Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 11

M.Sc (Chemistry) (Sem.-3)

PHYSICAL CHEMISTRY-III

Subject Code : CHL503-18

M.Code : 76680

Date of Examination : 21-12-22

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C will comprise of two compulsory questions with internal choice in both these questions. Each question carries TEN marks.**

SECTION-A

1. Write briefly :

a) Write the mathematical formula of Nernst equation.

b) Define electrode potential.

c) Mention two examples of reference electrode.

d) State Henry's law.

e) What are azeotropes?

f) Define critical solution temperature.

g) How does the triple point of water differ from its freezing point?

h) Mention any two examples of chemisorption.

i) The molecules of a gas have two energy states zero and E and degeneracy gl and g2 respectively. Write down the expression for the molecular partition function.

j) Write down the relations of internal energy and entropy with the partition functions.

SECTION-B

2. Briefly describe oxidation and reduction potential with suitable examples.

3. Draw and discuss the phase diagram of water-chloroform-acetic acid system.

4. Illustrate the function of salt bridge with suitable example.

5. 20 molecules are divided equally between 4 non-degenerate energy levels. Calculate thermodynamic probability (W) for this distribution.

6. What is an ensemble? Define micro canonical and grand canonical ensemble.

7. Write a short note on Langmuir isotherm.

8. Explain, how a catalyst increases the speed of a reaction?

9. Write a short note on heterogeneous catalysis.

SECTION-C

10. Explain translational partition function and rotational partition function. Deduce a relation between partition function and internal energy.

OR

Briefly discuss Nernst distribution law and its limitations. Write a short note on Fermi-Dirac statistics.

11. Discuss the kinetics of surface catalyzed uni-molecular reactions.

OR

Write short notes on steam distillation and triple point of water.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.