17102

11819

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 the terms :

(i)   Ultimate stress

(ii)   Factor of safety

(b)   State Hooke's law of elasticity. Define Elastic limit.

(c)   State the effect of temperature and adulteration on viscosity of liquid.

(d)   Calculate the pressure at a depth 12 m inside the water. (density of water = 1000 kg/m^3)

(e)   Define surface Tension. State its S.I. unit.

(f)   Define absolute zero temperature and one calorie.

(g) Define specific heat of gas at constant pressure and at constant volume.

(h) Define Isothermal and Adiabatic process.

(i) The velocity of wave is 300 m/s. If the frequency of vibration of wave is 300 Hz. Calculate the wavelength.

(j) Define amplitude and periodic time of a vibrating particle.

(k) State any two characteristics of stationary waves.

(l) Define Resonance. Give its one example.

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

(a) Calculate Young's Modulus of elasticity for a wire having length 1.5 m and diameter 5 mm, if the wire elongates by 2 mm when subjected to a load of 10 N.

(b) Explain behaviour of wire under continuously increasing load using stress-strain diagram.

(c) State Newton's law of viscosity. Hence define co-efficient of viscosity. State its S.I. Unit.

(d) Distinguish between streamline flow and turbulent flow of liquid. (Any four points.)

(e) (i) Define Cohesive force and Adhesive force.

   (ii) Define Capillarity. Give its any two examples.

(f) Find the amount of heat conducted in one hour by a window pane of dimensions 60 cm × 30 cm and thickness 3 mm, if the difference between temperatures is 5 °C and K = 0.0002 k cal/m °C-sec.

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

(a) State any two applications each of conduction and radiation.

(b) Volume of certain quantity of gas at N.T.P. is 12 litres. What will be the pressure exerted by same quantity of gas when enclosed in a gas cylinder of 10 litres at 273 °C ?

(c) Explain Total internal reflection with neat diagram. Hence define the term critical angle.

(d) (i) State Prism formula with meaning of each term.

(ii) Define Numerical Aperture and Acceptance angle.

(e) Distinguish between Transverse wave and longitudinal wave. (Any four points).

(f) (i) A tuning fork of frequency 512 Hz resonates with air column of length 16 cm. The end correction is 0.5 cm. Calculate velocity of sound.

(ii) Distinguish between free vibrations and forced vibrations. (Any two points)

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