

Q.2. Write short answers to any eight (8) of the following parts. All parts carry equal marks.

- (i) What are the significant figures in the following measurement:
(a) 1.009 m (b) 0.00450 kg (c) 1.66×10^{-27} kg (d) 2001 sec
- (ii) Is it possible that displacement is zero but not the distance, under what condition displacement will be equal to distance?
- (iii) An iron shot of mass 6 g is fired with an airgun. If the velocity of the shot is 62 ms^{-1} . What is the magnitude of momentum?
- (iv) How does friction help you walk? Is it kinetic friction or static friction?
- (v) State first and second conditions of equilibrium.
- (vi) Write a note on Law of Universal Gravitation.
- (vii) What would happen to your weight on earth if the mass of the earth doubled, but its radius stayed the same?
- (viii) A 60 g bullet is fired from a gun with 3150 J of kinetic energy. Find its velocity.
- (ix) Why a small needle sinks in water and huge ships travel easily in water without sinking?
- (x) Explain Anomalous expansion of water.
- (xi) Explain why burns caused by steam at 100°C on the skin are often more severe than burns caused by water at 100°C .

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

- Q.3. (a) What is isolated system? State law of conservation of momentum. Explain law of conservation of momentum in firing of rifle. (4)
- (b) Divia is pulling a box on the floor with a force of 20 N making an angle of 60° with the horizontal. Find the horizontal and vertical components of this force. (3)
- Q.4. (a) Show that the orbital speed depends upon the mass of earth and the distance from the center of mass of the satellite. (4)
- (b) What power is required for a ski-hill chair lift that transports 500 people (average mass 65 kg) per hour to an increased elevation of 1200 m? (3)
- Q.5. (a) Explain Pascal's Principle. (4)
- (b) A rectangular glass block of dimensions 30 cm by 5 cm by 10 cm weighs 37.5 N. Calculate the least and the greatest pressure it can exert when resting on a horizontal table? (3)
- Q.6. (a) Explain volume thermal expansion of solids. Also define co-efficient of volume thermal expansion and what is its unit? (4)
- (b) What is the specific heat of a metal substance if 135 kJ of heat is needed to raise (3)

4.1 kg of the metal from 18.0°C to 37.2°C ?