

**Scheme - G**

**Sample Question Paper**

**Course Name : All Branches of Diploma in Engineering and Technology.**

**Course Code : AE/CE/CH/CM/CO/CR/CS/CW/DE/EE/EP/IF/EJ/EN/ET/EV/EX/IC/IE/IS/  
ME/MU/PG/PT/PS/CD/CV/ED/EI/FE/IU/MH/MI/DC/TC/TX**

**Semester : First**

**17102**

**Subject Title : Basic Science (Physics)**

**Marks : 50**

**Time:2 Hours**

**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. Preferably, write the answers in sequential order.

**Q1. Attempt any NINE of the following:**

**18 Marks**

- a. State Hooke's law.
- b. Define the following terms: (i) Elastic limit (ii) Factor of safety
- c. Define the term 'pressure'. State its SI unit.
- d. Rain drop of radius 0.2 mm is falling with velocity of 2 m/s. If coefficient of viscosity of air is  $1.8 \times 10^{-4} \text{ N s / m}^2$ , determine viscous force acting on the drop.
- e. A liquid rises to a height of 10 cm in a capillary tube of radius 0.5mm. How far will it rise in a capillary tube of radius 0.25 mm?
- f. Define absolute zero temperature.
- g. Define the two specific heats for a gas.
- h. Why  $C_p$  is greater than  $C_v$ ? Explain.
- i. Define the terms (i) Amplitude (ii) Period
- j. Derive the relation  $V = n \lambda$
- k. What are stationary waves?
- l. Define resonance.

**Q2. Attempt any FOUR of the following:**

**16 Marks**

- a. Explain the behavior of a wire under continuously increasing Load.
- b. A 300 cm long wire of 0.75 mm radius hangs vertically. When a load of  $100 \times 9.8 \text{ N}$  is applied to the wire, it elongates by 2 cm. Find Young's modulus of elasticity.
- c. Distinguish between streamline flow and turbulent flow. (min. 4 points)
- d. State (i) Pascal's law (ii) Archimedes' principle
- e. i.) State effect of temperature on surface tension.  
ii.) Give any two examples of capillarity.
- f. A window pane is 100 cm X 30 cm. Its thickness is 3 mm. If the difference between inside & outside temperature is  $5^{\circ}\text{K}$ , calculate the amount of heat conducted in 1 hour.  $K$  for glass =  $1 \text{ W/ m}^{\circ}\text{K}$ .

**Q3. Attempt any FOUR of the following:**

**16 Marks**

- a. State the three ways in which heat is transferred from one place to another. Give one example of each.
  - b. Distinguish between isothermal process & adiabatic process. ( 4 points)
  - c. Determine the numerical aperture of a step index fibre when the core refractive index  $n_1 = 1.5$  & the cladding refractive index  $n_2 = 1.48$ .
  - d. i) State prism formula with meaning of each term.  
ii) Draw neat ray diagram of propagation of light through prism.
  - e. Distinguish Between transverse and longitudinal waves.
  - f. The minimum length of the air column in a resonance tube is 16 cm when resonance is obtained with a tuning fork of frequency 520 Hz. If the diameter of the tube is 4 cm, calculate the velocity of sound in air.
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