SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc. - END SEMESTER EXAMINATIONS NOVEMBER - 2022
SEMESTER - I
22PCHCT1003 - Chemical Kinetics and Thermodynamics

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Describe collision theory of reaction rates. What are the advantages of activated complex theory over collision theory?
2. Explain the graphical method to determine the fugacity of real gases.
3. How will you verify Onsager's reciprocal relationship?
4. Four distinguishable molecules are distributed in energy levels E_1 and E_2 with degeneracy of 2 and 3 respectively. Calculate number of micro states, with 3 molecules in energy level E_1 and one molecule in energy level E_2.
5. Explain Lindemann mechanism for uni-molecular reactions.
6. What are partial molar quantities? Deduce the Gibbs - Duhem equation and mention its applications.
7. State Dulong Petit law and explain the Einstein model for the heat capacity of solids
8. Compare and distinguish between Maxwell- Boltzmann, Fermi-Dirac and Bose-Einstein Statistics.

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. (i) Describe the concept of the kinetics of reactions in solutions.
   (ii) Illustrate the following factors
   a) Dielectric constant b) primary salt effect.
10. What are characteristics of Enzyme catalysed reaction? Discuss in detail Michaelis and Menten treatment of Enzyme-catalysed reaction.

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11. Justify your answer, how mole fraction relates with partial pressure of a component in a liquid mixture?

12. Explain how the entropy production associates with heat flow in irreversible thermodynamic processes.

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. How will you relate thermodynamic quantities with partition functions and derive thermodynamic quantities in terms of partition functions.

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