

# 17102

**21819**

**2 Hours / 50 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.  
(2) Assume suitable data, if necessary.  
(3) Use of Non-programmable Electronic Pocket Calculator is permissible.  
(4) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any NINE of the following:** **18**
- Define stress and strain.
  - State pressure depth relation. Give meaning of each term in it.
  - Define velocity gradient and state its unit.
  - Define cohesive force and adhesive force.
  - Convert body temperature 98.6°F into °C.
  - Explain why  $C_p$  is greater than  $C_v$ .
  - Define the two specific heats for a gas.
  - Find angle of incidence if angle of refraction is 30° for a glass having refractive index 1.5.
  - Derive the relation  $V = n\lambda$ .
  - Define phase angle and Epoch.
  - State how stationary wave is formed.
  - Define resonance.

P.T.O.

- 2. Attempt any FOUR of the following:** **16**
- a) Explain behaviour of wire under continuously increasing load. Using stress-strain diagram.
  - b) Calculate Young's modulus of elasticity for a wire having length 80 cm and diameter 4 mm. The wire elongates by 1.5 mm when subjected to a load of 10 N.
  - c) State and explain Newton's law of viscosity and hence define coefficient of viscosity.
  - d) A liquid rises through a height of 4 cm in a capillary tube of radius 0.4 mm. How far will it rise in a capillary tube of radius 0.8 mm.
  - e) Define critical velocity. State significance of Reynolds's number.
  - f) Distinguish between isothermal process and adiabatic process.
- 3. Attempt any FOUR of the following:** **16**
- a) State and explain law of thermal conductivity of heat.
  - b) State three gas laws. What is an ideal gas?
  - c) (i) State Snell's law of refraction.  
(ii) State condition of total internal reflection in optical fiber.
  - d) Calculate numerical aperture and acceptance angle for an optical fiber. If R.I. of core is 1.5 and R.I. of cladding is 1.3.
  - e) Distinguish between transverse wave and longitudinal wave.
  - f) A tuning fork of frequency 512 Hz resonates with an air column of length 15 cm. The end correction is 5 mm. Calculate the velocity of sound in air.
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