Profits of Corporation – Payments for Social Security Provisions – Corporate Taxes + Government Transfer payments + Business Transfer payments + Net Interest paid by government.
   SOCIAL SECURITY PROVISIONS = Payments made by employees towards pension & provident fund
   TRANSFER PAYMENTS = Payments made not against any productive activity. eg. – old age pension, unemployment compensation, disaster relief payment, etc.
5. **Disposal Personal Income (DPI):** Income that is available to individuals that can be disposed at their will.

   DPI = Personal Income – Direct Taxes.

6. **National Income at constant price & current price**

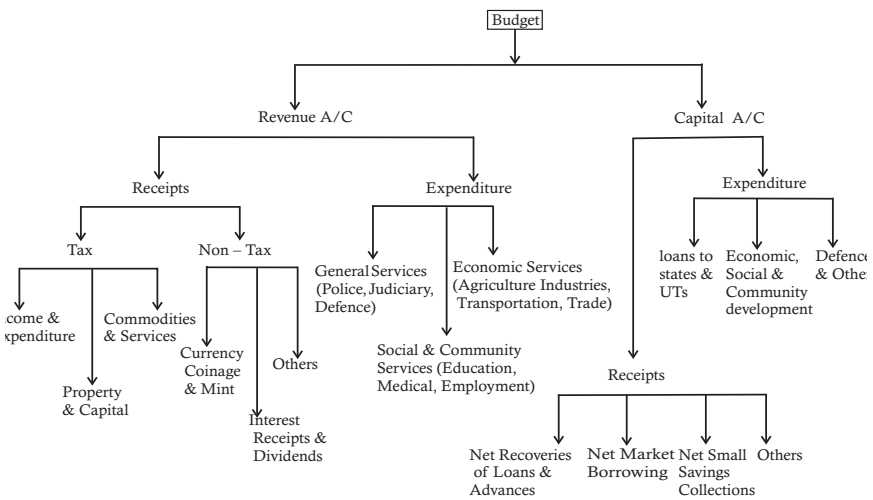
   NI CONSTANT PRICE = Total quantity of all final goods & services produced in a particular year × Price of base year.

   Base year of National Income accounts is the year chosen to enable inter – year comparisons. The new series changes the base to 2011–12 from 2004–05

   NI CURRENT PRICE = Total quantity of all final goods & services produced in a particular year × Price of goods & services in that particular year.

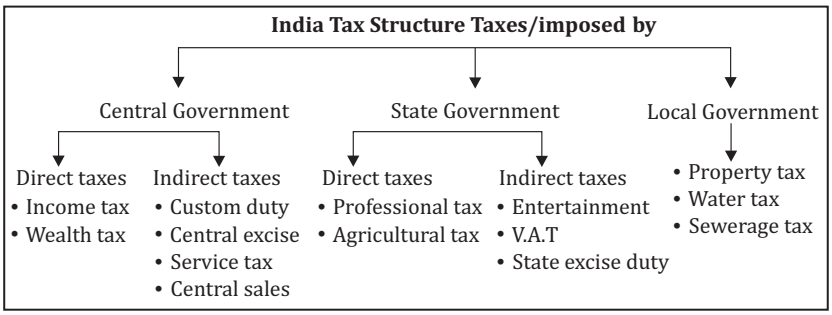
BUDGET

Budget is an annual financial statement. The Budget in India is divided into 2 parts – Revenue Account & Capital Account.



Indian Tax Structure

- **Tax Structure** present in India is very strong and follows the financial year.
- **Direct taxes** are those which are imposed on a person either on his income or wealth and the tax liability cannot be escaped. It is governed by Central Board of Direct Taxes (CBDT).
- **Indirect tax** is collected by middle men in the channels of distribution of goods and it is remitted to the Government treasury. It is governed by Central Board of Excise and Customs (CBEC).



Goods and Services Tax (GST)

Features

- Uniform regim of taxes across India.
- Common market of goods and services across India.
- States will collect services taxes.
- Centre will collect Integrated Goods and Service Tax (IGST) or inter-state supplies.
- IGST rate will be equal to Central GST (CGST) + State GST (SGST).
- It will subsume 16 central or state's taxes.

GST Replaces

States Taxes	Central Taxes
• VAT/Sales Tax	• Central Excise Duty
• Entry Tax/Octroi	• Excise Duty on Medicines and Toilet
• Local Tax	• Additional Custom Duty
• Entertainment Tax	• Sp. Add. Custom Duty
• Purchase Tax	• Countervailing Duty
• Mandi Tax/Local Levis	• Service Tax
• Luxury Tax	• Cesses and surcharges
• Tax on Lottery and Betting	
• Inter-state Tax	

Poverty in India

- One third of the world's poor live in India.
- The number of poor in India is now estimated at 148 million in 2014 as compared to 396 million in 2004-05.
- Goa ranks best with least poverty of 5.09% and Chattisgarh has the most poverty with 39.93%.
- Poverty is concentrated among agricultural labourers, casual workers, scheduled castes and scheduled tribes.
- According to Economic Survey 2013-14, **poverty ratio declines to 21.9%.**

Unemployment in India

- The country's overall unemployment rate was estimated to be **4.9% in 2013-14.**
- In case of women living in urban areas, the unemployment rate was 12.4%, while in rural areas, it was 6.4%.
- The overall unemployment among women was 7.7% across the country.
- Gujarat has the lowest unemployment rate of 1.2%, as per the fourth Annual Employment & Unemployment Survey report for 2013-14, released by Labour Bureau, under Union Ministry of Labour and Employment.

Schemes for Women and Child Development

1. Ahimsa Messengers

- Scheme of Ministry of women and child development launched by UPA in 2013.
- Includes Women Panchayati Raj Members, Youth, NGOs etc.
- These people work for prevention of violence against women, dowry etc.

2. CSWB

- Central social welfare board (CSWB).
- To implement welfare programs for women and children via NGOs, family counselling, awareness generation etc.

3. Poorna Shakti Kendra

- Created under National Mission for empowerment of women in 2013.

- One stop information centres.
- Help women get benefit from various govt. schemes.

4. SABLA

- Rajiv Gandhi Scheme for Empowerment of Adolescent Girls launched in 2011.
- To provide nutrition for growing adolescent girls by provision of food grains.
- All girls will be given a kishori card which will be updated with details of the girl's growth and provision of the food grains.
- SABLA is created by merging earlier two schemes: Nutrition program for adolescent girls + Kishori Shakti Yojana.
- Target: girls aged 11-18.
- 100 gms of foodgrain per day per girl for 300 days in a year.

5. Saksham

- This is a scheme by Ministry of Women and Child Development launched in 2012.
- Made due to rising demand for gender sensitisation among boys after the Delhi gang-rape incident.
- It'll give training/moral education to adolescent boys (11-18 age) to respect women.

6. STEP

- Support to Training and Employment program for Women.
- Provides skill training.

Policies	
1974	National Policy for Children
2001	National Policy for Women
2004	National Charter for Children
2014	National Youth Policy

Child labour v/s Right to Education (RTE)

- RTE = Every child between the ages of 6 and 14 has right to free (and compulsory) elementary education
- Child Labour (Prohibition and Regulation) Act of 1986 makes a distinction between hazardous and non-hazardous categories of work for children under 14 years.

National Rural Health Mission

- Focus will be post-menopausal problems, osteoporosis and breast and cervical cancer.
- Dovetailing of NRHM with IGMSY [Indra Gandhi Matritva Sahyog Yojana] (conditional cash transfer for maternity benefit) and National Food Security Bill (NFSB) will be undertaken.
- Training Anganwadi and ASHA workers (Accredeted Social Health Activist) on issues relating to nutrition, counselling, child rights and gender discrimination

Rashtriya Bal Swasthya Karyakram

- This scheme was launched in 2013.
- To provide comprehensive healthcare and improve the quality of life of children focus on 4D.
- Defects at birth (cleft lip, down's syndrome, Talipes etc.).
- Diseases (dental, heart, asthama etc.).

ICDS

- Integrated Child Development Service (ICDS) started in 1975.
- Beneficiary-children below the age of six, lactating mothers, pregnant mothers.

Dhanlakshmi

Conditional cash transfer for girl child, launched in 2008, for fulfilling following conditions:

- birth and registration of birth
- immunization
- enrolment and retention in school

Rajiv Gandhi National Creche

- Scheme provides for day-care facilities to 0-6 year-old children of working mothers by opening crèches and development services
- Requirement: combined monthly income of both the parents should not exceed ₹12,000 for availing of the facilities.

INDUSTRIES:

- Public Sector Enterprises (PSE) is a government-owned corporation owned by Union Government of India, or one of the many state or territorial governments, or both.

- They are under the Department of Public Enterprises of Ministry of Heavy Industries and Public Enterprises.
- There are 298 PSU companies on 31-03-2015 in India.

- **Maharatna**
- **Navratna**
- **Miniratna**

  CPSEs (itself divided into Category I & Category II)

  As on 26 October, 2014 there are 7 Maharatna, 17 Navratna and 73 Miniratna CPSE's.

There are 7 Maharatnas :

(i) Bharat Heavy Electricals (BHEL)
(ii) Coal India
(iii) Indian Oil Corporation (IOC)
(iv) GAIL
(v) NTPC
(vi) Oil & Natural Gas Corporation (ONGC)
(vii) Steel Authority of India (SAIL)

There are **17 Navratna** CPSEs in the country, these are:

1. Bharat Electronics Limited
2. Bharat Petroleum Corporation Limited
3. Container Corporation of India Limited
4. Engineers India Limited
5. Hindustan Aeronautics Limited
6. Hindustan Petroleum Corporation Limited
7. Mahanagar Telephone Nigam Limited
8. National Aluminium Company Limited
9. Nation al Buildings Construction Corporation Limited
10. NMDC Limited
11. Neyveli Lignite Corporation Limited
12. Oil India Limited
13. Power Finance Corporation Limited
14. Power Grid Corporation of India Limited
15. Rashtriya Ispat Nigam Limited
16. Rural Electrification Corporation Limited
17. Shipping Corporation of India Limited

Industrial Policy 1991

(A) Objectives

- to maintain a *sustained growth* in productivity.
- to enhance gainful employment.
- to achieve *optimum utilisation of human resources*.

(B) Main Focus on

- *deregulating* Indian industry.
- allowing the industry *freedom and flexibility* in responding to market forces, and

(C) Policy Measures

- *Liberalisation* of Industrial Licensing Policy.
- Introduction of *Industrial Entrepreneur's Memorandum* (*i.e.* no industrial approval is required for industries not requiring compulsory licensing).
- Non-Resident Indians Scheme (NRIs are allowed to invest upto 100% equity on non-repatriation basis in all activities except for a small negative list).

Classification of Industries:

A. On the basis of source of raw materials

- **Agro based industry** (cotton textile, jute textile and sugar).
- **Mineral based industry** (iron and steel, machine tools and aluminium).

B. On the basis of main role played by the industry

- **Basic industries:** these are the industries whose finished products are used as the raw materials for other industries.
- **Consumer goods industries:** these are the industries whose finished products are directly used for consumption by consumers.

C. On the basis of capital investment

- **Small scale** industry
- **Large scale** industry

D. On the basis of ownership

- **Public sector undertaking** (SAIL, HAL, BEML)
- **Private sector undertaking** (TISCO, Mahindra and Mahindra, Birla Cement)
- **Joint sector undertaking** (Oil India Limited)
- **Co-operative industries** (Sugar Industry in Maharashtra)

E. Based on the bulk of raw materials and finished products

- Heavy industries
- Light industries

In India, industries are concentrated in four main regions:

1. West Bengal, Jharkhand and Chhatisgarh
2. Maharashtra and Gujarat region
3. Gangetic Plains
4. South India

First Time in India

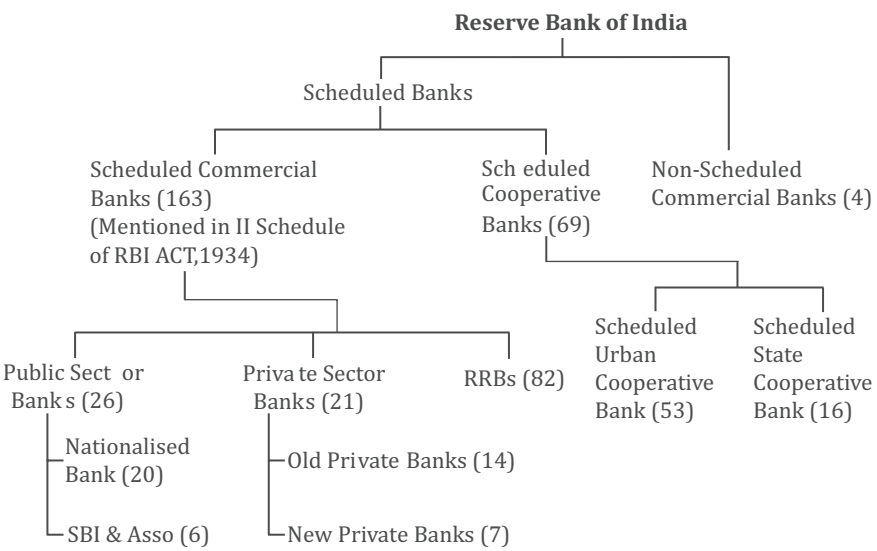
Cotton Industry	1818 Fort Gloster (Kolkata)
Iron and Steel Industry	1870 Kulti (West Bengal)
Sugar Industry	1900 Bihar
Jute Industry	1855 Rishara (West Bengal)
Paper Industry	1812 Serampur (W. Bengal)
Petroleum Industry	1956 Digboi (Assam)
Cement Industry	1904 Chennai (Tamil Nadu)

BANKING IN INDIA

The State Bank of India is the largest commercial bank in India.

Reserve Bank of India

- **Central bank** of India.
- **Established on April 1, 1935** with a capital of ₹ 5 crore.
- **Nationalised on January 1, 1949** as Government acquired the private share holdings.
- **Administration:** 14 Directors in Central Board of Directors besides the Governor, 4 Deputy Governors and 1 Government official. The Governor is the Chairman of the Board and Chief Executive of the Bank.



- **Governors:** 1st Governor – Sir Smith (1935-37); 1st Indian Governor- CD Deshmukh (1948-49).
- RBI follows Minimum Reserve System worth 200 crore (₹ 115 crore gold & ₹ 85 crore bond).
- All notes except one rupee are issued by the RBI & bear the signature of RBI Governor.
- Where as the one rupee note bears signature of Secretary of Finance (GOI).
- No personal accounts are maintained & operated in RBI.

Functions of RBI

- Issuance of note.
- Banker to the Government.
- Banker's Bank.
- Controller of Credit
- Custodian of Foreign Reserves
- Formulates and administers the monetary policy in India.
- Acts as the agent of the Government of India in respect to India's membership of the IMF and the World Bank.
- RBI acts as the central clearing house for the inter bank transactions.
- **Credit control** means control over the quantity and value of credit in the country. Among the functions of Central Bank, one main function is to control and regulate the credit in the country.

1. **Quantitative Credit Control:** Bank Rate, Cash Reserve Ratio (CRR), Open Market Operations (OMO), Statutory Liquidity Ratio (SLR), Repo/ Reserve Repo.
2. **Qualitative Credit Control:** Rationing of Credit, Regulation of Credit for Consumption Purpose, Variation of margin requirements, Moral Control, Direct action.

Printing of Securities and Minting in India

India Security Press (Nashik Road): Postal Material, Postal Stamps, Non-postal Stamps, Judicial and Non-judicial Stamps, Cheques, Bonds, NSC, Kisan Vikas Patra, Securities of State Governments, Public Sector Enterprise and Financial Corporations.

Currency Notes Press (Nashik Road): Since 1991, this press prints currency notes of ₹ 1, ₹ 2, ₹ 5, ₹ 10, ₹ 50, and ₹ 100.

Bank Notes Press (Dewas): Currency notes of ₹20, ₹50, ₹100 and ₹500 are printed here.

Modernized Currency Notes Press: Two new modernized currency notes press are under establishment at Mysore (Karnataka) and Salboni (West Bengal).

Security Paper: Hoshangabad (established in 1967-68) makes production of Bank and Currency notes paper.

Coins are minted at four places: Mumbai, Kolkata, Hyderabad and Noida.

STOCK EXCHANGE OF INDIA

- The Securities Contracts (Regulation) Act of 1956 established for the purpose of assisting, regulating and controlling, business in buying, selling and dealing in securities."
- There are **24 stock exchanges** in India.

Bombay Stock Exchange 1875- one of the oldest in the world and oldest in Asia.

Madras Stock Exchange- 1920

Ahmedabad Stock Exchange- 1894

Calcutta Stock Exchange- 1908

Securities and Exchange Board of India (SEBI): April 1988

SEBI

- It was given statutory status and powers through an ordinance promulgated on January 30, 1992.
- **Its office is situated in Mumbai** with regional offices at Delhi, Chennai and Calcutta.

Functions of SEBI:

- Check insider trading of securities.
- Encourage self-regulatory organisations.
- Eliminate malpractice of security market.
- Safeguard interests of investors.

AGRICULTURE

The agriculture sector of India occupies almost 43% of India's geographical area.

Importance

- It is the largest contributor to India's GDP.
- Provides livelihood to 65-70% of total population and employment to 58.4% of total work force.
- Importance source of raw materials to large and small scale industries.
- Agriculture accounts for 14.7% of total export earnings.
- Agriculture and related products contribute to 38% in total exports of the country.

Food grains procurement and Stocks in India

Food grains procurement by government serves two purposes- providing support price to the farmers and building up public stocks of food grains. It is carried by Food Corporation of India (**FCI**).

- Market intervention to augment supply so as to help moderate the open market prices.

Green Revolution in India

- The term 'green revolution' was given by American scientist- Dr. William Gande.
- The credit of Green Revolution goes to **Dr. Norman Borlaug (Mexico)** and **Dr. M.S. Swaminathan in India.**

Second Green Revolution in India

- Strategy adopted in Eleventh Plan.
- It aimed at efficient use of resources and conservation of soil, water and ecology on a sustainable basis and in a holistic framework.

Other Revolutions

Revolution	Area
Yellow Revolution	Oil Seeds
White Revolution	Milk
Blue Revolution	Fish
Pink Revolution	Shrimp
Grey Revolution	Fertiliser
Golden Revolution	Horticulture

White Revolution and Operation Flood in India

- India stands first in the world in the milk production.
- **Dr. Varghese Kurien is the pioneer of operation flood in India.**

FOREIGN DIRECT INVESTMENT (FDI)

Foreign Direct Investment (FDI) is an investment in a business by an investor from another country for which the foreign investor has control over the company purchased.

- A Multi National Enterprise (MNE) may create a new foreign enterprise by making a direct investment, which is called a *greenfield investment*.
- A MNE may make a direct investment by the acquisition of a foreign firm, which is called an *acquisition* or *prownfield investment* .
- The Government has allowed 100% FDI in all the sectors except Space (74%), Defence (49%), and News Media (26%).
- FDI restrictions in tea plantation has been removed.

FDI In India

FDI during 2015 – $ 39.32 billion
Highest FDI attracted sectors – Computers Hardware & Software, Services, Trading business, Automobiles & Chemicals.
Biggest FDI source – Singapore, Mauritius, US, Netherlands and Japan

FINANCIAL INCLUSION

The objective of Financial Inclusion is to extend financial services to the large hitherto un-served population of the country to unlock its growth potential. Following are the

1. Expansion of Bank Branch Network.
2. Swabhimaan Scheme
3. Direct Benefit Transfer
4. PAHAL Scheme
5. Pradhan Mantri Jan-Dhan Yojana (PMJDY)
   PMJDY was formally launched on 28th August, 2014.

New Pension System

The National Pension System (NPS) was launched on 1st January, 2004 with the objective of providing retirement income to all the citizens. It is a co-contributory pension scheme, **'Swavalamban Scheme'** in the Union Budget of 2010-11, under which the Government will contribute a sum of ₹ 1,000 to each eligible NPS subscriber who contributes a minimum of ₹ 1,000 & maximum ₹ 12,000 per annum.

GLOSSARY

- **Ante date:** To give a date prior to that on which it is written, to any cheque, bill or any other document.
- **Ad valorem tax-** a tax based on the value of property.
- **Balance of trade (or payment):** The difference between the visible exports and visible imports of two countries in trade with each other is called balance of payment.
- **Basis Point:** A unit of measurement which is equal to 1/100th of 1%. This is used to measure changes in interest rates, stock-market indices or yield on fixed income securities.
- **Balance Sheet:** It is a statement of accounts, generally of a business concern, prepared at the end of a year.
- **Bank Rate:** It is the rate of interest charged by the Reserve Bank of India for lending money to Commercial Banks.
- **Bear:** A speculator in the stock market who believes that prices will go down.
- **Bull:** Speculators in the stock markets who buy goods, in some cases without money to pay with, anticipating that prices will go up.
- **Cartel:** It is a combination of business, generally in the same trade formed with a view to controlling prices and enjoy monopoly.
- **Call money:** Loan made for a very short period. It carries a very low rate of interest.
- **Commercial Banks:** Financial institutions that create credit, accept deposits, give loans and perform other financial functions.
- **Deferred Payment:** Payments put off to a future date or extended over a period of time. Interest will usually still accumulates during deferment.
- **Deflation:** Deflation is a reduction in the level of national income and output, usually accompanied by a fall in the general price level.
- **Depreciation:** Reduction in the value of fixed assets due to wear and tear.
- **Devaluation:** Official reduction in the foreign value of domestic currency. It is done to encourage the country's exports and discourage imports.
- **Dividend:** Earning of stock paid to shareholders.
- **Dumping:** Sale of a commodity at different prices in different markets, lower price being charged in the market where demand is relatively elastic.
- **Double Taxation:** Corporate earnings taxed at both the corporate level and again as a stock holder dividend.
- **Fiscal policy:** Government's expenditure and tax policy.
- **Free-trade Area:** A form of economic integration in which there exists free internal trade among member countries but each member is free to levy different external tariffs against non-member nations.
- **Payee (Drawee):** The person who receives a payment. This often applies to cheque.
- **Payer (Drawer):** The person who makes a payment. This often applies to cheque.
- **Repo Rate:** The rate at which banks borrow from RBI. It injects liquidity into the market.
- **Reverse Repo Rate:** The rate at which RBI borrows from banks for a short-term. It withdraws liquidity from the market.
- **Statutory Liquidity Ratio (SLR):** SLR is the portion that banks need to invest in the form of cash, gold or government approved securities.
- **VAT(Value Added Tax):** A form of indirect sales tax paid on products and services at each stage of production or distribution, based on the value added at that stage and included in the cost to the ultimate customer.

Geography

UNIVERSE AND THE SOLAR SYSTEM

Universe, the vast and infinite space having million of galaxies is believed to be at least 10 billion light years in diameter it has been expanding since its creation in the Big Bang The **Big Bang Theory** is the leading explanation about how the **universe** began.
Solar system consist of 8 planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. It also consist of stars.

Planets

Planet	Rotational Time	Orbital Time	No. of Moons
Mercury	59 Days	88 Days	0
Venus	243 Days	255 Days	0
Earth	1 Day	365 Days	1
Mars	1.03 Days	687 Days	2
Jupiter	9 hrs 56 min	11 yrs 11 months	16
Saturn	10 hrs 40 min	29 yrs 5 months	18
Uranus	17 hrs 14 min	84 yrs	17
Neptune	16 hrs 7 min	164 yrs	8
Pluto	6 Days 9 hrs	248 yrs	1

Some facts about planets

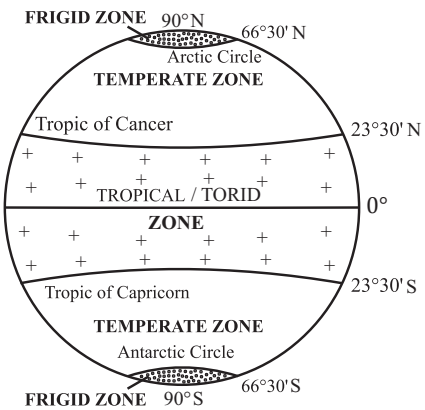
1. Biggest Planet is **Jupiter**
2. Biggest Satellite is **Ganymede**
3. Blue Planet is **Earth**
4. Green Planet is **Uranus**
5. Brightest Planet is **Venus**
6. Brightest Planet outside Solar System is **Sirus**
7. Closest Star of Solar System is **Proxima Centauri**
8. Coldest Planet is **Neptune**
9. Evening Star is **Venus**
10. Farthest Planet from Sun is **Neptune**
11. Planet with maximum number of satellites is **Saturn**
12. Fastest revolution in solar system is by **Mercury**
13. Hottest Planet is **Venus**
14. Densest Planet is **Earth**
15. Fastest Rotation in Solar System by **Jupiter**
16. Morning Star is **Venus**
17. Nearest Planet to Earth is **Venus**
18. Nearest Planet to Sun is **Mercury**
19. **Red** Planet is **Mars**
20. Slowest Revolution in Solar System is by **Neptune**
21. Slowest Rotation in Solar System is by **Venus**
22. Smallest Planet is **Mercury**
23. Smallest Satellite is **Deimos**
24. Earth's Twin-is **Venus**
25. Atmosphere like Earth is on **Titan**

Keywords in Universe

- **Celestial body:** Heavenly body.
- **Stars:** The celestial body with their own light and heat given out by burning of gases.

- **Constellation:** A group of stars forming some recognised shape.
- **Saptarishi Mandal:** The constellation of Great Bear or Ursa Major.
- **Ursa Major:** One of the most prominent and largest northern constellation also called the Great Bear.
- **Galaxy:** A system of millions or billions of stars found in clusters.
- **Milky Way Galaxy:** Our solar system belongs to this galaxy.
- **Orbits:** The elongated path on which the planets revolve round the sun.
- **Planets:** The bodies made up of rocks or gases and liquids with no light of their own going round the sun.
- **Moon:** Refers to the earth's Moon. Generally all satellites going round their respective planets are also termed as the moons.
- **Asteroids:** Planetoids found located in a gap between Mars and Jupiter.
- **Shooting stars:** The rapidly moving meteors that burn upon entering the earth's atmosphere.
- **Meteorites:** The fragments of meteors falling on the ground or in the oceans.
- **Comets:** A mass of ice and dust with a long tail moving around the solar system.

Earth



Important Parallels and Heat zones

Earth's Facts

- **Globe:** A model of the earth.
- **Latitudes:** The angular distance of a place north or south of the equator.
- **Longitudes:** The angular distance of a place east or west of the Prime Meridian.
- **Pole:** Either of the two poles north or south of the equator having 90° latitude.
- **Equator:** The latitude line with 0° value dividing the earth into two equal halves.
- **Hemispheres:** Any of the two halves of the earth north or south of the equator called northern and southern hemispheres respectively.
- **Tropic of Cancer:** The latitude line measuring 23°30' N.
- **Tropic of Capricorn:** The latitude line measuring 23°30' S.
- **Arctic Circle:** The latitude line measuring 66°30' N.
- **Antarctic Circle:** The latitude line measuring 66°30' S.
- **Tropical Zone:** Also called the Torrid Zone between Tropic of Cancer and Tropic of Capricorn.
- **Temperate Zone:** Any of the two zones between 23½° & 66½°N & S.
- **Frigid Zone:** Any of the two zones beyond Arctic & Antarctic Circles.
- **Rotation:** The movement of the planets on their axis.
- **Revolution:** The movement of the planets around the sun.
- **Solstice:** Any of the two occasions, Summer Solstice (21 June) and Winter Solstice (22 December) When the sun is at its highest or lowest point respecitvely in the sky. These occasions are marked by the longest and the shortest days.
- **Equinox:** Any of the two occasions in a year (23 September and 21 March) when days and nights are of equal length throughout the world.

Facts about Latitude

Lattitudes	Major Continents	Major Countries
Tropic of Cancer	North America, Africa and Asia	Bahamas, Mexico, Mauritania, Mali, Western Sahara, Algeria, Niger, Libya, Egypt, Saudi Arabia, India, China, Abudhabi, Oman, Bangladesh, Burma, and Taiwan.
Equator	South America, Africa, Asia	Equador, Colombia Brazil, Sao Tome & Prince, Gobon Republic of Congo Democratic Republic of Congo, Uganda, Kenya, Somalia, Maldives, Indonesia.
Tropics of Capricorn	South America, Africa, Asia	Chile, Argentina, Paraguay, Brazil, Namibia, Botswana, South Africa, Mozambique, Madagascar, Australia, French Polinesia, Caledonia, Fiji, Tonga and Coolis Island, etc.

Atmosphere

Atmosphere is a mixture of gases. Divide into 4 layers.

Gaseous Composition of Atmosphere

Component	Per cent by Volume
Nitrogen	78.08%
Oxygen	20.94%
Argon	0.93%
Carbon dioxide	0.03%
Neon	0.0018%
Helium	0.0005%
Ozone	0.00006%
Hydrogen	0.00005%

Geographical Phenomena

- **Earthquake waves:** Earthquakes generate pulses of energy called **Seismic waves** that can pass through the entire Earth.

Cyclone

The system of wind rotating inward to an area of low pressure zone from its surrounding high pressure area.

Cyclones	Region
Typhoons	China
Tropical Cyclone	Indian Ocean
Hurricanes	Caribbean sea
Tornadoes	USA
Willy-Willy	Australia
Taifu	Japan

SOME CYCLONES IN INDIA

Name	Year	State/Region
1. Bay of Bengal (BOB-01)	1990	Andhra Pradesh
2. Bay of Bengal (BOB-05)	1998	Andhra Pradesh
3. Yemyin	2007	Andhra Pradesh
4. Laila	2010	Andhra Pradesh
5. Nilam	2012	Andhra Pradesh
6. Helen	2013	Andhra Pradesh
7. Hudhud	2014	Andhra Pradesh
8. Onil	2004	Gujarat
9. Nada	2016	Kerala
10. Phyan	2009	Maharashtra
11. Phailin	2013	Odisha
12. Fanoos	2005	Tamil Nadu
13. Nisha	2008	Tamil Nadu
14. Madi	2013	Tamil Nadu
15. Vardah	2016	Tamil Nadu

Tides

- The periodic phenomenon of alternate rise and fall in the sea levels is known as **Tide**.
- It is produced due to gravitational interaction of the Earth, the Moon and the Sun.
- **Spring tides:** On the full moon and the new moon, tides are highest which are called **Spring tides**.
- **Neap tides:** A tide just after the first or third quarters of the moon when there is least difference between high and low water is called **Neap tides**.

Waves

- Waves are the oscillatory movements in water mainly produced by winds, manifested by an alternate rise and fall in the entire sea surface.

Types of Rocks

On the basis of modes of formation there are three types of rocks.

- **Igneous Rocks:** Igneous rock is formed through the cooling and solidification of **magma or lava** such as granite and diorite.
- **Sedimentary Rocks:** Sedimentary rocks are derived from the process of deposition and solidification of sediments after the process of **denudation**. For instance; Sandstone, limestone and chalk rock salts, gypsum or calcium sulphate, etc.
- **Metamorphic Rocks:** Metamorphic rocks arise from the transformation of existing rock types, in a process called **metamorphism**, which means "change in form". Gneiss phyllite, slate, schist, marble, quartzite, etc belongs to the category of metamorphic rocks.

INDIAN GEOGRAPHY

- **India is the seventh largest** country in the world.
- It covers an area of 32,87,2631 sq. km.
- India is situated North of the Equator between 8°4' and 37°C' North latitude and 68°7' and 97°25' east longitude and is surrounded by the Bay of Bengal in the East, the Arabian sea in the West and the Indian Ocean to the South.

List of Indian State Sharing Border with Neighbouring Countries

Countries	Indian States
Pakistan	Jammu and Kashmir, Punjab, Rajasthan and Gujrat
China	Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh
Nepal	Bihar, Uttarakhand, Uttar Pradesh, Sikkim and West Bengal
Bangladesh	West Bengal, Mizoram, Meghalaya, Tripura and Asom
Bhutan	West Bengal, Sikkim, Arunachal Pradesh and Asom
Myanmar	Arunachal Pradesh, Nagaland, Manipur and Mizoram
Afghanistan	Jammu and Kashmir (Pakistan occupied area)

Mountain Ranges in India

- The Himalayan Range is the world's highest mountain range.
- The tallest peak of the world, **Mt. Everest**, is also a part of it.
- **Karakoram Range** lies in Jammu and Kashmir and comprises more than 60 peaks.
- **K2** (Mount Godwin Austen) is the second highest peak of the world, also a part of this range. Its height is 8611m or 28,251 fit.
- **Shivalik Hills** extend from the Arunachal Pradesh to West Bengal and from Uttarakhand to Kashmir and Himachal Pradesh. Jammu, Kangra and Vaishno Devi are a part of this range.
- **Vindhya Range** spreads across central India and extends across 1,050 km.
- **Aravalli Range** is India's oldest mountain range and spreads across the parts of Rajasthan, Delhi and Haryana. **Guru Shikhar** in **Mount Abu** is the highest peak of this range.
- **Satpura Range** stretches from Gujarat and runs to Maharashtra, Madhya Pradesh and Chhattisgarh.

Mountain passes of India

Himalayan passes

- **Banihal pass** — between Doda and Anantnag (Jawahar Tunnel), J & K.
- **Shipki La** — River Sutlej enters India from Tibet, Himachal Pradesh.
- **Bara Lachan 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 and China

- **Shipki La** — Himachal Pradesh.
- **Thaga La and Niti La** — Uttarakhand .
- **Lipu Lekh La** — Tri-junction, India-Nepal-China, Uttarakhand.
- **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 Palakkad and Coimbatore.
- **Shenkota** — between Kollam and Madurai.
- **Thalghat** — between Mumbai and Pune.
- **Bhorghat** — between Mumbai and Nasik.

Some important facts about peaks

- Highest Mt. Peak in India: K_2 *(Karakoram 2) or Godwin Austin*
- Highest peak in Aravalli: Gurushikhar (in Mt. Abu)
- Highest peak in Satpura: Dhupgarh (Mahadeo Hills)
- Highest peak in E. Ghats: Mahendragiri (Orissa)
- Highest peak in W. Ghats: Anaimudi (Annamalai Hills - Kerala)
- Highest peak in Nilgiris: Doda Betta
- Hills in Southern Hill complex : Nilgiri, Annamalai, Cardamom & Palani
- Hills in Eastern Ghats: Shevaroy, Javadi, Palkonda, Nallamalai, Northern Circars
- Oblique ranges to Western Ghats in Maharashtra: Ajanta, Satmala, Harishchandra, Balaghat
- Satpura range from East to West: Amarkantak - Maikal- Mahadeo - Gawilgarh - Rajpipala
- Highest peak in Andaman and Nicobar islands : *Saddle Peak*
- The highest peak of Naga hills is Saramati peak.

Important lakes in India

Lakes Name	State
Kolleru Lake, Pulicat Lake	Andhra Pradesh
Deepor Beel, Chandubi Lake, Haflong Lake, Son Beel	Assam
Kanwar Lake	Bihar
Hamirsar Lake, Kankaria Lake, Nal Sarovar, Sursagar Lake	Gujarat
Brighu Lake, Dashir Lake, Dhankar Lake, Kareri (Kumarwah) Lake, Khajjiar Lake, Macchial Lake, Maharana Pratap Sagar, Manimahesh Lake, Nako Lake, Pandoh Lake,	Himachal Pradesh
Prashar Lake, Renuka Lake, Suraj Taal, Chandra Taal	Himachal Pradesh

Badkhal Lake, Brahma Sarovar, Karna Lake, Sannihit Sarovar, Surajkund Lake, Tilyar Lake, Blue Bird Lake	Haryana
Dal Lake, Pangong Tso, Sheshnag Lake	Jammu & Kashmir
Bellandur Lake, Ulsoor Lake, Sankey Lake, Agara Lake, Karanji lake, Kukkarahalli lake, Lingambudhi Lake, Pampa Sarovar	Karnataka
Ashtamudi Lake, Maanaanchira Lake	Kerala
Upper Lake, Lower Lake	Madhya Pradesh
Moti Jheel	Uttar Pradesh
Gorewada Lake, Lonar Lake	Maharashtra
Umiam Lake	Meghalaya
Loktak Lake	Manipur
Palak Dil Lake, Tam Dil Lake	Mizoram
Anshupa Lake, Chilka Lake, Kanjia Lake	Odisha
Kanjli Wetland, Harike Wetland, Ropar Wetland	Punjab

Important rivers of India

Name	Origin From	Fall into	Length (km)
Ganga	Gangotri (Bhagirathi)	Bay of Bengal	2525
Satluj	Mansarovar Rakas Lakes	Chenab	1050
Indus	Near Mansarovar Lake	Arabian Sea	2880
Ravi	Kullu Hills near Rohtang Pass	Chenab	720
Beas	Near Rohtang Pass	Satluj	470
Jhelum	Verinag in Kashmir	Chenab	725
Yamuna	Yamunotri	Ganga	1375
Chambal	M.P.	Yamuna	1050
Ghagra	Matsatung Glacier	Ganga	1080
Kosi	Near Gosain Dham Park	Ganga	730
Betwa	Vindhyanchal	Yamuna	480
Son	Amarkantak	Ganga	780
Brahmaputra	Near Mansarovar Lake	Bay of Bengal	2900
Narmada	Amarkantak	Gulf of Khambat	1057
Tapti	Betul Distt. of M.P.	Gulf of Khambat	724
Mahanadi	Raipur Distt. in Chattisgarh	Bay of Bengal	858
Luni	Aravallis	Rann of Kuchchh	450
Ghaggar	Himalayas	Near Fatehabad	494
Sabarmati	Aravallis	Gulf of Khambat	416
Krishna	Western ghats	Bay of Bengal	1327
Godavari	Nasik distt. in Maharashtra	Bay of Bengal	1465
Cauvery	Brahmagir Range of Western Ghats	Bay of Bengal	805
Tungabhadra	Western Ghats	Krishna River	640

Port

Name of the Port	State
Kandla	Gujarat
Mumbai	Maharashtra
Jawaharlal Nehru	Maharashtra
Marmugoa	Goa
Manglore	Karnataka
Kochi	Kerala
Haldia	West Bengal
Paradip	Odisha
Vishakapatnam	Andhra Pradesh
Chennai	Tamil Nadu
Ennore	Tamil Nadu
Tutikorin	Tamil Nadu

Mineral resources

Aluminium	-	Kerala.
Antimony	-	Antimony deposits are found in Punjab and Karnataka.
Asbestos	-	Karnataka and Rajasthan.
Bauxite	-	Ranchi and Palamau districts of Jharkhand, Belgaum, Jharia and Thana districts of Maharashtra, Balaghat, Jabalpur, Mandya and Bilaspur districts of Chhattisgarh.
Cement	-	Katni (M.P.), Lakheri (Rajasthan), Jabalpur (M.P.), Guntur (Andhra Pradesh), Jhinikapani (Singhbhum district of Jharkhand), Surajpur (Haryana).
China Clay	-	Rajmahal Hills, Singhbhum (district of Jharkhand), Kerala.
Chromite	-	Singhbhum and Bhagalpur (Jharkhand), Ratnagiri.
Coal	-	Raniganj (West Bengal), Jharia, Bokaro (Jharkhand), Giridih, Karanpur, Panch Valley and Chanda (M.P.), Singareni (Andhra Pradesh) and Mukum (Assam).
Cobalt	-	Rajasthan and Kerala.
Copper	-	Jharkhand (Singhbhum and Barajamda), Chhattisgarh, Rajasthan (**Khetri**).
Diamond	-	Diamond mines are found in **Panna** district of Madhya Pradesh, **Raipur** district of Chhattisgarh.
Gold	-	**Kolar** gold-fields (Karnataka).
Graphite	-	Rajasthan, Andhra Pradesh, Madhya Pradesh, Tamil Nadu, Karnataka, Odisha and Kerala.
Gypsum	-	Bikaner and Jodhpur (Rajasthan), Tiruchirapalli (Tamil Nadu), Gujarat and Himachal Pradesh.
Iron Ore	-	Singhbhum (Jharkhand), Chhattisgarh, Keonjhar and Mayurbhanj (Odisha).
Lac	-	West Bengal.
Lead	-	Zawar in Udaipur and at the Banjavi mines in Jaipur.
Lignite	-	Neyveli in South Arcot district (Tamil Nadu).

Limestone	-	Singareni and Singhbhum (Jharkhand), Panchmahals (Gujarat), Balaghat, Bhandara, Chhindwara, Nagpur.
Manganese	-	Madhya Pradesh, Jharkhand and Chhattisgarh.
Marble	-	Jaipur (Rajasthan).
Mica		**Koderma** in Hazaribagh district, Jharkhand, Monghyr.
Petroleum		**Digboi**, Badarpur, Musimpur and Patharia fields of Assam.
Red Stone	-	Jodhpur (Rajasthan).
Salt	-	Sambhar Lake (Rajasthan), and ocean water in **Rann of Kutch**.
Silver	-	Goldfields (Karnataka), Singhbhum.
Tungsten	-	Bihar, Nagpur (Maharashtra) and Marwar.
Uranium	-	Bihar.
Zinc	-	Zawar mines in Udaipur (Rajasthan).

Important National Highways

NH	Connects
NH 1	New Delhi-Ambala-Jalandhar-Amritsar.
NH 2	Delhi-Mathura-Agra-Kanpur-Allahabad-Varanasi-Kolkata.
NH 3	Agra-Gwalior-Nasik-Mumbai.
NH 4	Thane and Chennai via Pune and Belgaum.
NH 5	Kolkata-Chennai.
NH 6	Kolkata-Dhule.
NH 7	Varanasi-Kanyakumari (2369 km).
NH 8	Delhi-Mumbai (via Jaipur, Baroda & Ahmedabad).
NH 9	Mumbai-Vijaywada.
NH 10	Delhi-Fazilka.
NH 24	Delhi-Lucknow.
NH 26	Lucknow-Varanasi.

Water ways

National waterways-1	-	Allahabad to Haldia.
National waterways-2	-	Sadiya to Dhubri
National waterways-3	-	Kollam to Kottapuram.
National waterways-4	-	Kakinada to Pondicherry.
National waterways-5	-	Talcher to Dhamra.
National waterways–6	-	Lakhipur to Bhanga, (Proposed).

Climate of India

- India has 'Tropical Monsoon' type of climate.
- The country holds the **first position** in the world for the production of **Papaya**, **Mangoes** and **Banana** etc.
- India ranks sixth in the world in the production of **coffee**.
- India has the **biggest** number of **livestock** in the world.

WORLD GEOGRAPHY

- **Asia**

  (43,820,000 sq km) includes 50 countries, and it is the most populated continent, the 60% of the total population of the Earth live here.

- **Africa**

  (30, 370, 000 sq km) comprises 54 countries. It is the hottest continent and home of the world's largest desert, the Sahara, occupying the 25% of the total area of Africa.

- **North America**

  (24, 490,000 sq km) includes 23 countries. Led by the USA as the largest economy in the world.

- **South America**

  (17,840,000 sq km) comprises 12 countries. Here is located the largest forest, the Amazon rainforest, which covers 30% of the South America total area.

- **Antarctica**
  (13,720,000 sq km) is the coldest continent in the world, completely covered with ice. There are no permanent inhabitants, except of scientists maintaining research stations in Antarctica.
- **Europe**
  (10,180,000 sq km) comprises 51 countries. It is the most developed economically continent with the European Union as the biggest economic and political union in the world.
- **Australia**
  (9,008,500 sq km) includes 14 countries. It is the least populated continent after Antarctica, only 0.3% of the total Earth population live here.

List of Ocean in the World

RANK	OCEAN	NOTES
1	Pacific	Separated into north and South pacific.
2.	Atlantic	Separated into north and south Atlantic
3.	Indian	Known as the sea south of India containing the water of Arabian and Laccadive Seas
4.	Southern	Extension of the Pacific Atlantic and Indian Oceans
5.	Arctic	The sea around North pole containing the water of Greenland sea.

Important Grassland in the World

Grass lands

Regions	Grassland
Australia	Dawns
South America (Argentina & Uruguay)	Pampas
North America	Prairies
Africa and Australia	Savannah
South America	Selvas
Europe and Northern Asia	Steppes
Europe and Asia	Taiga
South Africa	Velds

Highest Mountains on each Continent of the Earth

Mountain name	Metres	Feet	Country	Continent
Mount Everest	8848	29029	Nepal, China	Asia
Aconcagua	6962	22841	Argentina	South America
Mount McKinley	6194	20320	USA	North America
Mount Kilimanjaro	5892	19340	Tanzania	Africa
Mount Elbrus	5642	18310	Russia	Europe
Vinson Massif	4892	16050	NA	Antarctica
Puncak Jaya	4884	16024	Indonesia	Australasia

List of Important Boundary Lines

Boundary Line	Countries
Radcliffe Line	Between India and Pakistan
Mac Mohan Line	Between India and China
Durand Line	Between Pakistan and Afghanistan
49th Parallel	Between USA and Canada
38th parallel	Between North and South Korea
Hindenberg Line	Between Germany and Poland
Maginot Line	Between France and Germany
Order Neisse Line	Between Germany and Poland

Longest Rivers

Name, Nation/Continent	Length in kms	Basin Area m^2 km
Nile Africa	6695	3.25
Amazon, South America	6516	6.14
Yangtze Kiang, China	6380	1.72
Mississippi Missouri, USA	5959	3.20
Ob Irtysh, Russia	5568	2.97
Yenisey Angari a Selenga, Asia	5550	2.55
Yellow (Hwang Ho), China	5464	–
Congo (Zaire), Africa	4667	–
Parana Rio de la Plata, S. Am	4500	2.58

Lakes

Deepest Lakes	
Baikal, Russian Fedn	1620 m
Tanganyika, Africa	1463 m
Caspian Sea, Asia-Europe	1025 m
Malawi of Nyasa, Africa	706 m
Issyk-Kul, Kyrgyzstan	702 m

Deserts

Largest Deserts of the World	
Subtropical	
Sahara, North Africa	8,600,650 sq. km
Arabian, Middle East	2,300,000 sq. km
Great Victoria, Australia	647,475 sq. km
Kalahari, Southern Africa	582,727 sq. km
Chihuahuan, Mexico	453,232 sq. km
Thar, India/Pakistan	453,232 sq. km
Great Sandy, Australia	388,485 sq. km
Gibson, Australia	310,788 sq. km
Sonoran, S.W. USA	310,788 sq. km
Simpson/Stony, N Africa	145,034 sq. km
Mohave, S.W. USA	139,854 sq. km
Cool Coastal	
Atacama, Chile SA	139,854 sq. km
Namib, S.W. Africa	33,668 sq. km
Cold Winter	
Gobi, China	1,166,450 sq km
Patagonian, Argentina	673,374 sq km
Great Basin, S.W. USA	492,081 sq. km
Kara-kum, West Asia	349,636 sq. km
Colorado, Western USA, also called the Painted Desert	336,687 sq. km
Kyzyl-kum, West Asia	297,838 sq. km
Taklamakan, China	271,939 sq. km
Iranian, Iran	258,990 sq. km

Ecology & Environment

Ecology is the branch of biology deals with the relations and interactions between organisms and their environment, including other organisms.

Ecosystem

An ecosystem is a functional unit of nature consisting of abiotic and biotic factors, where the living organisms interact among themselves and also with their physical environment (abiotic factors).

Biodiversity & Wildlife of India

Biodiversity mean diversity of heterogeneity at all levels of biological organisation, i.e from **Micro molecules** of the cells to the **Biomass**. The word Biodiversity was popularized by the sociologist **Edward Wilson**.

As per available data, the varieties of **species** living on the earth are **1753739**. Out of the above species, 134781 are residing in India. **Wild life Institute of India** has divided it into ten biogeographical regions and twenty five biotic provinces.

IUCN at a Glance

- It was founded in **1948** as the world's first global environmental organisation.
- The **IUCN** stands for "The International Union for Conservation of Nature and Natural Resources." Now known as World Conservation Union (WCU).
- The **IUCN Red List** of "Threatened Species" provides taxonomic, conservation status and distribution information on plants, fungi and animals.

Red Data Book

A **Red Data Book** contains lists of species whose continued existence is threatened.

By the end of 2014 India had 988 threatened species on the list, which lists.

Indian elephant, Bengal tiger, Indian lion, Indian Rhino, Gaur, lion tailed macaque, Tibetan Antelope, Ganga river dolphin, the Nilgiri Tahr, snow leopard, dhole, black buck, great Indian bustard, forest owlet, white – winged duck and many more are the most endangered animals in India.

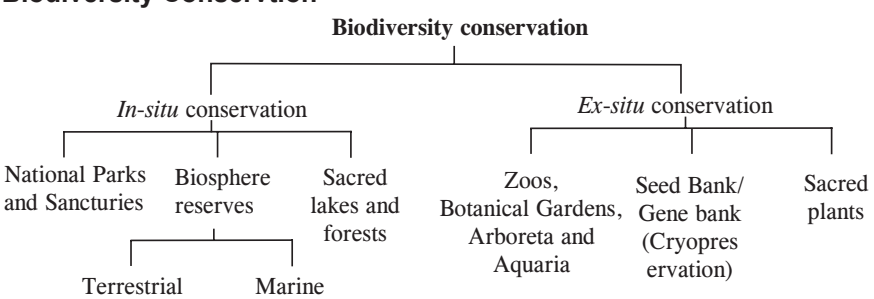
CITES

- Convention on International Trade in Endangered species (CITES) was signed in 1975 in Washington.
- Roughly 5,600 species of animals and 30,000 species of plants are protected by CITES against over-exploitation through international trade.

National Biodiversity Authority

The **NBA** is a body corporate established in accordance with the provisions of Sec.8 of the Biological Diversity Act, 2002, at Chennai w.e.f. 1st October 2003. It is an autonomous, statutory and regulatory organization which is intended to implement the provisions of Biological Diversity Act, 2002.

Biodiversity Conservtion



Biosphere Reserves in India Area-wise

Name	State	Key Fauna
Nilgiri Biosphere Reserve	Tamil Nadu, Kerala and Karnataka	Nilgiri tahr, lion-tailed macaque
Nanda Devi National Park & Biosphere Reserve	Uttarakhand	
Gulf of Mannar	Tamil Nadu	Dugong or sea cow
Nokrek	Meghalaya	Red panda
Sundarbans	West Bengal	Royal Bengal tiger
Manas	Assam	Golden langur, red panda
Simlipal	Odisha	Gaur, royal Bengal tiger, elephant
Dihang-Dibang	Arunachal Pradesh	
Pachmarhi Biosphere Reserve	Madhya Pradesh	Giant squirrel, flying squirrel
Achanakmar-Amarkantak Biosphere Reserve	Madhya Pradesh, Chhattisgarh	Four horned antelope, Indian wild dog, Saras crane)
Great Rann of Kutch	Gujarat	Indian wild ass
Cold Desert	Himachal Pradesh	Snow leopard
Khangchendzonga Biosphere Reserve	Sikkim	Snow leopard, red panda
AgasthyamalI Biosphere Reserve	Kerala, Tamil Nadu	Nilgiri tahr, elephants
Great Nicobar Biosphere Reserve	Andaman and Nicobar Islands	Saltwater crocodile
Dibru-Saikhowa	Assam	Golden langur
Seshachalam Hills	Andhra Pradesh	
Panna	Madhya Pradesh	Tiger, chital, chinkara, sambhar and sloth bear

National Parks

They are reserved for the betterment of wild life, both **fauna and flora.** In national parks private ownership is not allowed. The grazing, cultivation, forestry, etc. is also not permitted. The first national park of the world, **Yellow stone**, in **U.S.A.**, was founded in **1872**.

Important state wise national parks of India

Jammu and Kashmir - Dachigam, Salim Ali
Assam - Kaziranga, Manas*
Meghalaya - Nokrek
West Bengal - Sunderbans
Bihar - Hazaribagh, Palamau*
Uttaranchal - Corbett* (Hailey), Nanda Devi, Valley of flowers, Rajaji
U. P. - Dudhwa*
Gujarat - Gir, Marine
Rajasthan - Sariska*, Ranthambore*, Desert
Madhya Pradesh - Kanha* , Sanjay, Madhav, Panna, Bandhavgarh*, Van Vihar, Fossil
Odisha - Simlipal

Karnataka	-	Bandipur*
Kerala	-	Silent Valley, Periyar*

*These national parks are running **Tiger Project** also. *(The maximum national parks are present in Madhya Pradesh).*

Sanctuaries

In sanctuaries the protection is given to fauna only. The activity like harvesting of timber, collection of forest products and private ownership rights are permitted so long as they do not interfere with the well being of the animals. The important wild life sanctuaries are: **Chilka wild life sanctuary (Orissa), Bharatpur Bird Sanctuary (Rajasthan), Sultanpur Bird sanctuary (Haryana) and Jalpara sanctuary (West Bengal)**. Gir wild life sanctuary (Gujarat), Maximum sanctuaries belong to Andaman and Nicobar.

Pollutants and their Effects

Sr. No.	Pollutant	Origin	Effect
1.	Arsenic (As)	Coal, oil furnaces, glass factories	Lung and skin cancer
2.	Cadmium (Cd)	Smelters, coals, oil furnaces	Damage to lung, kidney, bones
3.	Chlorine (Cl)	Chemical Industries, volcanic activities	Causes irritation
4.	Carbon monoxide (CO)	Motor vehicles, smelters, coal steel plants	Starves body of oxygen, damages heart
5.	Fluoride (F)	Smelters, steel plants	Mottled teeth in children
6.	Formaldehyde (HCHO)	Chemical plants	Allergenic, carcinogenic, headaches, burning sensation in the throat, and can aggravate *asthma symptoms*
7.	HCl (Hydrogen chloride)	Incinerators	Irritates eyes and lungs
8.	Mercury (Hg)	Coal, smelters oil furnaces	Tremors, nerve troubles
9.	Nitric acid (HNO_3)	Formed from NO_2 causes acid rain	Respiratory diseases
10.	Nitrous acid (HNO_3)	Formed from NO_2 and water vapour	Respiratory disease
11.	Hydrogen sulphide (H_2S)	Refineries, Pulp mills	Nausea, irritates eyes
12.	Sulphuric acid (H_2SO_4)	Formed from SO_2 in sunlight with	Respiratory diseases hydroxyl ions
13.	Nitric Oxide (NO)	Motor Vehicles, coal, oil furnaces	Oxidizes to NO_2
14.	Ozone (O_3)	Ground level ozone formed from nitrogen oxides (NO_x) and volatile organic compounds (VOCs)	Asthma, irritates eyes sunlight from nitrogen oxides and hydrocarbons

15.	Lead (Pb)	Motor vehicles, high smelters	Brain damage
16.	Sulfur dioxide (SO_2)	Smelters Coal, Oil furnaces	Irritates eyes, breathing problems

UNFCCC

The United Nations Framework Convention on Climate Change (UNFCCC) entered into force on 21 March 1994. Today, it has near-universal membership. The 195 countries that have ratified the Convention are called **Parties** to the Convention.

Sustainable Development Initiatives of India

- Constitution of the forest conservation act 1980.
- Water (prevention and control of pollution) Act 1974.
- Air(prevention and control of pollution (Act 1981).
- Environment (protection) Act 1986.
- The Wildlife Protection Act ,1972.
- India acceded to the **Vienna convention** for the protection of the ozone layer, March 1985.
- India signed the convention on the **Conservation of Migratory Species of wild animals** (The Bonn Convention) in 1979.
- India signed the **International Convention** for the prevention of pollution of the sea by the oil, 1954(London).

Global Warming and Climate Change

- **Greenhouse Effect-** A greenhouse is an enclosure of glasses in which tropical plants are grown during winters in areas of colder climate. Heat trapped by the glass keeps the temperature inside the greenhouse much higher than the surrounding atmosphere. A similar heating phenomenon occurs in the atmosphere.
- Greenhouse effect is a natural phenomenon which keeps the earth warm at normal level.

Greenhouse Gas	Chemical Formula	Anthropogenic Sources
Carbon dioxide	CO_2	Fossil-fuel combustion, Land-use conversion, Cement Production.
Methane	CH_4	Fossil fuels, Rice paddies, Waste dumps.
Nitrous oxide	N_2O	Fertilizer, Industrial processes, Combustion.
Tropospheric Ozone	O_3	Fossil fuel combustion, Industrial emissions, Chemical solvents.
CFC-12	CCL_2F_2	Liquid coolants, Foams.
HCFC-22	CCl_2F_2	Refrigerants.
Sulfur Hexaflouride	SF_6	Dielectric fluid.

World Wide Fund for Nature

- It was set up in **India in 1969**
- Its coordinating body the **WWF international** is located in Gland in **Switzerland.**
- It has five broad programme components.
  - ➢ Promoting India's ecological security,
  - ➢ Conserving biological diversity,
  - ➢ Ensuring sustainable use of the natural resource base,
  - ➢ Minimum pollution,
  - ➢ Promoting sustainable lifestyle.

Art, Culture & Tourism

Culture plays an important role in the development of any nation. A country as diverse as India is symbolized by the plurality of its culture.
India has one of the world's largest collections of songs, music, dance, theatre, folk traditions, performing arts, rites and rituals, paintings and writings that are known, as the 'Intangible Cultural Heritage' (ICH) of humanity.

FAMOUS ART FORMS

Names	State of Origin	Materials Used
Patachitra painting	Raghurajpur Village in Puri district of Odisha	Cloth fortified with tamarind paste, chalk powder and gum and natural dyes.
Bengal pat painting	Bengal	Dye that are made of spices, earth, soot, etc.
Madhubani painting	Madhubani (Bihar)	Mud coated wall, cloth paper
Miniature painting	Developed during Mughal Period i.e. 16th – 19th century	precious stones conch shells, gold and silver
Tanjore art	Tanjore (Southern Tamil Nadu)	Semi-precious stones, glass and gold
Kalamkari	Golkonda and Chennai and Masulipatnam area of Hyderabad	pens made of bamboo and natural colours extracted from vegetables
Warli Painting	North Sahyadri Range in India.	Rice paste, mix with Gum and Water Red clay (Geru), cow dung, mud
Gond art	Gond Tribes of Central India.	Made on walls, ceilings and floors of village houses

Famous Indian Painters

Rabindranath Tagore	7 May 1861 – 7 Aug 1941
Abanindranath Tagore	7 Aug 1871 – 5 Dec 1951
Amrita Sher-Gil	30 Jan 1913 – 5 Dec 1941
Jamini Roy	1 Apr 1887 – 24 Apr 1972
Francis Newton Souza	12 Apr 1924 -28 Mar 2002
S.H. Raza	22 Feb 1922 - 23 june 2016
Tyeb Mehta	25 Jul 1925 – 2 Jul 2009
Satish Gujral	25 Dec 1925 - Till date
Nandalal Bose	3 Dec 1882 – 16 Apr 1966
Manjit Bawa	1941-29 Dec 2008
M. F. Husain	17 Sep 1915 – 9 Jun 2011

Indian Music

The music of India includes multiple varieties of folk music, pop and classical music. India's classical music tradition, including Hindustani music and Carnatic, has a history spanning millennia and developed over several eras. Music in India began as an integral part of socio-religious life.

Legends of Indian music

Legends	Life Span	Forte	Awards
Pandit Ravi Shankar	7 April 1920 – 11 Dec 2012	Sitar	Magsaysay award, Padma Vibhushan, UNESCO International Music,
Pandit Hariprasad Chaurasia	1st July 1938	Bansuri	Sangeet Natak Academy, Padma Bhushan, Konark Samman, Yash,
Pandit Shivkumar Sharma	13-1-1938	Santoor	Sangeet Natak Akademi Award, Padma Vibhushan, Padma Shri
Ustad Amjad Ali Khan	9-10-1945	Sarod	UNESCO Award, Padma Vibhusha, Unicef's National Ambassadorship,
Ustad Bismillah Khan	21-3-1913 to 21-8-2006	Shehnai	Bharat Ratna, Fellow of Sangeet Natak Akademi, Padma Vibhushan
Ustad Zakir Hussain	9-3-1951	Tabla	P. Bhushan, Grammy, Sangeet Natak Akademi.
Pandit Bhimsen Gururaj Joshi	4-2-1922 to 24-1-2011	Indian classical vocalist	Sangeet Natak Akademi P. Vibhushan,
Pandit Jasraj	28-1-1930	Indian classical vocalist	P. Vibhushan, Sangeet Natak Akademi
M. S. Subbulakshmi	16-7-1916 to 11-12-2004	Classical vocalist	Sangeet Natak Akademi Ramon Magsaysay, P. Vibhushan
Dr. Lakshminarayana Subramaniam	23 July 1947-	Classical, Carnatic,	Lifetime Achievement GiMA ISKCON,
M.Balamurali Krishna	6 July 1930-	Carnatic music	Padma Vibhushan, Padma Bhushan,
Bade Ghulam Ali Khan	2 April 1902 – 25 April 1968	Sarangi,	NA

Indian dance

There are many types of dance forms in India which are deeply religious in content to those which are performed on small occasions. The Indian dances are broadly divided into Classical dances and folk dances.

The most popular classical dance styles of India are **Bharatnatyam** of Tamil Nadu, **Kathakali** and **Mohiniattam** of Kerala, **Odissi** of Odisha, **Kathak** of Uttar Pradesh, **Kuchipudi** of Andhra Pradesh and **Manipuri** of Manipur.

THEATRES AND FILMS

The rich Indian theater culture has its origin dates back in first century, CE, and started and nurtured by the society as means of expressing, communicating and sharing the ideas-opinions-emotions-believe of mankind.

Some of the Important Theatres of Modern India

Name	Founder	Year and Place of Establishment	People Associated with it
National School of Drama (Deemed University)	Ministry of Culture, Government of India.	1959, New Delhi	Naseeruddin Shah, Irfan Khan, Anupam Kher, Nawazuddin Siddiqui, Pankaj Kapur, Himani Shivpuri and many more
Bhartendu Academy of Dramatic Arts	Padma Shri Raj Bisaria.	1975, Lucknow,	Rajiv Jain, Raajpal Yadav, Anupam Shyam
Theatre Arts Workshop (TAW)	Raj Bisaria	1966, Lucknow	

Hindi Films

Bollywood is the Hindi Language film industry which is based in Mumbai, Maharashtra. They are one of the largest film producers in India and one of the largest centres of film production in the world. **Raja Harishchandra** (1913), by **Dadasaheb Phalke**, is known as the first **silent feature film** made **in India**. **The first Indian sound** (talkie) film, Ardeshir Irani's **Alam Ara** (14 March 1931), was a major commercial success. In 1937, Ardeshir Irani, of Alam Ara fame, made the **first colour** film in Hindi, **Kisan Kanya.**

TOURISM

India has become a popular tourist destination with thousands of people visiting different parts of India each year. Major tourist destinations in India are the Himalayas, Agra, Jaipur,Goa, Kerala, Delhi, Odisha and Maharshtra.

Famous Tourist Destination in India

Akshardham Temple:

The 108 feet tall temple was built on 2nd, November 1992 in memory of Pramukh Swami in Gandhinagar district of Gujarat.

Ajmer Sharif:

It is sufi shrine dedicated to the sufi saint Moinuddin Chishti. It is situated in Ajmer, Rajasthan.

Amarnath Cave:

It is situated in Jammu and Kashmir

Ajanta and Ellora Caves:

They contain a cluster of Hindu and Jain temples along with cave monuments in.

Dal Lake:

The enchanting lake of Jammu and Kasmir bordered by ice covered mountains from three sides is famous for its gardens, shikara rides and house boat stay.

Golden Temple:

Harmandir Sahib Gurudwara, is commonly called as Golden Temple in Amritsar Punjab.

Gateway of India:

It is made by British in 1914 in Mumbai.

Haji Ali Dargah: The very famous dargah (tomb) is located on an islet of the coast of Worli in the Southern part of Mumbai built in 1431 in the memory of a wealthy merchant Sayyed Peer Haji Ali Shah Bukhari.

Khajuraho Group of Monuments: It is a group of Hindu and Jain temples situated in Madhya Pradesh.

Mahabaleshwar: It is a vast magnificent plateau located at a distance of 120 km south west of Pune with an average height of 1353 meters.

Taj Mahal: It is a white marble mausoleum located on the southern bank of the Yamuna river in Agra, Uttar Pradesh. It was built by Shah Jahan in 1632 in the memory of his loving wife Mumtaz Mahal.

Vaishno Devi Temple, Jammu Kashmir: The temple is recognized as one of the "Shakti Peeths" of goddess Durga. The holy shrine is situated in the folds of mighty 'Tirkuta' Hills' which attracts lakhs of devotees from all parts of India and abroad

FAMOUS TOURIST PLACES OF INDIA

Site	*Location*	*Founder*
Aram Bagh	Agra (Uttar Pradesh)	Babur
Anand Bhawan	Allahabad (Uttar Pradesh)	Moti Lal Nahru
Adhai Din Ka Jhopra	Ajmer (Rajasthan)	Qutub-ud-din-Aibak
Ajanta Caves	Aurangabad	Gupta Rulers
Akbar's Tomb	Sikandera (Uttar Pradesh)	Jahangir
Bibi ka Maqbara	Aurangabad (Maharashtra	Aurangzeb
Bharatpur Fort	Bharatpur (Rajasthan)	Raja Surajmal Singh
Bundi Fort	Bundi (Rajasthan)	Qutub-ud-din-Aibak
Bada Imambada	Lucknow (Uttar Pradesh)	Nawab Asaf-ud-daulah
Belur Math	Kolkata	Swami Vivekanand
Botanical Garden	Shilbpur (West Bengal)	-
Chhatra Mahal	Bundi Fort	Rani Chhatrasal
Chenna Keshab Temple	Belur (Karnataka)	Vishnu Vardhan
Char Temple	Konark (Odisha)	Narasing Dev I
Chasma-Shahi	Jammu and Kashmir	Ali Mardan Khan
Charar-e-Sarif	Srinagar (Kashmir)	Jainul Abedin
Chhota Immbada	Lucknow (Uttar Pradesh)	Mohammad Ali Shan
Cochin Fort	Kerala	Portuguese
Dewan-e-khas	Agra Fort (Uttar Pradesh)	Shah Jahan
Dilwara Jain Temple	Mount Abu (Rajasthan)	Vastu Pal Tejpal
Deeg Palace	Deeg (Rajasthan)	Raja Badan Singh
Dhar Fort	Dhar (Madhya Pradesh)	Mohammad Bin Tughlaq
Etamad-ud-daulah's Tomb	Agra (Uttar Pradesh)	Noor Jahan
Ellora Caves	Aurangabad	Rashtrakuta Dynasty
Elephanta Caves	Mumbai	Rashtrakutas
Fatehpur Sikri	Agra (Uttar Pradesh)	Akbar
Firoz Shah Kotla	Delhi	Firoz Shah Tughlaq
Fort William	Kolkata	Lord Clive
Fateh Sagar	Udaipur (Rajasthan)	Maharana Fateh Singh
Gateway of India	Mumbai	British Government
Golconda Fort	Hyderabad (Andhra Pradesh)	Qutubshahi Dynasty
Gol Ghar	Patna (Bihar)	British Government
Humayun's Tomb	Delhi	Hameeda Bano Beghum
Hauz Khas	Delhi	Ala-ud-din-khilji
Hajratbal Masjid	Srinagar (Kashmir)	-
Harmandir Sahib	Patna (Bihar)	Maharaja Ranjit Singh
Junagarh	Bikaner (Rajasthan)	Raja Jai Singh
Jama Masjid	Delhi	Shah Jahan
Jantar-Mantar	Delhi and Jaipur	Sawai Jai Singh
Jodhpur Fort	Jodhpur (Rajasthan)	Rao Jodha Ji

Jaku Temple	Kolkata	Rani Ras Moni
Jagannath Temple	Puri (Odisha)	Chola Gang Dev
Khas Mahal	Agra (Uttar Pradesh)	Shah Jahan
Kankaria Lake	Ahmedabad	Sultan Qutub-ud-din
Khirki Masjid	Delhi	Ghiyas-ud-din-Tughlaq
Kandaria Mahadev	Khajuraho (Madhya Pradesh)	Chandela Kings
Kanheri Caves	Mumbai	Buddhists
Laxman Temple	Chhatarpur (Madhya Pradesh)	Chandela Rulers
Laxmi Narayan Temple	Delhi	Birla Family
Laxman Jhula	Rishikesh (Uttarakhand)	-
Moti Masjid	Agra Fort (Uttar Pradesh)	Shah Jahan
Moti Masjid	Delhi Fort	Aurangzab
Mrignayani Palace	Gwalior (Madhya Pradesh)	Raja Man Singh Tomar
Madan Palace	Jabalpur (Madhya Pradesh)	Raja Madan Shah
Mecca Masjid	Hyderabad (Andhra Pradesh)	Kuli Kutab Shah
Nahargarh Fort	Jaipur (Rajasthan)	Raja Jai Singh
Nishaat Bagh	Jammu and Kashmir	Asaf Ali
Nakhuda Masjid	Kolkata	-
Old Forst (Purana Quila)	Delhi	Sher Shah Suri
President House	Delhi	British Government
Pichhola Lake	Udaipur (Rajasthan)	-
Pathar ki Masjid	Patna (Bihar)	Parvez Shah
Padari Ki Haveli	Patna (Bihar)	Father Capuchin
Patthar Ki Masjid	Jammu and Kashmir	Noor Jahan
Prince of Wales Museum	Mumbai	George V
Rani Ki Badi	Bundi (Rajasthan)	Rani Nathvati
Red Fort	Delhi	Shah Jahan
Sheesh Mahal	Agra (Uttar Pradesh)	Shah Jahan
Safdarjung ka Maqbara	Delhi	Shuja-ud-daulah
Sabarmati Ashram	Ahmedabad	Mahatma Gandhi
St Geogre Fort	Chennai (Tamil Nadu)	East India Company
Shalimar Bagh (Garden)	Srinagar (Kashmir)	Jahangir
Sunset Point	Mount Abu (Rajasthan)	-
Sher Shani Masjid	Patna (Bihar)	Parvez Shah
Sher Shah's Tomb	Sasaram (Bihar)	Islam Shah Suri, Son of Sher Shah
Taj Mahal	Agra (Uttar Pradesh)	Shah Jahan
Tughlakabad	Delhi	Ghiyas-ud-din-Tughlaq
Umaid Palace	Jodhpur (Rajasthan)	Maharaj Ummed Singh
Vijay Stambh	Chittorgarh (Rajasthan)	Rana Kumbha
Victoria Memorial	Kolkata	-
Vishnupad Temple	Gaya (Bihar)	Rani Ahilya Bai

UNESCO WORLD HERITAGE SITES IN INDIA

Year of Inclusion	Sites
1983	Ajanta Caves (Maharashtra)
1983	Ellora Caves (Maharashtra)
1983	Taj Mahal (Uttar Pradesh)
1983	Agra Fort (Uttar Pradesh)
1984	Sun Temple Konark (Odisha)
1985	Mahabalipuram Temples (Tamil Nadu)
1985	Manas Wildlife Sanctuary, Bharatpur (Rajasthan)
1985	Kaziranga National Park (Aassm)
1985	Keoladeo National Park Bharatpur (Rajasthan)
1986	Churches in Goa (Goa)
1986	Khajuraho Temples (Madhya Pradesh)
1986	Fatehpur Sikri (Utter Pradesh)
1986	Hampi Temple (Karnataka)
1987	Sunderbans National Park (West Bengal)
1987	Elephants Caves (Maharashtra)
1987	Pattadakal Temples (Karnataka)
1988	Nanda Devi National Park (Uttarakhand)
1989	Sanchi Stupa (Madhya Pardesh)
1993	Humayun's Tomb (Delhi)
1993	Qutub Minar (Delhi)
1999	Darjeeling Himalayan Railway (West Bengal)
2002	Mahabodhi Temple (Bodh Gaya) (Bihar)
2003	Rock Shelters of Bhimbetaka (Madhya Pradesh)
2004	Brihadeshwara Temple (Gangaikondacholapuram, Tamil Nadu)
2004	Airavatesvara Temple, Darasuram
2004	Champaner-Pavagadh Archaeologicatl Park (Gujarat)
2005	Valley of Flowers (Uttarakhand)
2005	Nilgiri Mountain Railway (Tamil Nadu)
2007	Red Fort (Delhi)
2008	Kalka-Shimla Railway (Himachal Pradesh)
2010	Jantar Mantar, Jaipur (Rajasthan)
2012	Western Ghat
2013	Hill forts of Rajasthan
2014	Rani ki Vav (Gujarat)
2014	Great Himalayan National Park (Himachal Pradesh)

HANDICRAFTS

India has got international acclamation in terms of its beautiful and creative handicrafts. Given below are the states with diversified crafts.

State	Handicrafts
Odisha	Weaving craft, palm leaf writing, patachitra- the chitrakar's foray, applique, stone carving, metal craft,
Delhi	Zardozi, lacquer work, clay and paper made dolls
Maharastra	Paithani saris, sawantwadi crafts, warli paintings, kolhapuri chappals, narayan peth
West Bengal	Leather craft, brass & bell metal, pottery, mat making, dhokra metal casting, cane & bamboo, fine arts, clay dolls, horn work, jute products.
Gujrat	Bead-work, jewellery, inlay work, embroidery, wood carving,

State	Handicrafts
Rajasthan	Tie-and-dye textiles, hand block printing, quilting, jewellery,
Himachal Pradesh	Jewelry, leather craft, woodcarving, architecture, kangra paintings
Goa	Pottery & Terracotta, Brass metal ware, Crochet & Embroidery, Fiber Craft, Jute Macrame Craft, carving, sea shell craft
Andhra Pradesh	Priceless Pearls
Karnataka	Woodcarving, Ivory carving
Jharkhand	Wood craft, paitkar paintings, metal work, stone carving, ornaments, toy making
Manipur	Wood carving, textile weaving, stone-carving, block printing, kauna (water reed) mat, hand-embroidery
Jammu & Kashmir	Carpets, Basket Weaving, Namdas, pashmina shawls, Papier-Mchie, Leather and fur, wood carvings

Top Ten Monuments With Highest foreign visitors in india

Monuments	No. of Foreign Visitors	% age share
1. Taj Mahal, Agra	695702	23.2
2. Agra Fort, Agra	363823	12.1
3. Qutub Minar, Delhi	307043	10.2
4. Humayun's Tomb, Delhi	276641	9.2
5. Fatehpur Sikri, Agra	255129	8.5
6. Red Fort, Delhi	141498	4.7
7. Mattancherry place Museum, Kochi	104717	3.5
8. Western Group of Temple, Khajuraho	89511	3.0
9. Excavated site, Sarnath	85991	2.9
10. Group of Monuments, Mamallapuram	70840	2.4

INDIAN FILM INDUSTRY

India is the largest producer of films in the world and second oldest film industry in the world which originated around about 103 years ago. It was in early 1913 that an Indian film received a public screening. The film was **Raja Harischandra**. Its director, Dadasaheb Phalke. By the mid 1920s, Madras had become the epicentre for all film related activities. Raghupathi Venkaiah Naidu, SS Vasan, AV Meiyappan set up production houses in Madras to shoot Telugu and Tamil films.

The silent era came to an end when Ardeshir Irani produced his first talkie, **'Alam Ara'** in 1931. If Phalke was the father of Indian cinema, Irani was the father of the talkie. The first talkie films in Bengali (Jumai Shasthi), Telugu (Bhakta Prahlad) and Tamil (Kalidass) were released in the same year.

Largest film industry in India is the Hindi film industry mostly concentrated in Mumbai (Bombay), and is commonly referred to as "Bollywood". Kochi and Kolkata are commonly referred to as "Tollywood" (Telugu), "Kollywood" (Tamil), "Sandalwood" (Kannada), "Mollywood" (Malayalam), "Tollywood" (Bangla). The largest film studio complex in the world is **Ramoji Film City** is located at Hyderabad, India, which was opened in 1996 and measures 674 ha (1,666 acres). Comprising 47 sound stages.

Communication, Media & Transport

COMMUNICATION

POST OFFICE

- The Department of Posts was founded in India on 1st April, 1774.
- This department serves as an agent of Govt.

Quick Facts

Founder of Telegraph and Postal System in India	: Governor General Lord Dalhousie
First General Post Office opened in India	: 1774 (Kolkata)
First postage stamp of India	: Sinde Dawk (1852)
Pin system started in India	: 1972
The First Indian Post Office Outside India	: Dakshin Gangotri in Antarctica (1983), Indian Territory
Speed Post started in India	: 1986
Money Order System	: 1880
Postal Life Insurance started	: 1884
Postal Staff College situated at	: Ghaziabad (UP)
World Postal Day is observed on	: 9th October
Indian Postal Day is observed on	: 10th October

TELECOMMUNICATION

- Communication technology uses channels to transmit information (as electrical signals), either over a physical medium (such as signal cables), or in the form of electromagnetic waves.
- The Telecommunications system in India is the 2nd largest in the world. The construction of 4,000 miles (6,400 km) of telegraph lines was started in November 1853.
- Code division multiple access (CDMA) is a channel access method used by various radio communication technologies.
- 4G, is the fourth generation of mobile telecommunications technology, succeeding 3G.

COMMUNICATIONS SATELLITE

- A communications satellite is an artificial satellite that relays and amplifies radio telecommunications signals via a transponder; it creates a communication channel between a source transmitter and a receiver(s) at different locations on Earth.
- Communications satellites are used for television, telephone, radio, internet, and military applications.

NEWS & MEDIA

Newspaper

Newspaper is the print media which prints information, activities and daily occurrences around us. It was introduced in 1780.

Quick facts

Event	Publishing Year	Name of the Publication
Bengal Gazette (also *Calcutta General Advertiser*), weekly	1780, Calcutta	Started by James Augustus Hicky (Irishman)
India Gazette	1787, Calcutta	Henry Louis Vivian Derozio associated with it
Madras Courier (First paper from Madras)	1784, Madras	—
Bombay Herald (First paper from Bombay)	1789, Bombay	—
Indian Herald (in English	1795, Madras	Started by R. Williams (Englishman and published by Humphreys
Digdarshana (First Bengali monthly	1818, Calcutta	—
Calcutta Journal	1818	Started by J.S. Buckingham
Bengal Gazette (First Bengali newspaper)	1818, Calcutta	Harishchandra Ray
Sambad Kaumudi (Weekly in Bengali)	1821	Raja Rammohan Roy
Mirat-ul-Akbar (First journal in Persian	1822, Calcutta	Raja Rammohan Roy
Jam-i-Jahan Numah (First paper in Urdu)	1822, Calcutta	An English firm
Banga-Duta (a weekly in four languages-English, Bengali, Persian, Hindi)	1822 Calcutta	Rammohan Roy, Dwarkanath Tagore and others
Bombay Samachar (First paper in Gujarati)	1822 Bombay	—
East Indian (daily)	19th century	Henry Vivian Derozio
Bombay Times (from 1861 onwards, *The Times of India*)	1838, Bombay	Foundation laid by Robert Knight, started by Thomas Bennett.
Rast Goftar (A Gujarati fortnightly)	1851	Dadabhai Naoroji
Hindu Patriot	1853, Calcutta	Girishchandra Ghosh (later, Harishchandra Mukerji became owner-cum-editor)
Somaprakasha (First Bengali political paper)	1858, Calcutta	Dwarkanath Vidyabhushan
Indian Mirror (fortnightly-first Indian daily paper in English	Early 1862, Calcutta	Devendranath Tagore
Bengalee (this, and *Amrita Bazar Patrika*—the first vernacular papers)	1862, Calcutta	Girishchandra Ghosh (taken over by S.N. Banerjea in 1879)
National Paper	1862, Calcutta	Devendranath Tagore
Madras Mail (First evening paper in India	1868 Madras	—

Amrita Bazar Patrika (Bengali in the beginning, later English, a daily)	1868, Jessore District	Sisirkumar Ghosh and Motilal Ghosh
Bangadarshana (in Bengali)	1873 Calcutta	Bankimchandra Chatterji
Indian Statesman (later, *The Statesman*)	1875, Calcutta	Started by Robert Knight
The Hindu (In English)— started as weekly	1878, Madras	G.S. Aiyar' Viraraghavachari and Subba Rao Pandit (among the founders)
Tribune (daily)	1881, Lahore	Dayal Singh Majeetia
Kesari (Marathi daily) and *Maharatta* (English weekly)	1881, Bombay	Tilak, Chiplunkar, Agarkar (before Tilak Agarkar and Prof Kelkar were the editors respectively)
Swadeshamitram (A Tamil Paper)	Madras	G.S. Aiyar
Paridasak (A weekly)	1886	Bipin Chandra Pal (Publisher)
Yugantar	1906, Bengal	Barindra Kumar Ghosh and Bhupendranath Dutta
Sandhya	1906 Bengal	Brahmabandhab Upadhyay
Kal	1906, Maharashtra	—
Indian Sociologist	London	Shyamji Krishnavarma
Bande Mataram	Paris	Madam Bhikaji Cama
Talvar	Berlin	Virendranath Chattopadhyay
Free Hindustan	Vancouver	Taraknath Das
Ghadr	San Francisco	Ghadr Party
Reshwa	Before 1908	Ajit Singh
Bombay Chronicle (a daily)	1913, Bombay	Started by Pherozeshah Mehta, Editor-B.G. Horniman (Englishman)
The Hindustan Times	1920, Delhi	Founded by K.M. Panikkar as part of the Akali Dal Movement
The Milap (Urdu daily)	1923 Lahore	Founded by M.K. Chand
Leader (in English	—	Madan Mohan Malaviya
Kirti	1926, Punjab	Santosh Singh
Bahishkrit Bharat (Marathi fortnightly)	1927	B.R. Ambedkar
Kudi Arasu (Tamil)	1910	E.V. Ramaswamy Naicker (Periyar)
Kranti	1927, Maharashtra	S.S. Mirajkar, K.N. Joglekar, S.V. Ghate
Langal and *Ganabani*	1927, Bengal	Gopu Chakravarti and Dharani Goswami
Bandi Jivan	Bengal	Sachindranath Sanyal
National Herald (daily)	1938	Started by Jawaharlal Nehru

Registrar of Newspapers is a statutory body of Government of India which is popularly known as RNI. It was established on 1st July 1956.

Press Trust of India (PTI) was incorporated in Madras on, 27th August, 1947.

United News of India (UNI) was founded on December 1961under the company acts. However its commercial application started on 21st March 1961.

Prasar Bharti is an autonomous body set up by an Act of Parliament on 23 Nov, 1997.

All India Radio (AIR) or Akashwani was formed in 1930 as a part of Prasar Bharti.

Doordarshan was launched on 15 September, 1959 as a part of Prasar Bharti with the motto Satyam Shivam Sundaram.

Reuters

It is an English news service opened in London by Julius Reuter in 1851, and now the most important institution of its kind in the British Empire. It has correspondents in all the great news centres of the world and furnishes telegraph and other news features throughout the eastern hemisphere and, to some extent, to Latin America, the United States and Canada.

AFP agence france-presse (AFP)

It is an international news agency. The headquarter of AFP is located in *Paris*. It was founded in 1944. It is the third largest in the world (after Associated Press and Reuters). AFP has regional offices in Nicosia, Montevideo, Hong Kong, and Washington, D.C., and bureaus in 150 countries. It transmits news in French, English, Arabic, Portuguese, Spanish and German.

AP (Associated Press)

It is one of the largest and most trusted sources of independent news gathering. It is neither privately owned nor government-funded; instead, as a not-for-profit news cooperative owned by its American newspaper and broadcast members. Founded in 1846, AP has covered all the major news events of the past 165 years, providing high quality, informed reporting of everything from wars and elections to championship games and royal weddings. Since the Pulitzer Prize was established, in 1917, AP has received 51 Pulitzers, including 31 photo Pulitzers.

BBC (The British Broadcasting Corporation)

It is the public service broadcaster of the United Kingdom, headquartered at Broadcasting House in *London*. It is the world's oldest national broadcasting organisation and the largest broadcaster in the world.

Al Jazeera

It is a Doha-based state funded broadcaster owned by the Al Jazeera Media Network, Partly funded by the house of Thani, the ruling family of Qatar. It is one of the largest news organizations with 80 bureaus around the world. The channel was launched on 1st November 1996 following the closure of the BBC's Arabic language television station. Hamid bin Thamer Al Thani is the chairman of the channel.

Social Media

Social Media are computer-mediated technologies that allow the creating and sharing of information, ideas, career interests and other forms of expression via virtual communities and networks.

Social media use web-based and mobile technologies on smartphones and tablet computers to create highly interactive platforms through which individuals, communities and organizations can share, co-create, discuss, and modify user-generated content or pre-made content posted online.

Some of the most popular social media websites are Facebook (and its associated Facebook Messenger), WhatsApp, Tumblr, Instagram, Twitter, Baidu Tieba, Pinterest, LinkedIn, Gab, Google+, YouTube, Viber, Snapchat, Weibo and WeChat.

TRANSPORT

Indian Road Network

- India has a road network of over approx. 4,689,842 kilometers.
- The Central Government is responsible for development and maintenance of the National Highways system.
- The Ministry carries out development and maintenance work of National Highways through three agencies. viz. National Highways Authority of India (NHAI), State Public Works Department (PWDs) and Border Road Organization (BRO).

Quick Facts

Categories	Dimensions in Kms (up to 2011)	Responsible Authority
National Highways	92,851	Ministry of Road Transport and Highways (Central government)
State Highways	1,63,898	State governments (State's public works department)
Major and Other District Roads	17,05,706	Local governments, Panchayats and Municipalities
Rural Roads	27,49,805	Local governments, Panchayats and Municipalities

National Highways Development Projects

Golden Quadrilateral : It comprises construction of 5,846 km long 4/6 lane, high density traffic corridor, to connect India's four big metro cities of Delhi-Mumbai-Chennai and Kolkata.

North-South and East-West Corridors: North-South corridor aims at connecting Srinagar in Jammu and Kashmir with Kaniyakumari in Tamil Nadu (including Kochchi-Salem Spur) with 4,076 km long road. The East-West Corridor has been planned to connect Silchar in Assam with the port town of Porbandar in Gujarat with 3,640 km of road length.

Important National Highways

NH	Connects
NH 1	New Delhi-Ambala-Jalandhar-Amritsar
NH 2	Delhi-Mathura-Agra-Kanpur-Allahabad-Varanasi-Kolkata
NH 3	Agra-Gwalior-Nasik-Mumbai
NH 4	Thane and Chennai via Pune and Belgaum
NH 5	Kolkata-Chennai
NH 6	Kolkata-Dhule
NH 7	Varanasi-Kanyakumari
NH 8	Delhi-Mumbai (via Jaipur, Boroda & Ahmedabad)
NH 9	Mumbai-Vijaywada
NH 10	Delhi-Fazilka
NH 24	Delhi - Lucknow
NH 26	Lucknow-Varanasi

Indian Railways

Indian Railways is a state-owned enterprise and one of the world's largest railway networks comprising 115,000 km of track over a route of 65,808 km and 7,112 stations.

It was founded on April 16, 1853.

Indian Railways Zones and their Headquarters

Name	Route (km)	Headquarters
Southern (SR)	5098	Chennai
Central (CR)	3905	Mumbai
Western (WR)	6182	Mumbai
Eastern (ER)	2414	Kolkata
Northern (NR)	6968	Delhi
North Eastern (NER)	3667	Gorakhpur
South Eastern (SER)	2631	Kolkata
Northeast Frontier (NFR)	3907	Maligaon
South Central (SCR)	5951	Secunderabad

East Central (ECR)	3628	Hajipur
North Western (NWR)	5459	Jaipur
East Coast (ECoR)	2677	Bhubaneswar
North Central (NCR)	3151	Allahabad
South East Central(SECR)	2447	Bilaspur
South Western (SWR)	3177	Hubli
West Central (WCR)	2965	Jabalpur

TOP TEN COUNTRIES WITH LONGEST RAIL NETWORK IN THE WORLD

Rank	Country	Route Km.
1.	USA	250000
2.	China	100000
3.	Russia	85500
4.	**India**	**65000**
5.	Canada	48000
6.	Germany	41000
7.	Australia	40000
8.	Argentina	36000
9.	France	29000
10.	Brazil	28000

Bangaluru Metro: Bengaluru Metro also known as Namma Metro is recently started rapid transit rail system in the Bengaluru city of Karnataka.

Jaipur Metro: The pink city of Rajasthan is got its first metro line of 9.2 km from Mansarovar to Chandpole Bazaar in November 2010.

AVIATION INDUSTRY

Air transport in India made a beginning in 1911 when airmail operation commenced over a distance of 10 km between Allahabad and Naini. The Airport Authority of India was constituted in 1972.

- JRD Tata was the first licensed pilot of Federation aeronautique International on behalf of the Aero Club of India and Burma.
- Prem Mathur became the first female commercial pilot to start flying for Deccan Airways, as she obtained her commercial pilots licence in 1947.

5/20 rule : The rule allows an Indian carrier to fly abroad only after it has completed five years of domestic operations and maintains a fleet of 20 aircrafts.

BUSIEST AIRPORTS IN INDIA

Rank	Name	City	State	IATA Code
1.	Indira Gandhi International Airpot	Delhi	Delhi	DEL
2.	Chhatrapati Shivaji International Airport	Mumbai	Maharashtra	BOM
3.	Kempegowda International Airport	Bangalore	Karnataka	BLR
4.	Chennai International Airport	Chennai	Tamil Nadu	MAA
5.	Netaji Subhash Chandra Bose International Airport	Kolkata	West Bengal	CCU
6.	Rajiv Gandhi International Airport	Hyderabad	Telangana	HYD
7.	Cochin International Airport			
8.	Sardar Vallabhbhai Patel International Airport	Ahmedabad	Gujarat	AMD
9.	Pune International Airport	Pune	Maharashtra	PNQ
10.	Goa International Airport	Dabolim	Goa	GOI

WATER WAYS

India has 14,500 km of navigable waterways. At present, 5,685 km of major rivers are navigable. The Inland Waterways Authority was set up in 1986.

NATIONAL WATERWAYS OF INDIA

Waterways	Stretch	Specification
NW 1	Allahabad-Haldia stretch (1,620 km)	It is divided into three parts for developmental purposes– (i) Haldia-Farakka (560 km), (ii) Farakka-Patna (460 km), (iii) Patna- Allahabad (600 km).
NW 2	Sadiya-Dhubri stretch (891 km)	Brahmaputra is navigable by steamers up to Dibrugarh (1,384 km) which is shared by India and Bangladesh.
NW 3	Kottapuram-Kollam stretch (205 km)	It includes 168 km of west coast canal along with Champakara canal (23 km) and Udyogmandal canal (14 km).
NW 4	Specified streches of Godavari and Krishna rivers along with Kakinada Puducherry stretch of canals (1078 km)	
NW 5	Specified stretches of river Brahmani along with Matai river, delta channels of Mahanadi and Brahmani rivers and East Coast canals (588km).	

PORTS

Indian coastline is about 7516.6 kilometers and it is one of the biggest peninsulas in the world. It is serviced by 12 major ports, 200 notified minor and intermediate ports. Maharashtra (48) has the maximum and Gujarat (42) and Andaman & Nicobar Islands (23). The Coastal States in India are Andhra Pradesh, Odisha, West Bengal, Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat.

Name of the Port	Coast	State
Kandla	Western Coast	Gujarat
Mumbai	Western Coast	Maharashtra
Jawaharlal Nehru	Western Coast	Maharashtra
Mormugao	Western Coast	Goa
Manglore	Western Coast	Karnataka
Kochi	Western Coast	Kerala
Haldia	Eastern Coast	West Bengal
Paradip	Eastern Coast	Odisha
Vishakapatnam	Eastern Coast	Andhra Pradesh
Chennai	Eastern Coast	Tamil Nadu
Ennore	Eastern Coast	Tamil Nadu
Tutikorin	Eastern Coast	Tamil Nadu

Facts about Ports of India

- Kandla Port is located on the Gulf of Kutch.
- Mumbai Port is the biggest port in our country.
- Mormugao Port is the leading iron ore exporting port of India.
- New Mangalore Port is an all weather port.
- Paradip Port is an artificial and deep-water port.
- Jawaharlal Nehru Port is the largest container port in India.
- Tuticorin Port is an artificial deep-sea harbour of India.

Healthcare

HEALTHCARE IN INDIA

Present Status

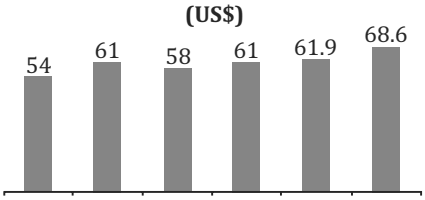
India has worked in improving the health of the citizens. However, the healthcare sector has been seen as a social sector receiving less focus and low budget allocation.

* The country spends a total of 4.2% of its GDP on healthcare while USA 18%.
* As a result of low GDP allocation private players are emerging to fulfil the growing healthcare needs.
* India shares 20% of the burden of global diseases with only 6% beds and 8 % doctors.
- Hospital bed density in India is 0.9 per 1,000 persons, against WHO's 3.5 per 1,000.
- India has one doctor per 1,700 citizens against WHO's a minimum ratio of 1:1,000.
* India has 387 medical colleges—181 governments and 206 privates.
* India produces 30,000 doctors, 18,000 specialists, 30,000 AYUSH graduates, 54,000 nurses, 15,000 ANMs and 36,000 pharmacists annually.
* India has about 6-6.5 lakh doctors. But it needs 4 lakh more by 2020 to maintain the required ratio of 1:1,000.

Rise in per capita healthcare expenditure

- Per capita healthcare expenditure is estimated at a CAGR of 5 % during FY 2008–15 to US$ 68.6 billion by 2015.
- This is due to rising incomes, easier access to high-quality healthcare facilities and greater awareness of personal health and hygiene.
- Greater penetration of health insurance aided the rise in healthcare spending, a trend likely to intensify in the coming decade.
- Economic prosperity is driving the improvement in affordability for generic drugs in the market.

Per capita healthcare expenditure (US$)



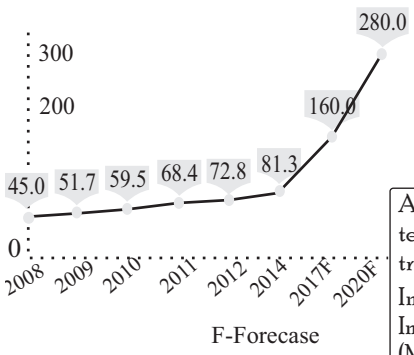
Source: World Bank, BMI Report, TechSci Research

GROWTH OF HEALTHCARE INDUSTRY IN INDIA

- Healthcare industry is growing at a tremendous pace owing to its strengthening coverage, services and increasing expenditure by public as well as private players.
- During 2008-20, the market is expected to record a CAGR of 16.5 per cent.
- The total industry size is expected to touch US$ 160 billion by 2017 and US$ 280 billion by 2020.
- As per the Ministry of Health, development of 50 technologies has been targeted in the FY16, for the treatment of disease like Cancer and TB.

HEALTHCARE

Healthcare Sector to Grow at a CAGR of 17% during 2008-20 and healthcare revenues to reach USD 280 billion by 2020



Policy Support

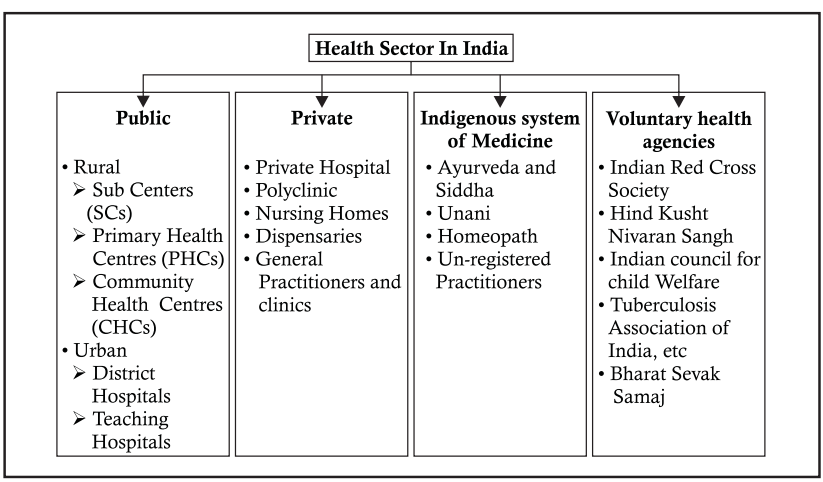
India to Emerge as a global healthcare hub
Reduced excise and customs duty
Exemption in service taxes
Establishment of new drug testing laboratories
Formulation of the Mental Health Policy

According to the Ministry of Health, over 50 technologies are being developed by FY16 for treatment of Cancer, TB and other diseases.

Implementation and Promotion of e-Health Initiatives-Mother and Child Tracking System (MCTS) and Facilitation Centre (MCTF).

Healthcare expenditure to Grow at a CAGR of 17% during 2011-20

Source: TechSci Research



NATIONAL HEALTH PROGRAMMES

AIDS Control Programme

A division of Ministry of Health and Family Welfare, was established in 1992 to prevent and control HIV/AIDS.

Cancer Control

Launched in 1975 for equipping the premier cancer hospital/institutions.

Pulse Polio Campaign (Do Boond Zindegi Ke)

Initiated in 1978 the programme aimed at preventing polio by vaccinating against the disease. As a result India was declared Polio free in 2014.

National Leprosy Eradication Programme (NLEP)

Launched in 1955 with an objective of eliminating leprosy with the use of Multidrug therapy (MDT) in phases.

Eliminate Kala-azar

A part of National Health Policy envisaged in 2010 to eradicate the dreaded disease 'Kala-azar' or Visceral Leishmaniasis, also known as 'Black Fever' and 'Dumdum Fever' from India by 2015.

National TB Control Programme

Launched in 1962 with an objective of eradication of the disease but till 1992 only 30% of the country had been covered.

National Tobacco Control Programme

Launched in 2007 by the Ministry of Health and Family.

NATIONAL RURAL HEALTH MISSION (NRHM)

Launched on 5th April,2005.

- Creation of cadre of Accredited Social Health Activist (ASHA)
- Mainstreaming AYUSH (Indian System of Medicine)

Swachh Bharat Abhiyan

- It was launched by Prime Minister Narendra Modi on 2nd October 2014, covering 4041 statutory towns with the purpose to clean the streets, roads and infrastructure of the nation.

National Bal Swachhta Mission

- It was launched by the Union Government on 14th November 2014, on the 125th birth anniversary of India's first prime minister Jawahar Lal Nehru.
- Its themes

1. Clean Anganwadis, Playgrounds, Clean Self, Food, Drinking Water, Toilets

YOGA and its Health Benefit

YOGA is just a master stroke. It's an ascetic Hindu discipline which involves practices like controlling breath with prescribed body position and meditation with an objective to attain a state of deep spiritual insight and tranquility. These practices in turn promote good health, fitness and control of mind. **Sage Patanjali** was known to be the founder of this practice and the knowledge he had given was known as **Yoga Sutra.** The United Nations has declared **June 21** as the I**nternational Day of Yoga.**

7 Structural Problems in India's Healthcare System

1. A weak primary healthcare sector
2. Unequally distributed skilled human resources
3. Large unregulated private sector
4. Low public spending on health
5. Fragmented health information systems
6. Irrational use and spiralling cost of drugs
7. Weak governance and accountability

A3's Healthcare Challenge in Remote Areas

- **A3rmt** is a wireless portable medical technology developed as a solution to area-specific healthcare inefficiencies. A3 is a remote technology came in to help doctors sitting in cities or anywhere to control patients from long distances, i.e. rural areas.
- The concept and devices useful in developing countries was started by Dr. Shrikant Parikh, founder and CEO of the company, in 2008.
- A3 will help India in tackling its rural health problems by connecting needy patients to medical experts. A3rmt create customized devices to connect patient side units to multiple cloud servers. Doctors just need to have a smart phone/ hand held device.
- A3rmt provides detailed information about the specific local challenges in healthcare.
- The A3 services focuse on five broad areas: cardiovascular diseases, cuts and wounds, war zone medical care, pregnancy, and radiology.
- A3 devices are helping doctors and cardiologist of Tamil Nadu State Governmental District Hospital to remotely serve patients in the Primary Healthcare Centre of Kunjapanai village, which lies in a hilly, forested terrain.
- A3 has provided their technology to six Indian states so far, and has even crossed the Indian border to reach the hospital of Mwanza-Tanzania, where patients are remotely monitored by senior doctors in Ahmedabad.

Government Initiatives in Health Sector

India's universal health plan that aims to offer guaranteed benefits to a sixth of the world's population will cost an estimated Rs 1.6 trillion (US$ 23.48 billion) over the next four years.

Some of the major initiatives taken by the Government of India to promote Indian healthcare industry are as follows:

- Provisions made in the Union budget 2016-17:
  - **National Dialysis Services Programme** to be initiated to provide dialysis services in all district hospitals.
  - A new health protection scheme for health cover upto Rs 1 lakh (US$ 1,470) per family.
  - Setting up 3,000 medical stores across the country to provide quality medicines at affordable prices.
  - Senior citizens will get additional healthcare cover of Rs 30,000 (US$ 441) under the new scheme.
  - **Pradhan Mantri Jan Aushadhi Yojana** to be strengthened, 3000 generic drug storer to be opened.
- Government of West Bengal has introduced **G1 Digital Dispensary**, to provide people from rural areas access to primary healthcare services.
- A unique initiative for healthcare **'SEHAT' (Social Endeavour for Health and Telemedicine)** has been launched to empower rural citizens by providing access to information, knowledge, skills and other services in different sectors through digital technologies.
- Government of India has launched the **National Deworming** initiative to protect 24 crore children of 1-19 years from intestinal worms.
- **Mission Indradhanush** launched by Government of India to immunise children against seven diseases, i.e. diphtheria, whooping cough, tetanus, polio, tuberculosis, measles and hepatitis B by 2020.

Startups Making Difference in Healthcare Digitally

About 90% of the **startups** evaluated in 2015 were working on **preventive healthcare and monitoring solutions**, revealed an InnAccel's report. Hospitals, medical devices, clinical trials, outsourcing, tele-medicine, medical tourism, health insurance and medical equipment collectively form the pillar of healthcare sector.

Today, you can locate diagnostic centres, hospitals and doctors just by a swipe on a smartphone's Apps created by Startups. Below are the list of some healthtech startups:

eKincare: It was founded in 2014 by Kiran Kalakuntla and Sunil Motaparti at Hyderabad. It helps users put their health records and keep it on the cloud — where they can access the data anywhere, using a PC or a mobile device.

Medibox Technologies: Mr. Bhavik Kumar and Kapil Kanbarkar started it at Bengaluru. Medibox allows patients to search for healthcare facilities like pharmacies, hospitals and blood banks across India. It is a mobile application based services.

Mediaka Bazaar: It was founded by Mr. Vivek Tiwari (IIM) in 2015 in Mumbai. Medikabazaar is a marketplace for all medical and healthcare needs. It helps buyers search and compare from over 10,000 medical devices and consumable options for all health and wellness needs.

Medical Unique Identity (MUI): Mr. Mayank Harlalka started it in Bengaluru. MUI manages personal health information to deliver quality healthcare to the public. It allows users to maintain lifetime health records and data for improving the quality of medical treatment.

BookMEDS.com: **It was started** by Mohammed Abubakar, Subathra Santanam, and Sajid Sikander in 2013 at Hyderabad. BookMEDS is an e-commerce portal for medicines and medical products. The product categories include orthopedic care, home care, mother and baby care, medical gadgets, hospital equipment, contraceptives care, protein supplements, fitness and sports, homeopathy and Ayurveda, ENT, eye, and dental care.

Sports & Games

Olympics

- The Games were first held in honour of the Greek God, Zeus in 776 B.C. on Mount Olympia in the plain of the kingdom of Elis.
- The first Modern Olympic Games were started in Athens on 6th April 1896. Since then these Games are held every four years.
- Olympic Symbol comprises five rings or circles, linked together to represent the sporting friendship of all people. The rings also symbolise the continents-Europe, Asia, Africa, Oceania and America.
- The Olympic flag was created in 1914 at the suggestion of Baron Pierre de Coubertin and was hoisted first time in the Antwerp Olympic Games in 1920.
- For the first time an Olympic flame was ceremonially lighted and burned in a giant torch at the entrance of the stadium at the Amsterdam Games in 1928 .
- The Olympic motto is "Citius-Altius-Fortius" (faster, higher, stronger).
- Mary Leela Rao was the 1st Indian woman participant in the Olympic Games.

Commonwealth Games

- After Olympics, Commonwealth Games are the second largest sports festival in the world.
- The Games are held in four years but only in between the Olympic years.
- The 1st Commonwealth Games were held in 1930 at Hamilton, Canada.
- India, for the first time, participated in the second Commonwealth games held in London in 1934.

ASIAN Games

- The first Asian Games began on March 4, 1951 in New Delhi.
- The AGF(Asian Games Federation) adopted "Play the game in spirit of the game", given by Pt. Jawaharlal Nehru, as the motto of the Asian Games
- The emblem of Asian Games is a 'bright full rising sun' with interlocking rings.
- In the 16th Asian Games Twenty-20 Cricket was included.

South Asian Games

- The South Asian Games (SAG Games) are a bi-annual multi-sport event held for the athletes from South Asia.
- The governing body of these games is South Asian Sports Council (SASC), formed in 1983.
- At present, SAG are joined by eight members namely Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka.
- The first South Asian Games were hosted by Kathmandu, Nepal in 1984.
- These Games are often hyped as the South Asian version of Olympic Games.

Afro-Asian Games

- They are inter-continental multi-sport competitions, held between athletes from Asia and Africa.
- These Games are supposed to be held once every four years.
- They are jointly supervised by the Olympic Council of Asia (OCA), and the Association of National Olympic Committees of Africa (ANOCA).

- The Inaugural Afro-Asian Games were held in 2003 in Hyderabad, India

Cricket World Cup

- The ICC Cricket World Cup is the international championship of One Day International (ODI) cricket.
- This is organized by the International Cricket Council (ICC).
- It is held every four years.
- The first World Cup was organized in England in June 1975.
- The current trophy is made from silver and gold, and features a golden globe held up by three silver columns.
- The ICC keeps the original trophy. A replica differing only in the inscriptions is permanently awarded to the winning team.

Cricket World Cup

Year	Host	Winner
1975	England	West Indies
1979	England	West Indies
1983	England	India
1987	India, Pakistan	Australia
1992	Australia, New Zealand	Pakistan
1996	India, Pakistan	Sri Lanka
1999	England	Australia
2003	South Africa	Australia
2007	West Indies	Australia
2011	India, Bangladesh	India
2015	Australia, New Zealand	Australia
2019	England	
2023	India	

FIFA World Cup

- The FIFA World Cup is an international association football competition
- It is contested by the senior men's national teams of the members of Federation Internationale de Football Association (FIFA).
- It is held every four years.
- The current champion is Germany, which won its fourth title at the 2014 tournament in Brazil.
- Brazil have won five times, and they are the only team to have played in every tournament.
- The next two World Cups will be hosted by Russia in 2018 and Qatar in 2022.
- From 1930 to 1970, the Jules Rimet Trophy was awarded to the World Cup winning team.
- After 1970, a new trophy, known as the FIFA World Cup Trophy, was designed.
- The designer of the current FiFA Trophy was Silvio Gazzaniga(the Italian designer).
- The new trophy is 36 cm (14.2 in) high, made of solid 18 carat (75%) gold and weighs 6.175 kg (13.6 lb).

Year	Host	Winner	Score	Runner-up
1930	Uruguay	Uruguay	4–2	Argentina
1982	Spain	Italy	3–1	West Germany
1986	Mexico	Argentina	3–2	West Germany
1990	Italy	West Germany	1–0	Argentina
1994	United States	Brazil	3–2	Italy
1998	France	France	3-0	Brazil
2002	South Korea & Japan	Brazil	2-0	Germany
2006	Germany	Italy	5-3	France
2010	South Africa	Spain	1-0	Netherlands
2014	Brazil	Germany	1-0	Argentina
2018	Russia			

Hockey World Cup

- The Hockey World Cup is an international field hockey competition organised by the International Hockey Federation (FIH).
- The tournament was started in 1971.
- It is held every four years, bridging the four years between the Summer Olympics.
- The Hockey World Cup trophy was designed by the Bashir Moojid and created by the Pakistani Army.
- The trophy consists of a silver cup with an intricate floral design, surmounted by a globe of the world in silver and gold, placed on a high blade base inlaid with ivory.

Year	Host	Winner
1971	Barcelona, Spain	Pakistan
1973	Amstelveen, Netherlands	Netherlands
1975	Kuala Lumpur, Malaysia	India
1978	Buenos Aires, Argentina	Pakistan
1982	Bombay, India	Pakistan
1986	London, England	Australia
1990	Lahore, Pakistan	Netherlands
1994	Sydney, Australia	Pakistan
1998	Utrecht, Netherlands	Netherlands
2002	Kuala Lumpur, Malaysia	Germany
2006	Monchengladbach, Germany	Germany
2010	New Delhi, India	Australia
2014	The Hague, Netherlands	Australia
2018	Bhubaneswar, India	

TROPHIES ASSOCIATED WITH SPORTS

NATIONAL

Name of the Trophy	Related game
Aga Khan Cup	Hockey
Barna Belleck Cup	Table Tennis
Beighton Cup	Hockey
Bombay Gold Cup	Hockey
Burdwan Trophy	Weight Lifting
D.C.M. Trophy	Football
Dhyan chand Trophy	Hockey
Dr. B.C. Roy Trophy	Football
Duleep Trophy	Cricket
Durand Cup	Football
Ezra Cup	Polo
I.F.A Shield	Football
Lady Ratan Tata Trophy	Hockey
Moin ud daula Gold Cup	Cricket
Rangaswami Cup	Hockey
Ranji Trophy	Cricket
Santosh Trophy	Football
Scindia Gold Cup	Hockey
Subroto Mukherjee Cup	Football (Inter-School)
Wellington Trophy	Rowing

INTERNATIONAL

Name of the Trophy	Related game
American Cup	Yatch Racing
Ashes Cup	Cricket (Australia-England)
Azlan Shah	Hockey
US Masters	Golf
Hopman Cup	Lawn Tennis
Colombo Cup Trophy	Football
Davis Cup	Lawn Tennis
Kings Cup Race	Air Races (England)
Merdeka Cup	Football (Asia)
Swaythling Cup	World Table Tennis
Thomas Cup	World Badminton (Men)
Uber Cup	World Badminton (women)
US-Open	Lawn Tennis
French-Open	Lawn Tennis
Australian Open	Lawn Tennis
Wimbledon	Lawn Tennis
Masters Champions Trophy	Hockey
British Open	Golf
Malaysian Open	Badminton
Tata Open	Lawn Tennis

National Games of various Nations

Nation	National Games
USA	Baseball
Spain	Bull Fighting
Canada	Ice Hockey
New Zealand	Rugby Union
India	No Game
Bangladesh	Kabaddi
Srilanka	Volley ball
Russia	Bandy
China	Table Tennis
Brazil	Capoeira
Nation	**National Sports**
France	Football
England	Cricket
Japan	Sumo
Australia	Cricket
Pakistan	Hockey
Malaysia	Sepak takraw
Scotland	Golf
Indonesia	Badminton
Bhutan	Archery
Switzerland	Swiss Wrestling
Turkey	Oil Wrestling and Cirit

TERMS USED IN GAMES AND SPORTS

Badminton	Deuce, Double, Drop, Fault, Game, Let, love, Smash.
Baseball	Bunting, Diamond, Home, Pitcher, Put out, Strike.
Billiards	Break, Cannons, Cue, In off, Jigger, Scratch,
Boat Race	Cox
Boxing	Hook, Jab, Knock-out, Punch, upper cut.
Bridge	Diamonds, Dummy, Grand slam, Little slam, Revoke, Ruff, Tricks, Trump.
Chess	Check, Checkmate, Gambit, Stalemate
Cricket	Bowling, Bouncer, Crease, Cover point, Drive, Duck, Follow on, Googly, Gulley, Hat Trick, Hit wicket, L.B.W. (Leg Before Wicket), Leg Break, Leg spinner, Leg bye Maiden over, No ball, Pitch, Run, silly point, Stumped, Wicket keeper.
Football	Dribble, Drop Kick, Foul, Hattrick, Off-side, Penalty, Throw in, Touch Down.
Golf	Bogey, Caddie, Hole, Links, Put, Putting the green, Stymie, Tee.
Hockey	Bull, Carry, Centre Forward, Carried, Dribble, Goal, Hat trick, Penalty corner, Scoop, Short corner, Sticks, Striking circle, Under cutting.
Horse Racing	Jockey, Place, Protest, Punter, Win.
Lawn Tennis	Back-hand-drive, Service, Smash, Volley, Deuce, Game, Set, Love.
Polo	Bunder, Chuckker, Mallet.
Rifle Shooting	Bull's eye.
Rugby	Drop kick, Screen.
Swimming	Stroke.
Volley ball	Booster, Deuce, Love, Service, Spikers.
Wrestling	Half Nelson, Heave.

MCQs

RAILWAYS

1. When was the first underground railway (Metro Railway) started?
   (a) 1982 (b) 1989
   (c) 1984 (d) 1992
2. Shatabdi Express train was started in
   (a) 1984 (b) 1988
   (c) 1990 (d) 1985
3. At which of the following places Diesel Component Works is established?
   (a) Jamshedpur (b) Patiala
   (c) Perambur (d) Varanasi
4. Which Zone is the largest in Indian Railways?
   (a) Central Railway
   (b) Northern Railway
   (c) Eastern Railway
   (d) Western Railway
5. The railway station situated in the extreme south is
   (a) Chennai (b) Cochin
   (c) Kanyakumari (d) Trivandrum
6. A platform surrounded by rail lines from all the four sides, is called
   (a) dock platform
   (b) passenger platform
   (c) island platform
   (d) goods platform
7. When was the nationalization of Indian Railways done?
   (a) 1952 (b) 1950
   (c) 1951 (d) 1954
8. In which year Research, Design and Standard organization was established?
   (a) 1954 (b) 1957
   (c) 1959 (d) 1967
9. Railway Staff College is situated at
   (a) Bangalore (b) Secundrabad
   (c) Chennai (d) Vadodara
10. Where is the Research, Design and Standard Organization situated?
    (a) Lucknow (b) Bangalore
    (c) Pune (d) New Delhi
11. Which is the following pairs of regional Railways and their headquarters not true?
    (a) SouthCentral Railway Secunderabad
    (b) Central railway Bhopal
    (c) South Railway Chennai
    (d) North Railway New Delhi
12. Between which of the destinations the first Indian train was started?
    (a) From Calcutta to Delhi
    (b) From Mumbai to Thane
    (c) From Mumbai to Surat
    (d) From Mumbai to Madras
13. When was the first train in Indian started?
    (a) 1851 (b) 1852
    (c) 1853 (d) 1854
14. In which Governor General's reign railway lines in India was established?
    (a) Lord William Bentick
    (b) Lord Cornwallis
    (c) Lord Kenning
    (d) Lord Dalhousie
15. station where the rail lines end, is called
    (a) junction station
    (b) waysidestation
    (c) block station
    (d) terminal station
16. How much distance was traveled by first train of India?
    (a) 33 km (b) 36 km
    (c) 34 km (d) 46 km
17. what is the position of the Indian Railway in the world according to the length of rail lines?
    (a) First
    (b) Second
    (c) Third
    (d) Fourth
18. What is the length of NorthEastern Frontier Railway (NEFR)?
    (a) 4300 Km (b) 3700 Km
    (c) 4290 km (d) 5298 km

19. The headquarters of NorthEastern railway is situated at
    (a) Mumbai (V.T)
    (b) Guwahati
    (c) Gorakhpur
    (d) New Delhi
20. When was the NorthEastern frontier Railway (NEFR) established?
    (a) 15th Jan, 1958
    (b) 15th Jan, 1955
    (c) 2nd Jan, 1956
    (d) 14th April, 1952
21. The headquarters of North Eastern Frontier Railway (NEFR) is
    (a) Calcutta
    (b) Maligaon (Guwahati)
    (c) Chennai
    (d) Gorakhpur
22. In which of the following cities, the first subway train was started?
    (a) Mumbai (b) Delhi
    (c) Calcutta (d) Chennai
23. General Manger is responsible for
    (a) Railway Board
    (b) Railway Ministry
    (c) Both railway Board and Railway Ministry
    (d) None of these
24. The headquarters of SouthCentral Railways is situated at
    (a) Mumbai (V.T)
    (b) Chennai
    (c) Secundrabad
    (d) Mumbai (Central)
25. The headquarters of Northern Railway is at
    (a) New Delhi
    (b) Guwahati
    (c) Gorakhpur
    (d) Mumbai (V.T)
26. The headquarters of South Railways is situated at
    (a) Calcutta (b) Chennai
    (c) Delhi (d) Mumbai
27. In which institution the training of electric work is being given?
    (a) Indian Railways Institute of Mechanical and Electrical Engineering
    (b) Indian Railways Institute of Electrical Engineering
    (c) Railway Staff College
    (d) Indian Railways Institute of Civil Engineering
28. Who invented the railway engine?
    (a) Charles Babbage
    (b) Isaac Newton
    (c) James Watt
    (d) George Stephenson
29. Where is the Indian Railways Institute of Mechanical and Electrical Engineering Institution situated?
    (a) Nasik (b) Baroda
    (c) Jamalpur (d) Pune
30. Metro Railway is functioning in which of the following Indian States?
    (a) Gujarat (b) Maharashtra
    (c) West Bengal (d) Tamil Nadu
31. The zone with the minimum length is
    (a) NorthEastern Railway
    (b) NorthEastern Frontier Railway
    (c) SouthEast Railway
    (d) SouthCentral Railway
32. Where is the Indian Railways Institute of Civil Engineering Institute situated?
    (a) Pune (b) Chennai
    (c) Nasik (d) Sikandrabad
33. How many training institutions of Railways are in India?
    (a) Three (b) Four
    (c) Five (d) Six
34. What is the position of the Indian Railway under the zonal system?
    (a) First (b) Second
    (c) Third (d) Forth
35. Which of the gauges is used in the hilly areas?
    (a) Broad gauge (b) Meter gauge
    (c) Narrow gauge (d) Special gauge
36. Where is the extreme north of India a railway station?
    (a) Jammutavi (b) Amritsar
    (c) Pathancoat (d) Guwahat
37. How many institutions do give suggestions for railways technology?
    (a) One (b) Two
    (c) Three (d) Four
38. Diesel Locomotive Works is situated at
    (a) Perambur (b) Varanasi
    (c) Kapurthala (d) Bangalore
39. The manufacturing of steam engine in Chittranjan Locomotive stopped in
    (a) 1974 (b) 1961
    (c) 1971 (d) 1973

40. The passenger bogies of the Indian Railways are manufacture following places?
    (a) Kapurthala (b) Chittranjan
    (c) Perambur (d) Bangalore
41. Indian Railways which is the largest of the Public Sector E divided into how many regions?
    (a) 7 (b) 9
    (c) 8 (d) 10
42. Besides Mahrashtra, Karnataka and Goa, which of the following State for Konakan Railway Project?
    (a) Kerala
    (b) Tamil Nadu
    (c) Gujarat
    (d) Andhra Pradesh
43. Palace On Wheels train was inaugurated in
    (a) 1988 (b) 1972
    (c) 1982 (d) 1965
44. When was the Central Railway established?
    (a) 5th Nov 1951
    (b) 14th Nov 1951
    (c) 14th April 1951
    (d) 16th August, 1951
45. Rajasthan is under which of the following railway zones?
    (a) Northern region
    (b) Western region
    (c) NorthWestern region
    (d) Central Region
46. The largest national enterprise of India is
    (a) Indian Railway
    (b) Indian Shipyard
    (c) Airways
    (d) None of these
47. The first locomotive which was manufactured in Chittranjan on
    (a) November 1950
    (b) October 1950
    (c) September 1949
    (d) October 1954
48. Where is the wheel and axle plant of Indian Railways situated?
    (a) Chittranjan (b) Kapurthala
    (c) Bangalore (d) Perambur
49. When was the Jammu City appeared on the map of Indian Railway?
    (a) 1965 (b) 1963
    (c) 1967 (d) 1965
50. Where is the headquarters of Central Railway situated?
    (a) Mumbai (V.T)
    (b) Mumbai (Church Gate)
    (c) Gwalior
    (d) Gorakhpur
51. Where is the rail museum of india ?
    (a) Delhi (b) Bangaluru
    (c) Chennai (d) Mumbai
52. Who was the first women rail minister of india?
    (a) mamata banarjee
    (b) j Fatima bibi
    (c) suchita kriplani
    (d) surekha yadav
53. Which train in India has the longest route length?
    (a) Howrah - Jammu Tawi Himgiri Express
    (b) Kanyakumari - Jammu Tawi Himsagar Express
    (c) Kanyakumari - Dibrugarh Vivek Express
    (d) Guwahati-Thiruvanthapuram Express
54. Which is the longest train in india?
    (a) Jansadharan express
    (b) Prayag express
    (c) Magadh express
    (d) Gomti express
55. Which is the fastest train in india?
    (a) Mahamana express
    (b) Duronto express
    (c) Shatabdi express
    (d) Gatiman express
56. Which is the slowest train in india?
    (a) Nilgiri express
    (b) Janta express
    (c) Taj express
    (d) Life line express
57. When was first rail budget presented in india?
    (a) 1947 november
    (b) 1948 december
    (c) 1950 january
    (d) 1952 november
58. On which of the following is the longest railway bridge in India located?
    (a) River Ganges
    (b) Vembanad Lake
    (c) River Brahmaputra
    (d) Chilka Lake

59. In which of the following cities are located 3 zonal headquarters of Indian Railways?
(a) Guwahati (b) Mumbai
(c) New Delhi (d) Kolkata

60. Who of the following is known for having designed the first railway timetables?
(a) George Bradman
(b) George Bernard Shaw
(c) George Bradshaw
(d) George Brummel

61. Which of the following is the eastern-most division of the Indian Railways?
(a) Tinsukia (b) Lumding
(c) Rangiya (d) Katihar

62. Over which of the following rivers is the world's highest railway bridge in Kashmir being constructed?
(a) Chenab (b) Jhelum
(c) Sutlej (d) Indus

63. Gorakhpur which has the longest railway platform in the world is located in which of the following states?
(a) Odisha (b) West Bengal
(c) Uttar Pradesh (d) Chhattisgarh

64. Which of the following stations has all the three guages viz. broad, metre and narrow?
(a) Lucknow (b) Chandigarh
(c) Shimla (d) Siliguri

65. What is the width of broad guage railway line in India?
(a) 5 feet 3 inches
(b) 5 feet 6 inches
(c) 4 feet 11 inches
(d) 5 feet 4 inches

66. Match the manufacturing units with their locations

Manufacturing Unit	**State**
A. Chittaranjan Locomotive Works	1. Tamilnadu
B. Integral Coach Factory	2. Punjab
C. Wheel and Axle Plant	3. West Bengal
D. Rail Coach Factory	4. Karnataka

(a) A - 3; B - 4; C - 1; D - 2
(b) A - 2; B - 1; C - 4; D - 3
(c) A - 3; B - 1; C - 4; D - 2
(d) A - 3; B - 1; C - 2; D - 4

67. Which of the following stations was formerly known as Victoria Terminus?
(a) Churchgate Railway Station
(b) Mumbai Central
(c) Lokmanya Tilak Terminus
(d) Chhatrapathi Shivaji Terminus

68. Fairy Queen, the world's oldest steam locomotive in regular operation, plies between New Delhi and -
(a) Shimla (b) Alwar
(c) Kalka (d) Gwalior

69. Who of the following was the first Railway Minister of independent India?
(a) John Mathai
(b) Lal Bahadur Shastri
(c) Jawaharlal Nehru
(d) Shanmugham Shetty

70. Shatabdi Express trains were introduced in 1989 to commemorate the 100th anniversary of which of the following personalities?
(a) Swami Vivekanand
(b) Mahatma Gandhi
(c) Jawaharlal Nehru
(d) Rabindranath Tagore

71. Who was the Governor General of India when Railways were first introduced in India?
(a) Lord Canning
(b) Lord Dalhousie
(c) Lord William Bentick
(d) Lord Ripon

72. What is the rank of India in the world in terms of length of railroad network?
(a) First (b) Second
(c) Third (d) Fourth

73. The Maitree Express connects India with which of the following countries?
(a) Myanmar (b) Pakistan
(c) Bangladesh (d) Nepal

74. Which of the following is the largest zone in terms of route kilometers?
(a) Western Railways
(b) Eastern Railways
(c) Northern Railways
(d) Southern Railways

75. Which of the following is the largest marshalling yard in India (also the longest in Asia)?
(a) Mughalsarai (b) Mathura
(c) Itarasi (d) Guntakal

76. Which of the following zonal headquarters - city combination is incorrect?
    (a) South East Central - Bilaspur
    (b) North Western - Jodhpur
    (c) East Central - Hajipur
    (d) West Central - Jabalpur
77. In which city is the Indian Railway Institute of Financial Management (IRIFM) being set up as announced in the Railway Budget 2013?
    (a) Secunderabad
    (b) Lucknow
    (c) Rae Barelly
    (d) Gurgaon
78. Into how many zones is the Indian Railways organized?
    (a) 17 (b) 15
    (c) 14 (d) 16
79. Which state has the longest route kilometers of railway line in India?
    (a) Maharashtra
    (b) Andhra Pradesh
    (c) Rajasthan
    (d) Uttar Pradesh
80. Last Railway station in North India:
    (a) Jammutavi
    (b) Baramulla
    (c) Ghagwal railway station
    (d) banihal
81. Last Railway station in South India:
    (a) Kanyakumari (b) Aattur
    (c) Aduturai (d) Avadi
82. Last Railway station in Western India:
    (a) Naliya near Bhuj in Gujarat.
    (b) Okha in gujrat
    (c) Warka in gujrat
    (d) Porbanar in gujrat
83. Who was the first female loco pilot in india?
    (a) Surekha yadav
    (b) Roze Millian Bethew
    (c) Puneeta Arora
    (d) Sushama Chawala
84. What is the full form of irctc? –
    (a) Indian Railway Catering and Tourism Corporation
    (b) Indian Railway Corporatio and Tourism Corporation
    (c) Indian Railway Catering and Tourist Corporation
    (d) Indian Railway Catering and Tourism Counsil
85. Which of the following is the first railway station in India to have free high-speed WiFi Internet facility?
    (a) Chennai Central station
    (b) Mumbai Central station
    (c) New Delhi station
    (d) Kolkata station
86. Which is the busiest railway station in India?
    (a) Howrah junction
    (b) Newdelhi railway station
    (c) Kanpur central
    (d) Kalyan junction
87. which is the oldest railway station currently operational in India?
    (a) Royapuram railway station
    (b) Chhatrapati shivaji terminal
    (c) Chennai central
    (d) Howrah junction
88. When did Life Line Express (Jeevan Rekha) Started ?
    (a) 1992 (b) 1991
    (c) 1989 (d) 1990
89. When did the The first live telecast of railway budget took place
    (a) 1992 (b) 1993
    (c) 1994 (d) 1995
90. India's first CNG train runs between
    (a) Mathura to Agra
    (b) Rohtak to Rewari
    (c) Delhi to Palwal
    (d) Allahabad to Varanasi
91. The Trans-Siberian Railway is a network of railways connect
    (a) Yaroslavsky to Vladivostock
    (b) Mascow to Shanghai
    (c) Yaroslavsky to Beijing
    (d) Valadimir to Beijing
92. In which year Indian Railway board established ?
    (a) 1905 (b) 1906
    (c) 1907 (d) 1904
93. Which train is named after Pt. Shri Madan Mohan Malaviya
    (a) Shabdbhedi express
    (b) Uday express
    (c) Mahamana express
    (d) Muv –anand vihar express
94. Which of the following is not a tourist train
    (a) Palace on Wheels
    (b) Maharaja Express
    (c) The Golden Chariot
    (d) Swarn jayanti express

95. Which of the following has been declared the World Heritage site by UNESCO in 1999?
    (a) Konkana railways
    (b) Darjeeling Himalayan Railway
    (c) Chhatrapati shivaji terminal
    (d) Delhi railway station.
96. Which country has the longest railway network?
    (a) United States (b) China
    (c) India (d) Russia
97. The longest rail journey in the world is between?
    (a) Moscow andVladivostok
    (b) Toronto to Vancouver
    (c) Shanghai to Lhasa
    (d) Sydney to Perth
98. What is the full form of SCRA?
    (a) Special Class Railway Association
    (b) Special Commercial Railway Apprentice
    (c) Super Class Railway Apprentice
    (d) None of these
99. Where is head quarter of Indian Railway RAIL BHAWAN situated?
    (a) Kolkata (b) New delhi
    (c) Lucknow (d) Allahabad
100. Toy train is the name given to
    (a) Kalka-Shimla Railway
    (b) Darjeeling Himalayan Railway
    (c) Nilgiri Mountain Railway
    (d) konkana railways

ANSWERS KEY

1.	(c)	2.	(b)	3.	(b)	4.	(c)	5.	(c)	6.	(c)
7.	(b)	8.	(b)	9.	(d)	10.	(a)	11.	(b)	12.	(b)
13.	(c)	14.	(d)	15.	(d)	16.	(c)	17.	(d)	18.	(b)
19.	(c)	20.	(a)	21.	(b)	22.	(c)	23.	(a)	24.	(c)
25.	(a)	26.	(b)	27.	(b)	28.	(d)	29.	(c)	30.	(c)
31.	(b)	32.	(a)	33.	(c)	34.	(b)	35.	(c)	36.	(a)
37.	(b)	38.	(b)	39.	(c)	40.	(c)	41.	(b)	42.	(a)
43.	(c)	44.	(a)	45.	(b)	46.	(a)	47.	(a)	48.	(c)
49.	(d)	50.	(a)	51.	(a)	52.	(a)	53.	(c)	54.	(b)
55.	(d)	56.	(a)	57.	(a)	58.	(b)	59.	(b)	60.	(c)
61.	(a)	62.	(a)	63.	(c)	64.	(d)	65.	(b)	66.	(b)
67.	(d)	68.	(b)	69.	(a)	70.	(c)	71.	(b)	72.	(d)
73.	(c)	74.	(c)	75.	(a)	76.	(b)	77.	(a)	78.	(a)
79.	(d)	80.	(a)	81.	(a)	82.	(a)	83.	(a)	84.	(a)
85.	(b)	86.	(a)	87.	(a)	88.	(b)	89.	(c)	90.	(b)
91.	(a)	92.	(a)	93.	(c)	94.	(d)	95.	(b)	96.	(a)
97.	(a)	98.	(b)	99.	(b)	100.	(b)				

GENERAL KNOWLEDGE

1. To whom the line 'A thing of beauty is a joy for ever' is attributed ?
   (a) John Keats
   (b) Dr. Charles Dickens
   (c) Dr. Jonathan Swift
   (d) William Wordsworth
2. The birthday of which of the following leaders is celebrated as 'Teachers Day' in India?
   (a) Dr. Rajendra Prasad
   (b) S. Radhakrishnan
   (c) C. Rajgopalachari
   (d) Lala Lajpat Rai
3. The award given for outstanding performance in sports is
   (a) Bharat Ratna
   (b) Padma Shri Award
   (c) Arjuna Award
   (d) Dronacharya Award
4. Which hill station's name means place of the thunderbolt'?
   (a) Shillong (b) Oottacamand
   (c) Darjeeling (d) Gangtok
5. The ship building yard––Mazgaon Dock is located at –
   (a) Kochi (b) Kolkata
   (c) Mumbai
   (d) Vishakhapatnam
6. Electric current is measured using which of the following instrument ?
   (a) Voltmeter (b) Anemometer
   (c) Wattmeter (d) Ammeter
7. 'Agha Khan Cup' is related with which of the following sport event ?
   (a) Cricket (b) Hockey
   (c) Table Tennis (d) Football
8. Where was the first conference of SAARC (South Asian Association for Regional Cooperation) held ?
   (a) Dhaka (b) New Delhi
   (c) Colombo (d) Kathmandu
9. Which among the following is not a Bretton Woods Institution ?
   (a) International Monetary Fund (IMF)
   (b) World Bank
   (c) Organisaiton of Economic Cooperation and Development (O.E.C.D.)
   (d) None of these
10. Equilibrium price in the market is determined by the
    (a) equality between total cost and total revenue
    (b) equality between average cost and average revenue.
    (c) equality between marginal cost and marginal revenue
    (d) equality between marginal cost and average cost.
11. In the national context which of the following indicates Macro Approach ?
    (a) Sales of Bata Shoe Company
    (b) Exports of Mangoes to U.K.
    (c) Income from Railways
    (d) Inflation in India
12. Internal economies
    (a) arise in an economy as it makes progress
    (b) accrue to a firm when it expands its output
    (c) arise when there is expansion in internal trade
    (d) arise when there is expansion in an industry
13. One of the features of a free market economy is
    (a) public ownership of factors of production
    (b) rationing and price control
    (c) consumer's sovereignty
    (d) active state intervention
14. Gross National Product – Depreciation Allowance = ?
    (a) Gross Domestic Product
    (b) Personal Income
    (c) Net National Product
    (d) Per Capita Income
15. The Panchayat Samiti remains accountable for its functions to
    (a) The Gram Panchayats and Gram Sabhas
    (b) Zilla Parishads
    (c) Anchal Panchayats
    (d) Janpad Panchayats
16. The legislature gains a priority over the executive in
    (a) A Federal Government
    (b) An Authoritarian Government
    (c) A Parliamentary Government
    (d) A Presidential Government
17. The legislature in a democratic country can influence public opinion by
    (a) Granting rights
    (b) Enacting non controversial laws
    (c) Defining the duties of the citizens
    (d) Focusing attention on public issues

18. If the President wants to resign from his office, he may do so by writing to the
    (a) Vice President
    (b) Chief Justice of India
    (c) Prime Minister
    (d) Speaker of Lok Sabha
19. Which of the following is not a Union Territory ?
    (a) Lakshadweep
    (b) Puducherry
    (c) Nagaland
    (d) Dadra and Nagar Haveli
20. The greatest king of the Pratihara dynasty was
    (a) Bhoj (Mihir–Bhoj)
    (b) Dantidurga
    (c) Nagbhatta II
    (d) Vatsaraj
21. In 1939 Subhash Chandra Bose was elected as President of the Congress Party defeating
    (a) Jawaharlal Nehru
    (b) Maulana Abul Kalam Azad
    (c) V.B. Patel
    (d) Pattabhi Sitharamayya
22. Jallianwala incident took place at
    (a) Lucknow (b) Surat
    (c) Amritsar (d) Allahabad
23. Who was the founder of Lodhi dynasty ?
    (a) Sikandar Lodhi
    (b) Bahlol Lodhi
    (c) Ibrahim Lodhi
    (d) Daulat Khan Lodhi
24. Which one of the following pair is not correctly matched ?
    (a) Akbar – Todarmal
    (b) Chanakya – Chandragupta
    (c) Vikramaditya – Chaitanya
    (d) Harshvardhan – Hiuen Tsang
25. The South East trade winds are attracted towards the Indian sub continent in the rainy season due to
    (a) the effect of easterlies
    (b) the effect of Northern–East trade winds
    (c) the presence of low atmospheric pressure over North–West India
    (d) the development of cyclone over the equator
26. The 'graded profile' of a river course is a
    (a) smooth curve in the upper course
    (b) smooth curve in the middle course
    (c) smooth curve in the lower course
    (d) smooth curve from source to mouth
27. Sink hole is a phenomenon of _____ topography.
    (a) Desert (b) Tundra
    (c) Karst (d) Plain
28. Kerala is famous for the cultivation of
    1. Coconut 2. Black pepper
    3. Rubber 4. Rice
    (a) 1, 2 and 4 (b) 2, 3 and 4
    (c) 1 and 4 (d) 1, 2 and 3
29. The longest continental Railway in the world is
    (a) Trans Siberian Railway
    (b) Canadian Pacific Railway
    (c) Canadian National Railway
    (d) Trans Atlantic Railway
30. Photoperiodisrn affects
    (a) Flowering
    (b) Vegetative growth
    (c) Fruiting
    (d) All of these
31. Match the following :

I	II
A. Ascorbic acid	1. Photosynthetic pigment
B. Chlorophyll	2. Quencher
C. Carotenoid	3. Enzyme
D. Superoxide dismutase	4. Vitamin–C

	A	B	C	D
(a)	4	2	1	3
(b)	2	4	1	3
(c)	4	1	3	2
(d)	4	1	2	3

32. Allantois of Embryo helps in
    (a) respiration (b) excretion
    (c) protection (d) digestion
33. Which one of the following animals belongs to mollusca ?
    (a) Hare (b) Hydra
    (c) Hyla (d) Haliotis
34. Outside the nucleus DNA is found in
    (a) Mitochondria
    (b) Ribosome
    (c) Endoplasmic reticulum
    (d) Golgi bodies
35. Animal protein is called first class protein because it is
    (a) delicious in taste
    (b) cheaper in the market
    (c) rich in essential amino acids
    (d) easily digestible
36. It is easy to burst a gas filled balloon with a needle than with a nail. It is because
    (a) nail exerts more pressure than needle on the balloon

(b) needle exerts more pressure than nail on the balloon
(c) gas is reactive with the needle
(d) nail is more longer than needle

37. The velocity of sound in moist air is more than in dry air because the moist air has
(a) less pressure than dry air
(b) more pressure than dry air
(c) more density than dry air
(d) less density than dry air

38. X–rays can be used
(a) to detect heart diseases.
(b) to detect defects in precious stones and diamonds.
(c) to detect gold under the earth.
(d) for cutting and welding of metals.

39. Ice is packed in saw dust because
(a) saw dust is poor conductor of heat.
(b) saw dust is a good conductor of heat.
(c) saw dust does not stick to the ice.
(d) saw dust will not get melted easily.

40. What is used to identify whether a data word has an odd or even number of 1's ?
(a) Sign bit (b) Zero bit
(c) Parity bit (d) Carry bit

41. Rearranging and allocating space in memory to provide for multiple computing tasks is called
(a) Multiprogramming
(b) Multitasking
(c) Memory Management
(d) Networking

42. What happens when a drop of glycerol is added to crushed KMnO4 spread of a paper ?
(a) There is a violent explosion
(b) There is no reaction
(c) The paper ignites
(d) There is a crackling sound.

43. Most commonly used bleaching agent is
(a) Alcohol
(b) Carbon dioxide
(c) Chlorine
(d) Sodium chloride

44. The least penetrating power ray is
(a) a–Ray (b) b–Ray
(c) g–Ray (d) X–Ray

45. Hydrogen peroxide is an effective sterilizing agent. Which one of the following product results when it readily loses active oxygen ?
(a) Water (b) Hydrogen
(c) Ozone
(d) Nasant Hydrogen

46. The maximum fixation of solar energy is done by
(a) Bacteria (b) Fungi
(c) Green plants (d) Protozoa

47. The term 'brown air' is used for
(a) Photochemical smog
(b) Sulfurous smog
(c) Industrial smog
(d) Acid fumes

48. Which of the following is FALSE with respect to rain water harvesting?
(a) It helps raising water table
(b) It helps meet rising water demand
(c) It increases run–off losses
(d) It is a device of water conservation

49. Peroxyacetyl nitrate is a
(a) Plant hormone
(b) Vitamin
(c) Secondary pollutant
(d) Acidic dye

50. Which of the following river does not originate in Indian territory ?
(a) Mahanadi (b) Brahmaputra
(c) Satluj (d) Ganga

51. A computer executes programs in the sequence of :
(a) Decode, Fetch, Execute
(b) Execute, Fetch, Decode
(c) Fetch, Decode, Execute
(d) Store, Fetch, Execute

52. What is 'Reformation'?
(a) Revival of classical learning
(b) The revolt against authority of pope
(c) Rise of absolute monarchy
(d) Change in attitude of man

53. Which of the following particles has the dual nature of particle–wave ?
(a) Neutron (b) Electron
(c) Meson (d) Proton

54. SIDBI stands for :
(a) Small Industries Developmental Banker Institute
(b) Small Industrial Designed Bank of India
(c) Small Innovations Development Banker's Institute
(d) Small Industries Development Bank of India

55. The metal ion present in vitamin B12 is :
(a) nickel (b) cobalt
(c) iron (d) zinc
56. Swaraj is my Birth Right and I shall have it. This was advocated by :
(a) Mahatma Gandhi
(b) Lala Lajpat Rai
(c) Sardar Patel
(d) Lokmanya Tilak
57. Which of the following is called the Light house of the Mediterrancan ?
(a) Stromboli of sicily
(b) Mount Pelee of West Indies
(c) Paracutin of Mexico
(d) Vesuvius of Italy
58. Who of the following has given the term rhizosphere :
(a) Alexopolus
(b) Garret
(c) Hiltner
(d) None of the given options
59. Which one among the following industries in the maximum consumer of water in India ?
(a) Textile
(b) Engineering
(c) Paper and Pulp
(d) Thermal Power
60. First Nobel Prize to India was given for :
(a) Physics (b) Literature
(c) Medicine (d) Chemistry
61. Gandhiji's Famous Quit India Movement call to the British was given in :
(a) 1940 (b) 1942
(c) 1941 (d) 1943
62. Choose the correct option which represents the arrangement of atmospheric layers.
(a) Troposphere, Stratosphere, Mesosphere, Ionosphere, Exosphere
(b) Mesosphere, Ionosphere, Exosphere, Troposphere, Stratosphere
(c) Ionosphere, Exosphere, Mesosphere, Troposphere, Stratosphere
(d) Exosphere, Troposphere, Ionosphere, Mesosphere, Stratosphere
63. Which of the following options correctly explains the term 'heat budget'?
(a) It is the amount of heat which the surface of earth receives form the sun.
(b) It is the radiation from the earth in the form of long waves
(c) It is a mode of transfer of heat through matter by molecular activity.
(d) It is the balance between incoming and outgoing radiation.
64. Reverse transcription was discovered by :
(a) Beadle and Tatum
(b) Watson and Crick
(c) Temin and Baltimore
(d) Har Govind Khorana
65. Burns caused by steam are much more severe than those caused by boiling water because:
(a) Steam pierces through the pores of body quickly
(b) Temperature of steam is higher
(c) Steam is gas and engulfs the body quickly
(d) Steam has latent heat
66. Which among the following is the sweetest sugar ?
(a) lactose (b) maltose
(c) glucose (d) fructose
67. Ultra purification of a metal is done by :
(a) smelting (b) leaching
(c) zone melting (d) slagging
68. The layer of atmosphere close to the earth's surface is called:
(a) Exosphere (b) Ionosphere
(c) Stratosphere (d) Troposphere
69. Microbial degradation of nitrates into atmospheric nitrogen is known as :
(a) Ammonification
(b) Denitrification
(c) Putrefacation
(d) Nitrifcation
70. Which of the following is in the ascending order of Data hierarchy ?
(a) Bit–Byte – Record – Field – Database – File
(b) Byte – Bit – File – Record – Database – Field
(c) Bit– Byte – Field – Record – File – Database
(d) Field – Byte – Bit – Record – File– Database
71. The best milch breed in the world is :
(a) Deoni
(b) Holstein – Friesian
(c) Sindhi
(d) Chittagong

72. In which year was the Indian National Congress formed :
(a) 1901 (b) 1835
(c) 1875 (d) 1885
73. Bangladesh was created in :
(a) 1973 (b) 1970
(c) 1972 (d) 1971
74. Raja Ram Mohan Roy was the founder of :
(a) Brahmo Samaj
(b) Prathna Samaj
(c) Ram Krishna Mission
(d) Arya Samaj
75. Pulses are obtained from the family :
(a) Liliaceae (b) Fungi
(c) Cycadaceae (d) Leguminosae
76. Who was the Indian women president of the United Nations General Assembly ?
(a) Margret Thatcher
(b) Golda Mayer
(c) Sarojini Naidu
(d) Vijya Lakshmi Pandit
77. The one rupee note bears the signature of :
(a) Governor, Reserver Bank of India
(b) Finance Minister
(c) Secretary, Ministry of Finance
(d) None of these
78. What is the currency of Saudi Arabia ?
(a) Riyal (b) Pound
(c) Lira (d) Dinar
79. Reserve Bank of India was nationalised in :
(a) 1951 (b) 1947
(c) 1935 (d) 1949
80. Which among the following is a folk dance of India.
(a) Kathakali (b) Mohiniattam
(c) Manipuri (d) Garba
81. NABARD stands for
(a) National business for Accounting and Reviewing
(b) National Bank for Agriculture and Rural Development
(c) National Bank for Aeronautics and Radar Development
(d) National Bureau for Air and Road Transport
82. Surplus budget is recommended during :
(a) Depression (b) Boom
(c) War (d) Famines
83. Who was the first Speaker of the Lok Sabha :
(a) B.R. Ambedkar
(b) G.V. Mavalankar
(c) N. Sanjeev Reddy
(d) Dr S.P. Mukherjee
84. What is the plural volting system?
(a) All the citizens caste three votes each
(b) Eligible voter exercises one vote and some voters with specific qualifications cast more than one vote.
(c) Only the higher officials caste more than one votes
(d) Candidates themselves caste more than one vote.
85. Which of the following plant shows chloroplast dimorphism?
(a) Sugarcane (b) Sugar beet
(c) Rice (d) Wheat
86. Day and Night are equal at the :
(a) Prime Meridian
(b) Poles
(c) Equator
(d) Antarctic
87. Economic profit or normal profit is the same as :
(a) accounting profit
(b) optimum profit
(c) net profit
(d) maximum profit
88. Evergreen type forests are found in :
(a) Mediterranean region
(b) Monsoon climatic area
(c) Desert region
(d) Equatorial region
89. The gene which exhibits multiple effects is known as :
(a) Pleiotropic
(b) Pseudogene
(c) Polygene
(d) Complementary
90. The ash–grey soils of high latitude coniferous forests are known as :
(a) Grey–Brown soils
(b) Red and Yellow soils
(c) Tundra soils (d) Podsols
91. Radio activity was discovered by :
(a) Curie (b) Beequeral
(c) Soddy (d) Rutherford
92. Muddy water is treated with alum in purification process, it is termed as :
(a) absorption (b) adsorption
(c) coagulation (d) emulsification
93. An enzyme produced by HIV that allows the integration of HIV DNA into the host cell's DNA is :
(a) DNA gyrase (b) Ligase
(c) Integrase (d) Helicase

94. Voting is :
(a) The unit of area who constitute a unit for electing representative
(b) The process by which voters exercise their right to vote
(c) The process of selecting representatives
(d) Universal adult franchise.

95. The two specific heats of gases are related by :
(a) Cp / Cv = R (b) Cp – Cv = RJ
(c) Cp – Cv = R/J (d) Cp + Cv = RJ

96. Who initiated the movement to form the Indian National Congress :
(a) Annie Besant (b) A.O. Hume
(c) W.C. Banerjee (d) Gandhi ji

97. Best way to conserve our water resources :
(a) All of the options mentioned here.
(b) Encouragement of natural regeneration of vegetation
(c) Sustainable water utilization
(d) Rain water harvesting

98. Constitutional Monarchy means :
(a) The King is elected by the people
(b) The King interprets the constitution
(c) The King writes the constitution
(d) The King exercises power as granted by constitution

99. What is popular sovereignty ?
(a) Sovereignty of the legal head
(b) Sovereignty of the head of state
(c) Sovereignty of the people
(d) Sovereignty of peoples representative

100. Granite, quartzite areas have upstanding look because
(a) not easily worn
(b) these rocks are resistant to all kinds of erosion
(c) these rocks are not easily eroded
(d) mechanically weathered faster

101. Indus Valley Civilization was discovered in:
(a) 1911 (b) 1921
(c) 1931 (d) 1941

102. Who is the most important God in Rigaveda?
(a) Agni (b) Indra
(c) Varun (d) Vishnu

103. The main reason for the boycott of Simon Commission in India was
(a) Appointment before time
(b) All the members were Englishman
(c) Chairman was a member of British Liberal Party
(d) None of these

104. The earliest epigraphic evidence mentioning the birth place of Sakyamuni Buddha is obtained from
(a) Sarnath (b) Sravasti
(c) Kausambi (d) Rummindei

105. Rulers of which of the following dynasties maintained diplomatic relations with distant countries like Syria in the west?
(a) Maurya (b) Gupta
(c) Pallava (d) Chola

106. Who of the following also had the name Devanama Priyadasi?
(a) Chandragupta Maurya
(b) Ashoka
(c) Bindusara
(d) Harsha

107. Who of the following had issued gold coins for the first time?
(a) Kujula Kadphises
(b) Vima Kadphises
(c) Kanishka
(d) Huvishka

108. Who was the first ruler of Gupta dynasty to assume the title of 'Maharajadhiraja?
(a) Srigupta
(b) Chandragupta I
(c) Samudragupta
(d) Chandragupta II

109. Who declared the 'Law of Gravity' long before the Newton's law ?
(a) Aryabhatta (b) Prithuyasas
(c) Brahmagupta (d) Varahamihira

110. Arab was defeated in 738 AD by
(a) Pratiharas (b) Rashtrakutas
(c) Palas (d) Chalukyas

111. Which Sultan of Delhi had established a separate agriculture department and had planned the rotation of crops?
(a) Iltutmish
(b) Balban
(c) Alauddin Khilji
(d) Muhammad Bin Tughlaq

112. Among the following, which Mughal emperor introduced the policy of Sulah-i-Kul?
(a) Akbar (b) Jahangir
(c) Humayun (d) Aurangzeb

113. Who among the following Maratha women led struggles against of Mughal empire from 1700 AD onwards?
(a) Ahalya Bai (b) Mukta Bai
(c) Tara Bai (d) Rukmini Bai

114. Who among the following formulated and implemented the 'Doctrine of Lapse'?
(a) Lord Wellesley
(b) Lord Clive
(c) Lord Hastings
(d) Lord Dalhousie

115. Subhash Chandra Bose had founded 'Forward Block' in the year
(a) 1936 AD (b) 1937 AD
(c) 1938 AD (d) 1939 AD

116. Name the foreign journalist who reported Satyagrah at Dharsana salt work was
(a) Mark Tully (b) Web Miller
(c) Philip Sprat (d) Francis Louis

117. Who introduced the Indian University Act?
(a) Lord Curzon (b) Lord Minto
(c) Lord Morelay (d) Lord Rippon

118. Which one of the following ocean currents is different from others?
(a) Gulf stream
(b) Kuroshivo
(c) North Atlantic Drift
(d) Labrador

119. The clockwise movement of winds in the cyclones of southern hemisphere is mainly caused by
(a) Centrifugal force
(b) Deflective force
(c) Frictional force
(d) Pressure force

120. The neighbouring country of India which has the largest area is
(a) Bangladesh (b) China
(c) Pakistan (d) Nepal

121. The river also known as Tsangpo in Tibet is
(a) Brahmaputra (b) Indus
(c) Sutlej (d) Teesta

122. Project Tiger was launched in
(a) 1973 (b) 1980
(c) 1982 (d) 1984

123. 'Jhum' is
(a) A tribe in the North-East of India
(b) The type of cultivation
(c) A Folk dance
(d) The name of a river

124. Which state of India tops in literacy?
(a) Kerala (b) Tamil Nadu
(c) Delhi (d) Uttar Pradesh

125. The principle of Black hole was enunciated by
(a) C.V. Raman
(b) H.J. Bhabha
(c) S. Chandrashekhar
(d) H. Khurana

126. Which planet is called "Evening star"?
(a) Mars (b) Jupiter
(c) Venus (d) Saturn

127. Rift valley is formed by
(a) Earthquake (b) Folding
(c) Faulting (d) All of these

128. The total population divided by available arable land area is referred to as
(a) Population density
(b) Nutritional density
(c) Agricultural density
(d) Industrial density

129. Which planets are known as the 'big four'?
(a) Saturn, Uranus, Neptune and Mercury
(b) Jupiter, Saturn, Neptune and Uranus
(c) Earth, Venus, Mars and Jupiter
(d) Venus, Mercury, Mars and Saturn

130. Which of the following statements is not correct?
(a) The real earth has a needle that passes through earth's centre
(b) Axis is an imaginary line
(c) The earth moves around its axis.
(d) The north and south end of the earth's axis are called north and south pole respectively.

131. Which soil swells when wet and develops cracks when dry?
(a) Alluvial (b) Red
(c) Black (d) Laterite

132. The minimum distance between the sun and the earth occurs on
(a) December 22
(b) June 21
(c) September 22
(d) January 3

133. Which comet appears every 76 years?
(a) Hailey's
(b) Holme's
(c) Donati's
(d) Alpha Centauri

134. The most prominent gases in the atmosphere, in terms of volume, are
(a) nitrogen and methane
(b) nitrogen and oxygen
(c) oxygen and carbon dioxide
(d) hydrogen and nitrogen.

135. What is a tornado?
(a) A very high pressure centre
(b) A very low pressure centre
(c) A very high ocean wave
(d) A planetary wind
136. In the constitution of India, the term 'federal' appears in
(a) The preamble
(b) Part III of the constitution
(c) Article 368
(d) None of the above
137. Which of the following articles of the Indian constitution deals with citizenship in India?
(a) Article 333 to 337
(b) Article 17 to 20
(c) Article 05 to 11
(d) Article 01 to 04
138. Which term is not used in the preamble of the Indian constitution?
(a) Republic (b) Integrity
(c) Federal (d) Socialist
139. The Constitution of India vests the executive powers of the Indian Union in which of the following ?
(a) The prime minister
(b) The president
(c) The council of ministers
(d) The parliament
140. Money bill is introduced in
(a) Lok Sabha
(b) Rajya Sabha
(c) Joint sitting of both the Houses
(d) None of the above
141. Three-tier system of Panchayati Raj consists of
(a) Gram Panchayat, Panchayat samiti, Block Samiti
(b) Gram Panchayat, Block samiti, Zila Parishad
(c) Gram Panchayat, Panchayat Samiti, Zila Parishad
(d) Gram Panchayat, Zila Parishad, Block Samiti
142. Elections in the Panchayati Raj Institutions in India are conducted by
(a) State Election commissioner
(b) Election commission of India
(c) State Government
(d) Central Government
143. What is the main difference between Fundamental Rights and the Directive Principles of state policy?
(a) Constitutional Protection
(b) Political Protection
(c) Judicial Protection
(d) Moral Protection
144. Which of the following is not provided for by the constitution of India?
(a) Election Commission
(b) Finance Commissions
(c) Public Service Commission
(d) Planning Commission
145. Which Article of the constitution allows the centre to form new states ?
(a) Article 3 (b) Article 4
(c) Article 5 (d) Article 6
146. The source of the basic structure theory of the constitution of India is
(a) the constitution
(b) opinion of jurists
(c) indicial interpretation
(d) parliamentary statutes
147. When was the first amendment in the Indian Constitution made?
(a) July 1950
(b) December 1950
(c) June 1951
(d) July 1951
148. When did the Indian constitution Assembly meet for the first time?
(a) 26 Jan, 1950 (b) 15Aug, 1947
(c) 9 Dec, 1946 (d) 19 Nov, 1949
149. The President can be impeached on the grounds of violating the constitution.
(a) The chief justice of India
(b) The vice-president of India
(c) The speaker of the Lok Sabha
(d) The two Houses of Parliament
150. How many articles are there in the Indian constitution?
(a) 395 (b) 396
(c) 398 (d) 399
151. Right to Constitutional Remedies are available to:
(a) only citizens of India
(b) all persons in case of infringement of a fundamental right
(c) any person for enforcing a fundamental rights conferred on all
(d) an aggrieved individual alone
152. Enforcement of Directive Principles depends on :
(a) Courts
(b) Effective opposition in the Parliament
(c) Resources available to the Government
(d) Public cooperation

153. The SI unit of current is
(a) kelvin (b) ampere
(c) newton (d) volt
154. When a substance is heated its density
(a) increases (b) decreases
(c) remains same (d) none of these
155. Splitting of Uranium nucleus releases
(a) kinetic energy
(b) potential energy
(c) nuclear energy
(d) chemical energy
156. Potential energy of your body is minimum when you –
(a) are standing
(b) are sitting on a chair
(c) are sitting on the ground
(d) lie down on the ground
157. What is the sign of the work performed on an object in uniform circular motion?
(a) Zero
(b) Positive
(c) Negative
(d) Depends on the particular situation
158. What is the magnitude of the work done by a force acting on a particle instantaneously?
(a) Zero (b) Positive
(c) Negative (d) None of these
159. The units of power are defined as
(a) Joules
(b) Newtons
(c) Joules per meter
(d) Watts
160. The potential energy is always the same for an object with the same
(a) Velocity (b) Speed
(c) Acceleration (d) Position
161. If the weight of a body is more than the weight of the liquid displaced by it, then the body may:
(a) float
(b) first floats and then sinks
(c) sinks
(d) neither floats nor sinks
162. Stationary wave is formed by
(a) a transverse wave superposing a longitudinal wave
(b) two waves of the same speed superposing
(c) two waves of same frequency travelling in the same direction
(d) two waves of same frequency travelling in the opposite direction
163. Ultrasonic waves have frequency –
(a) below 20 Hz
(b) between 20 and 20,000 Hz
(c) only above 20,000 Hz
(d) only above 20,000 MHz
164. A real, inverted and highly diminished image is formed by a convex lens when the object is placed at
(a) the focus (b) infinity
(c) 2F (d) none of these
165. The type of lens used as a magnifying glass
(a) concave lens
(b) convex lens
(c) concavo-convex lens
(d) convexo-concave lens
166. The focal length of a concave mirror depends upon –
(a) The radius of curvature of the mirror
(b) The object distance from the mirror
(c) The image distance from the mirror
(d) Both image and object distance
167. The radius of curvature of a plane mirror is -
(a) zero (b) infinite
(c) negative (d) finite
168. The most appropriate measure of a country's economic growth is its:
(a) Gross Domestic Product
(b) Net Domestic Product
(c) Net National Product
(d) Per Capita Real Income
169. Which of the following committees examined and suggested financial sector reforms?
(a) Abid Hussain Committee
(b) Bhagwati Committee
(c) Chelliah Committee
(d) Narasimham Committee
170. SEBI is a
(a) constitutional body
(b) advisory body
(c) staturory body
(d) non-statutory body
171. Indian Economy is.....economy.
(a) mixed (b) socialist
(c) free (d) Gandhian
172. The 'Father of Economics' is:
(a) Max Muller (b) Karl Marx
(c) Adam Smith (d) Paul

173. Who among the following was the first Chairman of the Planning Commission?
(a) Dr Rajendra Prasad
(b) Pt Jawaharlal Nehru
(c) Sardar Vallabhbhai Patel
(d) JB Kriplani

174. In which area is the public sector most dominant in India?
(a) Organized term lending financial institutions
(b) Transport
(c) Commercial banking
(d) Steel production

175. Devaluation of currency leads to:
(a) fall in domestic prices
(b) increase in domestic prices
(c) no impact on domestic prices
(d) erratic fluctuations in domestic prices

176. MRTP Act was implemented in:
(a) 1967 (b) 1968
(c) 1969 (d) 1970

177. Finance Commission is constituted every:
(a) two years (b) three years
(c) five years (d) six years

178. 'Sarvodaya Plan' was prepared by:
(a) Jaiprakash Narayan
(b) Mahatma Gandhi
(c) Binoba Bhave
(d) Jawaharlal Nehru

179. RBI was nationalized in:
(a) 1949 (b) 1935
(c) 1969 (d) 1955

180. Which of the following institutions does not provide loans directly to the farmers?
(a) NABARD
(b) State Bank of India
(c) Regional Rural Bank
(d) Primary Agricultural Credit Society

181. Green Revolution in India was launched in:
(a) 1971-72 (b) 1960-61
(c) 1966-67 (d) 1980-81

182. Disguised unemployment in India is prevalent in:
(a) service sector
(b) manufacturing sector
(c) agriculture sector
(d) None of these

183. The concept of greenhouse gases was postulated by
(a) C.C. Park
(b) J.N.N. Jaffers
(c) Joseph Fourier
(d) L. Zobler

184. Eco-Mark is given to the Indian products that are
(a) Pure and unadulterated
(b) Rich in proteins
(c) Environment-friendly
(d) Economically viable

185. Chipko movement was basically against
(a) Water pollution
(b) Noise pollution
(c) Deforestation
(d) Cultural pollution

186. Acid rain is caused due to air pollution by
(a) carbon dioxide
(b) carbon monoxide
(c) methane
(d) nitrous oxide and sulphur dioxide

187. To meet Euro II emission standards, what should be the sulphur content in the ultra low sulphur diesel ?
(a) 0.05 percent or less
(b) 0.10 percent
(c) 0.15 percent
(d) 0.20 percent

188. The concept of ecological niche was first introduced by
(a) C.C. Park
(b) E.P. Odum
(c) J. Grinnell
(d) G.E. Hutchinson

189. Which one of the following is not related to water pollution ?
(a) Eutrophication
(b) Nitrification
(c) Biological Oxygen Demand (BOD)
(d) Oil slicks

190. All components and individuals in an ecosystem are
(a) individualistic
(b) independent
(c) interdependent
(d) dispensable

191. What term denotes the organisms getting their food from others ?
(a) Heterotrophs
(b) Autotrophs
(c) Producers
(d) Synthesizers

192. Which of the following environmentalists first gave the concept of Biodiversity 'Hotspots' ?
(a) Julia Hill
(b) John Muir
(c) Norman Myers
(d) Gaylord Nelson

193. The loss of biodiversity is due to
(a) the destruction of natural habitats of organism
(b) environmental pollution
(c) destruction of forests
(d) all the above

194. As an ecosystem, wetlands are useful for which of the following?
(a) For nutrient recovery and cycling
(b) For releasing heavy metals through absorption by plants
(c) In reducing saltation of rivers by retaining sediments
(d) All of the above

195. Vermicompost is a/an
(a) inorganic fertilizer
(b) toxic substance
(c) organic biofertilizer
(d) synthesis fertilizer

196. Environmental Kuznets curve
(a) a semi-circle curve suggesting increase in per-capita income increases the pollution
(b) a U-shaped curve suggesting the level of development and carbon emission
(c) suggest a U-shaped relationship between the carbon emission and Ozone layer depletion
(d) suggest a bell-shaped relationship between the concentration of certain pollution emission and per-capita real GDP

197. Who is known as 'Raffale of East'?
(a) Raja Ravi Verma
(b) Raja Martanda
(c) Raja Keshav Varma
(d) Raja Uday Rao

198. The panchatantra was written during the
(a) Later Vedic period
(b) Mughal period
(c) Maurya period
(d) Post Gupta period

199. Katputli, the string puppetry belongs to
(a) Rajasthan
(b) Karnataka
(c) Madhya Pradesh
(d) Uttrakhand

200. In which year SPIC MACAY was established?
(a) 1977 (b) 1919
(c) 1954 (d) 1955

201. Thillana is a format of
(a) Kuchipudi
(b) Odissi
(c) Baharatanatyam
(d) Kathak

202. Where is the Tagore Centre for the Study of Culture and Civilization?
(a) Shimla
(b) Kolkata
(c) Chennai
(d) Dehradun

203. Thumri Singer Girija Devi belongs to which among the following Gharanas?
(a) Banaras Gharana
(b) Agra Gharana
(c) Kirana Gharana
(d) Lucknow Gharana

204. Highest award given to civilian in India is
(a) Bharat Ratna
(b) Padma Vibhushan
(c) Sharam Award
(d) Padma Bhushan

205. Sports coaches receive which of the following awards?
(a) Rajiv Gandhi Khel Ratna Award
(b) Dronacharya Award
(c) Arjuna Award
(d) None of these

206. Saraswati Samman is given to which field?
(a) Sanskrit Literature
(b) Science
(c) Literature
(d) Social Harmony

207. The Rajiv Gandhi National Sadbhavana Award conferred in the field of
(a) Communal harmony and peace
(b) Literature
(c) Medical Science
(d) Sports

208. Dhyanchand Puraskar conferred in the field of
(a) Music (b) Sports
(c) Science (d) Literature

209. The prestigious Ramon Magsaysay Award was conferred upon Mr.Arvind Kejriwal in which of the following category?
(a) Emergent Leadership
(b) Literature
(c) Community Welfare
(d) Government Service

210. Vishwakarma Rashtriya Puraskar is given by which ministry?
(a) Ministry of Culture
(b) Ministry of Labour
(c) Ministry of Minority
(d) Ministry of Rural Development

211. Which state gives the Nandi Award?
(a) Kerala (b) Tamilnadu
(c) Karnataka
(d) Andhra Pradesh

212. 'Playing to Win' is written by
(a) Salman Rushdie
(b) Saina Nehwal
(c) Nadeem Aslam
(d) Harsh Mander

213. 'A Voice for Freedom' is a book written by
(a) Corazon Aquino
(b) Nayantara Sahgal
(c) Aung San Suu Kyi
(d) Benazir Bhutto

214. The books Chitrangada, Gitanjali and Gora were written by
(a) Rabindra Nath Tagore
(b) Kuldip Nayyar
(c) Amrita Pritam
(d) Khushwant Singh

215. Who wrote Jungle Book?
(a) Mohd. Salim
(b) Rudyard Kipling
(c) Sibhu
(d) R.K. Narayan

216. Who wrote, 'Towards Total Revolution'?
(a) Lenin
(b) Subash Chandra Bose
(c) A.K. Goplan
(d) Jayaprakash Narayan

217. 'The Naked Face', a very popular book is written by
(a) Dominique Lapierre
(b) Larry Collins
(c) Sidney Sheldon
(d) Juan Benet

218. 'A passage to England' was written by
(a) Nirad C Chaudhury
(b) RK Narayan
(c) Khushwant Singh
(d) Nayantra Sehgal

219. Who was the first ODI captain for India?
(a) Ajit Wadekar
(b) Bishan Singh Bedi
(c) Kapil Dev
(d) Vinoo Mankad

220. Rangaswami Cup is associated with
(a) Wrestling (b) Football
(c) Hockey (d) Golf

221. 'Ashes' is the term associated with which of the following sports?
(a) Cricket (b) Badminton
(c) Basketball (d) Football

222. Who was the first Indian to win an individual medal in Olympics?
(a) PT Usha
(b) Karnam Malleshwari
(c) Deepika Kumari
(d) Sania Nehwal

223. When did the Wimbledon Grand Slam Tennis tournament start?
(a) 1857 (b) 1877
(c) 1897 (d) 1898

224. Which one of the following countries had hosted the first world Paralympic Games in 1960?
(a) Rome, Italy
(b) Mumbai, India
(c) Madrid, Spain
(d) Paris, France

225. What is the number of players in Polo and Water-polo respectively?
(a) 2 and 5 (b) 7 and 9
(c) 4 and 7 (d) 6 and 5

226. Duleep Trophy is associated with the game of
(a) Hockey (b) Badminton
(c) Football (d) Cricket

227. The first world cup hockey was played in
(a) Amsterdom, 1972
(b) Barcelona, 1971
(c) Kualalumpur, 1975
(d) Mumbai, 1976

228. Who was the first Indian to win the World Amateur Billiards title?
(a) Geet Sethi
(b) Wilson Jones
(c) Michael Ferreira
(d) Manoj Kothari

229. Which of the following trophies is NOT associated with cricket?
(a) Charminar Challenge Cup
(b) Thomas Cup
(c) Rohinton Baria Trophy
(d) Duleep Trophy

230. Who was the 1st ODI captain for India?
(a) Bishen Singh Bedi
(b) Ajit Wadekar
(c) Vinoo Mankad
(d) Nawab Pataudi

231. If you are going to a site you use often, instead of having to type in the address every time, you should .....
(a) save it as a file \
(b) make a copy of it
(c) bookmark it
(d) delete it

232. For creating a document, you use ..... command at File Menu.
(a) Open (b) Close
(c) New (d) Save

233. A(n) ..... is created by an application.
(a) executable file
(b) software program
(c) document
(d) operating system

234. To restart the computer ..... key is used.
(a) Del + Ctrl
(b) Backspace + Ctrl
(c) Ctrl + Alt + Del
(d) Reset

235. A word in a web page that, when clicked, opens another document ..... .
(a) anchor (b) URL
(c) hyperlink (d) reference

236. Which key is used in combination with another key to perform a specific task?
(a) Function (b) Control
(c) Arrow (d) Space bar

237. The taskbar is located .....
(a) on the Start menu
(b) at the bottom of the screen
(c) on the Quick Launch toolbar
(d) at the top of the screen

238. Which of the following refers to the fastest, biggest and most expensive computers ?
(a) Personal Computers
(b) Supercomputers
(c) Laptops
(d) Notebooks

239. A ——— is an electronic device that process data, converting it into information.
(a) computer (b) processor
(c) case (d) stylus

240. Portable computer, also known as laptop computer, weighing between 4 and 10 pounds is called
(a) general-purpose application
(b) Internet
(c) scanner
(d) notebook computer

241. A personal computer is designed to meet the computing needs of a(n)
(a) individual (b) department
(c) company (d) city

242. To change selected text to all capital letters, click the change case button, then click
(a) Uppercase (b) Upper all
(c) Capslock (d) Lock Upper

243. Which part of the computer helps to store information?
(a) Monitor (b) Keyboard
(c) Disk drive (d) Printer

244. In Excel, _____ contains one or more worksheets.
(a) Template (b) Workbook
(c) Active cell (d) Label

245. What is the package called which helps create, manipulate and analyse data arranged in rows and columns?
(a) Application package
(b) Word processing package
(c) Outlining package
(d) Spreadsheet package

246. The three faiths of Hinduism, Buddhism and Jainism were carved in
(a) Ellora caves
(b) Elephanta caves
(c) Ajanta caves
(d) Barabar hills

247. Which of the following is known as 'Seven Pagodas'?
(a) Mahabalipuram temple
(b) Karle caves
(c) Chaityas
(d) Elephanta caves

248. The image of Nataraja (the lord of dance) is a superb masterpiece of the period of
(a) Chola (b) Pandya
(c) Hoyasala (d) Chalukyas

249. Who among the following is a famous santoor player?
(a) Shiv Kumar Sharma
(b) Hari Prasad Chaurasia
(c) Ravi Shankar
(d) Zakir Hussain

250. Who amongst the following has directed the film 'Little Buddha'?
(a) Bernardo Bertolucci
(b) Mani Kaul
(c) Richard Attenburrough
(d) Durosowa

251. Prof. Milton Friedman was the leader of
(a) Ohio school
(b) Chicago school
(c) Cambridge school
(d) London school

252. Which one of the following is not a qualitative control of credit by the Central Bank of a country?
(a) Rationing of credit
(b) Regulation of consumer credit
(c) Variation of the reserve ratio
(d) Regulation of margin requirements

253. The market in whcih loans of money can be obtained is called
(a) Reserve market
(b) Institutional market
(c) Money market
(d) Exchange market

254. If the marginal return increases at a diminishing rate, the total return
(a) increases
(b) decreases
(c) remains constant
(d) becomes zero

255. The law of Increasing Returns means
(a) increasing cost
(b) decreasing cost
(c) increasing production
(d) increasing income

256. The most important feature of Cabinet system of Government is
(a) Individual responsibility
(b) Collective responsibility
(c) Responsibility to none
(d) Non-responsibility

257. Direct legislation in Switzerland has
(a) a natural growth
(b) a haphazard growth
(c) an artificial growth
(d) None of the above

258. Who gave the idea of "Cabinet Dietatorship"?
(a) Muir (b) Lowell
(c) Marriot (d) Laski

259. In which of the following countries are the judges of the federal court elected by the two Houses of the Federal Legislature?
(a) Switzerland (b) Germany
(c) Canada (d) Both (a) and (b)

260. The President of the USA appoints Supreme Court Judges
(a) with Senate's consent
(b) at his discretion
(c) with consent of the House of Representatives
(d) None of these

261. Multan was named by the Arabs as
(a) City of beauty (b) City of wealth
(c) City of gold (d) Pink city

262. Which one of the following was the book written by Amoghvarsha, the Rashtrakuta King?
(a) Adipurana
(b) Ganitasara Samgraha
(c) Saktayana
(d) Kavirajamarga

263. Who built the Kailasanatha Temple at Ellora?
(a) Rajendra I
(b) Mahendra Varman I
(c) Krishna I
(d) Govinda I

264. The land measures of the Second Pandyan Empire was mentioned in
(a) Thalavaipuram Copper Plates
(b) Uttirameru Inscription
(c) Kudumiyammalai Inscription
(d) Kasakudi Copper Plates

265. Who was the greatest ruler of the Satavahanas?
(a) Satkarni I
(b) Gautamiputra Satkarni
(c) Simuka
(d) Hala

266. Cactus is referred to as
(a) Hydrophyte (b) Mesophyte
(c) Xerophyte (d) Epiphyte

267. Which of the following is not a renewable resource?
(a) Thorium
(b) Geothermal heat
(c) Tidal power
(d) Radiant energy

268. Which of the following statements is correct?
(a) Mahadeo hills are in the west of Maikala hills.
(b) Mahadeo hills are the part of Karnataka Plateau.
(c) Mahadeo hills are in the east of Chhotanagpur Plateau.
(d) Mahadeo hills are the part of Aravalli ranges.

269. Which one of the following pairs is not correctly matched?
(a) Hevea Tree—Brazil
(b) Sumatra Storm—Malaysia
(c) Kajan River—Borneo
(d) Dekke Toba fish—Brazil

270. Which of the following resources is renewable one?
(a) Uranium (b) Coal
(c) Timber (d) Natural Gas

271. How many neck canal cells are found in the archegonium of a fern?
(a) One (b) Two
(c) Three (d) Four

272. Which angiosperm is vesselless?
(a) Hydrilla
(b) Trochodendron
(c) Maize
(d) Wheat

273. Who was the first child born after operative procedure?
(a) Caesar (b) Huxley
(c) William (d) Pasteur

274. Myrmecology is study of
(a) Insects (b) Ants
(c) Crustaceans (d) Arthropods

275. NIN (National Institute of Nutrition) Central Office is located at
(a) Hyderabad (b) Mumbai
(c) Bengaluru (d) Kolkata

276. HIV often changes is shapes due to the presence of an enzyme called
(a) Reverse Transcriptase
(b) Enterokinase
(c) Nucleotidase
(d) Nucleoditase

277. Fleming's right hand rule is used to find the direction of the
(a) Alternate current
(b) Direct current
(c) Induced current
(d) Actual current

278. The unit of electrical power is
(a) Volt (b) Watt
(c) Kilowatt hour (d) Ampere

279. The resistance of the human body (dry condition) is of the order of
(a) 101 Ohm (b) 102 Ohm
(c) 103 Ohm (d) 104 Ohm

280. Certain substances loose their electrical resistance completely at super low temperature. Such substances are called
(a) super conductors
(b) semi conductors
(c) dielectrics
(d) perfect conductors

281. The section of the CPU that selects, interprets and monitors the execution of program instructions is
(a) Memory (b) Register unit
(c) Control unit (d) ALU

282. Who among the following introduced the world's first laptop computer in the market?
(a) Hewlett-Packard
(b) Epson
(c) Laplink travelling software Inc
(d) Microsoft

283. Brass contains
(a) Copper and Zinc
(b) Copper and Tin
(c) Copper and Silver
(d) Copper and Nickel

284. Which is the purest commercial form of iron?
(a) Pig iron (b) Steel
(c) Stainless steel
(d) Wrought iron

285. In galvanization, iron is coated with
(a) Copper (b) Zinc
(c) Tin (d) Nicked

286. Which one of the following is also known as solution?
(a) A compound
(b) A homogeneous mixture
(c) A heterogeneous mixture
(d) A suspension

287. The cells which are closely associated and interacting with guard cells are
(a) Transfusion tissue
(b) Complementary cells
(c) Subsidiary cells
(d) Hypodermal cells

288. Conversion of starch to sugar is essential for
(a) Stomatal opening
(b) Stomatal closing
(c) Stomatal formation
(d) Stomatal growth

289. Soil erosion can be prevented by
(a) Increasing bird population
(b) Afforestation
(c) Removal of vegetation
(d) Overgrazing

290. Natural sources of air pollution are
(a) Forest fires
(b) Volcanic eruptions
(c) Dust storm
(d) Smoke from burning dry leaves

291. Which of the following Genetically Modified vegetable is recently being made available in Indian market?
(a) Carrot (b) Radish
(c) Brinjal (d) Potato

292. "Bull's eye" is used in the game of
(a) Boxing (b) Basketball
(c) Polo (d) Shooting

293. As per newspapers report what percent of Government stake will be disinvested in Rashtriya Ispat Nigam Ltd. (RINL)?
(a) 5% (b) 50%
(c) 10% (d) 12%

294. Pablo Picasso, the famous painter was
(a) French (b) Italian
(c) Flemish (d) Spanish

295. Which of the following is the Regulator of the credit rating agencies in India?
(a) RBI (b) SBI
(c) SIDBI (d) SEBI

296. Which is the first Indian Company to be listed in NASDAQ?
(a) Reliance (b) TCS
(c) HCL (d) Infosys

297. RRBs are owned by
(a) Central Government
(b) State Government
(c) Sponsor Bank
(d) Jointly by all of the above

298. The Monetary and Credit Policy is announced by which of the following?
(a) Ministry of Finance of Centre
(b) Reserve Bank of India
(c) State Bank of India
(d) Planning Commission of India

299. Which of the following method is not used in determining National Income of a country?
(a) Income Method
(b) Output Method
(c) Input Method
(d) Investment Method

300. What does the letter 'e' denotes in the term 'e-banking'?
(a) Essential Banking
(b) Economic Banking
(c) Electronic Banking
(d) Expansion Banking

ANSWERS KEY

1.	(a)	2.	(b)	3.	(c)	4.	(c)	5.	(c)	6.	(d)	7.	(d)
8.	(a)	9.	(c)	10.	(c)	11.	(d)	12.	(d)	13.	(c)	14.	(c)
15.	(b)	16.	(c)	17.	(d)	18.	(a)	19.	(c)	20.	(a)	21.	(d)
22.	(c)	23.	(b)	24.	(c)	25.	(c)	26.	(d)	27.	(c)	28.	(d)
29.	(a)	30.	(d)	31.	(d)	32.	(b)	33.	(d)	34.	(a)	35.	(c)
36.	(b)	37.	(c)	38.	(b)	39.	(a)	40.	(c)	41.	(c)	42.	(a)
43.	(c)	44.	(a)	45.	(a)	46.	(c)	47.	(a)	48.	(c)	49.	(c)
50.	(b)	51.	(c)	52.	(b)	53.	(b)	54.	(d)	55.	(b)	56.	(d)
57.	(a)	58.	(d)	59.	(d)	60.	(b)	61.	(b)	62.	(a)	63.	(d)
64.	(c)	65.	(d)	66.	(c)	67.	(c)	68.	(d)	69.	(b)	70.	(c)
71.	(b)	72.	(d)	73.	(d)	74.	(a)	75.	(d)	76.	(d)	77.	(d)
78.	(a)	79.	(d)	80.	(d)	81.	(b)	82.	(b)	83.	(b)	84.	(d)
85.	(a)	86.	(c)	87.	(b)	88.	(b)	89.	(a)	90.	(a)	91.	(b)
92.	(c)	93.	(c)	94.	(c)	95.	(b)	96.	(b)	97.	(a)	98.	(d)
99.	(c)	100.	(a)	101.	(b)	102.	(b)	103.	(b)	104.	(d)	105.	(a)
106.	(b)	107.	(b)	108.	(b)	109.	(c)	110.	(a)	111.	(d)	112.	(a)
113.	(c)	114.	(d)	115.	(d)	116.	(b)	117.	(a)	118.	(d)	119.	(b)
120.	(b)	121.	(a)	122.	(a)	123.	(b)	124.	(a)	125.	(c)	126.	(c)
127.	(c)	128.	(a)	129.	(b)	130.	(a)	131.	(c)	132.	(d)	133.	(a)
134.	(b)	135.	(b)	136.	(d)	137.	(c)	138.	(d)	139.	(b)	140.	(a)
141.	(d)	142.	(a)	143.	(c)	144.	(d)	145.	(d)	146.	(c)	147.	(b)
148.	(c)	149.	(d)	150.	(a)	151.	(c)	152.	(c)	153.	(b)	154.	(b)
155.	(c)	156.	(d)	157.	(a)	158.	(a)	159.	(d)	160.	(d)	161.	(a)
162.	(d)	163.	(c)	164.	(a)	165.	(b)	166.	(a)	167.	(b)	168.	(d)
169.	(d)	170.	(c)	171.	(c)	172.	(c)	173.	(b)	174.	(c)	175.	(b)
176.	(d)	177.	(c)	178.	(a)	179.	(a)	180.	(a)	181.	(c)	182.	(c)
183.	(c)	184.	(c)	185.	(c)	186.	(d)	187.	(a)	188.	(c)	189.	(b)
190.	(c)	191.	(a)	192.	(c)	193.	(d)	194.	(c)	195.	(c)	196.	(d)
197.	(a)	198.	(c)	199.	(a)	200.	(a)	201.	(c)	202.	(a)	203.	(a)
204.	(a)	205.	(b)	206.	(c)	207.	(a)	208.	(b)	209.	(a)	210.	(b)
211.	(d)	212.	(b)	213.	(b)	214.	(a)	215.	(b)	216.	(d)	217.	(c)
218.	(a)	219.	(a)	220.	(c)	221.	(a)	222.	(b)	223.	(b)	224.	(a)
225.	(c)	226.	(d)	227.	(b)	228.	(c)	229.	(b)	230.	(b)	231.	(c)
232.	(c)	233.	(d)	234.	(b)	235.	(d)	236.	(d)	237.	(a)	238.	(b)
239.	(b)	240.	(d)	241.	(a)	242.	(a)	243.	(c)	244.	(b)	245.	(d)
246.	(a)	247.	(a)	248.	(a)	249.	(a)	250.	(a)	251.	(b)	252.	(c)
253.	(c)	254.	(a)	255.	(b)	256.	(b)	257.	(a)	258.	(a)	259.	(a)
260.	(a)	261.	(c)	262.	(d)	263.	(c)	264.	(a)	265.	(b)	266.	(c)
267.	(a)	268.	(a)	269.	(d)	270.	(c)	271.	(a)	272.	(b)	273.	(a)
274.	(b)	275.	(a)	276.	(a)	277.	(c)	278.	(b)	279.	(d)	280.	(a)
281.	(c)	282.	(b)	283.	(a)	284.	(d)	285.	(b)	286.	(b)	287.	(c)
288.	(a)	289.	(a)	290.	(c)	291.	(c)	292.	(d)	293.	(c)	294.	(d)
295.	(d)	296.	(d)	297.	(d)	298.	(b)	299.	(d)	300.	(c)		