## Competency Statements : Standard XII

| Area/ Unit/ Lesson | Competency Statements After studying the content in Textbook students would be able to.... |
|---|---|
| **Unit I** Ratational Motion and Mechanical Properties of fluids | • Distinguish between centrifugal and centripetal forces.<br>• Visualize the concepts of moment of inertia of an object.<br>• Relate moment of inertia of a body with its angular momentum.<br>• Differentiate between translational and rotational motions of rolling objects.<br>• Relate the pressure of a fluid to the depth below its surface.<br>• Explain the measurement of atmospheric pressure by using a barometer.<br>• Use Pascal's law to explain the working of a hydraulic lift and hydraulic brakes.<br>• Relate the surface energy of a fluid with its surface tension.<br>• Distinguish between fluids which show capillary rise and fall.<br>• Identify processes in daily life where surface tension plays a major role.<br>• Explain the role of viscosity in everyday life.<br>• Differentiate between streamline flow and turbulent flow. |
| **Unit II** Kinetic theory and Thermodynamics | • Relate various gas laws to form ideal gas equation.<br>• Distinguish between ideal gas and a real gas.<br>• Visualise mean free path as a function of various parameters..<br>• Obtain degrees of freedom of a diatomic molecule.<br>• Apply law of equipartition of energy to monatomic and diatomic molecules.<br>• Compare emission of thermal radiation from a body with black body radiation.<br>• Apply Stefan's law of radiation to hot bodies .<br>• Identify thermodynamic process in every day life.<br>• Relate mechanical work and thermodynamic work.<br>• Differentiate between different types of thermodynamic processes.<br>• Explain the working of heat engine, refrigerator and air conditioner. |
| **Unit III** Oscillations and waves | • Identify periodic motion and simple harmonic motion.<br>• Obtain the laws of motion for simple pendulum.<br>• Visualize damped oscillations.<br>• Apply wave theory to understand the phenomena of reflection, refraction, interference and diffraction.<br>• Visualize polarized and unpolarized light.<br>• Apply concepts of diffraction to calculate the resolving power.<br>• Distinguish between the stationary waves in pipes with open and closed ends.<br>• Verify laws of vibrating string using a sonometer.<br>• Explain the physics involved in musical instruments. |
| **Unit IV** Electrostatics and electric current | • Use Gaus's law to obtain the electric field for a charge distribution.<br>• Relate potential energy to work done to establish a charge distribution.<br>• Determine the electrostatic potential for a given charge distribution.<br>• Distingusih between conductors and insulators.<br>• Visualize polarization of dielectrics.<br>• Categorize dielectrics based on molecular properties.<br>• Know the effect of dielectric material used between the plates of a capacitor on its capacitance.<br>• Apply Kirchhoff's laws to determine the current in different branches of a circuit.<br>• Find the value of an unknown resistance by using a meter bridge.<br>• Find the emf and internal resistance of a cell using potentiometer.<br>• Convert galvanometer into voltmeter and ammeter by using a suitable resistor. |

| | |
|---|---|
| **Unit V** Magnetism | • Realize that Lorentz force law is the basis for defining unit of magnetic field.<br>• Visualize cyclotron motion of a charged particle in a magnetic field.<br>• Analyze and calculate magnetic force on a straight and arbitrarily shaped current carrying wires and a closed wire circuit.<br>• Apply the Biot-Savart law to calculate the magnetic field produced by various distributions of currents.<br>• Use Ampere's law to get magnetic fields produced by a current distribution.<br>• Compare gravitational, magnetic and electrostatic potentials.<br>• Distinguish between paramagnitic, diamagnetic and ferromagnetic materials.<br>• Relate the concept of flux to experiments of Faraday and Henry.<br>• Relate Lenz's law to the conservation of energy.<br>• Visualize the concept of eddy currents.<br>• Determine the mutual inductance of a given pair of coils.<br>• Apply laws of induction to explain the working of a generator.<br>• Establish a relation between the power dissipated by an AC current in a resistor and the value of the rms current.<br>• Visualize the concept of phases to represent AC current.<br>• Explain the passage of AC current through circuits having resistors, capacitors and inductors.<br>• Explain the concept of resonance in LCR circuits. |
| **Unit VI** Modern Physics | • Establish validity of particle nature of light from experimental results.<br>• Determine the necessary wavelength range of radiation to obtain photocurrent from given metals.<br>• Visualize the dual nature of matter and dual nature of light.<br>• Apply the wave nature of electrons to illustrate how better resolution can be obtained with an electron microscope.<br>• Check the correctness of different atomic models by comparing results of various experiments.<br>• Identify the constituents of atomic nuclei.<br>• Differentiate between electromagnetic and atomic forces.<br>• Obtain the age of a radioactive sample from its activity.<br>• Judge the importance of nuclear power.<br>• Explain use of p-n junction diode as a rectifier.<br>• Find applications of special purpose diodes for every day use.<br>• Explain working of solar cell, LED and photodiode.<br>• Relate the p-n junction diode and special purpose diodes.<br>• Realize transistor as an important building block of electronic circuits, analyze situations in which transistor can be used. |

# CONTENTS