Physics (XI)
Code No. (042)
Session -2021-22

Annual Examination March/April, 2022

Max Marks: 35

Unit		Marks
Unit–VII	**Properties of Bulk Matter**	18
	Chapter–9: Mechanical Properties of Solids	
	Chapter–10: Mechanical Properties of Fluids	
	Chapter–11: Thermal Properties of Matter	
Unit–VIII	**Thermodynamics**	
	Chapter–12: Thermodynamics	
Unit–IX	**Behaviour of Perfect Gases and Kinetic Theory of Gases**	
	Chapter–13: Kinetic Theory	
Unit–X	**Oscillations and Waves**	10
	Chapter–14: Oscillations	
	Chapter–15: Waves	
*	Elementary concepts of differentiation and integration with example Unit vector; resolution of a vector in a plane, Scalar and Vector product of vectors and their applications in specific cases like work done by a force, torque and angular momentum Motion in a plane - projectile motion and circular motion	05
*	Conservative and non-conservative forces Equilibrium of rigid bodies Gravitational potential energy and gravitational potential	02
	Total	**35**

*Topics from Term –I Syllabus

 Unit VII: Properties of Bulk Matter

Chapter–9: Mechanical Properties of Solids

Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus

Chapter–10: Mechanical Properties of Fluids

Pressure due to a 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 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, (recapitulation only) thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; C_p, C_v - calorimetry; change of state - latent heat capacity.

Heat transfer-conduction, convection and radiation (recapitulation only), thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law, Greenhouse effect.

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, isothermal and adiabatic processes.

Second law of thermodynamics: reversible and irreversible 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.

Simple harmonic motion (S.H.M) and its equation; 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. Free, forced and damped oscillations (qualitative ideas only), resonance.

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, Beats

PRACTICALS

Class XI Syllabus for TERM II

The record, to be submitted by the students, at the time of their annual examination, has to include:

Record of at least 4 Experiments, to be performed by the students

Record of at least 3 Activities [with 3 each from section A and section B], to be demonstrated by teacher.

Two experiments one from each section	**8Marks**
Practical record (experiment and activities)	2Marks
Viva on experiments, and activities	**5** Marks
Total	**15 Marks**

Experiments

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

   OR

   To find the force constant of a helical spring by plotting a graph between load and extension.
2. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and 1/V.
3. To determine the surface tension of water by capillary rise method.

   OR

   To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
4. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.

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

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

   OR

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

7. 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 metre scale loaded at (i) its end (ii) in the middle.

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

Practical Examination for Visually Impaired Students Class XI

Note: Same Evaluation scheme and general guidelines for visually impaired students as given

for Class XII may be followed.

A.   Items for Identification/Familiarity of the apparatus for assessment in practicals (All experiments)

Spherical ball, Cylindrical objects, vernier calipers, beaker, calorimeter, Screw gauge, wire, Beam balance, spring balance, weight box, gram and milligram weights, forceps, Parallelogram law of vectors apparatus, pulleys and pans used in the same 'weights' used, Bob and string used in a simple pendulum, meter scale, split cork, suspension arrangement, stop clock/stop watch, Helical spring, suspension arrangement used, weights, arrangement used for measuring extension, Sonometer, Wedges, pan and pulley used in it, 'weights' Tuning Fork, Meter scale, Beam balance, Weight box, gram and milligram weights, forceps, Resonance Tube, Tuning Fork, Meter scale, Flask/Beaker used for adding water.

B.   List of Practical's

1.   To measure diameter of a small spherical/cylindrical body using vernier calipers.

2.   To measure the internal diameter and depth of a given beaker/calorimeter using

     vernier calipers and hence find its volume.

3.   To measure diameter of given wire using screw gauge.

4.   To measure thickness of a given sheet using screw gauge.

5.   To determine the mass of a given object using a beam balance.

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

7.   Using a simple pendulum plot L-T and L-T^2 graphs. Hence find the effective length of second's pendulum using appropriate length values.

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

9.   (i) To study the relation between frequency and length of a given wire under constant tension using a sonometer.
     (ii) 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 observing the two resonance positions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.