

Physics

Note: Time allowed for Section-B and Section-C is 2 Hours and 45 minutes.

SECTION-B

Q2: Attempt any EIGHT parts. Each part carries FOUR marks.

- 1) Describe thermodynamics and optics by giving one example of each.
- 2) Define translator motion and describe its three types with examples.
- 3) Calculate the acceleration of the elevator with a counterweight mass of 1200kg and mass 1100kg when carrying passengers.
- 4) What is friction? Provide three cases where friction is desirable.
- 5) In a balanced system, a force of 150N is applied at a distance of 4m from the pivot. Calculate the force needed on the other side at 3m from the pivot.
- 6) Compare and contrast the concepts of centre of mass and centre of gravity of irregular object highlighting any differences.
- 7) Obtain the expression for calculating earth's mass using law of universal gravitation.
- 8) Categorize the following sources of energy as renewable or non-renewable with a brief description of each.

(a) Wind energy	(b) Fossil fuels
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- 9) Determine the energy produced when a mass of 0.03kg is completely converted into energy.
- 10) Define atmospheric pressure, compare the atmospheric pressure at sea level and top of Mount Everest.
- 11) Discuss four factors that affect the rate of heat transfer through a solid conductor.

SECTION-C Marks: 24

Note: Attempt any THREE questions. All questions carry equal marks.

- Q3:** (a) Elaborate how vectors differ from scalars with two examples.
 (b) Specify whether each of the following quantities is a vectors or scalar: Pressure, Momentum, Torque, Work, Electric Current, Temperature
- Q4:** (a) Using the law of gravitation, derive formula for orbital speed of satellite.
 (b) A satellite orbits the earth 225 km above its surface, find it's orbital speed given that mass of earth is 6×10^{24} kg and radius of earth is 6.4×10^6 mm.
- Q5:** (a) Deduce formula for pressure beneath a liquid surface.
 (b) The deepest point in an ocean is 12km below sea level, what is the pressure in atmosphere at this point?
- Q6:** (a) Explain the molecular process of evaporation at the liquid's surface, providing two examples.
 (b) What is the specific heat of a metal substance. If 105 kJ of heat is needed to raise the temperature of 2.3kg of the metal from 16°C to 35.2°C ?

