A–0982

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

MSCCH-503

M.Sc. Chemistry (MSCCH)

Physical Chemistry–I

Examination February, 2026

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. Define the classical collision theory of reaction rate. Derivate the Lindmann theory of unimolecular reaction. (19)

2. Discuss collision theory of reaction rates. Describe the weakness and cause of weakness of this theory. (19)

3. (a) Discuss the significance of Einstein heat capacity equation at high and low temperatures. (10)

   (b) Define partial quantities. What is physical significance of chemical potential ? (9)

4. Explain the terms activity coefficient and mean ionic activity coefficient. Discuss in detail the Debye Huckle mean ionic activity coefficient. (19)

5. (a) Discuss about various factors affecting reaction rates in solution. (10)

   (b) Write a note of flash photolysis for studying kinetics of fast reactions. (9)

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 the following :

   (a) Residual Entropy

   (b) Microstates and Macrostates (4+4)

2. Calculation of equilibrium constants of gaseous solutions in terms of partition function. (8)

3. Discuss kinetics of photochemical reaction between hydrogen and bromine. (8)

4. Explain Bose-Einstein Statistics. (8)

5. Define the Joule Thomson effect. (8)

6. What are the terms fugacity and activity ? How are they related to chemical potential ? (8)

7. Explain the term overvoltage. (8)

8. Obtain the expression for Stirling approximation. (8)

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