NEST Physics Syllabus

General

The general basic physics will include Units and dimensions, dimensional analysis. Least count, significant figures. Methods of measurement (Direct, Indirect, Null) and measurement of length, time, mass, temperature, potential difference, current and resistance.

Also Design of some simple experiments are to be studied. ALong with it, identification of independent, dependent and control variables, identification of sample size, range and interval and identification of appropriate measurement techniques and instruments are to be studied.

Graphical representation, interpretation and analysis of data as well as Errors in the measurements and error analysis form a part of study of general physics.

Mechanics

Kinematics in one and two dimensions (Cartesian coordinates only), projectiles, Uniform circular motion along with Relative velocity is to be studied.

Mechanics would also include Newton's laws of motion, Inertial and uniformly accelerated frames of reference, Static and dynamic friction, Kinetic and potential energy, Work and power, Conservation of linear momentum and mechanical energy.

The study under this topic would also consist of Systems of particles, Centre of mass and its motion, Impulse as well as Elastic and inelastic collisions.

Law of gravitation, Gravitational potential and field, Acceleration due to gravity, Motion of planets and satellites in circular orbits and Escape velocity are a part of study for the examination.

Rigid body, moment of inertia, parallel and perpendicular axes theorems, moment of inertia of uniform bodies with simple geometrical shapes, Angular momentum, Torque, Conservation of angular momentum. Dynamics of rigid bodies with fixed axis of rotation, Rolling without slipping of rings, cylinders and spheres, Equilibrium of rigid bodies, Collision of point masses with rigid bodies are the few topics which the student need to go through as a part of study for the test.

Linear and angular simple harmonic motions, along with Hooke's law and Young's modulus is included.

Other concepts include Pressure in a fluid, Pascal's law, Buoyancy, Surface energy and surface tension, capillary rise, Viscosity: Stoke's and Poiseuille's law, Terminal velocity, Streamline flow, equation of continuity and Bernoulli's theorem.

Plane wave motion, longitudinal and transverse waves, superposition of waves, Progressive and stationary waves, Vibration of strings and air columns, Resonance, Beats, Speed of sound in gases and Doppler effect (in sound) will also be in the list of components of study of mechanics.

Thermal Physics

The concept of thermal physics will include topics such as Thermal expansion of solids, liquids and gases, Calorimetry, latent heat, Heat conduction in one dimension, Elementary concepts of convection and radiation, Newton's law of cooling, Ideal gas laws, Specific heats (C_V and C_P for monoatomic and diatomic gases), Isothermal and adiabatic processes, bulk modulus of gases, Equivalence of heat and work, First and second law of thermodynamics and its applications (only for ideal gases), Entropy, Blackbody radiation: Absorptive and emissive powers, Kirchhoff's law, Wien's displacement law and Stefan's law.

Electricity and Magnetism

The study covering the topic of electromagnetism will include Coulomb's law, Electric field and potential, Electrical potential energy of a system of point charges and of electrical dipoles in a uniform electrostatic field; Electric field lines, Flux of electric field, Gauss's law and its application in simple cases such as to find field due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell.

Concept of Capacitance will be included with topics such as Calculation of capacitance with and without dielectrics, Capacitors in series and parallel and Energy stored in a capacitor.

More concepts include study of electric current, Ohm's law, Series and parallel arrangements of resistances and cells, Kirchhoff's laws and simple applications and Heating effect of current.

Biot-Savart's law and Ampere's law, magnetic field near a current carrying straight wire, along the axis of a circular coil and inside a long straight solenoid, Force on a moving charge and on a current carrying wire in a uniform magnetic field are the sub-topics under the basic concept of magnetism.

This will also include magnetic moment of a current loop, effect of a uniform magnetic field on a current loop, Moving coil galvanometer, voltmeter, ammeter and their conversions.

Electromagnetic induction concept would include Faraday's law, Lenz's law, Self and mutual inductance, RC, LR and LC circuits with and A. C. Sources.

Optics

The study of optics would include rectilinear propagation of light, reflection and refraction at plane and spherical surfaces, deviation and dispersion of light by a prism, thin lenses, combination of mirrors and thin lenses as well as magnification.

The concept study would also include Wave nature of light. This concept will consist of Huygen's principle, interference limited to Young's double slit experiment. The Elementary idea of

diffraction would include sub-topics of rayleigh criterion. In a similar manner, the Elementary idea of polarization would include Brewster's law and the law of Malus.

Modern Physics

The modern physics would include atomic nucleus, alpha, beta and gamma radiations, law of radioactive decay, decay constant, half-life and mean life, binding energy and its calculation, fission and fusion processes and energy calculation in these processes.

The concept will also include study of photoelectric effect, Bohr's theory of hydrogen like atoms, characteristic and continuous X-rays, Moseley's law, de Broglie wavelength of matter waves as well as Heisenberg's uncertainty principle.

▷ Numerous fully-solved NEST Physics questions with detailed illustrated explanations. Concise study notes focusing on aspects important for real exam.