

16117

2 Hours / 50 Marks

Seat No.

--	--	--	--	--	--	--	--

- Instructions :**
- (1) All Questions are *compulsory*.
  - (2) Answer each next main Question on a new page.
  - (3) Illustrate your answers with neat sketches wherever necessary.
  - (4) Figures to the right indicate full marks.
  - (5) Assume suitable data, if necessary.
  - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks****1. Attempt any NINE of the following :****18**

- (a) Define Elastic limit.
- (b) Define Poission's Ratio.
- (c) Define Coefficient of viscosity. Write down its S.I. unit.
- (d) Calculate the pressure at a depth 12 m inside the water.
- (e) Define capillarity or capillary action.
- (f) State law of thermal conductivity. State its S.I. unit.
- (g) Distinguish between isothermal and adiabatic expansion (process) of gas. (two points)
- (h) 100 ml of air is measured at 20 °C. If temperature of air is raised to 50 °C. What will be its volume ? Pressure of air remains constant.
- (i) Define : (i) Amplitude (ii) Frequency.

- (j) A body produces wave of wavelength 33 cm. What is the frequency of vibration if velocity of propagation is 330 m/s ?
- (k) Define free and forced vibration.
- (l) State the formula for velocity of sound by resonance tube method.

**2. Attempt any FOUR of the following :****16**

- (a) Define : Young's modulus, Bulk modulus, Rigidity modulus of Elasticity. Give relation between them.
- (b) Explain stress-strain diagram.
- (c) Derive Stoke's formula in viscosity.
- (d) Define Reynold's number. State its significance.
- (e) A capillary tube of diameter 1 mm is dipped in water. How far will the water rise in the tube of surface tension of water is  $7.2 \times 10^{-2}$  N/m ?  
Density of water =  $1 \times 10^3$  kg/m<sup>3</sup>.
- (f) Find the quantity of heat conducted in 5 minutes across a silver sheet of size 40 cm  $\times$  30 cm of thickness 3 mm. If its two faces are at temperatures of 40 °C and 25 °C, k for silver = 0.1 kcal/ m °C S.

**3. Attempt any FOUR of the following :****16**

- (a) State and explain three modes of transmission of heat.
  - (b) Define  $C_p$  and  $C_v$  and derive the relation between them.
  - (c) Derive prism formula.
  - (d) Numerical aperture of a fiber is 0.244 and refractive index of cladding is 1.48. Calculate refractive index of core and acceptance angle.
  - (e) Define transverse wave and state its three characteristics.
  - (f) Calculate the velocity of sound if resonating length 14 cm is observed for a tuning fork of frequency 512 Hz.
-