

PART 1 - PHYSICS (35 Questions)

UNIT 1: Units and Measurement

Units for measurement, system of units-S.I., fundamental and derived units, measurements-errors in measurement-significant figures, dimensions-dimensional analysis-applications.

UNIT 2: Mechanics

Motion in one dimension-uniform and non-uniform motion-uniformly accelerated motion-scalar and vector quantities-Newton's laws of motion-force and inertia-impulse and momentum-law of conservation of linear momentum-applications-motions in two dimension- projectile motion-uniform circular motion-friction-laws of friction-applications- centripetal force-centre of mass-torque-angular momentum and its conservation-moment of inertia-theorems of moment of inertia-work-energy-potential energy and kinetic energy-power-collision-elastic and inelastic collisions.

UNIT 3: Gravitation, Mechanics of Solids and Fluids

The universal law of gravitation, acceleration due to gravity-variation of 'g' with altitude, latitude and depth-gravitation potential-escape velocity and orbital velocity-geostationary satellites-Kepler's laws of planetary motion. Solids-elastic behaviour, stress-strain-Hooke's law-Moduli of elasticity-relation between them-surface tension-capillarity-applications-viscosity-Poiseuille's formula-Stokes law-applications-streamline and turbulent flow-Reynolds number-Bernoulli's theorem- applications.

UNIT 4: Oscillations and Wave Motion

Periodic motion-simple harmonic motion-equations of motion-oscillations of spring-simple pendulum-free, forced and damped oscillations-resonance-applications-wave motions-longitudinal and transverse waves-velocity of wave motion in different media-Newton's formula-Laplace's correction-super position of waves-progressive and standing waves-sonometer-air columns-Doppler effect and its applications.

UNIT 5: Heat and Thermodynamics

Kinetic theory of gases-postulates-pressure of a gas-specific heat capacity-relation between C_p and C_v -first law of

thermodynamics thermodynamical processes-isothermal and adiabatic-reversible and irreversible process-second law of thermodynamics-Carnot's engine-Heat transfer-conduction-convection-radiation-thermal conductivity of solids-black body radiations-Kirchoff's law-Wien's displacement law-Stefan's law-Newton's law of cooling.

UNIT 6: Ray and Wave Optics and Magnetism

Reflection and refraction of light-total internal reflection-velocity of light determination-deviation and dispersion of light by a prism-Lens formula-magnification-power of lens-combination of thin lenses in contact-Microscope-Astronomical telescope-wavefront-Huygens principle-wave nature of light-interference-Young's double slit experiment-diffraction and polarization.

UNIT 7: Electricity and Magnetism

Electrostatics-Coulomb's inverse square law-dielectric constant-electric field-electric lines of force-electric dipole-electric potential-potential difference-electric flux-Gauss theorem-electrostatic induction-capacitor capacitors in parallel and series-action of points-lightning arrester electric current-drift velocity of electrons-Ohm's law-electrical resistivity and conductivity-super conductivity-Kirchoff's law-Wheatstone's bridge-principle of potentiometer-electric power-Earth's magnetic field and magnetic elements-magnetic field due to a magnetic dipole-torque on a magnetic dipole-tangent law tangent galvanometer-deflection magnetometer-magnetic properties of a material-dia, para and ferromagnetic materials-applications.magnetic effects of electric current-Bio Savart law-force on a moving charge in an uniform magnetic field-moving coil galvanometer-conversion of a galvanometer into voltmeter and ammeter-Faraday's law-Lenz law of electromagnetic induction-Self inductance-mutual inductance-Flemming's right hand rule-methods of inducing emf-eddy current. Alternating currents-LCR series circuit-AC generator-Transformer.

UNIT 8: Atomic Physics and Relativity

Atomic structure-properties of cathode rays and positive rays-specific charge of an electron-atom model-Thomson atom model-Rutherford atom model-Bohr atom model-merits and demerits-quantum numbers-X-rays-production-properties-Bragg's law-Bragg's



X-ray spectrometer-Photoelectric effect-laser-spontaneous and stimulated emission-laser action-characteristics of laser light-ruby laser-applications of laser relativity-Einstein's mass energy relation-variation of mass with velocity.

UNIT 9: Dual Nature of Matter and Nuclear Physics

Matter waves-wave nature of particles-De Broglie wavelength- electron microscope. Nuclear properties; radius, mass, binding energy, density, isotopes, mass defect-Bainbridge mass spectrometer-nuclear forces neutron discovery-radioactivity - α , β and γ decay-half life and mean life-artificial radio activity-radio isotopes-radio carbon dating-radiation hazards. Nuclear fission-nuclear reactor-nuclear fusion-hydrogen bomb cosmic rays-elementary particles.

UNIT 10: Electronics and Communication

Semiconductors-doping-types-PN junction diode-biasing-diode as a Rectifier-transistors-transistor characteristics-amplifier-gain-feedback in amplifiers-logic gates-basic logic gates-NOT, OR, AND, NOR, NAND-universal gates-De Morgan's theorems-space communication propagation of electromagnetic waves in atmosphere-sky and space wave propagation-modulation types-demodulation-microwaves-radars.