INTERMEDIATE PART-I (11ᵗʰ CLASS)
PHYSICS   PAPER-I (OLD SCHEME)   TIME ALLOWED: 2.40 Hours
GROUP-II   **SUBJECTIVE**   MAXIMUM MARKS: 68

NOTE: - Write same question number and its part number on answer book,
         as given in the question paper.

SECTION-I

2.   **Attempt any eight parts.**   **8 × 2 = 16**

(i)   Differentiate between Precision and Accuracy.

(ii)   Why do we find it useful to have two units for amount of substance, the kilogram and the mole?

(iii)   The period of simple pendulum is measured by stopwatch.
         What type of errors are possible in the time period?

(iv)   Prove that $\hat{i} . \hat{i} = \hat{j} . \hat{j} = \hat{k} . \hat{k} = 1$

(v)   Suppose the sides of a closed polygon arranged head to tail. What is sum of these vectors?

(vi)   Name three different conditions that could make $\vec{A}_1 \times \vec{A}_2 = 0$

(vii)   If a car starts from rest and its velocity increases uniformly to $20\, ms^{-1}$ in 5 sec.
         What is its average acceleration?

(viii)   An object is thrown vertically upward. Discuss sign of acceleration due to gravity,
         Relative to velocity, while the object is in air.

(ix)   At what point or points in its path does a projectile have its minimum speed, its maximum speed?

(x)   Write power in terms of force and velocity.

(xi)   Calculate the work done in Kilo Joules in lifting a mass of 10 kg (at a steady velocity)
         through a vertical height of 10 m.

(xii)   A boy uses a catapult to throw a stone which accidentally smashes a green house window.
         List the possible energy changes.

3.   **Attempt any eight parts.**   **8 × 2 = 16**

(i)   Why does a diver change his body positions before and after diving in the pool?

(ii)   A disc and a hoop start moving down from the top of an inclined plane at the same time.
         Which one will be moving faster on reaching the bottom?

(iii)   Define Centripetal Force and give an example.

(iv)   State Stoke's Law and write its mathematical form.

(v)   What is systolic and diastolic pressure? What is relation between torr and Nm^{-2} .

(vi)   Explain how the swing is produced in fast moving cricket ball?

(vii)   Show that in SHM, the acceleration is zero when velocity is greatest and velocity is zero
         when acceleration is greatest.

(viii)   Will the period of vibrating spring increase decrease or remain constant by
         addition of more weight?

(ix)   If the mass spring system is hung vertically and set into oscillations,
         why does the motion eventually stop?

(x)   Explain why sound travel faster in warm air than in cold air?

(xi)   What features do longitudinal waves have in common with transverse waves?

(xii)   As a result of a distant explosion, an observer senses a ground tremor and
         then hears the explosion. Explain the time difference.

4.   **Attempt any six parts.**   **6 × 2 = 12**

(i)   Explain whether the Young's experiment is an experiment for studying interference or
         diffraction effects of light.

(ii)   Could you obtain Newton's Rings with transmitted light? If yes, would the pattern be
         different from that obtained with reflected light?

(iii)   Why the Polaroid Sunglasses are better than Ordinary Sunglasses?

(iv) What do you understand by Linear Magnification and Angular Magnification?

(v) If a person was looking through a telescope at the full moon, how would the appearance of the moon be changed by covering half of the objective lens?

(vi) What is Near Point? Write its value.

(vii) Define Internal Energy.

(viii) A thermos flask containing milk as a system is shaken rapidly. Does the temperature of milk rise?

(ix) Is it possible to construct a heat engine that will not expel heat into the atmosphere?

SECTION-II

NOTE: - Attempt any three questions.

5.(a) Define Elastic Collision and show that the relative velocity of two bodies before Collision is equal and opposite to their relative velocity after Collision, if the Collision is elastic   5

(b) The magnitude of dot and cross product of two vectors are $6\sqrt{3}$ and 6 respectively. Find the angle between the vectors.   3

6.(a) Define Escape Velocity. Derive an expression for escape velocity and calculate its value on the earth's surface.   5

(b) A gramophone record turntable accelerates from rest to an angular velocity of 45.0 rev per min in 1.60 s. What is its average angular acceleration?   3

7.(a) Define two molar specific heats of a gas and derive relation between them as $C_P - C_V = R$ 5

(b) What gauge pressure is required in the city mains for a stream from a fire house connected to the mains to reach a vertical height of 15.0m?   3

8.(a) Show that total energy is conserved in Simple Harmonic Motion.   5

(b) A Church organ consists of pipes, each open at one end of different lengths. The minimum Length is 30 mm and the longest is 4m. Calculate the frequency range of fundamental notes. (Speed of sound = $340\,ms^{-1}$)   3

9.(a) What is Compound Microscope? Explain working and find Magnification of Compound Microscope.   5

(b) Yellow Sodium light of wavelength 589 nm emitted by a single source passes through two narrow slits 1.00 mm apart. The interference pattern is observed on a screen 225 cm away. How far apart are two adjacent bright fringes?   3