

## CLASS - XI

### SEMESTER – II

#### SUBJECT: PHYSICS ( PHYS )

**FULL MARKS: 35**

**CONTACT HOURS: 60 HOURS**

#### COURSE CODE : THEORY

UNIT No.	TOPICS	CONTACT HOURS	MARKS
6	<b>GRAVITATION</b> The universal law of gravitation. Acceleration due to gravity and its variation with altitude, depth and rotation of earth. Kepler's laws of planetary motion. Gravitational potential energy, Gravitational potential. Escape velocity, Orbital velocity of a satellite. Geostationary satellite.	9	5
7	<b>PROPERTIES OF BULK MATTER</b> <b>SUB TOPIC : MECHANICAL PROPERTIES OF SOLIDS</b> Elastic behavior, stress - strain relationship. Hooke's law, Young's modulus( $Y$ ), bulk modulus( $K$ ), shear modulus of rigidity( $\eta$ ), Poisson's ratio( $\sigma$ ), relation between $Y$ , $K$ , $\eta$ , $\sigma$ (no derivation). Elastic energy for stretched string and extended spring. <b>SUB TOPIC: MECHANICAL PROPERTIES OF FLUIDS</b> Streamline and turbulent flow, Critical velocity. Viscosity, Newton's law of viscosity, Stoke's law, terminal velocity, Reynolds' number. Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension, ideas to drops, bubbles. Capillary rise and fall (no derivation, only analytical treatment). <b>SUB TOPIC : THERMAL PROPERTIES OF MATTER</b> Heat, temperature, thermal expansion of solids, liquids, and gases. Anomalous expansion of water and its effects. Specific heat capacity, principle of calorimetry, change of state, latent heat capacity. Heat transfer: conduction, convection and radiation, black body radiation, Kirchhoff's law, absorptive and emissive powers, thermal conductivity. Newton's law of cooling, Wien's displacement law, Stefan's law and	17	10

UNIT No.	TOPICS	CONTACT HOURS	MARKS
	Boltzmann's correction.		
8	<b>THERMODYNAMICS</b> Thermal equilibrium and definition of temperature, Zeroth law of thermodynamics. Heat, work and internal energy, First law of thermodynamics, $C_p$ and $C_v$ and determination of their relation. Isothermal and Adiabatic processes. P-V diagram, calculation of external work done in different cases. Second law of thermodynamics, reversible and irreversible processes. Heat engine, Calculation of efficiency of Carnot engine only, efficiency of refrigerator (only qualitative idea).	9	5
9	<b>KINETIC THEORY OF GASES</b> Assumptions for the kinetic theory of gases, RMS speed of gas molecules, degrees of freedom. Concept of pressure, kinetic energy and temperature in the light of kinetic theory, ideas of gas laws in the light of kinetic theory of gases. Law of equipartition of energy (statement only) and application regarding of specific heats of the gases. Concept of mean free path, Avogadro's number.	8	5
10	<b>OSCILLATION AND WAVES</b> <b>SUB TOPIC : OSCILLATION</b> Periodic motion-period, frequency, displacement as a function of time, Periodic functions. Simple harmonic motion (S.H.M) and its equation, phase, oscillation of a spring - restoring force and force constant, combination of springs, energy in S.H.M - kinetic and potential energies. Simple pendulum, loaded spring - derivation of expression for time period. Free, damped and forced oscillations, resonance (qualitative ideas only).  <b>SUB TOPIC : WAVES</b> Wave Motion: longitudinal and transverse waves, speed of travelling wave motion. Velocity of sound in gaseous medium - Newton's law and Laplace's correction. Displacement relation for a progressive wave. Principle of superposition of waves. Formation of Stationary waves, reflection of waves in string and organ pipes: fundamental mode and harmonics. Formation of beats. Doppler effect of sound.	17	10

#### FOR SEMESTER II

- CONTACT HOURS FOR THEORY PART – 60 HOURS
- CONTACT HOURS FOR PRACTICAL PART – 20 HOURS
- CONTACT HOURS FOR REMEDIAL CLASSES AND TUTORIAL – 10 HOURS SO TOTAL CONTACT HOURS FOR 2nd SEMESTER IS 90 HOURS.