A–0406

Total Pages : 3 **Roll No. .....**

MSCCH-503

M.SC. (CHEMISTRY) (MSCCH)

(Physical Chemistry-I)

Examination, June 2025

Time : 2:00 Hrs. Max. Marks : 70

Note* :–** This paper is of Seventy (70) marks divided into Two (02) Sections 'A' and 'B'. Attempt the questions contained in these sections according to the detailed instructions given therein. ***Candidates should limit their answers to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

Section–A

Long Answer Type Questions 2×19=38

***Note* :–** Section 'A' contains Five (05) Long-answer type questions of Nineteen (19) marks each. Learners are required to answer any *two* (02) questions only.

1. Discuss thermodynamic formulation of activated complex theory. Compare the activated complex theory with kinetics theory of collisions.

2. Obtain an expression for translational partition function and give the expression for internal energy E and entropy S in terms of partition function.

3. Define the term activity. Explain the determination of activity coefficient by EMF measurements.

4. (a) Discuss the primary salt effect on ionic reactions in solution.

   (b) Discuss and derive Gibbs adsorption isotherm.

5. Write short notes on the following :

   (a) Decomposition potential

   (b) Role and importance of statistical mechanics in chemistry.

Section–B

Short Answer Type Questions 4×8=32

***Note* :–** Section 'B' contains Eight (08) Short-answer type questions of Eight (08) marks each. Learners are required to answer any *four* (04) questions only.

1. Discuss Lindmann theory of unimolecular reactions.

2. Discuss the kinetics of pyrolysis of acetaldehyde.

3. Write BET adsorption isotherm. What limiting condition it approximate to Langmuir adsorption isotherm.

4. Explain the term partial molal volume and one method to determine it.

5. Calculate the translational partial function for one mole of oxygen at 1 atmospheric pressure and 25°C temperature, assuming the gas behaves to be as ideally.

6. Write Debye Huckle Onsager equation of conductivity and explain its relation to ion solvent interaction.

7. What is an overvoltage ? Compare different types of overvoltage.

8. Discuss kinetics of reaction between hydrogen and bromine photochemically.

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