



THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (15x2=30)

- a. How does the viscosity of liquids and gases vary with temperature?
- b. What are the elastic properties of matter?
- c. Define polarization.
- d. Define pseudo forces. Give any two examples?
- e. What is the difference between conservative and non-conservative forces?
- f. How could you differentiate a field force from contact force? Give example of each.
- g. What are the limitations of Newton's law of motion? Enlist them.
- h. What do you mean by polarization of light?
- i. How the swing is produced in a moving cricket ball?
- j. At what angle of projection the range and height of a projectile becomes equal?
- k. How does the viscosity of liquids and gases vary with temperature?
- l. How the fringe spacing in the interference pattern will be affected if you perform Young's double slit experiment under water?
- m. What is meant by vector differential operator?
- n. A spring has a spring constant 15 N/m. How much work is needed to extend through 7 cm.?
- o. State Kepler's Law of area.

Answer the following questions.

Q.2 (a) Explain the effect of drag force on the speed of a moving object through air. (6 Marks)

(b) A body of mass $m=4.5g$ is dropped from rest at a height $h=10.5m$ above the earth surface.

Neglecting air resistance, what will its speed be just before it strikes the ground? (4 Marks)

Q.3 a) State Parallel Axis theorem. Using this theorem, find the rotational inertia of a hollow cylinder about an axis of symmetry. (6 Marks)

(b) A hoop and a sphere are released from the top of an inclined plane, when they reach at the bottom which one has greater rotational K.E? (4 Marks)

Q4. (a) What is Michelson Interferometer? What is its least count? Explain its working. (6 Marks)

(b) A slit of width 'a' is illuminated by white light. For what value of 'a' you would observe the first minima for red light having wavelength $\lambda = 650 \text{ nm}$ fall at $\theta = 15^\circ$? (4 Marks)