17102

15162

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****.*

Marks

1. Attempt **any nine** of the following : **18**

a) State Hooke's law of elasticity.

b) Define compressibility. State its SI Unit.

c) Define velocity gradient and state its unit.

d) A water tank having capacity to store 1000 cm^3 of water is filled one-third. Calculate pressure at the bottom of water tank.
Given : Density of water = 10^3 kg/m^3, g = 10 m/s^2)

e) Define :
i) Adhesive force ii) Cohesive force

f) What is absolute scale of temperature ?

g) Explain why C_p is greater than C_v.

h) Define the two specific heats of gas.

i) Define transverse wave. Give one example.

j) The wave travels with speed of 3×10^8 m/s and frequency 90 MHz. Calculate its wavelength.

k) State the principles of superposition of waves.

l) Define resonance.

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

a) Explain stress-strain diagram for a wire under continuously increasing load.

b) Calculate Young's modulus of elasticity for material of wire having length 2 m, 0.6 mm diameter. If weight applied is 100 N which elongates the wire by 1 mm.

c) State Newton's law of viscosity. Define coefficient of viscosity and state its SI unit.

d) Define :
i) Streamline flow ii) Turbulent flow
Give significance of Reynold's number.

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

f) A capillary tube of radius 0. 1 mm is dipped into a liquid of density 10^3 kg/m^3 and angle of contact 10°. If the liquid rises by 20 mm in the tube. Find the surface tension of liquid.

P.T.O.

Marks

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

a) State law of thermal conductivity. Define coefficient of thermal conductivity.

b) Define isothermal process and adiabatic process. Give one example of each in engineering field.

c) State the use of bad conductor in heat transfer.

d) Derive an equation for prism formula using neat labelled diagram.

e) Explain the propagation of light wave through optical fibre with help of neat labelled diagram.

f) i) A particle performing SHM has period of 3 sec. Calculate its acceleration at 2 cm from mean position.

ii) A tuning fork of frequency 512 Hz resonates with an air column of length 14 cm. Calculate the velocity of sound in air, if end correction is 26 mm.