15116

2 Hours / 50 Marks   Seat No. ⬚⬚⬚⬚⬚⬚⬚

Instructions : (1)   All Questions are *compulsory*.

(2)   Illustrate your answers with neat sketches wherever necessary.

(3)   Figures to the right indicate full marks.

(4)   Assume suitable data, if necessary.

(5)   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 compressibility. State its SI unit.

(b)   State any two factors affecting elasticity.

(c)   State Archimedes' principle.

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

(e)   Define capillarity. State two examples of capillary action.

(f)   State relation between °C, °F and K.

(g)   A 100 ml of air is measured at 20 °C. If the temperature of air is raised to 50 °C, calculate its volume as pressure remains constant.

(h)   Define specific heat of substance. State its SI unit.

(i)   A radio wave of frequency 91.1 MHz travels with speed of 3×10^8 m/s. Find its wavelength.

(j)   Define simple harmonic motion. Give its one example.

(k)   Define Resonance. State its one example.

(l)   Define free and forced vibrations.

P.T.O.

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

   (a) A wire of diameter 4 mm and length 2 m extends by 2 mm when a force of 10 N is applied. Find Young's modulus of the wire.

   (b) Define Young's modulus, Bulk modulus and Modulus of rigidity. State relation between them.

   (c) Differentiate between streamline and turbulent flow of liquid.

   (d) State any four applications of surface tension of liquid.

   (e) Explain Laplace's molecular theory of surface tension of liquid.

   (f) State and explain law of thermal conductivity. Define coefficient of thermal conductivity.

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

   (a) A plate of nickel 4 mm thick has a temperature difference of 32 °C between its faces. It transmits 200 kcal per hour through an area of 5 cm^2. Calculate the coefficient of thermal conductivity.

   (b) Differentiate between isothermal and adiabatic process.

   (c) Derive prism formula.

   (d) (i) Define numerical aperture and acceptance angle.

       (ii) Find angle of incidence if angle of refraction is 30° for a glass having refractive index 1.55.

   (e) Define transverse wave and longitudinal wave with example.

   (f) State any four characteristics of stationary waves.

_____