PP SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination
December-2021
SSCH3130– Physical Chemistry- VII

11.12.2021, Saturday **Time: 12:30 PM to 3:00 PM** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a The heat capacities of the liquid indicate as

- **A** $C_P(c)$
- **B** $C_P(l)$
- **C** $C_P(g)$
- **D** $C_P(v)$

1.1b S.T.P. stands for -

- **A** Static temperature and pressure
- **B** Standard thermodynamic pressure
- **C** Standard temperature and pressure
- **D** Steady temperature and pressure

1.1c Which is measure of the electrical intensity of solution

- **A** Ionic Strength
- **B** Atomic Strength
- **C** Molecule Strength
- **D** Nuclear Strength

1.1d The concept of ionic strength is always applicable to

- **A** strong electrolytes
- **B** Weak electrolytes
- **C** Neutral electrolytes
- **D** Both B and C

1.1e The term "activity" was introduced by whose?

- **A** Arrhenius
- **B** Lewis
- **C** Lawry
- **D** Gibbs

1.1f Activity depends on the

- **A** Only temperature

B Only pressure
C Only mixture of species
D All of the above

1.1g Which is not the colligative properties
A osmotic pressure
B depression
C freezing point
D gas

1.1h In Activity function what is γ
A molality
B activity
C activity coefficient
D factor

1.1i Which is the branch of physics that deals with the relationships between heat and other forms of energy
A Thermoplastic
B Thermodynamics
C Activity
D Pressure

1.1j A real gas is also known as
A ideal gas
B nonideal gas
C fugacity
D Active gas

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks)

1.2a Define: Gibbs Energy
1.2b Define: Thermodynamic
1.2c Complete the equation q= ?+w
1.2d The Nernst heat theorem was formulated by _____ Nernst.
1.2e ΔS is always Negative: True/False

Q.2 Short Notes (Attempt any two) [06]

A Ionic Strength
B Standard State
C Absolute Entropies

Q.3 Explain in detail (Attempt any two) [14]

A Define Fugacity? Explain Fugacity function, Fugacity at low pressure and physical significance of fugacity.
B Explain a) Nernst Heat Theorem b) Lewis –Randall Rule
C The concept of Activity and activity coefficient

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a The classical thermodynamics is based on _____laws.

- **A** Photochemistry laws
- **B** Gaseous laws
- **C** Thermodynamic laws
- **D** Empirical laws

1.1b Unit cells are

- **A** An element of pressure in phase space
- **B** An element of Temperature in phase space
- **C** An element of volume in phase space
- **D** An element of energy in phase space

1.1c The thermodynamic probability denoted by

- **A** T
- **B** D
- **C** W
- **D** R

1.1d Partition function denoted by

- **A** f
- **B** g
- **C** p
- **D** r

1.1e The set of occupation number is known as

- **A** formation
- **B** factor
- **C** Wave function
- **D** distribution

1.1f Ferric-Dirac statistics called

- **A** F-C
- **B** F-D
- **C** D-F
- **D** G-D

1.1g Maxwell-Boltzmann statistics called

- **A** M-B
- **B** M-D
- **C** B-M
- **D** D-M

1.1h Statistics weight factor is denoted by

A A
B I
C H
D G

1.1i Maxwell-Boltzmann statistics cannot be applied to _____

A Photons
B Molecules
C Atoms
D Lattice

1.1j Those functions whose wave functions are symmetric

A maxwellons
B quantum's
C fermions
D bosons

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a What is Entropy?
1.2b Write the formula of Heat capacity C.
1.2c Work function A= ?-TS
1.2d Full form of M-B statistics
1.2e Define: Bosons

Q.2 Short Notes (Attempt any two) **[06]**

A Probability
B Stirling's Theorem
C Types of Statistics

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain the Heat Capacity of solid in the terms of Einstein's and Debye's equation.
B Explain Bose-Einstein and Fermi-Dirac statistics distribution laws for crystal and metal respectively.
C Explain Fundamentals of Statistical Methods