ANNUAL SYLLABUS
SESSION-2023-24
CLASS-XI
SUBJECT:PHYSICS
(Code 042)

CONTENT

UNIT -I: PHYSICAL WORLD AND MEASUREMENT
Chapter-2 : Units and Measurements

Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

UNIT-II : KINEMATICS
Chapter-3 : Motion in a Straight Line

Frame of reference, Motion in a straight line:

Elementary concepts of differentiation and integration for describing motion, uniform and non-uniform motion and instantaneous velocity, uniformly accelerated motion, velocity - time and position - time graphs. Relations for uniformly accelerated motion (graphically treatment)

Chapter-4 : Motion in a Plane

Scalar and vector quantities; position and displacement vectors, general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors, unit vector, resolution of vector in a plane, rectangular components, scalar and vector product of' vectors.

Motion in a plane, cases of uniform velocity and uniform acceleration-projectile motion, uniform circular motion.

UNIT-III : LAWS OF MOTION
Chapter-5 : 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, lubrication.

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

UNIT-IV : WORK, ENERGY AND POWER

Chapter-6 : Work, Energy and Power

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:non- conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

UNIT-V : MOTION OF SYSTEM OF PARTICLES AND RIGID

BODY Chapter-7 : System of Particles and Rotational Motion

Centre of mass of a two- particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod. Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications.

Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions. Moment of inertia, radius of gyration, values of moments of inertia for simple geometrical objects (no derivation).

Mid term syllabus to be completed by 15/09/23
REVISION
Discussion of question paper of First term.

UNIT-VI : GRAVITATION

Chapter-8 : Gravitation

Kepler's laws of planetary motion, universal law of gravitation.

Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy and gravitational potential; Escape speed orbital velocity of a satellite.

UNIT-VII : PROPERTIES OF BULK MATTER

Chapter-9 : Mechanical Properties of Solids

Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity(qualitative idea only), Poisson's ratio; elastic energy.

Chapter-10 : Mechanical Properties of Fluids

Pressure due to fluid column; Pascal's law and its applications

(hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure. Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Chapter-11 : Thermal Properties of Matter

Heat; temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; Cp, Cv – calorimetry; change of state –latent heat capacity.

Heat transfer-conduction, convection and radiation, thermal Conductivity, qualitative ideas of Blackbody radiation; Wein's displacement Law, Stefan's Law.

UNIT-VIII : THERMODYNAMICS

Chapter-12 : Thermodynamics

Thermal equilibrium and definition of temperature Zeroth law of thermodynamics, heat, work and internal energy. First law of thermodynamics, Second law of thermodynamics: gaseous state of matter, Change of condition of gaseous state- isothermal, adiabatic ,reversible, irreversible and cyclic processes.

UNIT-IX: BEHAVIOUR OF PERFECT GASES AND KINETIC THEORY OF GASES

Chapter-13 : Kinetic Theory

Equation of state of a perfect gas, work done in compressing a gas. Kinetic theory of gases – assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases;

concept of mean free path, Avogadro's number.

UNIT-X:Oscillations and Waves

Chapter-14: Oscillations

Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their applications.

Simple harmonic motion (S.H.M) and its equation of motion; phase;

oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period.

Chapter- 15:Waves

Wave motion :Transverse and longitudinal waves, speed of travelling wave , displacement relation for a progressive wave, principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.

**Final syllabus to be completed
by 31/01/24.**

Practicals

- The record, to be submitted by the students, at the time of their annual examination, has to include:
- Record of at least 8 Experiments [with 4 from each section], to be performed by the students.
- Record of at least 6 Activities [with a minimum of 3 each from section A and section B], to be performed by the students
- Report of the project to be carried out by the students.

EVALUATION SCHEME

Time 3 hours   **Max. Marks: 30**

Topic	Marks
Two experiments one from each section	7+7
Practical record (experiment and activities)	5
One activity from any section	3
Investigatory Project	3
Viva on experiments, activities and project	5
Total	**30**

SECTION–A

EXPERIMENTS

1. To measure diameter of a small spherical/cylindrical body and to measure internal diameter and depth of a given beaker/calorimeter using Vernier Calipers and hence find its volume.

2. To measure diameter of a given wire and thickness of a given sheet using screw gauge.

3. To determine volume of an irregular lamina using screw gauge.

4. To determine the radius of curvature of a given spherical surface by a

spherometer.

5. To determine the mass of two different objects using a beam balance.

6. To find the weight of a given body using the parallelogram law of vectors.

7. Using a simple pendulum, plot its L-T^2 graph and use it to find the effective length of second's pendulum.

8. To study variation of time period of a simple pendulum of a given length by taking bobs of same size but different masses and interpret the result.

9. To study the relationship between force of limiting friction and normal reaction and to find the co- efficient of friction between a block and a horizontal surface.

10. To find the downward force, along an inclined plane, acting on a roller due to the gravitational pull of the earth and study its relationship with the angle of inclination θ by plotting a graph between force and sinθ.

Activities

1. To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm

2. To determine mass of a given body using a meter 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 projectile with angle of projection

6.To study the conservation of energy of a ball rolling down on an inclined plane (using a double inclined plane)

7.To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude & time.

SECTION–B

Experiments

1.To determine Young's modulus of elasticity of the material of a given wire.

2. To find the force constant of a helical spring by plotting a graph between load and extension.

3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting the graph between P and V,and between P and 1/V.

4. To determine the surface tension of water by capillary rise method

5. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body

6. To study the relationship between temperature of a Hot body and time by plotting a cooling curve.

7. To determine specific heat capacity of a given solid by method of mixtures.

8. To study the relation between frequency and length of a given wire under constant tension using a sonometer

9. To study the relation between the length of a given wire and tension for constant frequency using a sonometer.

10.To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.

Activities

1.To observe change of state and plot a cooling curve for molten wax.

2.To observe and explain the effect of heating on a bi-metallic strip.

3. To note the change in level of liquid in a container on heating and interpret the observations.

4.To study the effect of detergent on surface tension of water by observing capillary rise.

5.To study the factors affecting the rate of loss of heat of a liquid.

6.To study the effect of load on depression of a suitably clamped meter scale loaded at (i) its end (ii) in the middle.

7.To observe the decrease in pressure with increase in velocity of a fluid.