UPPSC GIC Lecturer Physics Syllabus

MECHANICS:- Vector algebra: scalar and vector products, vector identities, background of vector calculus, concept of line, surface and volume integrals, physical meaning of gradient, divergence and curl, Gauss and Stoke's theorems. Centre of mass, rotating frame of reference, co riolis force, motion of rigid bodies, moment of inertia, theorem of parallel and perpendicular axes, movement of inertia of sphere, ring, cylinder and disc. Angular momentum, torque, central force, Kepler's Law, motion of satellite (including geostationary satellite), Galilieon transformation, special theory of relativity, Michelson - Morley experiment, Lorentz transformation equations, variation of mass and length with velocity, time dilation, addition of velocities and massenergy equivalence relation. Stream line and turbulent motions, Reynold's number, Stoke's law, Poiseulle's formula, flow of liquid through narrow tube. Bernoulli's formula with applications, surface tension, Stress- strain relationship, Hooke's Law, modulii of elasticity and interrelation between them Poisson's ratio, elastic energy.

THERMAL PHYSICS:- Concept of temperature and the zeroth law, first law of thermodynamics and internal energy, isothermal and adiabatic changes, second law of thermodynamics, Entropy, Carnot cycle and Carnot engine, absolute scale of temperature. Maxwell's thermodynamical relations. The Clausius- Clapeyron equation, porus plug experiment and Joule Thomson effect. Kinetic theory of gases, Maxwell distribution law of velocities, calculation of mean velocity, root mean square velocity and the Most probable velocity, degrees of freedom, Law of equipartition of energy, specific heats of gases, mean free path, transport phenomena

Sarkari Journal

Black body radiation, Stefan's law, Newtons law of cooling Wien's law, Rayleigh Jeans law, Planck's law, solar constant. Production of low temperatures by adiabatic demagnetization

WAVES AND OSCILLATIONS:- Oscillation, simple harmonic motion, stationary and progressive waves, damped harmonic-motion, forced oscillations and resonance, sharpness of resonance, wave equation, Plane and spherical waves superposition of waves. Fourier analysis of periodic waves- square and triangular waves, phase and group velocities, Beats.

OPTICS: Cardinal points of a coaxial system, simple problems on combination of thin lenses eyepiece- Ramsdon and Huygens eyepieces. Huygen's principle, conditions for sustained interference Young double slit experiment division of amplitude and wavefront, Fresnel biprism, Newtons rings, Michelsoninterferometer, diffraction by straight edge, single, double and multiple slits. Rayleigh's criterion, resolving power of optical instruments. Polarization, production and detection of polarized light (linear circular and elliptical) Brewster's law, Huygen's theory of double refraction, optical rotation, ploearimeters.

LASERS: Temporal and spatial coherence, stimulated emission, basic ideas about laser emission, Ruby and He-Ne lasers.

ELECTRICITY AND MAGNETISM:- Gauss law and its applications, electric potential, Kirchoff's laws and their applications, Wheatstone's bridge, Biot-Savart law, Ampere's circuital law, and their applications. Magnetic induction and field strength, magnetic field on the axis of

Sarkari Journal

circular coil, Electro magnetic induction, Faraday's and Lenz's law, self and mutual inductances, alternating current, L.C.R. circuits, series and parallel resonance Circuits, quality factor. Maxwell's equations and electromagnetic waves transverse nature of electromagnetic waves, Poynting vector, dia-, para-, ferro-, antiferro- and ferimagnetism (qualitative approach only), hysterisis.

ELECTRONICS:- Intrinsic and extrinsic semiconductors, PN, junction, Zener diode, and their characteristics, unipolar and bipolar transisters solar cells, use of diode and transistor for rectification, amplification, oscillation, modulation and detection, waves. Logic gates and their truth tables, some applications

MODERN PHYSICS: Bohr's theory of hydrogen atom, electron spin, Pauli's exclusion principle, optical and X-ray spectra, spatial quantization and Stern-Gerlach experiment, vector model of the atom, spectral terms, fine structure of spectral lines J-J and L-S coupling, Zeeman effect, Raman effect, photoelectric effect, Compton effect, de Broglie waves, wave-particle duality, Uncertainty principle, postulates of quantum mechanics, Schrodinger wave equation and its applications to (i) particle in a box (ii) motion across a step potential (iii) one dimensional harmonic oscillator, and engine values, Einstein's and debye theory of specific heat of solids. Band theory of solids energy band, Kronig-Penny model in one dimension, energy gap, distinction between metals, semiconductors and insulators, variation of Fermi level with temperature and effective mass. Radio activity, alfa, beta and gamma radiations, elementary theory of alpha decay, nuclear binding energy, Semi emperical mass formula, nuclear fission and fussion and nuclear reactors elementary particles, particle accelerator, cyclotron, linear accelerator, Elementary idea's of super conductivity

Sarkari Journal