



Date: 08-11-2016

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

**PART A**

**Answer ALL questions**

**(10x2 = 20)**

1. What is Brownian movement?
2. The density of helium is  $0.0178 \text{ kg/m}^3$  at NTP. What is the rms velocity of helium molecules at NTP?
3. Define Isothermal and Adiabatic change.
4. What is super fluidity?
5. State first law of thermodynamics.
6. Calculate the increase in entropy when 1 gm of ice at  $-10^\circ \text{C}$  is converted to ice at  $0^\circ \text{C}$ .
7. State Gibbs –Helmholtz equation.
8. What is Joule –Kelvin effect?
9. Define micro and macro states.
10. State Wien's displacement law.

**PART B**

**Answer any FOUR questions**

**(4 x 7.5 = 30)**

11. Explain viscosity of gases on the basis of transport phenomenon.
12. Describe Andrews experiment on carbon dioxide with a suitable diagram.
13. State and explain Clausius theorem and hence deduce an expression for Clausius inequality.
14. Obtain expressions for change of entropy in reversible and irreversible processes.
15. Obtain the relation connecting entropy and probability. State the postulates of statistical mechanics.

**PART C**

**Answer any FOUR questions**

**(4 x 12.5 = 50)**

16. Obtain expressions for Coefficient of thermal conductivity and coefficient of diffusion on the basis of transport phenomenon.

17. Describe Clement and Desormes experiment to determine the ratio of specific heat capacities of a gas. What are the drawbacks of the experiment?
18. Obtain expressions for the entropy of a perfect gas in terms of
  - (i) Volume and pressure
  - (ii) Pressure and temperature.
19. Derive Maxwell's thermodynamic relations.
20. Derive Planck's law of radiation. Hence deduce Wien's law and Rayleigh –Jeans law.

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