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MSCCH-503

Physical Chemistry-I

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2023 (June)

Time : 2 Hours] **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 answer to the questions on the given answer sheet. No additional (B) answer sheet will be issued.

SECTION–A

(Long Answer Type Questions)

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.

(2×19=38)

1. Deduce and expression for ionic atmosphere.

2. (a) Discuss kinetics of thermal chain reaction between H_2 and Br_{2-}.

(b) Describe briefly flow method for the study of fast reactions.

3. (a) Derive an expression for the translational partition function.

(b) Calculate the vibration partition function for H_2 at 300 K. The vibrational frequency for H_2 is 4654 cm^{-1}.

4. Discuss the following :

(a) Residual Entropy.

(b) Third law of thermodynamics.

(c) Importance of Statistical Mechanics in Chemistry.

5. (a) Discuss the physical significance of partial molal Volume and one method of its determination.

(b) Kinetics of Enzyme Reactions.

SECTION–B

(Short Answer Type Questions)

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. (4×8=32)

1. Define the term activity coefficient. How do you determine the activity coefficient using EMF method ?

2. What is reversible process? Show that entropy change for any reversible process is always equal to zero.

3. Derive Gibbs adsorption isotherm.

4. What is over voltage? Discuss various types of over voltage.

5. Define fugacity. How is fugacity determined by graphical methods?

6. Discuss the Bose Einstein Statistics.

7. Discuss the following :

(a) Debye-Huckel Theory for electolytic solution.

(b) Primary salt effect.

8. Discuss the effect of dielectric constant on reaction rates.