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Syllabus for Recruitment Examination of Post Graduate Teacher

Subject : Physics

PAPER –I

Mechanics and properties of materials

Unit 1:- Physical world and measurement

System of Unit, measurement of length , mass and its dimensional analysis, error of measurement.

Unit 2:- Kinematics

Uniform motion, non-uniform motion, accelerated motion, vectors, motion in plan, circular motion and its example, projectile motion.

Unit 3:- Laws of motion

Newton's laws of motion, inertial and non inertial frames , elastic and inelastic collision, friction,

Unit 4:-Work, Energy & Power

Work done by a constant force and by a variable force, kinetic and potential energy, power, gravitational potential energy, spring constant, potential energy of a spring, different forms of energy, mass – energy equivalence.

Unit 5: -Motion of system of particles and rigid body

Centre of mass and its application, moment of force, torque angular momentum and its application. Moment of inertia, theorem of parallel axis and perpendicular axis. Moment of inertia of uniform rod, ring, disc, sphere and cylinder.

Unit 6:- Gravitation

Universal law of gravitation, variation of "g" due to altitude and depth and rotation of earth, gravitational potential, escape velocity , orbital velocity of satellite, geostationary satellite and polar satellite and their uses.

Unit 7:- Properties of matter

Elasticity, Hook's law, Elastic constant of isotopic solid and their relation, fluid pressure, Pascal's law, buoyancy , Archimedes principle, surface tension and its application, viscosity, Stoke's law, Poiseuille's equation, Bernoulli's theorem and its application.

Unit 8:- 'D' Alembert's principle motion under central force field, equation of orbit under centre force, Kepler's law. Generalised co-ordinates, Lagrange equation. Hamiltonian and Hamilton's Canonical equation and its application.

Heat and Thermodynamics

Unit 1:- kinetic theory of gases, deduction of pressure, Maxwell law of velocity distribution and its experimental verification, equi-partition law of energy, transport phenomena , conductivity and diffusion , Brownian motion, Avagadro's number, ideal gas equation, Vander waal's equation .

Unit 2 :-Thermal expansion in solid, specific heat of gases at constant volume and constant pressure, specific heat in solid (Dulong and petite's law).

Unit 3:- Thermodynamics

Zeroth laws and first law of thermodynamics , reversible and irreversible process, isothermal and adiabatic process. Carnot engine and refrigerator, Efficiency and co-efficiency performance of heat engine, second law of thermodynamic, Claussius-Clapeyron's equation. Kelvin thermodynamic scale of temperature and their application Gibbs's phase rule, triple point, Joule-Thomson effect.

Unit 4:- Transfer of heat

Conduction, convection and radiation, thermal conductivity of solid, black body radiation , Kirchhoff's law, Wien's displacement law, Stefan's law, Rayleigh-Jean formula, Planck's law, Newton's law, of cooling, solar constant, surface temperature of the sun.

Waves & Oscillation

Unit: - 1 Oscillation

Periodic motion and periodic function, simple harmonic motion and its equation energy of SHM. Simple pendulum damped simple harmonic motion and its equation. Logarithmic decrement, Relaxation time, Q factor, free and forced oscillation, resonance and sharpness.

Unit:- 2 Waves

Longitudinal and transverse wave transverse wave in string and its differential equation with solution, Velocity of sound in air. Newton's formula and Laplace's correction. Factors affecting the velocity of sound in air and gases. Displacement relation for progressive wave, principle of superposition of waves, standing wave in