Glossary

A.C. generator: A generator based on the phenomenon of electromagnetic induction which states that whenever magnetic flux linked with a conductor (or coil) changes, an emf is induced in the coil.

Absolute refractive index: The relative refractive index for light travelling from vacuum into the substance.

Accelerated charge: A source of electromagnetic waves.

Accommodation: The process by which the lens changes its focal length to focus on objects at different distances.

Alpha particle: A positively charged particle consisting of two protons and two neutrons in its nucleus.

Alternating current: An electric current which is able to reverse its direction in an electric circuit at regular intervals.

Ammeter: A device used to measure electric current.

Ampere (A): The SI unit for measuring the rate of flow of electric charge.

Ampere Maxwell law: The law which Relates induced magnetic field to changing electric flux and current.

Ampere's law: A law stating that the surface integral of magnetic field over a closed loop is μ_o times the current threading through the closed loop.

Amperian loop: An imaginary closed curve around a current carrying conductor which is used to apply Ampere's law.

Amplification: The process of increasing the strength of the transmitted signal.

Amplifier: A device that takes a small current and converts it into a large one.

Amplitude: Displacement of oscillation from an equilibrium.

Analog devices: The devices that have needle displacements proportional to the quantities they are measuring.

Analyzer: The crystal that is used to analyze the nature of light.

Angle of incidence: The angle between the incident ray and the normal.

Angle of reflection: The angle between the reflected ray and the normal.

Angle of refraction: The angle between the refracted ray and the normal.

Angle of the prism: The angle between the refracting faces.

Angular frequency: A scalar measure of rotation rate.

Angular magnification: The angular size θ' of the final image produced by the instrument divided by a reference angular size θ.

Antineutrino: The particle emitted during beta minus decay.

Aperture: The diameter of the mirror disk.

Armature: The coil/core in combination with an electric motor.

Astigmatism: The defect of the human eye due to which the eye is not able to focus properly on horizontal and vertical lines.

Atomic number: The number of protons in a nucleus.

Attenuation: The loss of signal strength by transmitted signal.

Aurora: A ghostly "curtain" of light that hangs down from the sky at high altitudes.

Autocollimation: The condition, where the object and the image coincide with each other.

Average life: The ratio of the total life time of all the atoms of the element to the total number of atoms present initially in the sample of the element.

Average relaxation time: The average time between successive collisions of electrons with each other and walls of conductor.

Average value of the alternating current over a half cycle: The value of direct current which will send the same amount of charge in a circuit in a time of half cycle as is sent by the given alternating current in the same circuit in the same time.

Axial line of electric dipole: A line joining the centers of the two charges of an electric dipole.

Balmer series: The series of spectral lines emitted, when an electron jumps from a higher energy state n to state 2.

Bandwidth: The portion of the electromagnetic spectrum occupied by a signal.

Bar magnet: A magnet in the form of a bar possessing magnetic poles at each end.

Battery: A combination of cells either in series or parallel or both, in which chemical energy is converted into electrical energy.

Beta particle: A high speed electron or positron emitted by any radioactive substance.

Binding energy of a nucleus: The energy that would have to be provided to split a nucleus into its individual nucleons.

Binding energy per nucleon: The average energy required to remove a nucleon from the nucleus to infinite distance.

Biot-savart law: A law stating that the strength of magnetic field dB due to a small current element Ids carrying a current I at a point distant r from the element is directly proportional to I, ds, sin θ and inversely proportional to the square of the distance (r^2) where θ is the angle between ds and r.

Blue shift: When source and observer approach each other (i.e. come towards each other) then change in frequency, Δv, is positive. Thus the apparent frequency as observed by the observer increases or the apparent wavelength decreases (frequency and wavelength are inversely related).

Bohr magnetron: A unit for expressing electrons magnetic dipole moment.

Brachytherapy: A treatment used for lung cancer.

Brackett series: The series of spectral lines emitted, when an electron jumps from a higher energy state *n* to the state 4.

Brewster's law: This law states that when unpolarized light is incident at polarizing angle on the interface separating air from a medium of refractive index *n*, the reflected light is fully polarized provided the refractive index of the medium is equal to the tangent of the polarizing light.

Capacitance: Capacitor's ability to store electric charge.

Capacitive reactance of capacitor: The resistance offered by the capacitor to the flow of charge carriers through it.

Capacitor: A device which is used to store energy in form of electric field.

Capacitors in parallel: The equivalent capacitance of *n* number of capacitors in parallel is equal to the algebraic sum of the individual capacitances of the capacitors.

Capacitors in series: The equivalent capacitance of *n* capacitors connected in series is equal to the sum of the reciprocals of individual capacitances of the capacitors.

Carbon dating: A chemical analysis used for the determination of age of organic objects based on the amount of radioactive isotope carbon-14 present in it.

Cathode ray tube: A vacuum tube in which cathode rays produce luminous image on a fluorescent screen.

Cathode rays: A beam of electrons emitted from electric discharge tubes.

Caustic curve: The full circular shape of the mug spreads the point focus out into a curve, called a caustic curve.

Cell: A device which is used to maintain a steady current in an electric circuit .

Center of curvature: The center of the spherical surface.

Centripetal force: A force acting on a moving body in a circular path which is directed towards the centre around which the body is moving.

Chain reaction: It occurs when neutrons, emitted from the decay of one atom, are free to initiate fission in the surrounding nuclei.

Charge density: Total amount of electric charge present either in line, surface or volume.

Charged particles: Particles possessing an electric charge.

Charging by friction: The charging done by rubbing two insulating objects with each other.

Charging by induction: The process of charging a neutral body by bringing a charged body near it without making contact between the two bodies.

Chromatic dispersion: The spreading out of light by refraction.

Coefficient of mutual induction: The amount of magnetic flux linked with one coil when unit current flows through the neighboring coil.

Coefficient of self induction: The amount of magnetic flux linked with the coil when unit current flows through the coil.

Coercivity: The value of magnetizing force which is applied to reduce the residual magnetism or retentivity to zero.

Coherent sources of light: Sources of light which emit continuous light waves having the same wavelength, same frequency, and in same phase or having a constant phase difference.

Coiled wired resistor: A resistor which consists of a coil of fine wire made of a resistance alloy such as nichrome.

Communication system: Any arrangement used for the transmission of information from one place to another.

Compound semiconductors: Those semiconductors which have more than one type of atoms as their constituent particles are known as compound semiconductors.

Concave lens: A lens that is thinner in the middle than the edges.

Concave mirror: A curved mirror with the reflecting surface on the inside of the curve.

Conduction band: Energy by which electrons can move freely in solid.

Conduction current: The current carried by conductors due to flow of charges.

Conduction electrons: An electron present in the conduction band of a solid, where it is free to move under the influence of an electric field.

Conductivity: Reciprocal of resistivity of a conductor.

Conductors: Substances which allow the flow of heat and electricity through them.

Continuous charge distribution: A system which consists of a large number of charges along its length, area or volume.

Converging lens: Those that bend incident parallel rays towards a focus.

Convex lens: A lens that is thicker in the middle than the edges.

Convex mirror: A curved mirror with the reflecting surface on the outside of the curve.

Coolant: A device which keeps the temperature constant throughout the reactor core and is also used to transfer heat energy from the reactor core to the heat exchanger.

Cornea: The curved front surface of the eye. It refracts light towards the pupil so that it can pass through toward the lens.

Coulomb's law: A Law describing the electrostatic interaction between electrically charged particles

Critical angle: The angle of incidence for which the angle of refraction is 90°.

Curie law: A law stating that the intensity of magnetization (*I*) of a magnetic material is directly proportional to magnetic induction (*B*) and inversely proportional to temperature (*T*) of the material.

Current amplification factor: The ratio of the change in collector current (ΔI_C) to the change in base current (ΔI_B) at a constant collector–emitter voltage (VC_E), when the transistor is in active state.

Current density: A measure of the density of flow of a conserved charge.

Current sensitivity: The current required (usually given in amperes) to give a deflection of one scale.

Cyclotron: An accelerator that employs a magnetic field to repeatedly bring particles back to an accelerating region, where they gain more and more energy until they finally emerge as a high-energy beam.

Dark bands: Fully destructive interference and are visible between adjacent pairs of bright fringes.

Dark current: When no light is applied to the *p-n* junction of the photodiode, the reverse current *I*r is almost negligible and is called dark current.

D.C. current gain: The ratio of the collector current (I_C) to the base current (I_B).

De Broglie hypothesis: It states that a moving particle shows both wave and particle nature.

Decay constant: The reciprocal of the time at the end of which the number of undecayed atoms in a radioactive sample reduces to (1/*e*) times the original number of atoms in the sample.

Demodulation: It involves processing of the transmitted signal at the receiver end to extract the original message signal.

Diamagnetic substances: The materials in which the individual atoms/molecules do not posses any net magnetic moment on their own.

Dielectrics: They are the insulating materials such as mineral oil or plastic.

Diffraction of light: The phenomenon of bending of light around the corners of an obstacle placed in its path, on account of which it penetrates into the region of geometrical shadow of the obstacle.

Diffuse reflection: Reflection from a rough or irregular surface.

Diode: An electric component which allows current to move through it in one direction.

Direct current: The electric current which flows only in one direction.

Dispersion: The separation of light into different colors as a result of refraction.

Displacement current: The current which comes into play in the region in which the electric field and the electric flux are changing with time.

Diverging lens: Those that bend incident parallel rays away from each other.

Doping: Addition of impurity into the semiconductor lattice.

Doppler Effect: This law states that whenever there is relative motion between a source of light and an observer, the apparent frequency of light received by the observer is different from the true frequency of the light emitted from the source.

Drift velocity: The average velocity with which all the electrons in a conductor move, when a potential difference is applied across the ends of the conductor.

Earthing/grounding: When a charged body is brought in contact with the earth and all the excess charge on the charged body leaks to the Earth.

Eddy currents: The currents induced in bulk pieces of conductors when the magnetic flux linked with the conductor changes.

Electric charge: The intrinsic property of material objects that make it possible for them to exert electrical force and to respond to electric force.

Electric conductors: Substances that readily conduct electric charge due to the presence of a large number of free electrons.

Electric current: The rate of flow of electric charge through a conductor.

Electric dipole moment: Strength of an electric dipole is measured by this quantity.

Electric dipole: A system of two equal and opposite charges separated by a very small distance.

Electric energy: The total work done (or energy supplied) by the source of emf in maintaining the electric current in the circuit for a given time.

Electric field due to point charge: The three dimensional space around the charge in which its influence (force) can be felt by a unit positive test charge placed at any point in that region.

Electric field lines: Number of lines per unit area through a surface perpendicular to the lines is proportional to the magnitude of the electric field in that region.

Electric field: Force acting between two electrically charged particles.

Electric flux: The number of electric field lines crossing a surface.

Electric insulators: Materials that conduct electric charge poorly due to the absence of free charge carriers.

Electric potential energy of a system of charges: It is equal to the work that must be done by an external agent to assemble the system, bringing each charge in from an infinite distance.

Electric potential: The difference in electrical charge between two points in a circuit expressed in volts.

Electric power: The rate at which electrical energy is transferred in an electric circuit.

Electrode: A cathode or anode inside electric cell.

Electrojet: The electric current that occurs in the ionosphere.

Electrolyte: Solution containing ions.

Electromagnet: A magnet in which electric field is produced by electric current.

Electromagnet: A magnet in which electric field is produced by electric current.

Electromagnetic induction: The phenomenon of generation of current or emf by changing the magnetic field.

Electromagnetic oscillations: Oscillations of the capacitor's electric field and the inductor's magnetic field.

Electromagnetic spectrum: An orderly distribution of electromagnetic waves according to their frequency or wavelength.

Electromagnetic waves: Waves in which there is sinusoidal variation of electric and magnetic field vectors, such that they are perpendicular to each other and also to the direction of propagation of the wave.

Electromagnets: The magnets which gets magnetized only when the current flows through them.

Electromotive force (EMF): A measure of the battery's ability to "pump" or move electric charge along the circuit.

Electron emission: The phenomenon of emission of electrons from the surface of a metal.

Electron: The negatively charged particles which surrounds the atomic nuclei with each electron carrying one unit of negative charge.

Electronic circuit: The devices through which electric current can flow.

Electroscope: A simple device that can be used to test the presence of an electric charge.

Electrostatic equilibrium: When there is no net motion of charge within a conductor.

Electrostatic field line: An imaginary curve tangent to which at a point gives the direction of electric field at that point.

Electrostatic force: A force of repulsion or attraction between two objects due to the nature or signs of their charges.

Electrostatic potential energy difference: Work done by an external force in moving a charge q_0 from one point to another point in an electric field of any arbitrary charge distribution.

Electrostatic shielding: The process of protecting a region from the influence of nearby electric fields by placing it inside a metallic box or cavity.

Electrostatics: The branch of physics that deals with the study of charges at rest.

Elemental semiconductors: Those semiconductors which have only a single type of atoms as their constituent particles.

EMF of the cell: The potential difference between the terminals of a battery (treated as a cell) when no current is drawn from the battery.

Enrichment: The process of increasing the percentage of ^{235}U in a sample of uranium.

Equatorial line of the electric dipole: A line which is perpendicular to the axial line and passes through the center of an electric dipole.

Equipotential surfaces: A surface which has the same electric potential at each and every point on it.

Excitation energy: The energy needed to take the electron from its ground state to an excited state.

Faraday's law of electromagnetic induction: A law stating that, an *emf* is induced in a closed loop when the magnetic flux linked with the closed loop change.

Faraday's second law of electromagnetic induction: A law stating that, the rate of change of magnetic flux is directly proportional to the induced emf.

Femtometer: A small unit for measuring distances on the scale of nuclei.

Ferromagnetic materials: The substances in which each individual atom/molecule has a non-zero magnetic moment.

Fictitious current: Imaginary current.

Field emission: When electrons are ejected from a metal surface by applying strong electric field to the metal surface.

Field inclination: The angle (up or down) between a horizontal plane and the direction of the Earth's magnetic field.

Field: A physical quantity that has a value at every location in space.

Flux density: The number of lines per unit area.

Focal length of a mirror: It is the distance from the pole to a point on the principal axis where a beam of light converges after reflection from the mirror.

Focal plane of the lens: The plane perpendicular to the central axis at the focal point.

Focal plane: A plane passing through the focus and perpendicular to the principal axis.

Focus: A point on the principal axis where a beam parallel to the principal axis converges after reflection from the mirror.

Forbidden energy gap (E_g): The energy gap between the valence band and the conduction band.

Fresnel distance: The minimum distance which a beam of light travels before it deviates from its straight line path due to diffraction.

Friction: Force that resist relative motion when two objects are in contact.

Fuel rods: It consist of a number of thin tubes full of pellets of the fissionable material.

Full-wave rectifier: A rectifier in which for both the cycles of the ac input we get the rectified output across the load.

Galvanometer: A device which is used for detection and measurement of small electric currents.

Gamma rays: The electromagnetic waves which have wavelength in the range of 10^{-14} m to 10^{-10} m and the frequency range of 3×10^{18} Hz to 5×10^{22} Hz.

Gauss's law: The total electric flux enclosed inside a closed surface is $1/\varepsilon_0$ times the charge enclosed within the surface.

Gaussian surface: A closed surface through which electric flux is calculated.

Geographic meridian: The vertical plane passing through the axis of rotation of Earth or the line joining the true geographical north and south poles.

Gravitational forces: Force of attraction between two masses.

Greenhouse effect: The phenomenon of trapping of infrared radiation by greenhouse gases such as CO_2 and water vapor.

Ground wave: A radio wave which does not gets reflected by ionosphere and reaches a receiver from transmitter directly.

Half life: The time taken for half of a group of unstable nuclei to decay.

Half-wave rectifier: A rectifier in which the output for only half of the input ac wave is obtained.

Heisenberg's uncertainty principle: It states that it is not possible to measure exactly both the position and momentum of a microscopic particle (say electron) at the same time.

Hertz: The S.I. unit of frequency.

Hypermetropia (far sightedness): The defect of the human eye due to which the eye can see far away objects clearly but is not able to see nearby objects distinctly.

Hysteresis: The phenomenon of lagging of I or B behind H when a specimen of a magnetic material is subjected to a cycle of magnetization.

Impact parameter: The perpendicular distance between the initial velocity vector of an alpha-particle from a central line passing through the center of nucleus, when the alpha-particle is far away from the nucleus.

Index of refraction: The ratio of the speed of light (c) in vacuum to the speed of light in the material.

Induced current: The current which flows in a closed looped conductor.

Induction coil: A coil used to produce a high potential difference (of several thousand volts) between the two metal spheres.

Induction: The process of producing the current and emf.

Inductor: A device used in electric circuits to provide inductance.

Infrared waves: Electromagnetic waves having frequency range ($3 \times 10^{11} - 4 \times 10^{14}$) Hz.

Input resistance: The ratio of change in the base-emitter voltage (ΔV_{BE}) to the resulting change in the base current (ΔI_B) at constant collector-emitter voltage (V_{CE}).

Insulators: Materials which do not allow electricity to flow through them.

Interference of light: The redistribution of light energy on account of superposition of light waves from two coherent sources of light.

Interference pattern: The pattern of bright and dark fringes on the screen.

Internal field emission: The process of emission of electrons from the host atoms due to high electric field in the order of 10^6V/m across the junction.

Internal resistance: A voltage source present in a battery which causes a drop in voltage in presence of current.

Intrinsic semiconductor: A pure semiconductor which contains only one type of atoms and is free from any impurity.

Ionization energy: The minimum energy needed to remove the electron from its atom.

Ions: Atoms with an overall positive or negative charge.

Iris: The colored portion of the eye which controls the amount of light reaching the retina.

Isotope: Atoms containing the same number of protons but different numbers of neutrons.

Kirchoff's junction rule: A rule stating that total current directed into a junction must be equal to the total current directed out of the junction.

Kirchoff's law: A law which describes the flow of electric current in an electric circuit.

Laser light: The light emitted when atoms make a transition from one quantum state to a lower one.

LASIK: Laser-assisted in situ keratomileusis used in eye surgery.

Lateral inversion: The apparent sideways reversal of an image in a mirror when compared to the object in front of the mirror.

Law of conservation of charge: The net electric charge of an isolated system remains constant (i.e. is conserved).

Law of Malus: A law stating that when a beam of plane-polarized light is incident on the analyzer, the intensity of light (I) transmitted from the analyzer is directly proportional to the square of the cosine of the angle (θ) between the plane sof transmission of the polarizer and analyzer.

Law of radioactive decay: The number of atoms disintegrating per second at any instant is directly proportional to the number of atoms of the radioactive element actually present in the sample at that instant.

Law of reflection: When a plane wavefront gets reflected from a plane surface, the angle of reflection is equal to the angle of incidence, and the reflected wave is a plane wave.

***LC* oscillations:** The charge on the capacitor and the current in the circuit exhibit a phenomenon of electrical oscillations similar to oscillations in mechanical systems. Such oscillations are known as *LC* oscillations.

***LCR* circuit:** A circuit consisting of an inductor (L), a capacitor (C), and a resistance (R) connected in series with respect to each other.

Lenz's law: The law indicating that the induced current has a direction such that the magnetic field due to the current opposes the change in the magnetic flux that induces the current.

Linear charge distribution: When charge is distributed uniformly along a line.

Liquid oxygen: A bluish translucent magnetic liquid.

Loop rule: A rule stating that around any closed-circuit loop, the sum of the potential drops equals the sum of the potential rises.

Lorentz force: The sum of electric force and magnetic force which can be exerted on a particle due to its electric charge.

Lyman series: The series of spectral lines emitted, when an electron jumps from a higher energy state n to ground state, $n = 1$.

Magnet: An object which is surrounded by a magnetic field and possesses the property of attracting steel or iron.

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Magnet: An object which is surrounded by a magnetic field and possesses the property of attracting steel or iron.

Magnetic effects of current: It states that a current flowing in a wire produces a magnetic field round it.

Magnetic confinement: A process involving the confinement of fusing material in a very strong magnetic field.

Magnetic declination: The angle between magnetic axis and geographic axis at a place or the angle between magnetic meridian and geographic meridian.

Magnetic dipole moment: The product of the pole strength of the either magnetic pole and the magnetic length of the magnetic dipole.

Magnetic dipole: An arrangement of two unlike poles of equal strength and separated by a small distance.

Magnetic field lines: The hypothetical lines which indicates the strength of a magnetic field in a particular region.

Magnetic field: A field produced by moving electrical charges.

Magnetic flux: A measure of magnetic field passing through a surface.

Magnetic forces: The force between two magnetic poles or electrically charged particles.

Magnetic inclination: The angle which the direction of total strength of earth's magnetic field, makes with a horizontal line in magnetic meridian.

Magnetic induction: The number of magnetic lines of induction (magnetic field lines inside the material) crossing per unit area normally through the magnetic material.

Magnetic materials: Materials that are attracted by both north and south poles of the magnet.

Magnetic meridian: A vertical plane passing through the axis of a freely suspended magnet.

Magnetic moment: A quantity which determines the force a magnet can exert on electric current and the torque that magnetic field will exert on it.

Magnetic resonance imaging: A medical imaging technique which uses powerful magnetic fields to image the internal structure of body.

Magnetic susceptibility: The ratio of the intensity of magnetization(I) induced in the material due to the magnetizing force (H) applied on it.

Magnetism: A force of attraction or repulsion between various substances due to motion of electric charges.

Magnetization: Net magnetic moment per unit volume of the material.

Magnetizing intensity: The number of ampere turns flowing round unit length of toroid to produce the magnetic induction B , in the toroid.

Magnification of a mirror: The ratio of the height of the image to the height of the object.

Magnifying glass: The simplest device that provides angular magnification.

Malignant tumor: A tumor having the tendency to spread to other parts of the body.

Mass defect: The sum of the individual masses of the separated protons and neutrons exceeding the mass of the stable nucleus by an amount ΔM.

Mass number: The total number of neutrons and protons in a nucleus.

Mass spectrometer: An instrument that can be used to find the mass of an ion.

Matter wave: The wave associated with a moving particle.

Metal film resistor: A resistor which consists of a glass or pottery tube coated with a thin film of metal.

Metallic conductors: The conductors in which conduction is only due to the presence of free mobile electrons.

Metals: solids which have very low resistivity and very high electrical conductivity.

Microwaves: The shortest wavelength radio waves.

Mirage: An optical phenomenon that occurs with inverted reflections of distant objects, and results from distortion of light by alternate layers of hot and cool air creating the illusion of water.

Mirror: A surface that can reflect a parallel beam of light in one direction instead of either scattering it widely in many directions or absorbing it.

Mobility of a conductor: The drift velocity per unit electric field applied across the ends of the conductor.

Moderator: A device used to slow down the neutrons released during fission.

Modulation: The process by which the low-frequency message signal is superimposed on a high-frequency wave, called carrier.

Modulator: A device that can perform the functions of both modulator and demodulator.

Monochromatic light: The light made of one color.

Motional emf: An induced emf produced by the separated charges on the ends of the moving conductor.

Moving coil galvanometer: A device used to detect small current flowing in an electric circuit.

Mutual induction: The phenomenon according to which an opposing *emf* is produced in a coil as a result of change in current or magnetic flux linked with a neighbouring coil.

Myopia (near sightedness): The defect of human eye due to which the eye can see nearby objects clearly but is not able to see far away objects distinctly.

Neutrino: A neutral particle which has a very small mass or zero mass, that is emitted from the nucleus along with the electron or positron during the decay process.

Non-uniform magnetic field: A magnetic field whose magnitude and direction of magnetic flux densities varies in a particular region.

Non-polar dielectrics: Dielectrics in which the center of positive charge coincides with the center of negative charge.

North pole of magnet: The end of the magnet which aligns toward the north pole.

***n-p-n* Transistor:** When a layer of a *p*-type semiconductor material is sandwiched between two *n*-type semiconductors.

Nuclear decay: A process in which an unstable atom loses its energy (by losing an electron) and thereby emits ionizing radiation.

Nuclear energy: The energy emitted by a nucleus as it becomes more stable.

Nuclear fission: The process of splitting a large nucleus to form two smaller, more stable nuclei.

Nuclear fusion: The process of joining together two nuclei to form a larger, more stable nucleus.

Nuclear reactor: A device used to control nuclear reactions for the production of energy.

Nucleons: The collective consideration of neutrons and protons.

Nucleus: The center of an atom which consists of concentrated mass of atom.

Nuclide: A specific nucleus of atom, which is characterized by its atomic number *Z* and mass number *A*.

Ohm's law: A law stating that keeping the physical conditions constant, the current flowing through a conductor is directly proportional to the potential difference applied across the ends of the conductor.

One atomic mass unit: (1/12)th of the mass of the $^{12}_{6}C$ isotope. It is represented by the symbol 'u' and is the average of mass of a nucleon.

One doiptre: Power of lens having focal length one meter.

One Henry: A coefficient of mutual inductance of two coils.

Optical fiber: A thin tube of transparent material that allows light to pass through without being refracted into the air or another external medium.

Orbital magnetic moment: Any charge which moves in a uniform circular motion having an associated magnetic moment.

Output resistance: The ratio of the change in collector–emitter voltage (ΔV_{CE}) to the resulting change in the collector current (ΔI_C) at constant base current (I_B).

Parallel plate capacitor: A capacitor possessing parallel metallic plates.

Paramagnetic materials: The materials in which each individual atom/molecule has a net non-zero magnetic moment of its own.

Paraxial rays: Rays which have the angle of incidence close to 0°.

Paschen series: The series of spectral lines emitted, when an electron jumps from a higher energy state *n* to state 3.

Pfund series: The series of spectral lines emitted, when an electron jumps from a higher energy state *n* to the state 5 (all of them lie in far infrared region).

Phasor: The representation of the sine waves whose amplitude, phase and angular frequency are the time invariants.

Photocell: A cell which converts a change in the intensity of light into a change in the electric current.

Photoelectric effect: The phenomenon in which electrons are emitted from a metal surface only when light shines on the surface.

Photoelectric efficiency: The fraction of photons which is able to cause the emission of photoelectrons.

Photoelectrons: The electrons emitted from a metal surface with the aid of light.

Photographic plate: A glass plate on which photographic images can be visualized.

Photon: A particle carrying discrete packets of energy called as quanta.

Planck's quantum theory: This theory states that light is considered to be made up of small packets (or particles) of energy known as quanta of energy or radiation.

***p-n* junction:** A single semiconductor crystal that has been selectively doped so that one region is *n*-type material and the adjacent region is *p*-type material.

***p-n-p* Transistor:** When a layer of an *n*-type semiconductor material is sandwiched between two *p*-type semiconductors.

Point charge: If the size of a charged body is very small as compared to its distance from all other surrounding objects of interest then such a body can be considered as a point charge.

Point Particle: An object whose radius is very small as compared to its distance from all other objects of interest.

Polar dielectrics: Dielectrics in which the centers of positive and negative charges do not coincide because of asymmetric shape of molecules.

Polarization of light: The phenomenon of restricting the vibrations of light to a single plane.

Polarization: The dipole moment per unit volume of the dielectric.

Polarizing angle: The angle of incidence at which the reflected light gets completely plane-polarized.

Potential difference: The difference in electric potential between two points in an electric field.

Potential energy: The work done by the external force in bringing charge q_0 from infinity to that point.

Potentiometer: A device which allows the measurement of potential without taking any current from the system.

Power of the lens: The ability of a lens to converge or diverge the rays of light incident on it.

Proton: A positively charged particle present in the atomic nuclei.

Pyroelectric thermometer: A device which determines the body's temperature by measuring the amount of infrared radiation that emanates from the eardrum and surrounding tissue.

Quality factor or *Q*-factor: The ratio of the voltage developed across the inductance or capacitance at resonance to the voltage applied across resistor in a series *LCR* circuit.

Quanta: Small packets of energy.

Quantization of charge: Charge on any object is always an integral multiple of smallest unit of charge (*e*).

Quantum physics: Science involving the study of the microscopic world. In that world, many quantities are found only in certain minimum (elementary) amounts, or integer multiples of those elementary amounts; these quantities are then said to be *quantized*.

Quark: A subatomic particle responsible for building protons and neutrons.

RADAR: A system which uses radio waves for the detection of range, altitude, direction or speed of both moving and fixed objects.

Radiation pressure: The force exerted by an electromagnetic wave on unit area of a surface.

Radiation: The energy which is emitted from a particular source and travels through a medium.

Radiation: The energy which is emitted from a particular source and travels through a medium.

Radio waves: Electromagnetic waves whose frequency is in the range of 500 kHz to 1000 MHz.

Radioactivity: A nuclear phenomenon in which an unstable nucleus undergoes decay.

Range: The farthest distance to which a signal can be transmitted such that it is received with good strength by the receiver.

Ray of light: A very narrow pencil like beam of light.

Ray: A directed line showing the wave's direction of travel.

Rayleigh's criterion for resolvability: A condition where the angular separation of the two point sources is such that the central maximum of the diffraction pattern of one source is centered on the first minimum of the diffraction pattern of the other.

Reactor core: Where the fission takes place to produce energy.

Real image: The image through which light passes or it is the image formed by actual intersection of light rays.

Receiver: A receiver picks up the transmitted signal and processes the signal to restore it to its original form.

Rectifier: A device which is used to convert alternating current (ac) into direct current (dc).

Red shift: When source and observer recede from each other (i.e. move away from each other) the change in frequency, Δv, is negative. Thus the apparent frequency as observed by the observer decreases or the apparent wavelength increases (frequency and wavelength are inversely related).

Refracting edge: The edge at which the refracting faces meet.

Refraction: Deviation of the ray from its incident direction.

Regular reflection: Reflection from a smooth surface.

Relative magnetic permeability: The analog of dielectric constant in electrostatics.

Repeater: A system which receives a weak transmitted signal, amplifies it, and then retransmits it to the next component in the communication channel.

Residual Magnetism: The value of magnetic induction left in the specimen when the magnetizing force is reduced to zero.

Resistivity: Resistance of a conductor having unit length and unit area of cross-section

Resistor: An object specifically designed to provide resistance along a circuit path and thus control the amount of current.

Resolving power of a telescope: The reciprocal of the smallest angular separation between two distant objects (such as stars) so that they appear just separated when seen through the telescope.

Resolving power: The power or ability of an optical instrument to produce distinctly separate images of two closely spaced objects.

Resonance: The condition in which the impedance of a series *LCR* circuit is minimum and the current flowing through the circuit is maximum.

Resonating frequency: The frequency of oscillation of the circuit at resonance.

Retina: The part of the eye covered with nerve cells that detect the brightness and color of the light falling on it.

Reverse biased connection: Connection in which the negative terminal of the battery is connected at the *p*-type end of the *p-n* junction.

Root mean square value of alternating current: The value of that direct current which produces heat at the same rate as the alternating current in a given resistor

Rutherford's model: A model explaining that atom consisted of very small central core known as nucleus in which entire mass and total positive charge of atom is concentrated. Electrons revolved around nucleus in circular paths in same way as the planets revolve around sun.

Saturation current: The maximum possible current at a given intensity and frequency.

Scattering: The change in the direction of light caused by numerous small particles.

Secondary focus: When two parallel rays, not parallel to the principal axis, get reflected from the mirror, they meet at some point above or below the focus which is called as secondary focus.

Self induction: The property of a coil by virtue of which the coil opposes any change in the strength of current flowing through it by inducing an *emf.*

Semi conductors: Materials whose ability to allow the flow of charge carriers through them is midway between conductors and insulators.

Sinusoidal: A sine curve or sine wave.

Sky waves: This mode of propagation involves the use of reflection of radiowaves from ionosphere for communication.

Small signal voltage gain: The ratio of the small change in the output voltage (ΔV_o) to the small change in the input voltage (ΔV_i).

Snell's Law: When light travels from a material with refractive index n_1 into a material with refractive index n_2, the refracted ray, the incident ray, and the normal to the interface between the materials all lie in the same plane. The angle of refraction θ_2 is related to the angle of incidence θ_1 by

$$n_1 \sin\theta_1 = n_2 \sin\theta_2 .$$

Solar cell: An optoelectronic device which is used to convert sunlight into electrical energy.

Solenoid: A cylindrical coil of wire which acts like a magnet on passage of electric current through it.

South pole of magnet: The end of the magnet which aligns toward the south pole.

Spherical aberration: The distortion of an image produced by a concave mirror that is spherical rather than parabolic.

Static charge: An electric charge accumulated on an object.

Stationery orbits: Orbits that does not rotate electromagnetic waves.

Stopping potential: The minimum negative potential given to the metal plate with respect to collector at which the photoelectric current becomes zero.

Strong nuclear force: The force that holds nucleons together in the nucleus of an atom.

Sun dog: A phenomenon which creates bright spots of light in the sky on either side of the sun.

Superconductor: Conductors which allow electric current to flow through them without any energy loss.

Superposition: A condition in which an object can be at two or more places.

Surface charge distribution: When charges are distributed uniformly over a particular area.

Switch: A device for making and breaking the connection in an electric circuit.

Telescope: A device that improves our ability to see over long distances.

Terminal voltage: The voltage between the terminals of the battery.

Terrestrial magnetic field: Magnetic field of earth.

Terrestrial magnetism: The branch of physics which deals with the study of magnetism of earth.

Tesla: The resulting unit of magnetic field.

Test charge: A point particle having a negligible charge.

Test charge: A unit positive charge having magnitude 1 C.

Thallium heart scan: A test that uses radioactive thallium to produce images of the heart muscle.

Thermal electrons: The electrons ejected from the metal surface by suitable heating of the metal.

Thermonuclear weapons: The weapons whose initial fission explosion provides the heat required for the more massive fusion explosions to occur.

Threshold frequency: The minimum frequency of the incident light below which photoelectrons are not ejected from the metal surface.

Threshold voltage: The minimum voltage after which the current increases rapidly (exponentially) with the voltage.

Toroid: A coil of insulated wire, resembling the shape of donut.

Torque: A force that causes rotational motion of a body.

Total internal reflection: The total reflection of light from a boundary between two substances.

Transducer: A device that converts input energy of one form into output energy of another form.

Transformer: A device used for increasing or decreasing an ac voltage.

Transmitter: A device which transmits the message signal through a suitable communication channel.

Ultraviolet rays: Electromagnetic waves which have wavelength in the range 0.6–400 nm and frequency in the range of 8×10^{14} Hz to 5×10^{16} Hz.

Uncontrolled chain reaction: occurs when every free neutron goes on to produce another fission reaction.

Undamped *LC* oscillations: Oscillations of constant amplitude, which is produced because of the negligible resistance of circuit.

Uniform magnetic field: Magnetic field having same magnitude and direction in a particular region.

Valence band: The highest electron energy band in a solid which can be filled with electrons.

Van Allen belts: Two regions of the magnetic field at the poles.

Van de graaff generator: A device used to produce high potential difference of the order of a few million volts.

Velocity selector: The arrangement of adjusting electric and magnetic fields so that the net force on the charged particle becomes zero.

Virtual image: The image which cannot be captured on the screen because the light doesn't actually pass through it.

Visible rays: Electromagnetic waves that is visible to the human eye and having a wavelength ranging from 400 to 700 nm.

Voltage: The electric potential energy per unit charge.

Voltmeter: A device used to measure potential difference or voltage between two points in an electric circuit.

Volume charge distribution: The uniform distribution of charge over a particular volume.

Wattless current: The current which consumes no power for its maintenance in the circuit.

Wave theory: According to this theory, light is an electromagnetic wave consisting of electric and magnetic fields with continuous distribution of energy over the region of space over which the wave extends.

Wave: A disturbance that propagates in a medium.

Wavefront: Particles of light wave which are equidistant from the light source and vibrate in the same phase.

Wavefronts: Imaginary surfaces over which the wave has the same magnitude of electric field.

Wheatstone bridge: A circuit for measuring unknown resistance.

Work function of the metal: The minimum amount of energy required for an electron to be pulled out from the surface of a metal.

X-rays: The electromagnetic waves lying beyond the ultraviolet region of electromagnetic spectrum and having wavelength in the range of 10^{-4} nm to 10 nm.

Zener diode: A special-purpose diode which operates in the breakdown region of a *p-n* junction diode.

***α*-particle:** A relatively slow-moving decay product consisting of two protons and two neutrons.

***β*-particle:** A fast-moving electron that is ejected from an unstable nucleus.