Roll.No. | 25PCHCT1003

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.Chemistry - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - I

25PCHCT1003 - Chemical Kinetics and Thermodynamics

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

Section B

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

1. Explain the concept of partial molar properties and their significance in thermodynamics.
2. Describe the determination of fugacity and its variation with pressure.
3. Explain Onsager's reciprocal relations in irreversible thermodynamics.
4. Discuss the salient features of Einstein and Debye theories of heat capacity of solids.
5. Differentiate between Maxwell–Boltzmann, Fermi–Dirac, and Bose–Einstein statistics.
6. Explain the significance of partition functions in determining thermodynamic quantities.
7. Describe the various relaxation methods to study fast reaction.
8. Compare Lindemann and Hinshelwood theories of unimolecular reactions.

Section C

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

9. Discuss in detail the variation of chemical potential with temperature and pressure for an ideal gas mixture. Explain its applications.
10. Analyze the concept of entropy production in irreversible processes and explain Onsager's phenomenological equations.
11. Evaluate the role of partition functions in calculating internal energy, entropy, and work function for monatomic gases.
12. Discuss the kinetics of complex reactions with suitable examples of consecutive and parallel reactions.

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

13. Assess the mechanism of chain reactions using the Rice–Herzfeld mechanism and explain the decomposition of acetaldehyde.

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