

"Section - B"Marks: 40

Q-2. Write short answers to any ten (10) of the following parts. All parts carry equal marks:-

- (i) Explain with examples, the concept of precision and accuracy.
- (ii)  $\vec{A}$  and  $\vec{B}$  are two non-zero vectors. How can their scalar product be zero? And how can their vector product be zero.
- (iii) Explain the warning "Never use a large wrench to tighten a small bolt".
- (iv) The time rate of change of linear momentum is called force. Discuss.
- (v) Calculate the angle of projection for which kinetic energy at the summit is equal to one-fourth of its kinetic energy at point of projection.
- (vi) Is kinetic energy a vector quantity? Explain.
- (vii) What should be the orbital speed to launch a satellite in a circular orbit 900km above the surface of the earth?
- (viii) Why does smoke rise faster in a chimney on a windy day?
- (ix) Give one practical example each of free and forced oscillation.
- (x) Calculate the length of a second pendulum having time period 2s at a place where  $g = 9.8 \text{ms}^{-2}$ .
- (xi) Why does a sound wave travel faster in solid than in gases?
- (xii) Explain any two applications of polarized light.
- (xiii) Explain the energy ratios of refrigerator.

"Section - C"Marks: 27

Note: Answer any three (3) questions. All questions carry equal marks:-

- Q-3.
  - (i) For an ideal projectile, derive expressions of its maximum height and time of flight.
  - (ii) Show that for two complementary angles of measure  $75^\circ$  and  $15^\circ$  range of a projectile is same.
- Q-4.
  - (i) Explain the concept of apparent weight?
  - (ii) A 70kg man is standing on a scale in an elevator which is accelerating, as it heads for the top floor of a building at  $4 \text{ms}^{-1}$ . What apparent weight will show on the scale?
- Q-5.
  - (i) What is simple pendulum? Derive a relation for its time period and show that time period is independent of mass of the bob.
  - (ii) Calculate the frequency of a simple pendulum if its length is "im".
- Q-6.
  - (i) Explain any two (2) applications of first law of thermodynamics.
  - (ii) In a certain process, 400J of heat energy is supplied to a system and at the same time 150J of work is done by the system. What is the increase in internal energy?