17912

13141

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. Abbreviations used convey usual meaning.

(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. Answer any <u>NINE</u> of the following: **18**

a) Give relation between the three moduli of elasticity with the meaning of their symbol.

b) Define the terms :

i) Compressibility

ii) Poisson's ratio

Marks

c) What will be the pressure exerted by the liquid at any point inside the liquid, if 'h' is the height of liquid column having density 'ρ' in a cylinder of cross-sectional area 'A'.

d) State the significance of Reynold's number in flow of liquids.

e) Define surface tension. State its SI unit.

f) Find 'J', if the difference of specific heats of a gas is 0.55 J/kg°k (Given R = 2310 Mks unit)

g) Define the terms :

   i) calorie

   ii) absolute zero temperature

h) State Charle's law and Gay Iussac's law.

i) Define the terms :

   i) T.I.R.

   ii) critical angle

j) Draw a neat labeled structure of an optical fibre.

k) Write the expression of velocity and acceleration of a body performing S.H.M.

l) Define the terms :

   i) free vibration

   ii) forced vibration

m) Explain formation of a stationary wave.

Marks

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

a) Explain the behaviour of a metal wire under increasing load with the help of a neat labelled stress-strain diagram.

b) A wire of length 300 cm extends by 3 mm when a force of 2×10^{-3} KN is applied to it. Calculate :

i) stress produced in it, if y = 2×10^{11} N/m^2

ii) area of wire

c) State Newton's law of viscosity and hence derive the unit of coefficient of viscosity.

d) Define viscosity of a liquid. Explain effect of temperature and contamination on viscosity of a liquid.

e) Derive an expression for surface tension by capillary rise method.

f) i) State the law of thermal conductivity of heat.

ii) Define coefficient of thermal conductivity. State its SI unit.

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

a) Calculate coefficient of thermal conductivity. If the two faces of a glass window pane are at temperature of 30°c and 40°c respectively, when 150 kcal of heat is conducted in 30 minutes through it. (Given area and thickness of glass window pane as 3000 cm^2 and 4mm respectively)

OR

i) Differentiate between heat and temperature.

ii) Define 'radiation'. State applications of radiation.

Marks

b) Distinguish between isothermal process and adiabatic process (min. 4 points)

c) Define Numerical aperature and acceptance angle. State the relation between them.

d) A simple progressive wave is represented by $y = 0.5 \sin (314t - 12.65 x)$. Find :

i) amplitude

ii) wavelength

iii) speed of wave

iv) frequency

e) Give two examples of following :

i) Transverse wave

ii) Longitudinal wave

f) i) Define resonance

ii) Give two examples of resonance.

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