[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 884 **E** **Your Roll No.....**

Unique Paper Code : 219251

Name of the Course : **B.Sc. (Hons.) Geology**

Name of the Paper : PHYSICS – I [GEHT–204]

Semester : II

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Five** questions in all including Question No. **1** which is compulsory.
3. Each question carries equal marks.

1. (a) Define microstate, macro state and thermo dynamical probability.

   (b) Define extensive and intensive thermodynamic variables.

   (c) What is the zeroth law of thermodynamics ?

   (d) State Clauasius Inequality.

   (e) What is the Partition function ? (3×5=15)

2. (a) State and explain the Clausius and Kelvin-Planck form of the second law of thermodynamics. (10)

   (b) Show that both form of second law are equivalent. (5)

3. (a) State and explain the working of a Carnot engine and derive the expression for the efficiency. (10)

   (b) Calculate the efficiency of a Carnot engine operating at the 27°C and 100°C. (5)

P.T.O.

4. Derive the expression of Entropy for a reversible process using Carnot cycle and Clausius theorem. Also calculate the Entropy expression for the Ideal gas. (15)

5. Derive the Maxwell-Boltzmann law of distribution of velocities for gas particles. Also provide the indirect and direct methods of its experimental verification. (15)

6. (a) Calculate the relative magnitude of average, root mean square and most probable speed. (9)

   (b) Show that for a maxwellian distribution of velocity, the expression for mean free path is given by

   $$\lambda = 0.707/\pi d^2 n$$

   where symbols have their usual meaning. (6)

7. What is Planck's law of Blackbody radiation ? Derive the Rayleigh-Jean, Wien's displacement and Stefan-Boltzmann law from the Planck's law. (15)

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

   (a) Clausius-Clapyron equation

   (b) Bose-Einstein condensation

   (c) Thermodynamic potentials

   (d) Brownian motion (5,5,5)