

GENERIC ELECTIVE PAPER

Code: PHY(N)GE

Title: INTRODUCTORY PHYSICS

CREDIT 3

BLOCK-I :Mechanics and Properties of Matter:

Unit 1: Moment of Inertia Parallel axis and perpendicular axis theorem, M.I. of a Solid sphere and Solid cylinder,

Unit 2 : Gravitational potential and field due to a thin spherical shell and a solid sphere at external points and internal points

Unit 3: Relation among elastic constants, depression at free end of a light cantilever.

Unit 4: Surface tension, pressure, difference across a curved membrane, viscous flow, Poiseuille's formula.

Block II : Oscillation and Waves :

Unit 5: Simple harmonic motion, damped harmonic motion, under damped, over damped and critically damped motion, Forced vibration, Resonance,

Unit 6: Wave equation in a medium, Velocity of Longitudinal waves in an elastic medium and velocity of transverse wave in a stretched string,

Unit 7: Composition of SHM, Lissajous figures for superposition of two orthogonal simple harmonic vibrations (a) with same frequency, (b) frequency with 2:1.

Block -III : Thermal Physics:

Unit 8: Entropy, change in entropy in reversible and irreversible process, Carnot engine and its efficiency.

Unit 9: Carnot Theorem, Second law of thermodynamics, Kelvin-Planck, Clausius formula. Thermal conductivity, differential equation for heat flow in one dimension, Maxwell thermodynamic relation (statement only), Clausius Clapeyron equation, Black body radiation, Planck radiation formula (No derivation).

Block -IV : Electricity and Magnetism:

Unit 10: Gauss law of electrostatics, use of Gauss law to compute electrostatic field due to a linear charge distribution,

Unit 11: Magnetic induction B, Lorentz force law, Biot Savarts law, Magnetic induction due to long straight current carrying conductor, and in the axis of a current carrying circular coil, Amperes Circuital law, its differential form.

Unit 12: P-type and N-type semiconductors, PN-Junction as rectifier, Half wave and Full wave rectifiers (Bridge type), efficiency, ripple factor.