C112

Total Pages : 3 Roll No. ....

MSCCH-503

Physical Chemistry-I

M.Sc. Chemistry (MSCCH-21)

1st Year Examination, 2022 (June)

Time : 2 Hours] **Max. Marks : 80**

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

SECTION–A

(Long Answer Type Questions)

Note : Section 'A' contains Five (05) long answer type questions of Twenty (20) marks each. Learners are required to answer any Two (02) questions only.

(2×20=40)

1. Explain the following :

    (a) Collision theory of reaction rate and its limitations.

    (b) Decomposition potential and its applications.

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2. Define chemical potential. How does chemical potential vary with temperature and pressure. Derive Gibbs-Duhem equation.

3. Discuss Maxwell- Boltzmann, Bose-Einstein and Fermi-Dirac statistics.

4. Explain the following :

    (a)   Primary and secondary salt effect

    (b)   Ionic atmosphere and its thickness

5. What are strong electrolytes. Explain Debye-Huckel theory of strong electrolytes along with its derivation.

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SECTION–B
(Short Answer Type Questions)

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Note : Section 'B' contains Eight (08) short answer type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only.   (4×10=40)

1. Define adsorption isotherm and discuss Gibbs adsorption isotherm.

2. Explain the transition state theory of reaction rate.

3. Write short notes on the following :

    (a) Activity coefficient.

    (b) Fundamentals of statistical mechanics.

4. Define residual entropy. Calculate the entropy change when two moles of an ideal gas expands reversibly from a volume of 10 dm^3 to a volume of 20 dm^3 at 298K.

5. What do you mean by the term partition function ? Give its physical significance.

6. Derive Michaelis- Menten equation.

7. Define Gibbs free energy. Derive Gibbs-Helmholtz equation for a process at constant pressure.

8. Write short notes on the following:

    (a) Stirling's approximation.

    (b) Flash photolysis.