

This question paper contains 3 printed pages.]

Your Roll No.

515

Subsidiary for B.Sc. Honours/I A

PHYSICS – Paper II

(Thermal Physics)

Time : 3 Hours

Maximum Marks : 50

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any five questions.

Attempt parts of a question together.

All questions carry equal marks.

1. (a) Define the concept of temperature. Which law of thermodynamics elaborates its concept ? Explain briefly. 2, 3
(b) Describe the principle and working of a platinum resistance thermometer. 5

2. Describe the Maxwell-Boltzman Distribution Law of Velocities. How can this law be verified experimentally ? 6, 4

3. What are the different modes of transmission of heat ? Explain why metals are better conductors of heat than plastics. How do you determine the coefficient of thermal conductivity by Forbe's Method ? 3, 2, 5

OR

A bar of length 40 cms. and uniform cross-section 5 cm^2 . consists of two halves AB of copper and BC of iron welded together at B. The end A is maintained at 200°C and end C is at 0°C . The sides are thermally insulated. Find the rate of flow of heat along the bar when steady state has been reached. (Thermal conductivity of copper is 0.9 and that of iron is 0.2 SI units.) 10

4. Describe Porous Plug Experiment. Discuss its results. Obtain an expression for the Joule-Thomson cooling in the Porous-Plug Experiment. 10
5. Derive the Clausius-Clapeyron equation for change of state. Discuss the effect of pressure on boiling point and melting point. 7, 3
6. Describe the Carnot cycle. Explain why the efficiency of a Carnot cycle cannot be 100%, with reference to non-attainability of absolute zero. 7, 3

7. What is a black body ? How can it be obtained in practice ? Describe the energy distribution of a black body. 2, 2, 6

8. Write short notes on any **two** of the following :

(a) Isothermal and Adiabatic Elasticity.

(b) Absolute Scale of Temperature.

(c) Stefan's Law and Determination of Stefan's Constant. 5, 5
