This question paper contains **3** printed pages]

Roll No. ☐☐☐☐☐☐☐☐☐☐☐

S. No. of Question Paper : **1701**

Unique Paper Code : **219251**   **C**

Name of the Paper : **Physics– I (GEHT-204)**

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

Semester : **II**

Duration : **3 Hours**   Maximum Marks : **75**

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

Attempt *Five* questions in all.

Question No. **1** is compulsory.

1. Attempt any *five* of the following :

    (*a*) Mention the conditions for achieving reversible and irreversible processes with

    examples from each.   3

    (*b*) What do you mean by thermodynamic probability ?   3

    (*c*) Explain briefly about Brownian motion.   3

(*d*) Show that if the Claussius statement of the second law were not true, a violation of the Kelvin-Plank statement would be possible. 3

(*e*) Show that no refrigerator operating between two reservoirs at given temperatures can have a higher coefficient of performance than a Carnot refrigerator operating between the same two reservoirs. 3

(*f*) Calculate the mean free path of gas molecule of diameter 3.2A. Number of molecule per unit volume is 2.5×10^{25} m^{-3}. 3

2. (*a*) State and deduce First latent heat equation $\dfrac{dP}{dT} = \dfrac{L}{T(V_2 - V_1)}$. 10

(*b*) Why is the melting point of some solids decreased with the increase of pressure, while those of others are increased ? 5

3. Obtain Maxwell-Boltzmann's distribution of speed of gas molecules. 15

4. What is the significance of Partition function (Z) in statistical physics ? Obtain its expression and relate this with entropy. 15

5. State and prove the theorem of equipartition of energy. Also explain its merit. 15

6. Using the law of equipartition of energy, show that for a gas possessing f degrees of freedom, $\gamma = 1 + \dfrac{2}{f}$. Also estimate the value of γ for mono- di-, and polyatomic gases.   15

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

   (a) Micro and macro states;   5

   (b) Transport phenomenon;   5

   (c) Difference between diffusion and viscosity;   5

   (d) Bose-Einstein condensation;   5

   (e) Second law of thermodynamics.   5