S-461

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

MSCCH-503

Physical Chemistry-I

M.Sc. Chemistry (MSCCH)

1st Semester Examination, 2022 (Dec.)

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.

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. Derive Debye Huckel Limiting law and mention its limitations.

2. Write BET adsorption isotherm. What are its limitations? How do you determine the surface area of the catalyst by BET equation.

3. (a) Discuss Lindemann theory of unimolecular reactions.

(b) Discuss kinetics of decomposition of acetaldehyde.

4. (a) Derive the expression for partition function for translational motion of a molecule in three directions.

(b) Calculate the translational partition function for one mole of nitrogen at 2 atm and 300 K, assuming the gas to behave ideally.

5. Define partial molar free energy. Discuss its physical significance. Derive an expression for the variation of chemical potential with temperature and pressure.

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. Derive an equation of Fermi-Dirac Statistics.

2. Discuss primary salt effect on ionic reactions in solution.

3. Discuss the Debye's theory of heat capacity of solids.

4. Explain the mean activity coefficient of an electrolyte.

5. What is ionic strength? Calculate the ionic strength of 0.02 mol $A1_2(SO4)_3$.

6. Discuss the effect of pH and temperature on over voltage.

7. State various statements of second law of thermodynamics.

8. Derive the expression for Gibbs Duhem equation.
