Science One Liners – Part 1

Physics

1. Magnetism and Electricity
2. Dynamics
3. Electronics
4. Rocket and Artificial Satellite
5. Radioactivity
6. Energy

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MAGNETISM AND ELECTRICITY

- The natural ore of magnet is Magnetite
- The first person to make scientific study of magnets is William Gilbert
- The freely suspended magnet comes to rest in North and South direction
- The free ends of a magnet where attraction is maximum are called Poles of the magnet
- Like poles of the magnet Repel each other
- Unlike poles of the magnet attract each other
- The area in which magnetic force is present and magnetic effect is felt is Magnetic field
- The lines used to represent magnetic field are called Magnetic lines of Force
- The magnetic field strength decreases as substance moves away from the source
- The substances that are attracted by a magnet are called Magnetic substances
- The substances that are not attracted by magnet are called Non Magnetic substances
- An example for Diamagnetic element is Bismuth
- An example for Diamagnetic compound is Benzene

- An example for Paramagnetic non metal is Oxygen
- An example for Paramagnetic metals is Magnesium
- An example for Ferromagnetic substance is Iron
- The first theory that made a attempt to explain the phenomenon of Magnetism is Molecular theory
- The kinetic energy of the molecular magnet increases as when heated
- The ability of paramagnetic substances increases magnetism as we cool it
- An one of the method of making artificial magnets is Mechanical Magnet
- The temporary magnets are called as electromagnets
- Magnetic resonance imagery technique uses the principle of Magnetism
- The average speed of Magnetic levitation trains is 500km/h
- The best form of the energy is electrical energy
- The unit of measurement of electricity in the SI system is Joule
- The SI unit of Electric Power is Watt
- If p is power, E is energy and t is time is expressed by the formula P = E/t
- The unit used to measure electricity used for commercial purpose is Kilowatt hour(KWh)
- The presence of magnetic field around the current carrying conductor was discovered by Henry Christian Oersted
- The alloys of Fuse wire are Lead and Tin
- The protective device that is based on the heating effect of electric current is Fuse
- The substances which does not allow the current to flow through them are Insulators
- The substances that allow the current to flow through them in liquid form are electrolytes
- The substances that does not allow the current to flow through them even in aqueous solution is called Non electrolytes
- 1 Kilowatt hour is equal to 3600000 joules
- The device that converts chemical energy into electrical energy is called Electric Cell
- CFT stands for Compact Fluorescent Tube
- An example for Dry cells is Nickel Cadmium cells
- The magnets that are prepared in the laboratory are called Artificial Magnets
- The iron fillings on the magnet cling more at the Poles of Magnet

- The strength of the magnet decrease when it is heated strongly
- An example for a magnetic substance is Iron
- An example for a non magnetic substance is Paper
- The weakest of all types of Magnetism is Diamagnetism
- The substance that get weakly magnetized when placed in a magnetic field, in a direction opposite to the direction of the magnetic field are called Diamagnetic substances
- The substances that exhibit weak magnetism due to an external magnetic field in the direction of the magnetic field itself are called Paramagnetic substance
- The substances which are easily magnetized by external magnetic fields are called Ferromagnetic substances
- A device that converts electrical energy into heat energy is Electric iron
- A device that converts electrical energy into light energy is Flourescent Lamp
- A device that converts electrical energy into sound energy is Loud speaker
- The energy can neither be created nor destroyed but can be converted from one form to another is called Conservation of Energy
- In how much time does an electric fan of 60W, use 3000J of energy is 50s
- The energy used in 1min by a device that is rated 40W is 2400J
- A bulb consumes 1500J of electrical energy in 25s, the power is 60W
- A 40 bulb is used daily for 5 hours, the electricity used in one month is 6kwh
- The phenomenon in which a substance undergoes a chemical change due to the flow of electricity through it is called Chemical effect of Electric current
- An example for electrolytic substance is Sodium Chloride
- An example for non electrolytic substance is Kerosene
- A safety device used in electric circuit in order to prevent damage to the circuit and appliances is Electric Fuse
- A electric field works on the principle of heating effect of electric current
- An electric bulb works on the principle of heating effect of electric current
- An electric lamp of 25 W uses 25 joules of energy in one second
- The type of magnet is used in an electric bell is Electromagnet
- The pole of the magnet that shows northern direction is North pole
- The pole of the magnet that shows southern direction is South pole

- An electrolyte used in a dry cell is Ammonium Chloride
- The soft iron pieces used to preserve magnets called Keepers
- The two metals that are Paramagnetic magnet are Magnesium and Platinum
- The substance that is filed in the bulb to give it long life is Nitrogen
- The space between the layer and walls of zinc can is filled with paste of Ammonium Chloride in Dry Cell
- The two methods of preparing artificial magnets are Mechanical and Electrical method
- The substance that is used to temporarily magnetize by electrical method is Steel rod
- The instrument used to measure the electric flow of current is Ammeter
- The flow of electric charges is called Electric Current
- The SI unit for measuring the quantity of Electrical charges is Coulomb
- One coulomb = 6.3×10^{18} electrons
- The work done in bringing a unit positive charge from infinity to a point in the electric field is Potential at that point.
- The SI unit of electrical potential at any point is Joule / Coulomb
- The amount of work done in moving a unit positive charge from one point to another is Potential difference
- The SI unit of potential difference is Volt
- The instrument used for measuring electric current is Ammeter
- The SI unit of electric current is Ampere
- A path along which electric current flows is Electrical Circuit
- The formula to find the potential difference is $V = \frac{W}{Q}$
- The formula to find Electric current is $I = \frac{Q}{t}$
- The energy required to maintain potential difference between ends of a conductor is Electromotive Force
- The property of conductor to obstruct the flow of electrons through it is Electric resistance
- The SI unit of electric resistance is Ohm
- The value of V / I is a constant
- The relation between current and potential difference is V = RI
- A potential difference of 20V is applied across the end of a resistance 5Ω then the amount of current is 4 ampere

- A resistance of 20Ω has a current of 2 ampere flowing in it the potential difference between its ends is 40V
- A current of 5 ampere flows through a wire whose ends are at a potential difference of 3V then the resistance is 0.6Ω
- An iron box is used in an electrical circuit having a voltage of 220V if a current of 3.5 ampere flows through it then the resistance of Iron box is 62.8Ω
- The rate at which work is done by the electrical energy is Electrical Power
- One horse poser = 746 watts
- The energy consumed in units when a radio marked 60W is used for 50 hours is 3 units
- The current that flows in single direction is Direct current
- The current that changes its direction of flow at regular intervals of time is called Alternating current
- A device that converts mechanical energy into electrical energy is called Dynamo
- A device that converts electrical energy into mechanical energy is called Electric Motor.
- A dynamo that produces alternating current is called AC Dynamo
- A dynamo that produces direct current is called DC dynamo
- An electric motor, which works on direct current, is called DC Motor.
- The rotating part of a dynamo or motor is called Armature.
- The source of electrical energy required to produce an electric current in the circuit is called Electromotive force.
- The SI unit of electromotive force is called Volt.
- Michael Faraday discovered the phenomenon of Electromagnetic induction.
- Electromagnetic Induction is the working principle of a dynamo.
- The device that detects electric current in a circuit Ais called Galvanometer.
- The emf induced in electromagnetic induction does not depend upon the Length of the magnet.
- In electromagnetic induction the induced emf is directly proportional to the rate of change of magnetic field linking to the conductor.
- The dynamo rule was discovered by John Ambrose Fleming
- Dynamo rule discovered by Fleming is used to find the direction of motion of coil when the directions of induced current and the direction of the magnetic field are known.

- A Commutator is used in a DC dynamo to change the direction of the current induced in the coil
- The induced emf produced when a magnet is inserted into a coil does not depend upon the resistance of coil
- To induce an emf in a closed coil, the magnetic flux linked with it must change
- Electromagnetic induction is a phenomenon in which an emf is induced in a coil when lines of force of a magnetic field linked with the coil changes.
- The two ends of a coil are connected to the terminals of a galvanometer, if a magnet is pushed in the coil; the galvanometer shows a momentary deflection.
- The mechanical force on a current carrying conductor in a magnetic field is highest when the direction of current flows through the conductor is perpendicular to the direction of magnetic field.
- The type of current that can be transformed over very long distance easily is Alternating current.
- The AC supplied to our homes has a frequency of 100 hertz. This means the armature of the generator producing the current rotates 50 times per second.
- While applying the motor rule we use the first three fingers of the left hand only.
- While applying the dynamo rule we use the first three fingers of the right hand only.
- The current induced in the coil of a dynamo changes for every half rotation of the armature.
- The type of magnet used in Faradays experiment is bar magnet.
- The SI unit of potential difference is Volt.
- The cloth used in between the twines in Faradays Experiment is Calico cloth.
- The main finger in the dynamo rule indicates the direction of motion of the conductor.
- The central finger in the dynamo rule indicates the direction of the induced current.
- The Forefinger in the dynamo rule indicates the direction of magnetic field.
- The Fleming's right hand rule is also called as Dynamo Rule.
- The main finger in the motor rule indicates the direction of mechanical force.
- The central finger in the motor rule indicates the direction of electric current.
- The forefinger in the motor rule indicates the direction of magnetic field.
- The Fleming's left hand rule is also called as Motor Rule.

- Two equal and parallel forces acting on a body at two different points in opposite directions constitute a Couple.
- An electric current passing through a conductor produces the magnetic field around it.
- The metal that Faraday used to construct insulated wire is copper.
- The direction of wave propagation is perpendicular to the planes of electric and magnetic fields.
- The induced emf in a coil increases as the number of turns of the increases.
- According to Faraday's second law the induced emf is proportional to the rate of change of the magnetic field.
- The scientist who discovered that a magnetic field produces an electric field around it is Michael Faraday.
- In electric motor, the current flows in one direction.
- When a magnet is moving relative to a coil of conductor the rate of change of magnetic field depends on the speed of the magnet.
- The law that gives the relationship between the directions of magnetic field, induced current and the direction of motion of the coil is Fleming's right hand rule.
- The law that gives the relationship between the direction of magnetic field, electric current and the direction of mechanical force is Fleming's left hand rule.
- The electric current supplied to our homes and industries is Alternating current.
- The device that helps the current to flow in the external circuit in the same direction is called Commutator.
- When a magnetic field linking with a circuit changes an emf will be induced in the circuit this phenomenon is called Electromagnetic Induction.
- The frequency of Ac supplied for domestic use is Fifty cycles per second
- Relative motion between the conductor and the magnet produces the electric field
- The best method of getting maximum emf during electro magnet induction is by increasing the rate of change of magnetic field linked to the conductor.
- Rotating part of a dynamo is called Armature
- The nature of couple is tends to rotate the body
- DC dynamo speed is increased by increasing magnetic field
- A conductor carrying current is kept in a magnetic field then it forms an external circuit.

- Electromagnetic radiations of frequency higher than that of radio waves and lower than that of visible light is called Infrared radiation.
- Electromagnetic radiation of frequency higher than visible light and lower than that of X rays is called Ultraviolet radiation.
- Electromagnetic waves having the wavelength from 0.2 mm to about 10cm are called Microwaves.
- The phenomenon of spontaneous emission of electrons by a metal surface when it is irritated with photons is called Photoelectric effect.
- The emission of a photon on its own by an excited atom when it is stimulated by another photon is called Stimulated emission.
- The emission of a photon on its own by an excited atom, which occurs, spontaneously is called Spontaneous emission.
- The process of increasing the proportion of atoms in higher energy state is called Population inversion.
- The device that produces the high intensity monochromatic light is called LASER.
- If f is the frequency and is the wavelength then the velocity of the wave'v' is given b $v = f\lambda$.
- The speed of light in empty space is 3×10^8 ms^{-1}
- The SI unit of wavelength is metre'm'
- The SI unit of frequency is Hertz 'Hz'
- The wavelength of visible light extends from 400nm to 750nm
- 1 nanometer = 10^{-9} meter
- 1 angstrom = 10^{-10} meter
- Ultraviolet rays were discovered by J.W. Ritter in 1801
- Infrared spectroscopy is used to study the composition and structure of molecules in a compound
- Infrared radiations were discovered by William Herschel in 1800
- X rays were discovered by William Roentgen in 1895
- The diagnostic technique of studying an object with the help of its photographic image taken using high frequency waves like X rays is called Radiography.
- High energy electromagnetic radiations of frequency higher than those X rays are called gamma rays

- The value of Planck's constant is equal to 6.626×10^{-34} Js
- A quantum of electromagnetic radiations such as light is called Photon
- Einstein used Max Planck theory to explain the phenomenon of Photoelectric effect.
- A device that converts light energy into electrical energy by using photoelectric effect is called Photoelectric Cell
- LASER stands for Light Amplification by Stimulated Emission of Radiation
- The energy incident on unit area in one second is called Power density.
- The power density of Laser light is $10^8 W/cm^2$
- The process of increasing the number of atoms in excited state by supplying them with energy from an external source is called Optical pumping.
- Laser works on the principle of amplification of light stimulated emission of radiation.
- The technique of determining the distance between two objects using laser light is called Laser Ranging.
- The process of sending and receiving messages with the help of laser light using optical fibers is called Optical communication.
- Vitamin D is synthesized in our body with the help of low frequency ultraviolet rays.
- The electromagnetic waves used in radio and television transmission are radio waves.
- The only pair, which does not overlap in the complete electromagnetic spectrum, is Visible light and Radio waves.
- The range of wavelength of electromagnetic waves varies from about 10^{-15} to 100km.
- Electromagnetic waves having wavelength from about 0.2mm to about 10cm are known as microwaves.
- The frequencies in the visible region of the electromagnetic spectrum lie between those of Ultraviolet and Infrared rays.
- Electromagnetic waves used as carrier waves in radio broadcasting and telecasting are known as Radio waves.
- According to Planck's law the energy of a photon is directly proportional to its frequency.
- Carrier waves used in television broadcasting have frequency of $<10^9$Hz.
- The quantum theory of light was developed to explain the phenomenon of spectrum of black body radiations.
- The energy E of a photon of frequency V is given by $E = hv$

- The phenomenon of photoelectric effect was correctly explained by Einstein
- Ultraviolet radiations emitted by the sun are observed by Ozone in the atmosphere
- Gamma rays has the highest power of penetration through the matter
- If the frequency of the incident photon is increased, the kinetic energy of the photoelectron will increase
- The photoelectric effect cannot occur when the frequency of the incident photon is below a certain minimum.
- Einstein was awarded noble prize for his explanation about photoelectric effect.
- A photon of energy E falls on a metal and causes the emission of an electron from the metal. How many electrons are emitted from the metal surface if the incident photon has energy 6E? Only one electron.
- Photoelectrons are emitted from a metal surface when the metal is irritated with photons of suitable frequency.
- When the frequency of the incident photon is equal to the threshold frequency., the kinetic energy of the photoelectron will be Zero
- Photoelectric effect establishes that electromagnetic radiations consist of packets of a definite quantity of energy.
- The strength of the photoelectric current depends upon the intensity of incident radiation.
- Light emitted by the laser light is example for coherent light
- An example for solid laser medium is Ruby
- A source of gamma radiation is radioactive nuclei
- Einstein gave correct explanation about photoelectric effect by using Quantum theory of Radiation
- For effective lasing action to take place the number of atoms in excited state should be higher than in ground state.
- The photons in laser light will have identical frequency
- We can distinguish between real gems and artificial gems by using UV radiations.
- The photoelectric cell is used to reproduce the sound in cinematography.
- Bloodless surgery can be performed by using Laser light.
- For lasing action we can use stimulated emission only.
- Photoelectric effect establishes the particle nature of light.

- The electromagnetic waves used in locating fracture of bones is X rays
- Ultraviolet waves are used in the treatment of Rickets.
- The rays that is most suitable for long distance photography is Infrared rays.
- The rays that are used to stimulate blood circulation are Infrared rays.
- The radiation detected on account of its heating effect is Infrared rays.
- The electromagnetic radiations discovered on account of its photographic action are Ultraviolet rays.
- Light is made up of tiny packets these packets are called Photons.
- The rays that are used to examine old paintings are Infrared rays.
- The rays that are used, as efficient sterilizers are Ultraviolet rays.
- Radiations having frequency below this does not produce photographic effect Threshold frequency.
- The electromagnetic waves that were discovered due to its radioactive property are Gamma rays.
- Laser light is used in Laser Raman spectroscopy to understand Molecular structure.
- The technique used to locate flaws in the parts of machines is Radiography.
- The range of wavelength of Infrared radiations is 750nm to 0.4mm
- The range of wavelength of the X rays extends from 0.1A to 100A.
- The range of wavelength of the gamma rays extend from 0.01A to 0.1A
- The range of wavelength of the radio waves is >0.1m
- The range of the wavelength of the microwaves extend from 0.2mm to 10cm
- The order of frequency of radio waves is $<10^9$Hz
- The order of frequency of the microwaves vary from 10^{12} to 10^9Hz
- The order of frequency of the infrared rays vary from 10^{14} to 10^{10} Hz
- The order of frequency of the visible light is 10^{14}Hz
- The order of frequency of the ultraviolet ray vary from 10^{16} to 10^{14} Hz
- The order of frequency of the X rays vary from 10^{19} to 10^{16} Hz
- The order of frequency of the gamma rays vary from 10^{20} to 10^{19} Hz
- The radiations used to control different settings in TV remote handset are Infrared radiation.
- The radiations used in the study of crystal structure are X rays.
- The Quantum hypothesis was proposed by Max Planck in 1900

- The device that used in the operation of burglar alarms is Photoelectric cell.
- The process of raising the atom in a lower energy state to a higher energy state is called Excitation.
- The first LASER was constructed by T.H.Maiman in 1960
- The technique that helps in taking complete three-dimensional images of a given object is called Holography.
- An example for gas laser is Helium Neon Laser
- The elements used in continuous gas laser are He and Ne
- The most energetic of all electromagnetic waves is Gamma rays

DYNAMICS

- The change of position of a body when compared with that of another body is called Motion
- The branch of physics that deals with the behavior of matter under the action of force is called Mechanics
- The study of behavior of matter under the action of forces that produce motion of changes in motion is called Dynamics
- A branch of mechanics concerned with measurement and precise description of motion is called Kinematics
- The branch of mechanics which deals with the state of rest or of equilibrium is called Static's
- An example for invisible motion which can be experienced is moving air
- An example for invisible motion which cannot be experienced is motion of Earth
- An example for visible motion is flight of birds
- The actual path traversed by the body is called Distance traveled
- The least distance between the initial position and final position of the body is called Displacement
- Distance traveled is a Scalar quantity
- Displacement is a Vector quantity
- The SI unit of measurement of distance traveled is Meter
- The SI unit of measurement of displacement is Meter
- The distance traveled by a body in unit time is called Speed
- The SI unit of speed is m/sec

- The speed of a body moving with a uniform motion travels 100km in 21/2 hours is 40km/h
- 1km/h is equal to 5/18m/s
- 1m/s is equal to 18/5km/h
- The speed calculated on the total distance and total time is called Average Speed
- The rate of displacement of a body in unit time is called Velocity
- The SI unit of velocity is m/s
- The rate of change of velocity is called Acceleration
- If the initial velocity of the body is u , final velocity of the body is v, time taken is t, then acceleration is given by a = v-u/t
- The SI unit of acceleration is m/s2
- If the value of acceleration is positive, the velocity Increases
- If the value of acceleration is negative, the velocity Decreases
- The velocity of a body at rest is Zero
- Any motion that repeats itself in equal intervals of time is called Periodic motion
- The SI unit of Frequency is Hertz
- The number of oscillations in unit time is called Frequency
- The time taken by a body to perform one oscillation is called Period
- The maximum displacement of the oscillating body from its equilibrium is called Amplitude
- The laws of simple pendulum were discovered by Galileo Galile
- When the amplitude is small the period of simple pendulum does not depend on the amplitude, this is first law of Simple pendulum
- When the amplitude is small the period of the pendulum does not depend on the size and the density of the bob, this is second law of Simple pendulum
- The distance between the point of suspension and the centre of bob is the Length of the bob
- The amplitude of simple pendulum is directly proportional to the square root of the length of pendulum
- When the amplitude is small the period of the pendulum is directly proportional to the square root of the length of the pendulum, this is third law of simple pendulum
- The vibratory motion is also called as Periodic motion

- The first pendulum clock was invented by Christian Huygen
- The distance between any two successive similar points on the wave is called Wavelength
- The velocity of the can be calculated with the help of formula $V = n\lambda$
- The ability to do work is called energy
- The amount of work done when a force of 1 newton moved a body through 10m is 10N
- The amount of work done when a stone is pushed through 5mt by a force of 2N in the direction of force is 10Nm
- The SI unit of Work is Newton-Meter
- The SI unit of force is Newton
- 1Joule is equal to 1Newon – meter
- The earth is rotating on its axis from West to East
- The physical quantities which have both the direction and magnitude are called Scalar
- The physical quantities which have only magnitude but no direction are called Vector
- An example for Scalar quantity is Distance
- An example for Vector Quantity is Force
- If the body travels equal distance in equal intervals of time it is said to be Uniform motion
- If the body travels unequal distance in unequal intervals of time is said to be Non Uniform motion
- A graph obtained by plotting distance traveled along the Y axis and the time along the X axis is called Distance-Time graph
- A graph obtained by plotting velocity of a body along the Y axis and time taken along the X axis is called Velocity-Time graph
- A heavy bob suspended to a stand using a thin thread is called Simple Pendulum
- A periodic disturbance traveling in a medium carrying energy is called Wave
- The pattern of motion of wave is called Wave motion
- If the particles of the medium in which the wave is traveling at right angles to the direction of propagation of the wave are called Transverse wave
- If the particles of the medium in which the wave is traveling vibrate in the direction of the propagation of the wave is Longitudinal wave
- The distance time graph of a body in variable motion is Curved line

- The slope of the curve in distance time graph gives the velocity of the body
- When a body is traveling with constant speed the acceleration is Zero
- A train is 45m long it takes 30s to cross a bridge moving at a speed of 18km/h the length of the bridge is 150m
- The time taken by the swinging bob to move from one extreme position to another extreme position is equal to T/4
- The period of simple pendulum varies directly to the square root of the length of the bob
- The product of force acting on the body and displacement caused is called Work
- The product of force acting on the body and displacement caused is given as W = F x S
- The factors on which the period of simple pendulum depends are Length and acceleration due to gravity
- The laws of motion were proposed by Issac Newton
- The forces which are responsible for motion are Mechanical forces
- Every body continues in its state of rest or of uniform motion in a straight line unless it is compelled to change the state by forces impressed on it is Newton's First law of motion
- The tendency of body to be in state of rest or in uniform motion unless and until an external force acts upon it is called Inertia
- The group of forces whose resultant is zero is called Forces in equilibrium
- The acceleration given to a body by a force applied to it is directly proportional to the force and is in the same direction as the force and inversely proportional to the mass of the body is Newton's Second law of motion
- The relation between Force, Acceleration and Mass is F = ma
- The acceleration gained by a body of mass 2kg when a force of 100N acts is $50m/s^2$
- The force applied on a body of mass 100kg so that if moves with an acceleration of $5m/s^2$ is 500N
- The product of mass x velocity is Momentum
- The SI unit of vector quantity is kgm/s
- To every action there is always an opposed and equal reaction is Newton's third law of motion
- The acceleration gained by the bodies due to the gravitational force is Acceleration due to gravity

- If the height of the tower is 78.4m then time required for a bob to reach ground when it is dropped from the top of the tower is 4 seconds
- A body dropped from the top of a tower reaches the ground with a velocity of 48.9m/s after 5 seconds then the acceleration due to gravity at that place is $9.78 m/s^2$
- The energy possessed by a body by the virtue of its motion is Kinetic Energy
- Kinetic Energy = $\frac{1}{2} mv^2$
- The energy possessed by a body by virtue of its position is Potential Energy
- Potential Energy = mgh
- A body moves through a distance of 10m when 500N of force is applied on for 5 seconds then the power required to do the work is 1 kilowatt
- The power required to carry a body of mass 350kg vertically upwards from the earth to a height of 180m in 40 seconds is 15435 watt.
- The radial force acting on a body in circular motion and directed towards the centre of the circular path is called Centripetal force
- A body moving along a circular path is accelerated towards the centre of the circular path due to the centripetal force acting on it is called Centripetal acceleration
- A force equal and opposite to the centripetal force that arises as a reaction to the centripetal force is called Centrifugal reaction
- The force of attraction between two bodies that arises due to their masses is called Gravitational force
- A spinning device that uses centrifugal force to separate particles of different densities is called Centrifuge
- The simplest type of motion is Motion along a straight line
- If the trajectory is a Curve then motion of a body is said to be Curvilinear
- The simplest Curvilinear motion is Motion along a curved path
- The motion of a body along a circular path with constant speed is called Uniform circular motion
- A body moving along a circular path accelerated towards the centre of the circular path is called Radial acceleration
- The formula to find the magnitude of the centripetal force acting on a body in circular motion is $f = mv^2/r$

- The value of acceleration experienced by the moon due to the gravitational force excreted by the earth on it is $2.72x\ 10^{-3}ms^{-2}$
- The force that provides the centripetal acceleration to the moon and planets is Gravitational force
- The objects moves in a tangential path once the centripetal force is removed from the circular motion
- Cream is separated from milk in a cream separator by using Centrifugal force
- A body of mass m moving in a circular path of radius r with a constant speed v will have centripetal force equal to mv^2/r
- For a body in circular motion the direction of the velocity changes continuously
- A body in uniform motion is acted upon by a centripetal force
- The centripetal force acting on a body in circular motion depends upon its mass, velocity and radius of path
- The centripetal force on a cyclist negotiating as curve on a level road is provided by friction between the roads and wheel
- Roads and railway tracks are banked at curves in order to provide the necessary Centripetal force
- A body in uniform circular motion is accelerated along the radius towards the centre
- When a force responsible for keeping a body in circular motion is suddenly withdrawn, the body moves along the tangent to the circular path
- An orbiting satellite gets the centripetal force from the gravitational attraction of the planet on the satellite
- Centrifugal force on a body in circular motion does not have real existence
- A cyclist negotiating a curve leans towards the centre of the curved path to obtain the necessary centripetal force
- The device in an engine which controls the speed of the engine is called Governor
- The banking of a railway track is done to eliminate wear and tear of the wheels
- An object moves along a straight line if the net force acting on it is zero
- The agent which exerts a centripetal force is subjected to Centrifugal reaction
- If an automobile is moving fast along a curve then a person inside it feels pushed outwards
- Centrifugal force cannot be created but it is due to the inertia of rotational motion

- The speed of an engine can be controlled by Centrifugal governor
- For transferring large quantities of liquids from low pressure regions centrifugal pump is used
- The equation for the force acting on a body f =mv^2/r, where m is Mass
- The equation for the force acting on a body f =mv^2/r, where v is Velocity
- A device which dries clothes is Drying machine
- What will happen when a dish containing water and mercury are rotated rapidly about the vertical axis mercury will be surrounding water
- The passenger sitting in a car moving fast along a curve fell pushed outwards due to inertia of rotational motion
- Governor was deviced by James Watt
- The device where centrifugal pumps are used is blowers and Exhaust fans
- Centrifugal force can be experienced only
- In the case of a train taking a turn along a curved path the centrifugal reaction is lateral thrust if the wheels of the outer rails
- A stone is tied along a string, and held whirling around. If the string snaps, the stone moves along the tangential direction
- An example of circular motion is Merry go round
- When an object is moving in a circular path, the net force acting on it is angular to the direction of motion
- According to Newton's Third Law centrifugal reaction is equal and opposite to centripetal force
- Centrifuge is used to separate proteins, Hormones and vitamins in different liquid media
- While a spacecraft is orbiting the earth, the gravitational pull is providing the necessary centripetal force
- The device used to separate the minute particles of different densities is Centrifuge
- The gravitational force excreted by the body on earth is called Weight of a body
- The force that keeps the moon in nearly circular orbit around the earth is Gravitational force
- The universal law of gravitation was proposed by Sir Isaac Newton
- The force that keeps the planets in nearly circular orbit around the sun is Gravitational force
- Law of gravitation is called universal because it is valid for small and large masses and distances

- The weight of a body is equal to the product of mass and acceleration due to gravity
- The acceleration due to gravity on earth decreases with the increase in height
- We experience less weight then normal when we are moving downwards in a giant wheel
- The value of g vary from place to place because it depends on the radius of earth
- The laws of planetary motion were discovered by Johannes Kepler
- If r is the average distance of the planet from the sun and T is the period of revolution, then r^3 is proportional to T^2
- If the distance between the two bodies is doubled the Gravitational force decreases to four times
- The SI unit of Weight is Newton (N)
- The unit of universal gravitational constant is $Nm^{-2}kg^{-2}$
- The part of the earth in which the radius of the earth is higher is Near the equator
- The shape of the orbit of the planet around the sun is Elliptical
- The tides are due to gravitational attraction between the sun and the moon
- Gravitational force between two bodies arises due to their masses
- Gravitational force exists between any two masses
- The gravitational force between two bodies depends upon their masses and distance between them
- According to universal law of gravitation the force of gravity between two masses is inversely proportional to the square of the distance between them
- If two bodies of masses p and q are separated by the distance r then force of gravity between them is given by $F = pq/r^2$
- The force of gravity between two masses m1 and m2 when they are at a distance d apart is F, if the mass m1 is replaced by another body of mass 6m1, the gravitational force now would be 6F Newton
- The force of gravity between two masses is 4 Newton's, if the distance between them is doubled, then the force of gravity between them would be 2 Newton's
- The value of universal gravitational constant is $6.67 \times 10^{-11}\ Nm^2kg^{-2}$
- The value of the universal gravitational constant is a constant everywhere in the universe
- The value of gravitational constant is equal to the force of gravity between any two masses of 1kg each and 1m apart
- The weight of an object on earth is the gravitational force exerted by the body on earth
- To calculate the value of acceleration due to gravity we need the values of mass of the earth, universal gravitational constant and radius of the earth

- If M is the mass of the earth, R is the radius of the earth and G is the gravitational constant, then the value of acceleration due to gravity is given by $g = GM/R^2$
- The value of acceleration due to gravity on earth is highest at the poles
- A person standing in the lift accelerated upwards experience increase in weight
- A person standing in the lift accelerated downwards experience decrease in weight
- The value of acceleration due to gravity is less at Equator
- When a lift is falling freely a person experiences weightlessness because there is no reaction force acting on the person inside the lift
- The value of acceleration due to gravity on the earth depends upon the Shape
- An imaginary line drawn from the sun to a planet sweeps equal areas in equal intervals of time, this is known as Keplers second law of planetary motion
- A planet moving around the sun will have the highest speed when it is nearest to the sun
- 1 Astronomical unit is equal to 1.5×10^8Km
- The planet with the highest period of revolution is Uranus
- The first planet whose existence was predicted much before its discovery is Uranus
- The force that binds us towards the earth is Gravity
- Newton showed that Kepler's laws can be derived from his laws of motion
- The deviations observed in the orbit of Neptune led to the discovery of planet Pluto
- Universal law of gravitation cannot give the correct meaning for the freezing of water near the polar region
- When the medium between the two masses changes the force of gravity between them will not change
- When an apple falls from a tree both apple and earth are attracted
- The value of acceleration due to gravity changes from place to place
- Bodies of different mass are falling freely. They have the same acceleration
- According to universal law of gravitation $F = G\, m_1 m_2 / d^2$
- Weight W of an object is given by $W = mg$
- The acceleration due to gravity is given by $GM_E/(R_E)^2$
- Gravitational force is independent of the intervening medium and mass
- The condition of zero reaction on a person who is an occupant of a free falling body is Weightlessness
- The value g at a distance of 3.84×10^5 Km is 2.7×10^{-3}
- According to their law of planetary motion $r^3 \propto T^2$
- The law of gravitation successfully predicted the existence of planets Neptune and Pluto
- The planet Pluto was discovered in the year 1930
- In the equation $g = GM_E/R_E$, G refers to Gravitational constant
- An example for a person feeling weightlessness is Standing in a freely falling lift

- The scientist who examined the motion of celestial bodies is Newton
- The planet Pluto was discovered by Cycle Tom Baugh
- The planet Neptune was discovered by Johannes Galle
- The keplers third law is used to find the distance of planets from the sun
- In the equation $F = m_E m_o/d^2$, the m_E refers to Mass of the earth
- The planet Neptune was discovered in the 19^{th} century
- Every object on the surface of the earth are attracted by the earth towards its Centre
- Astronauts when they travel around the space experience weightlessness
- The shape of the earth is Geoids
- The value of acceleration due to gravity on the surface of earth is $9.8 m/s^2$
- The law that predicted the existence of planets beyond Uranus is Newton's law of gravitation
- The value of g does not depend on mass of the earth
- The law most suitable to find the mass of the sun is Kepler's third law
- Moon with the mass mo and mE revolves around the earth with distance d, the centripetal force acting towards the centre of the earth is $G\ m_o m_E/\ d^2$
- According to Kepler's third law r^3 = constant x T^2, the constant is $G_m/4II^2$
- According to Keplers third law the cube of the average distance is directly proportional to the square of a period of revolution
- The law the Newton used to show evidence to his law of gravitation is Kepler's third law of motion
- The weight of a body is measured by the reaction excreted on the body
- The planets move in elliptical orbits around the sun, with the sun at one focus is Kepler's first law
- There are 3 laws of Planetary motion proposed by Kepler

ELECTRONICS

- A substance whose conductivity lies in between that of conductor and insulator is called Semiconductor.
- The vacancy of an electron created in a semiconductor material is called a Hole.
- The process of adding an impurity to a pure semiconductor with the object of increasing the electrical conductivity is called Doping.
- A impurity which increases the electrical conductivity of a semiconductor is called Dopant

- Pure semiconductors containing equal number of electrons and holes are called an extrinsic semiconductor.
- The process of changing alternating current into direct current is called Rectification.
- The process of strengthening weak signals is called Amplification.
- The process of impressing the audio or video signals on the carrier wave is called Modulation.
- The process of separating the audio frequency signals from the carrier wave is called Demodulation.
- A negatively charged particle with negligible mass found revolving around the nucleus of all atoms is called Electron.
- The charge of one electron is 1.6×10^{-19} coulomb
- The mass of one electron is 9.1×10^{-31} Kg
- The branch of science that deals with the study of behavior of electrons, their control and use is called Electronics.
- The electrical conductivity of impure semiconductors caused due to unequal number of electrons and holes is called Electrical conductivity.
- A semiconductor crystal doped with a p type impurity at one end the n type impurity at the other is called a Junction diode.
- Transmission of speech or music over long distances, using radio waves is called Radio Broadcasting
- A wave consisting of strong electromagnetic waves of suitable frequency for carrying audio signals is called Carrier wave
- The device that converts sound waves into electrical signals of the same frequency is Microphone
- The device that converts electrical signals into sound waves is Loudspeaker
- The carrier frequency used in TV transmission range from about 40MHz to 600MHz
- The majority charge carriers in p type semiconductor are Holes
- The majority charge carriers in n type semiconductor are Electrons.
- The device that which produces electrical oscillations of desired frequency is called Oscillator.
- A transistor in which a p region is sandwiched between two n regions is called npn transistor

- A transistor in which a n region is sandwiched between two p regions is called pnp transistor
- The electrical conductivity of semiconductor is greater than that of insulator but less than the conductor.
- The charge carriers in a semi conducting material are both electrons and holes
- An example of Semiconductor is Germanium
- If silicon has to be doped by an acceptor impurity, the dopant should be trivalent
- Heating a semiconductor material will increase its electrical conductivity.
- The electrical conductivity of semiconductor can be increased by both doping and heating
- We can obtain a n type semiconductor by doping a pure semiconductor with an element of valency 5
- We can obtain a p type semiconductor by doping a pure semiconductor with an element of valency 3
- By doping an intrinsic semiconductor with a pentavalent impurity, we get n type semiconductor.
- Doping a pure semiconductor by trivalent impurity yields a p type semiconductor
- An example of a Donor impurity is arsenic
- An example of a acceptor impurity is Boron
- Pure semiconductors are also known as intrinsic semiconductors.
- Impure semiconductors are also known as extrinsic semiconductors.
- A hole can be considered equivalent to a positive charge.
- The most commonly used semiconductors are Germanium and Silicon
- A germanium atom contains four valence electrons
- At absolute zero temperature an intrinsic semiconductor is a perfect insulator
- A semiconductor that is electrically neutral has equal number of holes and electrons.
- The electrical conductivity of intrinsic semiconductors like germanium and silicon can be increased by doping them by either trivalent or pentavalent impurity
- Addition of a small amount of antimony to pure germanium will increase the number of free electrons in a germanium crystal
- The junction potential in an unbiased semiconductor diode stops the flow of charge carriers across the junction

- In a semiconductor diode the junction potential offers opposition to only majority charge carrier in both the regions.
- A p-n junction is said to be forward biased when a potential difference is applied across the junction by making p region positive and n region negative.
- A p-n junction is said to be reversed biased when a potential difference is applied across the junction by making p region negative and n region positive.
- A forward biased given to a junction diode overcomes the barrier potential
- The region of a junction diode containing neither free electrons nor holes is called Depletion region.
- When a p-n junction is forward biased the current flows from the p region to the n region
- In a junction there will be no appreciable current if p region is made negative and n region is made positive.
- Forward biased applied to junction diode decreases the resistance.
- Reverse biased applied to a junction increases the resistance.
- Rectification can be achieved by using a junction diode
- The conventional arrow in the circuit symbol of a semiconductor diode indicates The direction of flow of conventional current
- A device that converts alternating current into unidirectional current is called Detector.
- A p-n diode can be used as a rectifier.
- A transistor consists of two p type regions and one n type region
- The middle region of a transistor is called Base
- The base region in a transistor controls the flow of charge carriers into the collector
- The emitter region in the PnP junction transistor is more heavily doped than the base region so that the flow across the base region will be mainly because of holes.
- When a transistor is used as a voltage amplifier, the output voltage is taken across the load in the collector emitter circuit
- A small input voltage can be changed into large output voltage by using a transistor.
- A modulator in a radio transmitter mixes the audio frequencies with the carrier waves.
- The detector in radio set separates the audio frequency from radio frequency.
- The radio waves sent by all stations are received in radio receiver by Antenna.
- The number of electrons in the outer most orbit of the silicon is four.

- A device that converts information energy into electrical signal is Transducer.
- The impurity required to make germanium into a n type semiconductor is arsenic
- The p side of a diode is called Anode
- The n side of a diode is called Cathode.
- In npn transistor electrons are sent by emitter into base
- The impurity added to germanium to make it p type semiconductor is boron
- Radio waves of suitable frequency are generated in RF Oscillator.
- The output voltage taken across a resistor in the collector is called Load
- In PnP transistors holes are emitted into base.
- AF signals cannot be transmitted over a long distance because they have low energy.
- The junction potential for silicon is 0.7V
- The junction potential for germanium is 0.3V
- The Indian scientist who is credited with the construction of radio transmitter is S.K.Mitra.
- AM radio signals have carrier frequencies from 530 to 1600KHz
- FM signals have carrier frequencies between 88 to 108MHz–

ROCKET AND ARTIFICIAL SATELLITES

- The momentum of a body is defined as the product of its mass and velocity
- The radial force acting inwards on a body which keeps it along a circular path is called Centripetal force
- A space vehicles that carries propellants is called Rocket
- The fuel and the oxidant used in rocket are together called Propellants
- The velocity of a satellite which enables it to remain in orbit round the earth or any celestial body is called Orbital Velocity
- The minimum velocity a body must possess so that it escapes from the gravitational field of the earth is called Escape Velocity
- An object which is made to orbit around the earth or any celestial object is called Artificial satellite
- An orbit around the earth which is parallel to the equator is called Equatorial orbit
- An orbit around the earth which passes over the north and the south poles of the earth is called Polar orbit

- A satellite whose period of revolution is equal to the period of rotation of the earth is called Geostationary Satellite
- The principle of working of rocket is Law of conservation of Momentum
- Rockets can operate even in vaccum because they carry their own oxidant
- The ratio of payload mass to the fuel mass is called Payload Ratio
- The mass of the useful material sent in a rocket is called Payload
- A rocket system consisting of two or more stages placed one behind the other which are designed to trigger sequentially is called Multistage rocket
- The orbital velocity of a body in an orbit around the earth is about 8Km per second
- The value of escape velocity on earth is 11.2Km/s
- The escape velocity is equal to root two times the orbital velocity
- The principal use of Geostationary satellites is for Communication purpose
- ISRO was established in the year 1969
- ISRO has its headquarters located in Bangalore
- ISRO stands for Indian Space Research Organization
- The INSAT programme was started in the year 1977
- INSAT stands for Indian National Satellite
- The first satellite of INSAT programme is INSAT-1A
- ASLV stands for Augmented Satellite Launch Vehicle
- SROSS stands for Stretched Rohini Satellite Series
- GSLV stands for Geostationary Satellite Launch Vehicle
- PSLV stands for Polar Satellite Launch Vehicle
- The abbreviation of APPLE is Ariane Passenger Pay Load Experiment
- The IRS means Indian Remote Sensing
- The first IRS satellite was launched in March 1988
- The satellite INSAT-1B was launched in August 1983
- The satellite INSAT-1D was launched in June 1990 fromUSA
- The latest satellite of INSAT programmes INSAT-3E was launched on 28th Sept 2003
- The vehicle which can function even beyond the atmosphere of earth is Rocket
- With reference to the earth Escape velocity is higher than Orbital velocity
- The period of revolution of Geostationary satellite is 24 hours
- The rocket launching station in India is located at Thumba in Kerala

- The first ever Indian Satellite is Aryabhata
- The first Indian Geostationary Satellite is APPLE
- The total momentum of a system of interacting bodies is always remain unchanged
- The law of conservation of momentum states that the total momentum of bodies in a system are conserved
- The law of conservation of momentum is embedded in Newton's third law of motion
- Newton's third law of motion encompasses the law of conservation of momentum
- When a rocket launched into space lower atmosphere offers resistance to its motion
- A body of mass m is moving with a velocity v, the momentum of a body would be mv
- A bullet of mass m is fired from a rifle of mass M with a velocity v. If the rifle recoils back at a velocity V then mv = –MV
- The thrust provided to a rocket is given by the product of rate of fuel consumption and exhaust thrust
- If R is the rate of fuel consumption and Vex is the exhaust velocity, then the thrust on the rocket is RVex
- Multistage rockets are essential to launch satellites because a single rocket cannot by itself lift a heavy load
- The velocity of a body along a circular path is called Linear velocity
- If G is the gravitational constant, R is the distance between centre of the earth and the satellite and g is the acceleration due to gravity, then orbital velocity of a satellite around the earth is given by $V_o = R_g/G$
- The radius of the orbit of a satellite is R, the orbital velocity is Vo of the satellite is proportional to 1/R
- If R is the radius of the earth and g is the acceleration due to gravity of the place, then escape velocity Ve is given by $V_e = 2Rg$
- If V_e and V_o denote the escape velocity and orbital velocity respectively then the relation between them is given by $V_e = 2V_o$
- If the escape velocity on earth is 11.2Km/s then the orbital velocity of a satellite around the earth should be about 8Km/s
- The minimum number of communication satellites required to achieve communication all over the globe are 3
- The present chief of ISRO is G Madhavan Nair

- A geostationary satellite is placed in the orbit at a height of 36000Km
- The first satellite fabricated in India was Aryabhata
- The acceleration due to gravity varies with the height of the object above the earth
- Rocket works on the principle of Newton's III law of motion
- The mass of the rocket includes the mass of the Propellants and mass of Payload
- The payload ratio is given by m/M
- Payload is placed at the front portion of the rocket
- The sounding rocket used to study atmosphere was Rohini-RH-75
- The advent of television and internet is the impact of Satellites
- The launch vehicle that had put IRS-P6 in the orbit is PSLV-C5
- While launching rocket acceleration due to gravity changes continuously
- As the rocket consumes fuel at every instance its mass goes on decreasing
- The satellite Bhaskara was launched in 1979
- According to law of conservation of momentum the net external force acting on the system is Zero
- The Master Control Facility is located at Hassan
- The 27 tonne INSAT 3E has an operation life time of 15 years
- Thrust is the product of Mass and acceleration of body
- Larger the mass of the rocket lesser will be the acceleration
- As the rocket ascends into the sky acceleration due to gravity changes continuously
- A multistage rocket gets rid of its first stage when it reaches the height of 100Kms
- Escape velocity is independent of the mass of the body
- Escape velocity depends upon the radius of the body and acceleration due to gravity
- Indian space programme was started in 1963
- The satellite INSAT-3A was put into orbit in 19th April 2003
- Any object revolving round the planet under the influence of the gravitational force of the planet is called Satellite
- The time taken by a satellite to complete one revolution around the planet is called Period of satellite
- The vehicle Rocket was established in 1969
- The first IRS satellite of India is Bhaskara
- The space vehicle that launched APPLE was Arian from French Guiana

- There are 4 different types of launch vehicles built by ISRO
- In the case of a bullet firing from a rifle, when the bullet as well as the rifle are at rest, the total initial momentum is Zero
- Orbital velocity is independent of mass of the body
- Artificial satellites are launched using Multistage rockets
- Geostationary satellites are placed at a fixed position at a specific height above the Equator
- The massive first stage in a multistage rocket is called Booster
- The satellite that carried the dog named Laika into space is Sputnik II
- A satellite revolves around the planet in Elliptical path
- The collection of information about the various objects present in outer space is called Space exploration
- The first man to go in space was Yuri Gagarin
- The name of the satellite that carried the first man into space is Vostok I
- The first artificial satellite in space is Sputnik I
- The first communication satellite put into space is Score
- The first communication satellite for commercial use put into space is INTELSAT-I
- The first experimental space station established is Soyuz-4
- The first human being to set foot on moon was Neil Armstrong on 20th july1969
- The first satellite dedicated to remote sensing work is LANDSAT-I
- The first international link up of satellite in outer space is Apollo-Soyuz test project
- The spacecraft that carried the human being to moon is Apollo-11
- The first space probe to explore the asteroid belt is Pioneer-10
- The first landing of a space probe on the planet Mars is Mars-2
- The first satellite Sputnik I weighed about 84 Kgs
- The space vehicle rocket was developed by the scientists Konstantin Tsiolkovsky, Robbert Goddard, Herman Oberth
- An object which is given an initial velocity in any direction and then allowed to travel freely under the action of gravity is called Projectile
- The historian who used the missiles to destroy the British army was Tippu Sultan
- The devices that escape from the earth are called Space Vehicles

- The sophisticated remote sensing satellite placed in the polar orbit by PSLV is RESOURCESAT-1

RADIOACTIVITY

- The phenomenon of spontaneous disintegration of certain unstable atomic nuclei with the emission of certain radiations is called Natural Radioactivity
- Any substance that emits radioactive radiation is called Radioactive substance
- The changing of one classical element into another is known as Transmutation
- The time taken by a sample to get reduced to half of its initial amount is called Half life
- The phenomenon by which non radioactive substance is rendered radioactive is called Induced radioactivity
- The atoms of the same element having different mass number is called Isotope
- An isotope of an element which is radioactive is called Radioisotope
- The central massive part of Atom is called Nucleus
- The three fundamental particles present in atom are Protons, Electrons and Neutrons
- The Protons and Neutrons together are commonly known as Nucleons
- The number of protons present in an nucleus of an atom is called Atomic Number
- The sum of Protons and Neutrons present in an nucleus of an atom is called Atomic Mass number
- A nucleus X with mass number A and atomic number Z is symbolically represented as ${}_{Z}X^{A}$
- The phenomenon of Radioactivity was discovered by Henry Becquerel
- The radioactive rays emitted by a radioactive substance are called Becquerel rays
- The radiations emitted by the radioactive substance is called Radioactive radiations
- All chemicals having atomic number 81 to 92 are Radioactive
- The charge present on Alpha particles is +2
- The charge present on Beta particles is -1
- The time taken by a radioactive sample to disintegrate completely is Infinite
- A fundamental particle having 1 unit of positive charge and negligible mass is called a Positron
- A radioactive isotope of iron with the mass number 59 is called Radio Iron
- The two naturally occurring radioactive element are Uranium and Radium
- A nuclei which is made radioactive artificially is Phosphorous 30
- The parent nuclei for obtaining radioactive phosphorous is Aluminium 27

- The most massive of the radioactive rays is Alpha Particles
- The isotope of hydrogen which is radioactive is Tritium
- The isotope of Hydrogen with the mass number 2 is deuterium
- The radio-isotope used to study the action of medicines is Radio-Sodium
- The radio-isotope commonly used to estimate the age of fossils is Carbon-14
- The daughter nucleus that is formed when radium226 emits an Alpha particle is Radon-222
- The element formed when Carbon-14 emits a beta particle is Nitrogen
- The number of Nucleons present in the nucleus of Helium are Four
- An atom that consists 11 protons, 11 electrons and 12 neutrons has atomic number 11, mass number 23
- An example for electrically neutral particle is a Neutron
- A fundamental particle with one unit of positive charge and 1 unit of mass is known as a Proton
- A particle with negative charge and negligible mass is an Electron
- Radioactivity was first discovered in a mineral of Uranium
- The fact that the radioactive rays consists of three type of radiations was established by Rutherford
- Radioactive rays consists of Alpha, Beta and Gamma rays
- The mass of a Alpha particle is 4amu
- Gamma rays are not influenced by electric field
- During beta decay, the newly formed daughter nucleus will have its atomic number increased by 1
- The half life of Radium 226 is 1600 years
- The half life of a radioactive element is 16 days, A sample after radioactive decay will be left with 25% of the atom after 32 days
- The half-life of a radioactive element is 25 days. If the original amount of the substance is 25gm. What is the amount of substance after 100 days? 1.5625gm
- The half-life of Radium 226 is 1600 years. 1 mg of radium through radioactive decay becomes 0.125 mg in 4800 years
- The half life of radioactive element is independent of the initial mass
- $_{13}A^{27} + {}_{2}He^{4} \text{-----} {}_{15}P^{30} + X$, the X represents a proton

- The half life of $_{15}P^{30}$ is 3 minutes
- A nucleus of Aluminum can be rendered radioactive by bombarding it with an Alpha particle
- Phosphorous 30 undergoes a beta decay to form a nucleus of silicon
- The mass of Tritium the isotope of hydrogen is 3
- The two common isotopes of Uranium are Uranium-235 and Uranium-238
- The radio isotope used in the treatment of hyperactive thyroid glands is Radio Iodine
- The radio isotope used in the treatment of Cancer is cobalt-60
- When we represent the nucleus in the form $_ZX^A$, A represent s the mass number and Z represent s the atomic number
- When an alpha particle is emitted from a nucleus, the mass number of daughter nucleus will decrease by 4 units
- Isotopes are the element s having the same atomic but different mass number
- Isotopes of an element will have same number of protons but different number of neutrons
- A beta particle is Negatively charged
- A alpha particle is Positively charged
- The most massive radioactive rays is Alpha
- A beta particle is represented as $_{-1}e^0$
- A radioactive sample of half life T years has N number of atoms in the beginning is represented as N/2 atoms left after T years
- When $_{13}Al^{27}$ is struck by an alpha particle a neutron is ejected along with nucleus of atomic number 15
- The smallest particle of an element which cannot be divided further by retaining the property of the element is Atom
- Madam curie and her husband discovered Polonium and Radium
- Radioactivity produced artificially is called Induced
- Beta rays are a stream of electrons
- Atomic number of Alpha particle is 1
- Atomic mass number of Alpha particle is 4
- $_{88}Ra^{226}$------$_{86}Rn^{222} + _2He^4$
- The half life of $_{92}U^{238}$ is 4.5 billion years

- $_{13}Al^{27} + {}_{2}He^{4}$--------$_{15}P^{30} + {}_{1}n^{0}$
- $_{15}P^{30}$--------$_{14}Si^{30} + +{}_{1}e^{0}$
- The isotope of carbon are $_{6}C^{12}$ and $_{6}C^{11}$
- The name of the isotope of hydrogen $_{1}H^{2}$ is Deuterium
- The name of the isotope of hydrogen $_{1}H^{3}$ is Tritium
- The most unstable radio isotope of Uranium is U-235
- The scientist who was awarded Noble prize for the extraction of radium in its purest form is Madam Curie
- Half life of polonium-214 is 164 μ
- Half life of radium is 1622 years
- The Uranium has 2 isotopes
- The number of isotopes of Carbon are 4
- The number of isotopes of Hydrogen are 3
- Radium 226 is represented by the symbol $_{88}Ra^{226}$
- The extrinsic research in the field of Radioactivity was conducted by Henry Becquerel
- The isotope used in the field of Agriculture is Radio-phosphorous
- The number of nucleons in the nucleus of helium are 4
- The name of the isotope of hydrogen $_{1}H^{1}$ is Normal hydrogen
- The symbol of Radio Iodine is I^{131}
- The symbol of Radio Iron is Fe^{59}
- The symbol of Radio Sulphur is S^{35}
- The symbol of Radio phosphorous is P^{30}
- The induced radioactivity was discovered by curie Joliot and Frederick Joliot
- The induced radioactivity was discovered in the year 1934
- The products obtained from artificial radioactivity are called Radio-Nuclides
- The number of neutrons released in every nuclear fission in Uranium ^{235} are 2 or 3
- Two nuclei of deuterium combine together to form Tritium nucleus

ENERGY

- The particles present in the nucleus of an atom are called Nucleons
- The strong force that binds the nucleons together is called Nuclear force
- The energy released during the nuclear reactions is called Nuclear energy

- The atoms of the same element having the different mass number are called Isotopes
- A nuclear reaction in which a heavy nucleus splits up into two or more fragments with the liberation of enormous amount of energy is called Nuclear Fission
- A nuclear reaction in which two or more light nuclei combine together to form a heavy nucleus with the liberation of energy is called Nuclear Fusion
- The minimum size of the fissionable material required to sustain fission reaction is Critical size
- The process of increasing the proportion of Uranium-235 in a sample of naturally occurring Uranium is called Enrichment
- The substance used to slow down the neutrons in a nuclear reactor is called a Moderator
- The nuclear fusion reactions that proceed to very high temperature are called Thermonuclear reactions
- The capacity to do work is called energy
- The SI unit of energy is Joule
- The number of elements with atomic number Z and mass number A are represented by ${}_{Z}X^{A}$
- The two common isotopes of Uranium are U-235 and U-238
- The reactions involving changes in the nuclei of atom are called Nuclear reactions
- Nuclear energy is also called as Atomic energy
- A nuclear reaction which is allowed to continue at a steady rate is called Controlled Chain reaction
- A system of apparatus used to convert the energy produced by nuclear fission into electricity is called Nuclear power plant
- Shield that gives protection to workers and materials from dangerous radiation Concrete shield
- The rods that are used to maintain the fission reaction at a steady rate by controlling the number of neutrons are Control rods
- The enclosure for fuel assembly that helps to withstand the pressure created by fission Steel Vessel
- The material commonly used as a Moderator is Graphite
- The Control rods are commonly made up of Cadmium
- The coolant usually used in a nuclear reactor is Liquid sodium

- The cadmium is used as a material for control rods because they have ability to absorb neutrons
- The most penetrating nuclear radiation are Gamma rays
- The Einstein's mass energy equation is given by $E = mc^2$
- The process by which energy is released in a nuclear bomb is Nuclear fission
- The source of energy in the stars is Thermonuclear reaction
- The principle of nuclear reactor is Controlled fission
- The energy produced by the conversion of 1 mg mass yields energy equal to 9×10^{10}J
- An ideal particle for initiating a fission reaction is a Neutron
- Chain reaction in nuclear fission is possible due to neutrons produced during each fission
- The major constituent of naturally occurring Uranium is U-238
- The mass-energy equation was proposed by Einstein
- Boron rods are used in nuclear reactor because they can absorb neutrons
- An atom bomb is based on the principle of Nuclear fission
- The material best suited for fission is enriched Uranium-235
- An ideal fissionable material is Plutonium-239
- Two materials that are suitable fuels for nuclear fission reaction Plutonium and enriched Uranium
- Heavy water is used in a nuclear reactor to slow down the neutrons
- The energy released in the stars is due to nuclear fusion of light nuclei
- The core of a nuclear reactor consists of Control rods, moderator and reactor fuel
- An example of nuclear fusion is formation of helium from hydrogen nuclei
- In the reaction $_1H^2 + {}_1H^2$ ------- X + $_1H^1$ +energy, X represents tritium nucleus
- Nuclear fusion of 1gm of hydrogen yields energy of 6×10^{11}J
- Fusion reaction takes place in high temperature because high temperature helps to overcome the repulsion between nuclei
- Exposure to high frequency of ultraviolet light may cause Skin cancer
- The most harmful of the radiation is Gamma rays
- The nuclear fission reaction was discovered by Otto Hahn and Fritz strassmann
- The isotope which is not radioactive is considered as Stable
- The minimum energy required to separate the nucleons is called Binding Energy
- The binding energy is calculated by using the formula B.E/A

- The stability of nucleus is measured in terms of Binding energy per nucleon
- The instrument used for accurate measurement of nuclear masses is Mass Spectrographs
- The mass of nucleus is lesser than the sum of the masses of the Constituents (protons and neutrons) is called Mass defect
- The scientist who started the atomic energy era in India is Dr.H.J.Bhabha
- The scientist who is regarded as the architect of the India's atomic energy programme is Dr. Homi Jehangir Bhabha
- The product nuclei of fission reaction are called Fission fragments.

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