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Syllabus for Recruitment Examination of Trained Graduate Teacher

Subject: Physics

PAPER-I

1. Mechanics & Properties of Material :

Unit & dimension, accuracy, precision, error, dimension analysis and its application, motion in one and two dimension, uniform and non-uniform motion, relative-velocity, circular motion, projectile motion, laws of motion, friction and example of circular motion. Work, energy, Power, Potential energy and K.E, potentials energy of a spring, conservative and non-conservative forces, Elastics and inelastic force in one dimension and two dimension.

Centre of Mass:- application, moments of forces, Torque of parallel and perpendicular axes.

Gravitation: - Universal law, variation of "g" due to altitude and depth.

Gravitational potential energy, escape velocity and orbital velocity

Geostationary satellite and polar satellite and their uses.

Viscosity:- Poiseulli equation., Bernoulli's theorem and its application. Stoke's laws, terminal velocity, surface tension and its application, excess pressure inside a liquid drop and bubble Capillary rise.

2. HEAT & THERMODYNAMIC

Heat & temperature – thermal expansion, specific heats, calorimeter, Latent heat, modes of transmission of heats, thermal conductivity, Newton's Law's of cooling. Kinetic theory of gases, deduction of pressure, Maxwell law of Velocity distribution, Equi- partition of energy, Specific heats of gases – Cp and Cv, Zeroth law, 1st Laws of thermodynamics and 2nd law of thermodynamic, heat engine and refrigerator, Carnot cycle, Carnot theorem, Black body radiation, Kirchoff law, Stefan's Boltzmann Law, Wien's displacement Law.

3. WAVE & OSCILLATION

SHM, velocity, acceleration and energy of SHM, simple pendulum and its time period. Second pendulum, Forced Oscillation, damped oscillation, Resonance Transverse and Longitudinal wave, Speed of sound in elastic medium, effects of temperature, pressure, wind, moisture on speed of sound, Progressive and standing wave, interference, Beats and standing wave in string and organ pipe, Doppler's effects.

PAPER-II

4. OPTICAL

Reflection of light, Mirror equations, reflection of light, total internal reflection, refraction through spherical surfaces, Lens maker's formula and thin lens formula Refraction through prism, dispersion of light and scattering of light. Microscope and telescope and its magnifying power and resolving power. Wave front, Huygens Principle, Law of reflection & refraction, Interference of light, Young's Double slits Experiment and Diffraction due to single Slit and width of central maxima. Polarization of light, Brewster's law, Nicol Prism.

5. ELECTRICITY & MAGNETISM:-

Coulomb's law, Superposition principle, Electric field, Electric field due to point charge and dipole, Torque on electric dipole, electric flux, Gauss's theorem and its application, Electric potential due to point charge and electric dipole, Equipotential surface, Capacitance in series and parallel combination, Capacitance in case of dielectric constant, energy stored in parallel plate capacitor, dielectric a and polarization, Vende Graff generator.

Current electricity :- Drift velocity, relaxation time and its relation, Ohm's Law, Resistivity, Colour code of Carbon Resistors cell, Emf and potential differences, Kirchhoff's Law, Wheatstone Law and its application, Ampere's circuital Law and its application, forces on a moving charge, force between parallel current carry conductors. Cyclotron, Moving coil galvanometer and conversion of Ammeter into voltmeter Magnetic field lines, declination angle of dip, diamagnetic & Paramagnetic substances.

6. MODERN PHYSICS

Photo electric effects. Einstein's Photoelectric equation, Compton effect, photo cell, Bohr's Theory of Hydrogen atom, radius and energy of electron in orbit of hydrogen atom. Production of X- rays and its characteristics, Moseley's Law and its use. Wave nature of particle, De Broglie Law, Davisson and Germer experiment. Rutherford's Scattering experiment, size of nucleus, Mass defect Binding energy, magic number, Nuclear force and its properties. Radioactivity- Decay Law, properties of α , β and γ rays. half life, Mean life, Q- value of nuclear reaction. Nuclear Fission. Amorphous and crystalline solid, Crystal lattice, Primitive cell. Types of Crystal Lattice, potential energy of electron in metal, energy bands in solids.

7. ELECTRONIC AND COMMUNICATION

Energy bands in solid, Semi - conductor. Intrinsic and extrinsic Semiconductors, p-types and n-types Semiconductor, Biasing of p-n junction, Diode as half wave and full rectifier, Zener Diode, Zener Diode as Voltage regulator, Photo diode, Solar Cell, LED, Transistor, Biasing of Transistor (PNP and NPN). Characteristic of NPN Transistor as amplifier, common emitter amplifier, current gain, voltage gain, power gain. Transistor as oscillator, Logic gates, OR, AND, NOT, NAND and NOR gates.

Communication System:- Elements of communication system, band width of signal, and width of transmission medium, Needs of modulation, amplitude modulation, phase modulation frequency modulation. Production & detection of modulated wave. Different modes of propagation of E.M wave.
