P P SAVANI UNIVERSITY

First Semester of M.Sc. Examination

February-2022

SSCH7070–Advances in Physical Chemistry-I

09.02.2022, Wednesday Time: 12:00 p.m. to 02:30 p.m Maximum Marks: 60

Section-A (Total Marks - 30)

Q.1 Very short questions (Out of six questions-attempt any five- 2 marks each) (10)

1.1 State any two macroscopic quantities.

1.2 Define Chemical Potential.

1.3 On which types of systems is Bose-Einstein statistics applicable?

1.4 State the expression for Heat capacity at constant volume (Cv) in terms of partition function.

1.5 Give the expression for partial molal entropy.

1.6 State the different forms of Gibbs- Duhem equation.

Q.2 Write short notes (Out of three questions-attempt any two- 3marks each) (06)

2.1 Describe Maxwell-Boltzmann Distribution Law.

2.2 Define and explain ensembles.

2.3 Derive the expressions for excess chemical potential, excess Gibbs free energy and excess entropy.

Q.3 Detail questions (Out of three questions-attempt any two- 7 marks each) (14)

3.1 Describe Chemical potential for the mixture of ideal gases.

3.2 Discuss the variation in chemical potential with temperature.

3.3 Write a note on non-ideal solutions.

Section-B (Total Marks - 30)

Q.1 Very short questions (Out of six questions-attempt any five- 2 marks each) (10)

1.1 What are elementary and complex reactions?

1.2 Give Lippmann equation.

1.3 In what conditions does the activity of ions become equal to its concentration?

1.4 Define Relaxation and Electrophoretic effect.

1.5 What is enzyme kinetics? What are the factors affecting the rate of reaction?

1.6 Give the postulates of Debye-Huckel Theory.

Q.2 Write short notes (Out of three questions-attempt any two- 3marks each) (06)

2.1 Describe the reaction kinetics of decomposition of ethane.

2.2 Write a detailed note on activity of electrolytes.

2.3 Write a note on De-bye Huckel Onsagar equation.

Q.3 Detail questions (Out of three questions-attempt any two- 7 marks each) (14)

3.1 Discuss Lindemann's theory and the followed criticism.

3.2 Write a detailed note on ion solvent interactions.

3.3 Discuss kinetics of primary and secondary salt effect.