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Facts at a Glance

Important Information about Solar System

1. Largest planet – Jupiter
2. Smallest planet – Former Pinto present Mercury
3. Planet nearest to sun – Mercury
4. Planet farthest from sun – Former Pluto Present Neptune
5. Planet nearest to earth – Venus
6. Brightest planet – Venus
7. Brightest star – Dogstar
8. Planet that has no satellite – Mercury and Venus
9. Planet with largest number of satellites – Jupiter
10. Heaviest planet – Jupiter
11. Coldest planet – Former Pluto Present Uranus
    (Min. temp. – 216^0C and that of Neptune – 214^0C)
12. The Red planet – Mars
13. Satellite of earth – moon

Mechanics and General Properties of Matter

- Light year is the unit of distance. One light year = 9.46 x10^{12}km.
- Astronomical Unit (AU) is equal to the average distance between the sun and earth. It is 1.496 x10^8km.
- Parsec is the unit of distance and 1 parsec = 3x10^{16}m
- Oil rises due to capillary ascent in the wick of a lamp. It happens due to surface tension.
- Planck"s constant and angular momentum have the same units.
- In a uniform circular motion there is a change in both amplitude and velocity but the speed remains constant.
- The atmospheric pressure at sea level is 1bar.
- An instrument that marks the changes in the atmospheric pressure, in a certain time interval, on the paper is called Barograph.
- Manometer is an instrument that measures the pressure of a gas.
- Retrorockets are used to reduce the speed of a space ship.
- Vikram Sarabhai space Centre is in Trivandrum.
- Neil Armstrong was the first person to land on moon.
- Lunic-II was the first space ship to land on moon.
- The average density on earth is 5.5cm^3
- The weight of an object increases on taking it from the equator towards the pole at sea level.
- Raindrops are spherical due to surface tension.
- Nuclear radii are measured in Fermi 1 fermi =10^{-15}mrs
- The speed of a ship is measured in naut. 1 naut = 1852m/hr
- Mercury is a liquid. It is also known as quick silver. It is used in thermometer, barometer, manometer and other instruments.
- The path of the Halley"s comet is elliptical.
- Indian Institute of Astrophysics is in Kodai canal (TamilNadu).
- Halley"s comet is seen after 76 years.
- India"s first satellite was launched from the Rusia"s cosmodrome.

Lengthofdaysandnightsarealwaysequalattheequator.

- National Science Day is celebrated on 28 February. This day is celebrated because thediscoveryof„Ramaneffect"byC.V.Ramanbecameknowntotheworldonthis day.
- SirC.V.RamanwasawardedwithNobelPrizein1930.
- There is no force of attraction between the molecules of an ideal gas and hence, no energy change takes place on increase in its volume.
- Goniometer is used to measure the angle of thecrystal.
- Purity of milk is measured bylactometer.
- Thereisnochangeinthelevelofwaterduetothemeltingoficeinit.
- Solareclipsetakesplacewhenmooncomesbetweentheearthandthesun.
- Lunareclipsetakesplaceduetothecomingofearthbetweenthesunand the moon.
- IntensityofanearthquakeismeasuredbyRichterscale.
- Anearthquakeisdetectedbyaseismograph.
- Fathomistheunitformeasuringdepth.
- Greenwich time lags behind Indian Standard Time by 5 ½hours.
- There is no change in the mercury level when the radius of the tube in the barometer isincreased.
- Pascalistheunitofpressure. 1pascal=1newton/ m^2
- Flowoffluidsinmeasuredin Cusecwhichisequalto1cubicfoot/ sec.
- 1 cusec=0.28317 m^3/ sec.
- Electronsarepresentinallsubstances.
- Watercontractsonheatingfrom0^0cto4^0c.
- The time period of a second"s pendulum is 2seconds.
- A sudden fall in the barometer reading indicates astorm.
- If the barometer reading gradually falls it indicates rainfall.
- Ozonelayerinatmosphereabsorbsultravioletrays.
- Anemometer measures the speed ofair.
- Altimeter is used to measure the height ofplanes.
- Speed of air planes (or motor boats) is measured byTachometer.
- Periscope is used to see the objects outside thesubmarine.
- Clouds float in air due the viscosity of air and their lowdensity.
- The coefficient of viscosity is measured inpoise.
- Viscosity of gases increases withtemperature.
- Soap decreases the surface tension of solution hence clothes getcleansed.
- Needlefloatsonwaterduetosurfacetension.
- The attractive force acting between the molecules of the same substance is called cohesiveforce.
- The attractive force acting between the molecules of different substances is called adhesiveforce.
- Rocketpropulsionisbasedontheconservationoflinearmomentum.
- Aspacetravelerinaspaceshiprevolvingaroundearthfeelsweightlessness becausethegravitationalforceactingonthespaceshipisusedinprovidingitthe necessary centripetalforce.

- The moment of inertia in rotational motion plays the same role as the mass does in translational motion.
- Color of stars exhibits their temperature.
- The product of mass and velocity of a body is called its momentum.
- If a force is acting for a small duration, then the product of force and time is called impulse.
- The rate of change of impulse is equal to the force applied.
- Relative density is measured by hydrometer.
- When milk is skimmed, cream separates out due to the centripetal force.
- If a hollow pipe passes across the center of gravity of the earth and a ball is dropped in the pipe, the ball with execute SHM to and fro about the center of the earth.
- The periodic time of revolution around the earth of a communication satellite is 24 hours.
- The value of bulk modulus for an incompressible liquid is infinite.
- The viscous force limits the speed of the body falling in a liquid and it attains a constant velocity called the terminal velocity.
- The order of the layers of atmosphere on moving up from the earth"s surface is troposphere, stratosphere, ozonosphere, Ionosphere, exosphere.
- 1 picogram = 10^{-12} gram.
- When a lift is moving up then weight of a person standing in it increases.
- If a lift is falling freely the weight of a person becomes zero.
- The weight of a body at poles is maximum.
- The weight of a body at the center of earth is zero.
- If the velocity of a body is doubled its kinetic energy becomes 4 times.
- The average density of earth is about 5.5gm/cm^3.
- The frequency of oscillation of a simple pendulum decreases when it is taken on moon.
- A floating iceberg instead of melting from the upper surface melts at the base because due to the higher pressure at the bottom surface the melting point decreases.
- When speed of a car is doubled four times brake pressure has to be applied for stopping it.
- Both impulse and momentum have the same dimensional formula.
- On doubling the radius of a capillary tube the ascent of water in it becomes half.
- Velocities of the rain drops of different sizes are different.
- A pendulum clock becomes fast in winters.
- Brass is an alloy of copper and zinc.
- Man-made satellites are established in thermosphere (external atmosphere).
- Stainless steel is an alloy of iron, nickel and chromium.
- The velocity of escape from earth"s gravitation into space is 11.2km/sec.
- A feather and a piece of lead fall freely with the same velocity in vacuum.
- Mass is a scalar quantity but weight is a vector quantity.
- A body falling in a fluid acquires velocity due to the viscosity of the fluid.
- Bernoulli"s theorem is based on energy-conservation.

1 light year = 9.46 x 10^{12}km.

- Thereisnoatmosphereatmoonbecausethermsvelocityofgasmoleculesoniti s greaterthan the escapevelocity.
- Densityremainsunchangedonchangingtheamountofasubstance.
- Thespeedofrevolutionofearthroundthesunismaximumwhenearthisnearest to thesun.
- Pure gold is of 24carats.
- Detergentsdecreasethesurfacetensionofwaterduetowhichdirtandoil are easily removed from theclothes.
- Parsec is a unit for measuring the distancesofstars. 1 parsec=3.25light years.
- Mostoftheweatherdisturbancestakeplaceintroposphere.
- The study of friction and lubricants is done inTribology.
- A glass can be scratched by diamond or hydrofluoricacid.
- Forthedilutionofsulphuricacid,acidismixedinwaterandnotwaterinacid.
- F. Hile suggested that evolution of earth took place from gas and dustparticles.
- Theextentofpollutionofwaterinriversismeasuredbytheamountofoxygen dissolved init.
- Atruck,carormotorcyclemovingwiththesamekineticenergywillstopatthe same distance on the application of brakes.
- Thetendencyofaliquiddroptooccupytheminimumsurfaceareaisdue to surfacetension.
- Silver iodide is used for bringing artificialrain.
- Diamond is an allotropic form ofcarbon.
- Rocket works on the principle of conservation ofmomentum.
- A solid iron ball floats on the surface of mercury because the relative density of iron.
- Thecauseofthespreadingofadropofwateronacleanglassplateisthat cohesive force is lesser than the adhesive force.
- Barometer was invented byToricelli.
- TheoryofrelativitywasputforwardbyEinstein.
- Air consists of maximum amount ofnitrogen.
- Atmosphericpressureismeasuredby Barometer.
- Steel is more elastic thanrubber.
- Purityofmilkistestedbylactometerbymeasuringthedensityofmilk.
- The surface tension of a liquid is due to the cohesive force between itsmolecules.
- The cause of atmospheric pressure on earth is the gravitationalattraction.
- The increase in barometer reading indicates fairweather.
- The SI unit of work isjoule.
- Thepressureinsideasoapbubbleisgreaterthantheatmosphericpressure.
- Aironneedlefloatsonmercurybutgetsdrownedinwaterbecausethedensity ofironislessthanthedensityofmercurybutgreaterthanthedensityofwater.
- Oil spreads on the surface of water because the surface tension of oil is less than the surface tension ofwater.

- Itis difficulttowalkonicethanonroadbecausethefrictionalforceoniceisless er than onroad.
- Pendulumclocksbecomeslowinsummersbecausethelengthofthependulum increaseswithincreaseintemperature,duetowhichthetimeperiodincreases.

HEAT

- The maximum portion of solar energy obtained by earth is in the form of infrared and thermalenergy.
- 100^0C is equivalent to 212^0F and373K.
- Bolometerisaninstrumentthatdetectsthepresenceofinfraredrays.
- The boiling point of a liquid increases with an increase inpressure.
- Skating on ice is possible due toregelation.
- Thereisnoexchangeofheatenergyinanadiabaticprocess.
- Temperatureremainsconstantinanisothermalprocess.
- Icalorieheatisequivalentto4.2Joule ofwork.
- The process taking place at constant volume is called isochoricprocess.
- The specific heat in an isothermal process isinfinite.
- Cp-Cy=RiscalledMayer"sformula.
- -40^0C and – 40^0F exhibit the sametemperature.
- $T_k = t^0 C + 273$
- Total Radiation Pyrometer is based on Stefan"slaw.
- Thereisthefollowingrelationbetweenthevarioussalesoftemperature–

$$\frac{C}{5} = \frac{F-32}{9} = \frac{K-273}{5}$$

- InaplatinumthermometerRt=R0(1+at)inwhichaisthetemperatureresistance coefficient ofplatinum.
- The isothermal modulus of elasticity of an ideal gas is equal to itspressure.
- Theratiooftheelasticityofanidealgasisequaltotheratioofitsspecificheats.
- The adiabatic modulus of elasticity of an ideal gas is y times itspressure.
- Thetransmissionofheatbyradiationdoesnotrequireanymaterialmedium.
- Hydrometerisusedtomeasuretherelativehumidity.
- Absolutehumidityincreaseswithanincreaseintemperatureandrelative humiditydecreases.
- Thetemperatureofaglowingbulbisbetween2000^0Cto2500^0C.
- Thestudyofverylowtemperaturesiscalled Cryogenics.
- Alcohol is opted as a thermometric liquid in cold countries instead of mercury because its freezing point is quiteless.
- Radiations from the earth heat theatmosphere.
- Intheabsenceofatmospheretherehadbeenlargevariationbetweenthe temperatures of day andnight.
- Athermostatkeepsthetemperatureofabodyconstant.
- The volume of a fixed amount of a gas at constant pressure is directly proportional to its absolutetemperature.
- Change of state is an isothermal process. Its specific heat isinfinite.
- Specific heat in adiabatic change iszero.
- CpisgreaterthanCvforgases.

- There is no negative temperature on Kelvin scale.
- Cryogenics is used in spacecraft, surgery and magnetic levitation.
- At -40^0 the reading on the Celsius and Fahrenheit scale is the same.
- Pyrometer is used to measure high temperatures.
- Sir C.V. Raman was honoured with the Nobel Prize in 1930 for the discovery of Raman effect.
- The density of water is maximum at 4^{0}C
- Absolute zero temperature (-273.15^{0}C) is considered to be the lowest possible temperature.
- Relative humidity is the ratio of the amount of water vapour present in air at that temperature.
- Density of solids generally decreases on melting.
- The size of a metal ring increases on being heated.
- The boiling point of water increases when salt is mixed in it.
- Carbon dioxide gas produces green house effect.
- If the surface of a hot body is black and rough then it radiates heat rapidly.
- If water is heated from 0^{0}C to 10^{0}C then its volume first decreases, becomes minimum at 4^{0}C and then starts increasing.
- If water is heated from 0^{0}C to 10^{0}C then its density first increases, becomes maximum at 4^{0}C and then starts decreasing.
- The efficiency of an ideal heat engine is determined by the relation: $n = 1 - T_2/T_1 (T_1 > T_2)$.
- Critical temperature is the temperature below which a gas can be liquefied on increasing the pressure.
- Air conditioner controls temperature and relative humidity.
- Heat engine converts heat into mechanical energy.
- If an opened refrigerator is kept in a closed room then the temperature of the room increases.
- Heat is transmitted by conduction, convection and radiation.
- Temperature of sun is measured by pyrometer.
- The specific heat of water is 1 0 cal/ gm^{0}C.
- A thermos flask prevents the heat loss by conduction, convection and radiation.
- In a refrigerator the thermostat regulates the temperature.
- Volcano is called the safety valve" of nature.
- When two metals trips are heated on riveting the metal with greater expansion bends such that it remains outside while the metal which expands less remains inside.
- In cold countries, glycerol is mixed with water in car radiators due to which freezing point of water is lowered.
- While skating on ice the melting point of ice lowers due to pressure.
- When iron and wood are kept in sun the iron becomes more hot because it is good conductor of heat.
- Hand pump water is warm in winters because in winters the underground temperature is more than the atmospheric temperature.

- Two thin blankets give more warmth in winters in comparison to one thick blanket because there is a layer of air between the two thin blankets which is a bad conductor of heat and hence prevents the loss of heat fromwithin.
- Dark clothes are heat absorbers whereas white clothes are heatreflectors.
- Thermal energy is more largely produced in India in comparison to other forms of energy.
- Theicehillsmeltsveryslowlybecauseofitshighlatentheat.
- Ice-cream has a more cooling effect on teeth than chilled water because while melting the ice cream takes sufficient heat (equal to its latent heat) from theteeth.
- Theworkdoneinrubbinghandsconvertsintoheatwhichmakesourhan ds warm.
- Ammoniagasisusedasacoolantinrefrigerators.
- Calories is the unit of measuringheat.
- The atmospheric temperature increases due to the increase in the amount of carbon dioxide because it absorbs the infrared radiations fromspace.
- The bulb of a thermometer is made long and cylindrical instead of making it sphericalbecauseareof thecylindricalsurfaceisgreaterthanthatofaspherical surfacehencemoresurfaceareaofthebulbcomesincontactwiththetemper ature tobemeasuredwhichresultsinfastresponsetothechangesintemperature.
- Snowisabetterinsulatorthanicebecausesnowhasairfilledinitsporeswhich is a bad conductor ofheat.
- The thermal conductivity of an ideal insulator is zero and that of an ideal conductor isinfinite.
- Theblanketwhichkeepsuswarminwinter,preventstheicefrommelting because air fills up the space between the fibers of the blanket which is an insulator.
- Inertgasessuchasargon,neonetc,arefilledinelectricbulbsinsteadofvacuu m because if there is vacuum then the heat produced on burning the filament may increasethetemperatureoffilamenttotheextentthatitmeltsbutifinertgase sare filled the heat of the filament spreads by the convection currents preventing the filament temperature to riseup.

SOUND

- Soundtravelsfromonepointtoanotherintheformofwaves.
- Sound waves are longitudinal innature.
- Sound waves cannot bepolarized.
- Soundwavesrequireamaterialmediumtotravel.
- A microphone converts sound energy into electricalenergy.
- Loudspeakerconvertselectricalenergyintosoundenergy.
- Decibelistheunitofmeasuringsound.
- Inwater,soundisrecordedbythehelpofahydrophone.
- Bellsaremadeofmetalsbecauseoftheelasticityofmetals.
- There is no effect of pressure on the velocity of the sound if the temperature is keptconstant.
- Speedofsoundincreaseswithanincreaseintemperature.
- Speed of sound increases with the increase in humidity ofair.

- The speed of sound in a gas is proportional to the square of its absolute temperature.
- The speed of sound in air increases by 0-61 m/s by the increase of 1^0C temperature.
- The speed of sound is higher in rainy season than in summers.
- The unit of frequency is hertz.
- Sound waves exhibit interference.
- Nodes and antinodes are formed in stationary waves.
- The difference between a node and an antinode is / 4
- The difference between two consecutive nodes (or antinodes) is / 2
- Whenever there is relative motion between the source of sound and the listener, the actual frequency (or pitch) of the source of sound appears to be changed to the listener. This apparent change in frequency is called the Doppler"s effect.
- Doppler"s effect is related with the change in frequency of sound and not its intensity.
- Doppler"s effect is also applicable on light waves.
- If a light source is reseeding away from the observer on earth, then the frequency of light will appear to be decreased (or wave length increased) to the observer. Due to this, the spectral lines appear to displace towards the red end of the spectrum. This is called the „recessional red shift."
- If a light source is coming towards the observer on earth, the frequency of light will appear to be increased (i.e. wavelength decreased) to the observer due to which the spectral lines will appear to displace towards the violet end of the spectrum.
- In supersonic motions, the speed of an object is expressed relative to the speed of sound. Their ratio is called in mach number.

  Mach number = Speed of object / Speed of sound

  Mach number is greater than I for supersonic motions.

  Mach number is used to express the motion of jet planes or rockets.
- Echo is produced by the reflection of sound.
- When two sound sources of approximately same frequencies produces sound then beats are heard.
- The number of beats per second is equal to the difference in frequencies per second of the sound sources.
- The frequency of the sound produced by the supersonic planes is beyond the audible region.
- The quality of the same note produced from two different musical instruments is different.
- Hydrophone records sound inside water.
- Megaphone spreads sound to far off places.
- Sound waves cannot travel in vacuum.
- Tape of a tape recorder is coated with a thin layer of iron oxide It is a magnetic substance.
- If the original frequency of an open pipe is n, then the frequency of the pipe closed at one end remains $n/2$.

- If the light emitted from a star is found to be redder than the sun light then it means that the star is receding away from theearth.
- Thesoundfromapianooraguitarcanbedistinguishedonthebasisofitsquality.
- Sonar is used for communication and ranging beneath the surface of theocean.
- Thespeedofsoundinairatroomtemperatureis330m/s.
- Pitch of sound is determined by itsfrequency.
- On reflection of a wave from a surface there is no change in its velocity, wavelength andfrequency.
- The speed of sound is measured indecibels.
- Allparticlesbetweenthetwosuccessivenodesvibrateinthesamephase.
- The phase of vibration of the particles on one side of a node is opposite from the phase of vibration of the particles on the otherside.
- Sonarworksonthereflectionofsoundwaves.
- Audiblefrequencyrangeofsoundisfrom2020000hertz.
- When sound travels from one medium to another then its frequency remains unchangedbutitsspeed,amplitudeandintensitychange.
- The amplitude of a wave does not depend upon its velocity, wave lengthor
  frequency.
- The intensity of sound increases with the increase in density of themedium.
- Inatelephonereceiverelectricalenergyconvertsintosoundenergy.
- In microphone sound energy converts into electricalenergy.
- The phase difference between the particles on either side of a not at a same distanceis
- The sound of supersonic planes is not heard on earth because the velocity of supersonic plane is either equal to or more than the velocity of sound. Hence its frequencyisoutsideandaudibilityrange.

LIGHT

- Light waves are electromagnetic innature.
- Materialmediumisnotnecessaryforthetransmissionoflightwaves.
- Light waves aretransverse.
- Light waves exhibitpolarization.
- Thebluecolourofskyisduetoscatteringoflight.
- Velocity of light, amplitude and wavelength changes in refraction of light but frequency remainsunchanged.
- Arodkeptinthebucketofwaterappearstobebentbecauseofrefraction.
- A pond appears to be lesser in depth due torefraction.
- Therefractiveindexofwaterw.r.t.airisaUw=4/3andrefractiveindexofglass w.r.t. air is aUg = 3/2.
- Refractiveindexofglassw.r.t.wateriswUg=aUg/aUw
- Formation of a mirage is an optical illusion which takes place due to total internal refraction oflight.
- Myopiaisshortsightednessand Hypermetropiaislongsightedness.
- In myopia a person can see the near objects clearly but he can"t clearly see the far objects.

- Inhypermetropiaapersoncanseethedistantobjectsclearlybuthecan"tclearly see the nearobjects.
- In myopia the rays get focused in front of retina and in hypermetropia they are focused behind theretina.
- Myopiaiscorrectedbytheuseofconcavelensandhypermetropiaiscorrectedby using convexlens.
- Inareadinglensaconvexlensofshortfocallengthisused.
- Adriverusesconvexmirrorforseeingthetrafficattheback.
- If a lens is dipped in such a medium whose refractive index is greater than the refractive index of the material of lens then along with the change in focal lengthof the lens its nature also changes that is convex lens behaves as concave and concave lens behaves asconvex.
- In astigmatism a person cannot distinctly see the horizontal and vertical lies simultaneously at a normaldistance.
- Blackcolourisactuallytheabsenceofallcolours.
- Refractiveindexofredlightislesserthantherefractiveindexforvioletlight.
- Lighttravelsfasterinvacuumthaninair.
- A polished diamond due to its high refractive index shines by total internal reflection.
- Colour of stars exhibits theirtemperature.
- There is redistribution of energy in the interference pattern. Total energy in it remainsconserved.
- The unit of luminous intensity iscandela.
- Faut is the unitofilluminance 1 faut =10^4lux
- The formula for critical angle is sin C =1/u
- The power of a lens is measured indiopters.
- Resolvingpowerofatelescopeis1-22/ D.InitDisthediameteroftheobjective lens.
- Polarisation of light proves its transverse wavenature.
- Longitudinal waves cannot bepolarized.
- Gamma rays, X-rays, ultraviolet rays, infra-red rays and radio waves are all electromagneticradiations.
- Sextetmeasurestheangleformedbyanobjectwiththeeye.
- Infinite images of an object are formed that is placed between two parallel mirrors.
- Thenumberofimagesformedifftheanglebetweenthetwomirrorisis(360/ 0-1)
- Periscope is used to see the objectsoutside a submarine.
- Thecoloursinthinfilmsofsoapbubblesareseenduetoscatteringoflight.
- Various types of coloured designs may be seen by akaleidoscope.
- We cannot determine whether an a.c. or a d.c. is flowing by just observing a glowing electricbulb.
- When a glass lens (u=3/2) is dipped in water (u=4/3) its focal length becomes fourtimesofitsfocallengthinair.
- Thespeedoflightis3 x10^8m/ swhichisequivalentto18.6 x10^4miles/ sec
- Lux is the unitofilluminance. 1 lux = 1lumen/m^2

- Lumen is the unit of luminous flux.
- Sunlight consists of seven colours. The rays whose frequency is less than the frequency of red colour of sunlight are called ultraviolet rays and the rays whose frequency of violet colour are called ultraviolet rays. Both types of rays rare invisible. Infrared rays are not only emitted from sun but also from every hot object.
- Some objects absorb light of a definite colour and emit rays of some other colour. For example, calcium fluoride absorbs violet rays and emits blue rays. This phenomenon is called fluorescence.
- Some objects emit light even on being removed from the presence of a light source (Sun). This phenomenon is called phosphorescence. Calcium sulphide exhibits this property.
- Electromagnetic radiations whose wavelength lies in the range of 400nm to 700 nm are visible. This is the wavelength range of the visible region in spectrum.
- Horner (1876) first explained the colourblindness.
- A coin inside a bucket of water appears to be nearer than its actual depth in water due to refraction.
- If a person standing in water sees a coin above the water surface the coin appears to be higher than its actual position.
- The focal length of a lens is maximum for red light and minimum for violet light.
- Three dimensional image is called hologram.
- Light radiation is both of wave and particle nature.
- Sun always rises in the cast because earth rotates from west to east.
- If a transparent object becomes invisible on immersing in water, it implies that the refractive index of both water and the material of the object is same.
- When a light ray enters from air into glass. Its wavelength decreases.
- Objective lens is a convex lens of lesser focal length.
- Optical fiber was invented by T.H.Maiah.
- In India optical fiber is mainly used in telecommunication.
- Optical fiber is also used in endoscopy.
- Diamond sparkle is due to its high refractive index.
- If the angle between two plane mirrors is 75^0 then five images $(360^0/75-1)$ of an object placed between them can be formed.
- The unit of power of a lens is Dioptre.
- If a green colour tie is seen in the red light it appears black.
- Sky appears black to a space tourist.
- Cornea is donated in eye donation.
- Polarising angle for a glass plate of 1.54 refractive index is 57^0
- When a plane mirror is rotated by an angle 0 then the reflected ray rotates by an angle 20.
- The red colour of the setting sun is due to scattering of light.
- Astigmatism can be corrected by the use of a cylindrical lens.
- The sea water appears blue in colour due to sky"s reflection and lights catterin g by water particles.
- Mirage formation takes place by total internal reflection.

- The speed of light is 1,86,000 miles / sec.
- Human eye contains convex lens.
- An erect image of the same size as the object may be seen only by a plane mirror.
- The critical angle of diamond is 24.4^0
- Light rays in the human eye convert into neural impulses.
- Raman effect is related with the scattering of light.
- Erect and virtual images are always formed by plane and convex mirror.
- Optical fiber is based on the principle of total internal reflection.
- For a normally incident ray the angle of incidence is zero hence the angles of reflection and refraction for it are also zero.
- If aUw = 4/3 then wUa =¾
- wUg = aUg/aUw
- Endoscopy, a technique used for the testing of the internal organs of the body and stomach, is based on the phenomenon of total internal reflection.
- Erect and diminished image is seen by a convex mirror.
- A convex mirror is fitted at the side of a driver to see the images of the vehicles at the back.
- Since the red colour is less scattered hence a red signal may be seen from along
  distance.
- National Science Day is celebrated on 28 February (In the memory of the discovery of Raman effect by Sir C.V.Raman).
- A rare solar eclipse in 1999 was observed on 16 February.
- When light falls on an object at polarizing angle then reflected and refracted rays are mutually perpendicular.
- An air bubble in water acts as a concave lens.
- Hypo i.e. sodium thio-sulphate solution is used for fixing in photography.
- The colour of an opaque object is due to the colour of light reflected by it.
- The image of the object formed on retina is small and inverted.
- The power of sunglasses is zero.
- Infinite images of an object are formed that is placed between two parallel mirrors.
- If the atmosphere is absent sky would appear to be black.
- The order of the colour of the rainbow is violet, Indigo Blue, Green, Yellow, Orange and Red.

ELECTRICITY AND MAGNETISM

- The unit of charge is coulomb.
- The number of electrons in 1 coulomb charge is 6.25×10^{18}.
- Unit ampere-second is equivalent to coulomb.
- The magnetic effect of electric current was discovered by oersted.
- Only d.c. current can be measured by a Weston Ammeter.
- The resistance of an ammeter is very low and that of voltmeter is very high.
- The potential difference in volts between two points in an electrical circuit is measured by a voltmeter.
- Voltmeter is a vessel in which electrolysis takes place.

- By connecting a wire of low resistance (shunt) in parallel with a galvanometer, it is converted into an ammeter.
- When a wire of high resistance is connected in series with a galvanometer it gets converted into voltmeter.
- Ammeter is always connected in series with the electrical circuit.
- The resistance of an ideal ammeter is zero.
- A voltmeter is always connected in series in an electrical circuit.
- The resistance of an ideal volt meter is infinite.
- Electron volt (eV) is the unit of energy.
- 1eV = 1.6 x 10^{-19} Joule.
- Watt is the unit of Power.
- Watt = volt x ampere. = ampere^2 x ohm = volt^2/ohm
- Kilowatt hour (kWh) is the unit of electrical energy.
- Kilowatt hour = (volt x ampere x hour)/ 1000 = (watt x hour)/ 1000
- 1 kWh = 3.6x10^6 joule
- The resistance of a low power (watt) bulb is high.
- The filament of an electric bulb is made of nichrome.
- Fuse wire is made of lead and tin.
- A transformer works on the principle of electromagnetic induction. It brings about a change in the potential of an alternating current.
- A step-up transformer changes a strong a.c. of low potential into a weak a.c. of high potential.
- A step down transformer converts a high potential, weak alternating current in to a weak potential, strong alternating current.
- Transformers work only with an a.c.
- The transformation ratio of a step up transformer is always greater than I.
- The unit of specific resistance is ohm-meter.
- Lead is used in a storage battery.
- A magnetic field does not interact with a static charge.
- Silver is the best conductor of electricity.
- Heating effect of current does not depend upon the direction of the current.
- It cannot be predicted that whether the current flowing through a glowing electric bulb is an a.c. or a d.c. by just seeing it.
- An a.c. is not used for electroplating.
- Soft iron is used for making electromagnets.
- Steel is used for making permanent magnets.
- A dynamo converts mechanical energy into electrical energy.
- An electric motor converts electrical energy into mechanical energy.
- The potential inside a charged hollow spherical conductor is constant.
- A dynamometer measures the power produced by an engine.
- A cell converts chemical energy into electrical energy.
- The core of a transformer is laminated to prevent the formation of eddy currents.
- Electrons in motion form electric current.
- The unit of capacitance is Farad.
- Lenz"s law is based on the principle of energy conservation.

- Lenz"slawstatesthatthedirectionoftheinducedcurrentproducedinanelectric circuitissuchthatitopposesthecauseduetowhichitisproduced.
- Theunitofmutualinductionishenry.
- Thevalueofalternatingcurrentforacompletecycleiszero.
- Irms=I_0/ 2=0.707I_0,whereI_0isthepeakvalueofvoltage.
- In a complete cycle, the square root of average value of square of alternating currentiscalledtherootmeansquare(rms)valueofalternatingcurrent.
- Vrms=V_0/ 2=0.707 V_0, whereV_0isthepeakvalueofvoltage.
- If ohmic resistance in an a.c. circuit is zero then during the passage of electric current through the circuit, the average power is zero that is, energy is not consumed. This current is called wattles current. Practically, it is impossible to make the ohmic resistancezero.
- The inductance (L) of a choke coil is very high and its resistance (R) is very less. Choke coil is used in an a.c. circuit. The energy loss in it isnegligible.
- Thermistor is a non-ohmiccircuit.
- The resonant frequency in a parallel resonant circuit is f = ½LC
- Electrical energy is transferred from one place to another in the form of high voltagea.c.
- If Q colulomb charge is taken from one point to the other at V volt then W=VxQ work has to bedone.
- Therelativepermittivityofasubstanceisalwaysgreaterthan1.
- In electric bulbs a filament of high resistance and high melting point, like tungsten wire isused.
- Nitrogenoraninertgasisfilledinelectricbulbs.
- Thepotentialofamotorcarbatteryis12Volt.
- Chemical energy is stored in a storagecell.
- The specific resistance of a conductor depends upon its substance and temperature.
- The electrolyte used in car batteries is dilute sulphuricacid.
- German silver is an alloy of copper, zinc andnickel.
- 1 kWh = 3.6 x 10^6J (or 3.6 x10^3kJ)
- A.C. is not suitable for charging a strongbattery.
- If a metal experiences a feeble repulsion by a magnet then it is calleddiamagnetic.
- If on observing a coil from its surface the current is flowing towards south in it thenthatendofthecoiliscalledthesouthpole.
- The resistance of carbon, silicon and germanium decreases with an increasein temperature.
- Oxygen,aluminumandplatinumareparamagneticsubstances.
- Lenz"slawisbasedonenergyconservation.
- Transformer is used for stepping up or stepping down the a.c.voltage.
- The Thermal Coefficient of resistance of constantan and managanin is almost negligible.
- Dry cell is a primary cell. It converts chemical energy into electricalenergy.
- Cadmiumcelliscalledthestandardcell.
- Thefrequencyofa.c. mainsis50 c/ s.

- The resistance of mercury at 4K is zero.
- The function of a fuse in an electrical circuit is the prevention of the damage of electrical instruments.
- The amount of electricity that deposits 108 gm of silver at the cathode is called 1 Faraday.
- 1 faraday = 96500 coulomb/gm – equivalent = 9.65 x 10^7 colomb/Kg equiv.
- Copper is used in making electrical wires because it contains large number of free electrons
- Even on having the same power an illuminations tube gives more light than an electric bulb because the illumination substance in the tube converts the u.v. radiations into visible light
- 1 kilo watt = 1.34 horse power
- Electrical energy is transferred from one place to another at high a.c. Voltage because there is minimum energy loss in it.

Electron and modern Physics

- Electron was discovered by sir J .J .Thompson
- An Electron has 1.6 X 10^{-19} coulomb negative charge
- Cathode rays consist of moving electrons
- For an electrone/ m=1.76 X10^{11} coulomb/ kg
- Mass of an electron m = 9.1 X 10^{-31} Kg
- Isotopes are the elements with same atomic number but different mas number. Like $_1H^1$,$_1H^2$,$_1H^3$
- Elements whose nucleicons is tofs amenumberofnucleons but different number of protons and neutrons are called isobars. Like – $_1H^3$ and $_2He^3$,$_6C^{14}$ and $_7N^{14}$,$_8O^{17}$ and $_9F^{17}$
- When a particle is emitted from a radioactive nucleus the obtained nucleus is an isobar of the original one
- The elements which have different atomic number (Z) and mass number (A) but have same number of neutrons are called isotones like $_3Li^7$,$_4Be^8$
- A diode valve act as rectifier
- A triode valve consists of three electrodes anode, cathode and grid
- A triode valve is used as an amplifier
- The relation between the amplification factor (μ), internal resistance (r_p) and mutual conductance (g_p) of triode valve is $\mu = r_p x g_p$

- Voltage amplification of triode valveis

$$A = \frac{\mu}{\frac{r_p}{R} + 1}$$

where R is the load resistance

- Germaniumandsiliconarethepuresemiconductors
- Atransistorisanelectronicdeviceofpandntypesemiconductorswhichisused in place of a triodevalve
- The invention of transistor (transfer resistor) wasthe most importantelectronics
  event of 20th century as it made possible the integrated circuit andmicroprocessor, basis of modernelectronics
- Integratedcircuitchipsaremadeofsilicon
- The Thermal emission of electrons from a metal surface is called thermionic emission
- The emission of electrons from a metal surface by the incidence of light radiations is called photo electriceffect
- Therateofemissionofphotoelectronsisdirectlyproportionaltotheintensity of incidentradiation
- The maximum energy of the photo electrons increases with an increase inthe
  frequency of incident light
- The minimum frequency of the incident light that can emit electrons from a metal surface is called the thresholdfrequency
- The photo – electric effect of light was explained by Einstein on the basis of quantumtheoryforwhichhewashonouredwithNobelprize
- Einstein"s photo-electric equation is $\frac{1}{2} mv^2_{max} = h(v-v_0)$
- Work function (ϕ) or threshold energy of a metal is that minimum energy which is requiredtobringafreeelectronfrominteriorofthemetaltoitssurface
- $\phi = hv_0$ where v_0 is thethresholdfrequency
- Goodabsorbersarealsogoodemitters
- The ratio of the emissive power (e) to absorptive power (a) for radiation of given wave length is the same for all bodies at the same temperature and is equal to the emissivepower(e)ofperfectlyblackbodyatthattemperature

$$\frac{e}{a} = E$$

- Stefan"s law states that the total radiant energy emitted per second per unit surface area of a black body is proportional to the fourth power of the absolute temperature of thebody
  E = T^4 where is Stefan"s constant
- Theunitof isjoule/ $meter^2$ second-K^4) orwatt/ ($meter^2$.K^4)
- AccordingtoNewton"sLawofcooling,wherehotbodyiscooledinair,therate of
  lossofheatbythebodyisproportionaltothetemperaturedifferencebetween the body and its surroundings.
- According to Wien"s displacement law $_mT = constant = 2.9X\ 10^{-3}$ m-Kelvin

- According to Planck"s hypothesis, the emission of radiation is not continuous but takes place in the form of small bundles or packets of definite amount of energy which are called quanta. These bundles are also called photons
- Energy of a photon K= $h\nu$ = hc/
- Rest mass of photon is zero
- Momentum of a photon -p= h/ = $h\nu/c$
- Rutherford discovered that atom consists of nucleus in which the positive charge and (approximately) whole mass of an atom resides
- According to Bhore, electrons revolve round the nucleus only in those orbits for which the irangular momentum is an integral multiple of h/2 i.e. mvr= nh/2
- Electrons do not emit any energy while revolving in these orbits
- When an electron transit from higher energy level (E_2) to a lower energy level (E_1) then energy (E_2-E_1) is evolved during transition in the form of monochromatic radiations. *i.e.* E_2-E_1 = $h\nu$ = hc/ where h is the Planck"s constant
- When and electron makes a transition from n_2 to n_1 energy level then the wave length ( ) of the emitted radiation is obtained by the relation

$$\frac{1}{} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

Where , R is the Rydberg"s constant whose value is 1.097 X 10^7 per meter

- Hydrogen spectrum is classified into various spectral series. In which Layman series lies in ultra – violet region, Balmer series lies in visible region and Pachen, Backett and Pfund series lie in infrared region
- Fraunhofer lines are the black lines found in solar spectrum. These lines are formed by the absorption of characteristic wave lengths of sunlight by the vapors of several elements present in the interior region of the sun called chromosphere.
- Fluorescence is the phenomenon of light emission in which a substance on being illuminated by a high frequency light (blue ultraviolet) emit light of relatively low frequency as long as the substance is being illuminated.
- Phosphorescence is the phenomenon of light emission in which the substance continues to emit light for some time after the light incident on it is stopped
- X-rays are produced when fast moving cathode rays strike a metal piece of high atomic weight and high melting point like tungsten
- X-rays are emitted by the transition of electron from the inner energy levels of an atom
- The intensity of X-rays depends upon the number of electrons emitted per second from the filament .It is controlled by changing the potential difference applied between the ends of the tube
- The maximum frequency of the X-rays depends upon the accelerating potential V. It is given as V_{max} = eV/ h. The minimum wavelength corresponding the maximum frequency V_{max} is $_{min}$ = c/V_{max} = hc/eV
- Radioactivity was discovered by Sir Henry Becquerel. In it there is a spontaneous emission of , and rays from the nucleus of an atom
- particles are doubly ionised helium atoms. They are represented as $_2He^4$.

They posses $2X1.6X10^{-19}$ coulomb positive charge. The mass of an particle is $6.645X\ 10^{-27}$ Kg

- particles are fast moving electrons. A particle has 1.6 X 10^{-19} coulomb negative charge
- Since the velocity of particles is of the order of the velocity of light their mass increases with increase in velocity. If the rest mass of a particle be m_0, and that in the state of velocity v be m, then according to Einstein's theory of relativity, we have $m = m_0/(1-v2/c2)$
- rays are electromagnetic waves. The energy of photons is very large (of the order of million electron volt MeV). Hence, they have short wavelengths.
- The energy of a photon of energy 1 MeV (= 10^6 eV) is about 0.01 A
- Any radioactive element does not emit both and particles simultaneously. some elements emit particles while some elements emit particles
- rays are emitted with both and particles
- At any instant the rate of decay of radioactive atoms is proportional to the number of atoms present at that instant. it is represented by the following relation $N = N_0 e^{-t}$ where is the decay constant
- The time interval in which the mass of a radioactive substance or the number of its atoms, is reduced to half its initial value is called the half life of that substance. It is given as T =0.06931/
- The number of atoms left after n half lives is given by $N = N_0 (1/2)^2$
- The unit of radioactivity is curie. 1 curie = 3.7 X 10^{10} decays per second.
- The atomic number of element reduces by 2 and its mass number reduces by 4 by the emission of an particle
- Atomic number increase by 1 and mass number remains unchanged by the emission particle
- By the emission of 1 positron from the nucleus the mass number (i.e. nucleons) remains the same but the number of neutrons is increased by 1 and the number of protons is decreased by 1
- Due to rays emission, there is no change in the atomic and mass number of the nucleus.
- Proton was discovered by Rutherford
  Charge = + 1.6 X 10^{-19} coulomb Mass = 1.673 X 10^{-27} Kg
- Neutron was discovered by Chadwick. It s charge = 0 and its mass = 1.675 X 10^{-27} Kg
- Positron was discovered by Anderson. It is an anti-particle of electron, Its mass is equal to that of electron but charge is opposite to electron
- Age of fossils is determined by carbon dating.
- Einstein's mass – energy relation E= m X c^2 where c is the velocity of light
- The 12th part of mass of carbon atom ($_6C^{12}$) is called the atomic mass unit (amu)
- 1 amu = 1.6 X 10^{-27} Kg
- 1 amu = 931 MeV
- The binding energy of a nucleus is the energy required to take its nucleons away from one another.

- The larger is the binding energy per nucleon of a nucleus the more stable willbe thenucleus.
- In the process of nuclear fission a heavy nuclear fission a heavy nucleus breaksinto two nearly equal fragments with the release of large amount ofenergy.
- In nuclear fusion two lighter nuclei moving at very high speeds fuse together to form a single heavier nucleus and large amount of energy isliberated.
- Atomicbombisbasedonnuclearfissionandhydrogenbombisbasedonnuclear fusion
- AtombombwasinventedbyOttoHann
- Nuclear fusion reactions taking place within the sun are the source of solar energy.
- In the nuclear reactor controlled chain reactions takeplace.
- Cadmium being a good absorber of neutrons is used as controller in nuclear reactor.
- To slow down the speed of neutrons heavy water (D_2O) or graphite or beryllium oxide is used as moderator in thereactor
- TheApsarareactorinIndiaiscalledthe„swimmingpoolreactor"becauseinit heavy water is used as a moderator
- Thoriumisusedasafuelinthefastbreederreactor ofKalpakkam.3
- Polar reactor of India is inTrombay
- FirstatomicexplosioninIndiatookplaceinPokhran(Rajasthan)
- Atomic reactor „Kamini" in Madras (chennai) is the reactor made completely by the Indiantechnique
- Poloniumisthefirstmanmadeelement
- „Apsra" is the first nuclear research reactorof India
- Massofneutronisslightlygreaterthanthemassofaproton.
- India"sfirstpowerreactorthatusednaturaluraniumasfuelisinKalpakkam
- All the elements with atomic number greater than 83 are radioactive in nature
- When an energetic rays photons falls on a heavy substance, it is absorbed bysome nucleus of the substance and an electron and a positron are produced,. This phenomenon is called „pairproduction"
- The minimum energy of photon for pair production should be 1.02MeV
- Therest-massenergyofanelectronis0.51MeV
- Thereversephenomenonofpairproductioniscalledpairannihilation
- Whenever anelectronandpositroncomeverycloseto eachother,theyannihilate each other by combining together and two photons are produced. This phenomenon is called pairannihilation
- Polonium was discovered by Madam Marie Curie. She named the newly discoveredelementPoloniuminhonourofhernativelandPoland.
- Cobalt60isgenerallyusedinradiationtherapybecauseitemits rays
- Fissionreactionseriesiscontrolledinanuclearreactorwhereasitisuncontrolled in an atombomb
- Hydrogen nucleus does notcontain neutron
- Solarenergyisproducedbytheprocessofnuclearfusion

- 1 Kg mass is equivalent to 9 X 10^{16} J or 2.5 X 10^{10}kWhof energy. The energy so obtained is called the nuclearenergy.
- The tape of tape recorder is coated bya ferromagnetic substance
- X-rays areusedforthedeterminationofcrystalstructure
- Whensomeinformationisrequiredaboutpatient"sstomachbyX-ray,thepatient is administered some heavy atomic substance, like barium sulphate solution. Heavyatomsdiffract X-rays sufficiently.so,thosepartofthestomachwherethis solutiongoesarephotographedontheplat.Thepartwherethissolutiondoes not reach are not clearlyphotographed.
- TransistorwasinventedbyBardeen,ShockleyandBrattain.
- The unit of Planck"s constant his joulesecond
- Iftheenergyofaphotonis E=*hv*andmomentumis *p=h/ its*velocitywillbeE/ p
- Protonistheionisedbyhydrogenatom
- TheMasterControlFacilityofISROisinHasan
- Thechargeonapositronis1.6X10^{-19}coulomb
- By the emission from $_{11}Na^{22}$, Mg isproduced
- Thermonucleardeviceisrelatedwithnuclearfusion
- Cryogenic engine is used in Spaceshuttle
- Titanium is called the metal offuture
- Uraniumoxideiscalledtheyellowcake.Itissmuggledinborderareas.
- Deuterium oxide (D_2O) is heavywater
- Tritium is a radioactive isotope ofhydrogen
- Radio Tuning is example ofresonance
- About200MeVenergyisliberatedinthefissionofuranium-235nucleus
- Computerchipsaremadebysilicon
- Selenium, Silicon, gallium arsenide aresemiconductors.
- Fusedsodiumisusedascoolantinthefastbreederreactorin Kalpakkam
- If the amount of a radioactive substance is doubled then the rate of radioactive decay will also bedoubled
- Cobalt-60 radioactive isotope is sued to controlLeukemia
- The conductivity of semiconductor at 0 K iszero
- Zirconium is used in nuclear reactor because it is an absorber ofneutrons.
- Semiconductorscanconductatroomtemperaturesbutnotatlowtemperatures.
- Param is the first super computer ofIndia
- H.C.L. is related with manufacturing ofcomputer
- „Param1000"computerwasdevelopedbyC-DAC
- Filament of halogen lamp is made up on an alloy of tungsten andiodine.
- Atomic pile is used in nuclear fissionreaction
- Ceramicisanewlydiscoveredsuperconductor
- Storageinacompactdisc(CD)isdonebyopticalmethod
- Rador was invented by Robert A.WatsonWatt
- Satellite testing center is at SriHarikota
- In an electronic watch „crystalline bob" is used in place of pendulum in pendulum clock

Astronomy and space Physics

- The source of the energy of stars is nuclear fusion
- Mercury is the closet planet to the sun
- Saturn has 21 satellites and Jupiter has 16 satellites
- Moon is the only satellite of earth
- Venus is the planet that is nearest to the earth
- Moon completes one revolution around sun in $27\frac{1}{2}$ days
- Days and nights are caused due to earth"s rotation
- The changing of weather on earth is caused due to it being tilted on it axis at 23.5^0 and revolution round the sun
- Earth takes $365\frac{1}{4}$ days to complete one revolution round the sun
- There is no atmosphere on the moon
- Light takes 8 minutes (500 sec.) to reach earth from the sun
- Light takes 1.25 seconds to reach earth from the moon
- Uranus takes 84 years to complete one revolution round the sun
- Jupiter is the largest planet
- Jupiter is the heaviest planet
- Halley"s comet is seen in 76 years
- Orbit of Halley"s comet is elliptical in shape
- Dog star is the brightest star
- American astronaut Neil Armstrong was the first person to land on moon
- Leunic II is the fist space shuttle to land on moon. It was launched in Apollo II mission
- „Ingel" (Lunar Exploration model) was the first human space shuttle to land on moon
- USSR is the first country to launch artificial satellite
- USA is the first country to send a human astronaut on moon
- Alexi Niyonarof Soviet Union is the first space traveller
- The first space traveller of India is Rakesh Sharma
- Radio Waves are reflected from ionosphere
- The satellite projection center of India is in Sri Harikota (Andhra Pradesh)
- The Head office of ISRO is in Bangalore
- India"s first communication satellite center is established in Maharashtra „Arvy"
- Retro rockets are used to reduce the speed of a space shuttle
- The major satellite of India was projected from cosmodrome of Russia
- When a satellite is at a distance of 35880 km (about 36000 km) from earth in space then the period of revolution of this satellite and that of earth become same. Such a satellite is called the Geostationary satellite and its orbit is called Geostationary orbit
- Geostationary satellite appears stationary with respect to earth. Therefore INSAT-I B satellite is always stationary over Indonesia
- Aryabhatta was the first satellite launched by India on 19 April, 1975 from erstwhile soviet Union (USSR)
- Indian Space Research Organization (ISRO0 has fours pace centers. These centers are

- (1)VikramSarabahiSpaceCentre,Tiruvanathapuram
- (2) Indian Space research Organization satellite center, Bangalore(Karnataka)
- (3) SHAR Centre, Sri Harikota (AndraPradesh)
- (4) Space Application Centre, Ahmedabad(Gujarat)
- Theory of Black Hole was proposed byS.Chandrashekar
- RedGiantisthelaststageofthelifecycleofastar
- One cosmic year is the time taken by the sun to complete one revolution around the AkashGanga.
- Radio telescope are more suitable than the optical telescopes for the detection of radiosources
- RadiotelescopescanbeusedeveninCloudyweather.Itcanpenetratethe interstellar clouds
- Asteroidsarerockydebrisofdifferentshapesrevolvingaroundthesun,which are foundbetweentheorbitsofJupiterandSaturn
- Ifthemassofastarisdoubleofsunthentheresultantstarwillendaneutronstar
- Depletionofozonelayerresultsintheincreaseofultravioletradiationinspace
- Cosmosome is a detectivesatellite
- Shoemaker Levi 9 comet collided withsun
- ThesurfacetemperatureofRedstarisless thanthesurfacetempuraofBluestar
- A star whose mass is more than 1.4 times the mass of sun ends up forming Black hole
- Doppler"seffectisusedindeterminingthespeedofheavenlybodiesintheline of vision
- Redgiantisthelaststageinthelifeofstar
- ThshapeanddensityofMarsislikethshapeanddensityoftheearth
- Saturn is surrounded byrings
- BlackHoleisanobjectwithatremendouslyhighdensity
- Ozonelayerisfoundinstratosphere
- Venusistheplanetwhichisnearesttoearth
- Saturn has 7satellite
- Allthenormalstarswhoseoriginalmassislessthan1.4timesthemassofthe sun getconvertedintowhitedwarfs.ThislimitcalledChandrasekharLimit
- Mercury and Venus have no satellite
- Chlorofluoro carbons cause the depletion of ozonelayer
- Siriusisthebrightststarinthesky
- The tail of comet always points away from the sun because of solar radiation pressureandtheeffectofthesolarwind
- Sunisthestarthatisnearesttoearth
- Man first landed on moon in1969

Discoveries and Invention is Physics

Discover / Invention	Discoverer / Inventor
Radioactivity	Henry Becquerel (1896)
Cosmic rays	R.A.Millikan (1910)

Discovery of neutron	James Chadwick (1932)
Discovery of Radium and Polonium	Madam Curie and Pierre curie (1898)
Theory of Relativity	A.Einstein (1895)
Law of Electrolysis	Michal Faraday (1841)
Quantum Theory	Max Planck (1901)
Electro Magnetic Waves	Hertz (1887)
Cyclotron	Earnest Orlando Lawrence (1929)
Electro Magnetic Theory of Light	Maxwell
Dynamite	Alfred Nobel (1862)
Uranium decay	Otto Hann (1941)
Raman Effect	C.V.Raman (1928)
Discovery of X-ray	W.K.Rontgen (1895)
Locomotive Engine	Stevenson (1814)
Discovery of electron	J.J.Thompson
Discovery of Positron	Anderson (1932)
Discovery of meson	H.Yukawa (1949)
Discovery of Proton	Rutherford (1919)

Space Programme of India

- Department of space was set up in June, 1972. Department has brought about a remarkabledevelopmentinspacescienceandspacetechnology
- Space systems set up by this department have promoted the development and application of space technology in the areas of telecommunication, ,meteorology, resources survey andmanagement
- The launching of IRS and INSAT series satellites and the use of self designed launchvehicleslikePSLVandGSLVhavemadeIndiaaselfdependedcountryin the field of spacetechnology
- India"s progress in space technology has attracted world wide attention and demand, with leasing agreements for marketing of IRS data and supply of space hardware andservices
- The launching of Indian Remote Sensing Satellite – IRS-ID by Polar Satellite Launch Vehicle (PSLV) on 29 Semptember,1997 was an important event. This Indian achievement in the application of space based remote sensing technology has rendered it an independent technologicalstatusin the launching of satellites.
- After the setting up of satellites weighing 1200 kg in polar orbits by PSLV the follow on satellites of IRS series were launched by this rocket launch vehicleonly.

- The four Indian remote sensing satellite groups IRS-IC , IRS-ID and IRS-P3 have enhanced capabilities in terms of spatial resolution, additional spectral bands, stereoscopic imaging and wild fieldcoverage
- INSAT satellites are providing services in the field of telecommunication, television broadcasting and weather forecasting. Now these services are being provided by five satellites INSAT-ID, INSAT-2DINSAT-2B,INSAT-2C and INSAT=2DT acquired from ARABSATorganization.
- New technologies of satellite communication like Digital AudioBroadcasting are
  exhibited by Experimental satellite GSAT which was launched by GSLV during Developmental Test Flights of GSLV
- BraMos (blend name of 2-rivers-Brahmaputra of India & Moskva of Russia) - supersonic cruise missile was successfully tried on March 28, 2012 by BrahMos Aerospace from Interim Test Range, Chandipur from Balasore distt. Odisha. It is capable of carrying a conventional warhead of 200-300 kg. It is world‟s fastest cruise missile developed by Aerospace Private Ltd.- joint venture between India‟s DRDO and Russian Federation‟s NPO MashinoStreyenia.

Facts at a Glance

First Artificial Satellites of Various Countries

Country	Satellite	Date of Launching
USSR	Sputnik-1	4 October,1957
USA	Explore-1	31 January,1958
France	Astenic A-a	26 November,1965
Japan	Oasuni	11 February,1970
China	China-1	24 April 1970
India	Rohini/ RS-1	18 July,1980

Milestones of Space

1962	Indian National Committee for Space Research (INCOSPAR) was associated by Atomic Energy Commission and Thumaba Equatorial Launching Station (TERLS) was established
1963	First sounding rocket was launched TERS on 21 November,1963
1965	Space Science and Technology Centre (SSTC) was established in Thumba
1967	Satellite Telecommunication Earth station was established in Ahmedabad
1968	TERLS was taken over by United Nations
1969	Indian Space Research Organization (ISRO) under Atomic Energy Commission was established on 15 August,1969

1971	Satish Dhavan Space Centre , (SHAR), Sri harikota (Andhra Pradesh). This is main launch center of ISRO having two launch pads. Satellites are launched from here
1972	Space commission and department of space was established on 1 June,1972
1975	ISROwasconvertedfromautonomousstatusintogovernmentorganization1 April,1975

1984	Indian Soviet Manned Space Mission
1992	AntrixCorporationLtd.,wassetuptin1992.ItisacompanyofDepartmentof Space.Ithasbeenmarketingspaceproductsandservicesinglobalmarket.It has been bringing orders to launch foreigner satellite from India on payment basis
1997	An American citizen of Indian origin, Dr.Kalpana Chawla went into space in space shuttle Columbia launched on November 20,1997
2005	Master Control Facility (MCF), Bholpal. Due to heavy load on MCF, Hassan (set up in 1982), this Bhopal MCF is built up. MCF controls orbit operations all the life of the satellite, including orbit-raising of the satellites.
2007	IndianInstituteofSpaceScienceandTechnology(IIST),Thiruvananthapuram. This is Asia"s first Space University. Its objective is to offer the highest quality of education in space science and technology to meet the demands of Indian space programmes.
2008	ChandrayaanProject:Chandrayaan-1completed312daysinorbitandmade3400 orbitsaroundthemoon.Itprovidedexcellentqualityofhighresolutiondataand photographs.Chandrayaan-IIisbeingreadytobelaunched
2012	Project Mar Mission: Work on this project is going on ISRO will send a satellite to Planet Mars during 2013 timeframe. It will focus on climate, geology and sustainability of life on Mars

Atomic Energy Programme of India

Atomic Energy Commission (AEC) implements the atomic energy related programmes through the Department of Atomic Energy (DAE). This department controls over five research centers, four public sector undertakings, three industrial organizations and four service organizations. Apart from these, department offer shelp to seven research centers.

Organistions under department of Atomic Energy

Research and Development Organizations

1. Bhabaha Atomic Research center,Mumbai
2. Indira Gandhi Centre for Atomic Research,Kalpakkam
3. Centre for Advanced Technology,Indore
4. Variable Energy Cyclotron Centre,Kolkatta
5. Atomic Mineral Division,Hyderabad

Public Sector Organisation

1. Nuculear Power Corporation of India Ltd.,Mumbai
2. Indian Rare Earths Ltd.,Mumbai
3. Uranium Corporation of India Ltd.,Jaduguda
4. Electronics Corporation of India Ltd.,Hyderabad

Industrial Organisation

1. Heavy Water Board,Mumbai
2. Nuclear Fuel Complex,Hyderabad
3. Board of Radiation and Isotope Technology,Mumbai

Service and SupportOrganizations

1. Directorate of Purchase and Stores,Mumbai
2. ConstructionsServiceandEstateManagementGroup,Mumbai
3. General Service Organization,Kalpakkam
4. Atomic Energy Education Society,Mumbai

Fully AidedOrganizations

1. TataInstituteofFundamentalResearch,Mumbai
2. Tata Memorial Centre,Mumbai
3. Sha Institute of Nuclear Physics,Kolkata
4. Institute of Physics,Bhubaneswar
5. Metha Research Institute of Math"s and mathematical Physics,Allahabad
6. Institute of Mathematical Sciences,Chennai
7. Institute of Plasma Research,Ahmedabad

Board of Radiation & Isotope Technology (BRIT) made several radio isotopes. They are used in industry, research, agriculture and medicine. Radio isotopic substances and instruments are exported to United Kingdom, Indoneisa, Sri Lanka,Mauritius,AustraliaandNepal.Amongradioisotopicsubstances,carbon- 14 and tritium are labeled as radio chemicals, phosphorus-32 and sulphur-35 comeunderthelabelofnucleotideandotherareradiopharmaceuticalsandradio immunoassay kit-RIS, radiation source, gamma radiography equipment and gamma irradiatorsystem.

Plants under Construction(At a Glance)

Centre	Number of Reactors	Type of Reactor	Fuel	Production Capacity	Expected Commercial Operation
Kakrapar	2	PHWR	Natural Uranium	2 X 700	Unit-3 June2015 Unit-4-Dec-2015
Rajasthan	2	PHWR	Natural Uranium	2 X 700	Unit-7 Aug-2012 Unit-8-Mar-2013
Kudankulam	2	WER	Developed Uranium	2 X 1000	Unit-1Aug-2012 Unit-2-Mar-2013

PHWR-Pressurised Heavy Water Reactor WER-Russian version of PHWR

BARCwiththehelpofDSTdeveloped64-nodeAnupamSuperComputerSystem InKaigaandkalpakkamtheweathermonitoringsophisticatedsystemSODARis establishedwhichpresentsthemeteorologicaldata

Atomic Energy Projector underdevelopment

1. Kaiga Atomic Power Project- 1 & 2 – (2X 200 MWe PHWRs)-It is situated in the Uttar Kannada district of Karnataka and will produce 2420 MWepower
2. RajasthanAtomicPowerProject-3&4– (2X220MWePHWRs)-ThisProjectis established near Kota (Rajasthan) in Rawatbhata feeding the Northern Grid. Its third and fourth units were completed in May 1998 and November1998
3. Tarapur Atomic Power Project- 13 & 4– (2X 500 MWe PHWRs)-It was started in1997-98
4. KudankulamAtomicPowerProject-(2X1000MWePHWRs)-ThisProjectis based on the co-operative works of Russia and India. it is established in Tamil Nadu. Its Two nuclear power stations are based upon

pressurised Water Reactors and Each having power of 1000MWe Heavy water Plants of India are 8-Nangal,Pubjab; Tuticorin, Tamilnadu; Rawatbhata, Rajasthan; Baroda, Gujarat; Thal, Maharashtra; Talchar, Odisha;
Manuguru,AndhraPradeshandHazira,Gujarat,RawatbhataandManuguru

Plants use hydrogen sulphide and water exchange process Which is developed by Tromboy. Electrolysis of water and low temperature hydrogen distillation processes are used in Baroda, hazira, Tuticorin, Talcher and Thal plants. In all the other plants Ammonia Hydrogen Exchange process is used for the production of heavy water.

Know These Also

Cooled sodium is used in Advanced Heavy water Reactor (AHWR)

BARC successfully completed Aerial Gamma Spectrometric Survey in J odhpur

In area of Meghalaya where sand stone is found is prominence. Stobilanthes of Acanthaceae family are identified an indicator of Uraniferous sandstone

BARC has developed laser Enhanced ionization Spectrometer (LEIS) Which will study atomic and molecular species in a flame

Nitrogen laser developed by CAT Indore is used in healing of burn wounds.

Indira Gandhi Centre for Atomic Research-IGCAR situated in Kalpakkam (Tamil Nadu) is working in the development of sodium cooled Fast Reactor Technology

In the center for Advanced Technology, Indore (Madhya Pradesh) the research is going on in lasers, accelerators, high vacuum technology, cryogenics and large magnets

Kamini research reactor in Kalpakkam is working since 29 October, 1996. It is 30 KW reactor. Uranium 233 fuel is used in it and Uranium-233 is produced from thorium by radiation

Bhabaha Atomic Research Centre (BARC), Mumbai is India"s Major nuclear research and development center. There are three research reactors here which are Dhruva-100MWt, Cirus-40MWt, Apsara-1MWt. They produce radio isotopes.

Tarapur and Kalpakkam Plants are working under their control

Radiation Medicine Centre is a unit of BARC situated in Mumbai which is working as a Regional Referral Centre of World Health Organization

Work is going on, on the use of thorium in Advanced Heavy water Reactor (AHWR)

Fact at a Glance

Fully Aided Organizations from Department of Atomic Energy

1. Tata Institute of Fundamental Research (TIFR), Mumbai
2. Saha Institute of Nuclear Research (SINR), Kolkata
3. Tata Memorial center (TMC), Mumbai
4. Institute of Physics (IOP), Bhubaneswar
5. Institute of Mathematical science, Chennai
6. Mehta Research Institute, Allahabad
7. Atomic energy Education Society,

Mumbai Telecommunication Programme of India

The major function of the telecommunication department is to look after the engineering, management, planning and maintenance of the telecommunication services in the country

Internet services in the country are provided by DOT and Videhs Sanchar Nigam Ltd., (VSNL)

Telecommunication Department had decided to give the task of providing the following services to the registered Indian companies at

fixedrates-

1. RadioPaging
2. Cellular mobile telephoneservice
3. Voicemail
4. Electronicmail
5. Audiotext
6. Direct Accesscode
7. Bulletin cardservice
8. KBPS datanetwork
9. INSAT satellite system usingVSAT
10. Video textservice
11. Videoconferencing
12. Credit card Authorizationservice

Prominent Scientists

Albert Einstein

German – Swiss, famous scientist known for his theory of relativity. He lived between 1879 and 1955

Archimedes

A Greek mathematician who lived about 250 BC. He discovered the buoyancy in liquids., which is also invented Archimedean screw, a cylindrical device for raising water **Dr.Brain Josephson**

He belonged to England. He is known for the discovery of the Josephson effect.

He was honoured with a Nobel Prize for Physics in 1973

Karl Marx

Father of Scientific Socialism

Copernicus

HewasanastronomerofPolandwhodiscoveredthesolarsystem.Helived between 1413 and1543

Dr.Dennis Gabor

ABritishengineer,presentlyworkinginAmerica.HewasawardedNobelPri ze forPhysician1971forhisinventionindevelopmentoftheholographicmethod– t hree dimensionalphotography

Dr.Edward Teller

A US nuclear scientist. He developed the hydrogen bomb

G.Marconi

Italian scientist, lived between 1874 and 1937. he invented radio telegraphy and succeeded in sending wireless messages across Atlantic ocean in 1901. He was honoured with a Nobel prize for physics in 1909

Galileo

Italian scientist. He viewed that all falling bodies, great or small, descent with equal velocity. He invented telescope and became the first man to see the satellites of Jupiter. He lived between 1564 and 1642

Henri Becquerel

He was a French physicist. He lived between 1852 and 1908. In 1896 discovered Becquerelrays, the first indication of radio-activity; later named as gamma rays. He shared Nobel Prize for physics in 1903 with the Curies

Henry Cavendish

Bornin1731inBritain.Hediscoveredhydrogengas,determinedthestructureof watermoleculeandcalculatedthedensityofearthbyanexperiment.Hediesin1810

Sir HumphreyDavy

A British chemist. He invented the safety lamp. First to apply electric current for the isolation of metals. He lived between 1778 and 1829

Dr.H.Yukawa

Born in 1907. Predicted a new particle meson which holds the protons and neutrons of the atomic nucleus. He was the first Japanese to win the Nobel Prize in Physics(1949)

Sir Isaac Newton

HewasaBritishnaturalphilosopher.HediscoveredBinomialtheorem: the differentialandtheintegralcalculusandtheUniversallawofgravitation.Helived between 1642 and1974

Sir James Chadwick

ABritishphysicist.Hediscoveredtheparticleinanatomicnucleusknownasthe neutron,becauseithasnocharge.Helivedbetween1891and1974

Johannes Kepler

He was a British physicist. He lived between 1856 and 1940. He discovered the electron which resulted in the development of Electronics, a branch of Physics

Sir J.J.Thomson

He was a British physicist. He lived between 1856 and 1940. He discovered the electron which resulted in the development of Electronics, a branch of Physics

James Watt

He was a Scottishengineer. He lived between 1736 and 1819. He invented steam engine

Prof.John Wardine

Propoundedthe"TheoryofSuperconductivity".Forthishewashonoredwith NobelPrizein1972withProf.KapoorandSchriefer

W.Konard Rontgen

he was a German physicist. He discovered X-rays or Rontgen rays for which he wasawardedthefirstNoblePrizeforPhysicsin1901.Helivedbetween1845and1923

Madam MarieCurie

ShewasaPolishphysicistandchemist.Shediscoveredradiumandwasawarded aNoblePrizeforthisinPhysicsin1903.Shewasawardedwithasecond NobelPrizein Chemistryin1911.Shelivedbetween1867and1934

Michael Faraday

He was a British scientist. He was prominent in the field of electron-magnetism. He discovered the laws of electrolysis and alternating current. He lived between 1791 and 1867

Marcello Malpighi

Father of Microscopy

Max Planck

A German theoretical physicist. He formulated the quantum theory. He was awarded with the Noble Prize for it in 1918

Neils Bohr

He was a Danish physicist. He extended the theory of atomic structure of devising an atomic model in 1913. He was awarded with a Nobel Prize for physics in 1922 . He lived between 1885 and 1962

Otto Hahn

He was a German pioneer of nuclear research. He won the Nobel Prize for Chemistryin1944.Heprovedin1938thatatomicfissioncanbeachievedbybombarding Uranium withneutrons.

Robert Boyle

HewasanIrishnaturalphilosopher.HewasoneofthefoundersofmodernchemistryandBoyle"sLaw.Helivedbetween1627and1691

Rutherford

He was a British scientist. He won a Nobel Prize for his work on structure of atom and radio-activity. He lived between 1871 and 1937

Robert H.Goddard

He was an American pioneer of space research who mentioned the possibility of shooting a rocket to the moon in a paper entitled " A Method of Reaching Extreme Attitudes" published by his in 1919

Sir Robert Watson – Watt

He was British physicist. He developedradar

S.N.Bose

He was an Indian scientist. He discovered a particle called „boson". He was awarded with Padma Vibhushan in 1954. He lived between 1894 and 1974 **Thomas Alva Edison**

HewasanAmericanScientist.helivedbetween1847and1931.Heinvented phonograph, electric bulb, a new type of storage battery, an early form of cinematography, telegraphetc.,

Tsiolkovsky

A Russian pioneer who developed the basic theory of rocketry. He is also known as Father of Rocketry in Russia. He lived between 1857 and 1935

Dr.Werner Von Brown

HeisadirectorofMarshallSpaceFlightCentre,America,SaturnVrocketshave beendevelopedherebyhisefforts bywhichApollo11and12werelaunched

William Bragg

He was British physicist who researched on the behavior of crystals with regard to X-rays incident upon them. He lived between 1880 and 1971

Dr.Homi Jahangir Bhabha

He was an Indian Scientist. he published important papers on Cosmic Rays and Quantum Theory. He was a professor at the Indian Science Institute, Bengaluru; Chairman, Atomic Energy Commission; Director, Tata Institute of Fundamental Research; President, Indian Science Congress in 1951 and presided at the Atoms for Peace Conference held at Geneva in 1956. He had many significant researches in structure of atom and contributed largely to the setting up of atomic reactors at Trombay (Mumbai)

Dr.S.Bhagvantam

Hewasbornin199andwasamongtheprominentscientistsofIndiawhogave importantcontributioninradioastronomyandcosmicrays.

Dr.Shanti Swaroop Bhatnagar (1878-1955)

He was a great Indian scientist. He was the first Director General of Council of Scientific and Industrial Research. Under his directorship, may research laboratories were established throughoutIndia

Jagdish Chandra bose(1858-1937)

He was an eminent physicist and Botanist. he founded Bose Research Institute, Kolkata. He invented Cresco graph.

Prof.Satish Dhawan

An eminent Indian scientist, born in 1920. He was chairman of Indian space Research Organisation. Indian artificial satellites "Aryabhatta" and Rohini were launched due to his efforts.

Dr.K.S.Radhakrishnan (1898-1961)

Dr. Krishnan had contributed greatly in the field of Physics. He associated Dr.C.V.Ramaninthediscoveryof„RamanEffect".HewasalsothedirectorofNational Physics Laboratory,Delhi

Dr.B.D.Nag Chaudhary

An eminent Indian Nuclear Physicist known all over the world. He associated Dr.Lawrence in the invention of Cyclotron. He had also been the director of Saha Nuclear institute, Kolkata.

Dr.H.N.Sethna

Hehasgreatlycontributedinthedevelopmentofnucleartechnologyin India. Firstatomictestin Indiawasdoneunderhisguidance.HehadbeentheChairmanof AtomicPowerCommissionofIndia.In1959hewasawardedwithshantiSwaroop Bhatnagarawardandentitled with PadmaShree.Hewasalsohonoured with Padm a Bhushan in1966

J.V.Narlikar

An Indian scientist who was the co-author of Hoyle-Narlikar theory of continuous creation which supplies missing links in Einstein"s Theory of Relativity> Hoyle and Narlikar have shown that the gravitation is always attractive and there is no gravitationalrepulsion.

Dr.Raja Ramanna

AprominentIndianscientistwhowasinstrumentaltostageIndia"sfirstNuclea r explosion at Pokaran range in 1974. He had been a chairman of Atomic Energy Commission

Dr.C.V.Raman(1888-1970)

First Indian scientist to receive Noble Prize for Physics in 1929 for his invention

„Raman Effect". His study of crystal structure is of unique importance. He was also awarded with Lenin award and Bharat Ratna

Dr. Vikram Sarabhai (1919-1971)

Former Chairman of India"s Atomic Energy Commission and the Indian SpaceResearch Organization (ISRO). Dr.Sarabhai was eminent physicist mainly interested in the astrophysical implications of Cosmic Ray Time variation. He also had an active contribution in the establishment of Physical Research Laboratory, Ahmedabad and Indian Institute ofManagement.

Dr. Meghnad Saha (1893-1956)

He had provided a great contribution in the field of Physics and Mathematic. He is well known for his research in nuclear physics, cosmic rays, spectrum analysisand

other branches of theoretical Physics. Institute of Nuclear Physics was established due to his efforts. He was also a member of Lok Sabha

Dr.Subhramanyam Chandrashekhar

He was an American of Indian Origin. He won Nobel Prize in physics in 1983. He is an Astro-Physicist. His theory of stellar Evolution – the birth and death of stars is 35 years old. He is the fourth Indian to win Nobel Prize. In 1967, he was ,also honored by „ National Medal of Science" award in America.

Bhaskar-I

A prominent Indian astronomer of 7th century. Second satellite of India was named after him.

Bhaskaracharya- II (1114-1185)

He was great Hindu mathematician and astronomer. His work „sidhanta siromani" consists of two part of mathematic and two part of astronomy. He had fore- sight on the modern theory of conventions.

Aryabhatta (476-550)

He was a great mathematician and an astronomer. His contributions include information about the movement of earth around the sun, determination of various physical parameter of various celestial bodies such as diameter of earth and moon. he laid foundations of algebra and pointed out the importance of zero. The first Indian satellite was named after him.

Scientific Instrument

Accumulator

It is used to store electrical energy. It supplies electricity when required

Actiometer

An Instrument that measures the intensity of solar radiation

Aerometer

It is used to determine the weight and density of air and gas

Altimeter

It measures the height of a flying plane

Ammeter

It measures electric current in amperes.

Anemometer

It measures the power and speed of air / wind

Artificial Satellite

It is a man made satellite that revolves around the earth and helps in the study of a specific area

Audiometer

It measures the intensity of sound

Audio phone

It is fitted in ear for aid in hearing

Ballistic Galvanometer

It is used for measuring current in micro amperes

Barograph

It measures the change in atmospheric pressure

Barometer

It is used in measuring the atmospheric pressure

Binocular

It is used to see distant objects

Calipers

It measures the internal and external radii of cylindrical objects. It can also measure their thickness

Calorimeter

Ibis made up of copper and measures the quantities of heat

Carburetor

Anarrangementininternalcombustionenginestomixairwithpetroleum vapors.

Cardiogram

The record obtained from a cardiograph

Cardiograph

A medical instrument used for tracing the movement of the heart

Chronometer

An instrument used in ships to calculate accurate time

Cinematograph

Itisusedtofocusthefilmsonthescree.Itconsistsofanumberoflensesarran ged toprojectonascreeanenlargedimageofphotographs.

Colorimeter

An instrument for comparing intensities of colour

Communication Satellite

This satellite is used in communications.

Compass Box

A device that indicates the North and South direction at any place

Computer

It is an electronic device. It is used to solve mathematical problems and calculations

Cresco graph

An instrument used in recording growth of plants. It was invented by Dr.J .C.Bose

Cyclotron

An apparatus for electromagnetic acceleration of Charged atoms

Daniel Cell

It is used as a source of direct current in a circuit

Density Meter

Density is measured bythis instrument

Dictaphone

Amachinewhichfirstrecordswhatisspokeintoitandthenreproducesit.Itis generally used inoffices

Diesel engine

It is an instrument which converts the heat produced by the combustion of diesel into mechanical energy

Dip circle

An instrument to determine the angle between the directions of the earth"s magneticfieldandthehorizontalataplace.Thisparticularangleisknownasdipatthat place.

Dynamometer

An instrument for measuring the electrical power

Dynamo

An electrical instrument in which the mechanical energy is converted into electrical energy. The principle of electromagnetic induction is involve in it.

Electric bulb

Its filament emit white light on heating when electric current is passed through it

Electric Motor

It is an instrument that converts electrical energy into mechanical energy

Electroencephalograph

Used to record and interpret the electrical activity of the brain

Electrometer

An instrument for measuring electricity

Electron microscope

It is used to see very minute organisms called microbes. Its magnification power is one thousand time of a single microscope

Electrophorus

A instrument for generating statically electricity by induction

Electroscope

An instrument for detecting the presence of electric charge

Fathometer

An instrument for measuring the depth of the ocean

Fire Extinguisher

It consists of a metallic container filled with sodium carbonate solution and a small glass bottle. This bottle is fitted with a metallic rod whose end emerges out. The extinguisher is truck at this end at the time of use due to which the bottle breaks and the acid in it comes in contact with the sodium carbonate. Carbon dioxide is evolved by their reaction which extinguishes fire

Galvanometer

An instrument for measure of small magnitude

Geiger Muller Counter3

A device used to detect the presence of radiation of a radioactive source

Gravimeter

An instrument to record oil deposit under water

Gyroscope

An instrument to illustrate the dynamics of rotating bodies

Heart-lungs machine

It is used in the surgery of heart and lungs

Hovercraft

A Vehicle that moves on the cushion of air. It can move at a fast speed on land, marshy and snowy fields and deserts. This vehicle moves above the ground and has no contact with it

Hydro meter

An instrument to measure the specific gravity of liquids

Hydrophone

An instrument for recording sound under water

Hygrometer

An instrument to measure the humidity in air

Hygroscope

An instrument to show the changes in atmospheric humidity

Hypsometer

An instrument to measure the height above seal level

Internal combustion engine

Projects the jet planes in forward direction

Kaleidoscope

used to see various type of geometrical designs

Kymograph

An instrument to record graphically various physiological movements. i.e. blood pressure, heart beat, study of lungs etc. in living beings

Lactometer

An instrument used to test the purity of milk

Lighting Conductor

Itisplacedontheroofsofhighrisebuildingforthepreventionofthebuildings forthepreventionofthebuildingfromlightning

Loud Speaker

It is an instrument that amplifies the sound. It converts electric waves into sound

waves

Magnetometer

An instrument used to compare the magnetic moments and fields

Manometer

An instrument for determining the pressure of gas

Megaphone

An instrument for carrying sound to long distance

Micro meter

An instrument to calculate the fraction of the lowest division of a given scale

Microphone

An instrument used for converting sound waves into electrical signals

Microscope

An optical instrument that produces enlarge images of minute objects

Microtome

An instrument used to cut an object into thin parts for microscopic inspection

Odometer

An instrument use to determine the distance covered by wheeled vehicles

Oscillograph

An instrument that graphically represents the electrical and mechanical vibrations

Periscope

Aninstrumentusedbythecrewofasubmarinetosurveytheshipsetc.onthe surfaceoftheshipsetc.onthesurfaceofthesea.Itisusedinpitsduginwarfield

Phonograph

An instrument for recording and reproducing sound stored as

grooves cut in cylinders

Photo telegraph

An instrument that sends photograph from one place to another. It is used in communication system

Photographic camera

An apparatus used to take the real photograph of an object or a person

Photometer
An instrument used to compare the illuminating power of two sources of light

Potentiometer
It is used to compare the emf of cells, to measure the thermal emfs to determine the large potential difference currents and measure the low resistances

Psytotrone
An instrument used to create artificial weather

Pyknometer
An instrument used to measure the density and coefficient of expansion of liquid

Phyrheliometer
An instrument for measuring the solar radiations

Pyrometer
An instrument to record thehigh temperature of a distant object, e.g., the sun

Radar
It is used to detect the direction and range of a flying aircraft by means of wave radio
s

Radiator
Itisusedincarenginesandregulatorsthetemperatureoftheengine.Itactsasa coolingagent

Radio telescope
Itisaninstrumentthatenablesonetoseetheeventstakingplaceatoneplace at theotherplacebythemeansofwirelesssystem

Radiometer
An instrument for measuring the emission of radiant energy

Rain Gauge
An instrument for recording the rainfall at a particular place

Refractometer
It is and instrument used to measure the refractive indices of transparent media

Resistance Thermometer
Used for determining the electrical resistance of a conductor

Rocket
Itisusedfortravellinginspace.Oxygenandhydrogenareusedafuelinit.Italso goes beyondatmosphere

Saccharimeter
An instrument used to measure the amount of sugar content in a solution

Safety Lamp
Aninstrumentusedforlighteninginmines.Explosioninminescanbepreven ted by itsuse

Salinometer
Used to determine the concentration of salt solution by measuring their densities

Seismograph
An instrument used to record the intensity and distance of an earthquake

Sextet
It measures the height of a building, towers etc.,

Spectroscope

An instrument that for spectrum analysis

Speedmeter

An instrumentthat indicates speed at which a vehicle is moving

Speedometer

It is used to accurately measure the radius of curvature of spherical object

Sphygmomanometer

An instrument that measures arterial blood pressure

Sphygmoscope

An instrument by virtue of which arterial pulsations become visible

Sphgmophone

An instrument with the help of which a pulse beat can be hear

Stethoscope

Aninstrumentbywhichadoublephotographsnappedfromtwodifferentangles byatwolensedcameracanbeviewed

Stop watch

An instrument use to record small interval of time in laboratory, in races etc.,

Stroboscope

An instrument that brings fast moving objects in view as if they were at rest

Tachometer

An instrument that determines speed so aero planes, motor boats etc.,

Tape recorder

An instrument used to record and hear sound

Telephone

An instrument by virtue of which two persons at different places can communicate

Telephotography

The picture of a moving object can be telecast at another place by it

Teleprinter

An instrument which prints automatically the messages sent from various places

Telescope

An instrument used to observe astronomical objects

Television

Aninstrumentwhichreceivesimagesofmovingobjectstransmittedbyradio wavesandconvertsintorealsoundandsight

Telex

It helps in direct exchange of information between two countries

Telstar

It is a space satellite by which overseas communication are made possible

Theodolite

Aninstrumentformeasuringhorizontalandverticalangelswitharotating telescope

Thermocouple

An instrument based on thermo-electricity used for measuring temperature

Thermograph

An Instrument self registering the record made by thermometer

Thermos Flask

Itisdevicethatcanmaintainthetemperatureofthematerialskeptinitconstant for about 24hours

Thermostat

An apparatus to measure temperature to a particular degree. It is used in refrigeration

Transformer

It regulates the potential of an c source

Transistor

It receives and transmits the sound waves. It is a mode of transmission

Ultra Sonoscope

It is used to detect ailments in heart, brain etc.

Vacuum Cleaner

It is a device that cleans dirt. It is used to remove dirt from walls, floor, carpet etc.,

Viscometer

It is an instrument used to determine the viscosity of liquids.

Wireless

It is an instrument which can send messages from one place to another without the use of wire.