

PHYSICS CLASS-XI

SEMESTER-I

Unit-I: Physical World and Measurement

Physics-scope and excitement; nature of physical laws; physics, technology and society. Need for measurement; Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements, accuracy and precision of measuring instruments; errors in measurement; significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

Unit-II: Kinematics

Frame of references. Motion in a straight line: Position-time graph, speed and velocity. Uniform and non-uniform motion, average speed and instantaneous velocity.

Uniform accelerated motion. Velocity-time, position-time graphs, relations for uniformly accelerated motion (graphical treatment).

Elementary concepts of differentiation and integration for describing motion.

Scalar and Vector quantities. Position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number, addition and subtraction of vectors. Relative velocity.

Unit vector, Resolution of a vector in a plane-rectangular components. Motion in a plane Cases of uniform velocity and uniform acceleration-projectile motion. Uniform circular motion.

Unit-III: Laws of Motion

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction.

Uniform circular motion Dynamics of uniform circular motion: centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road.)

Unit-IV: Work, Energy and Power

Scalar product of vectors. Work done by a constant force and a variable force: kinetic energy, work-energy theorem, power.

Notion of potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (kinetic and potential energies): Non-conservative forces: elastic and inelastic collisions in one and two dimensions.

PRACTICAL

Experiments

1. Use of vernier callipers
 - (a) to measure diameter of a small spherical/cylindrical body.
 - (b) to measure dimensions of a given regular body of known mass and hence find its density.
 - (c) to measure internal diameter and depth of a given beaker/calorimeter and hence find its volume.
2. Use of screw gauge
 - (a) to measure diameter of a given wire.
 - (b) to measure thickness of a given sheet.
 - (c) to measure volume of an irregular lamina.
3. To determine radius of curvature of a given spherical surface by a spherometer.
4. To find the weight of a given body using parallelogram law of vectors.
5. To study relationship between force of limiting friction and normal reaction and to find co-efficient of friction between a block and a horizontal surface.
6. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between force and \sin .

Activities

1. To make a paper scale of given least count, e.g. 0.2 cm., 0.5 cm..
 2. To determine mass of a given body using a metre scale by principle of moments.
 3. To plot a graph for a given set of data with proper choice of scales and error bars.
 4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
 5. To study the variation in range of a Jet of water with angle of projection.
- To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane)