

EnrollmentNo: \_\_\_\_\_ Exam SeatNo: \_\_\_\_\_

# C.U.SHAH UNIVERSITY

## Summer Examination-2022

**Subject Name: Physical Chemistry-III**

**Subject Code: 4SC05PCH1**

**Branch: B.Sc. (Chemistry)**

**Semester: 5**

**Date: 25/04/2022**

**Time: 11:00 To 02:00**

**Marks: 70**

**Instructions:**

- (1) Use of Programmable calculator and any other electronic instrument is prohibited.
  - (2) Instructions written on main answer book are strictly to be obeyed.
  - (3) Draw neat diagrams and figures (if necessary) at right places.
  - (4) Assume suitable data if needed.
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**Q-1 Attempt the following questions:**

**(14)**

- a) Define the term 'Activity'.
- b) State the 2<sup>nd</sup> law of thermodynamics.
- c) What is the chemical relationship between 'q' and 'w' in cyclic process?
- d) Define: Galvanic cell
- e) Define: Entropy
- f) Give two examples of nonideal solutions.
- g) Define ideal solutions.
- h) Define colloids.
- i) Write one application of colloids
- j) Give the definition of 'Tyndal effect'.
- k) What are lyophobic sol?
- l) Define transport number of ion.
- m) What is molarity?
- n) Name any one electrode used for pH measurement.

**Attempt any four questions from Q-2 to Q-8**

**Q-2 Attempt all questions:**

**(14)**

- a) What is spontaneous process? Explain Carnot's cycle and the efficiency of this cycle in detail. (7)
- b) Explain the Clapeyron-Clausius equation using the principle of Carnot cycle and second law of thermodynamics. (7)



- Q-3 Attempt all questions: (14)**
- a) Explain Raoult's law and Henry's law of solution. Discuss vapour pressure curve for ideal and nonideal system. (7)
  - b) Discuss Phenol-water system in detail. (5)
  - c) Define 'Azeotropic mixture' and provide one example of it. (2)
- Q-4 Attempt all questions: (14)**
- a) Give introduction of phase rule. Discuss: Component, degree of freedom and phase reaction. (7)
  - b) Discuss the following: i) Gold number, ii) Electrophoresis, iii) Protective colloids. (7)
- Q-5 Attempt all questions: (14)**
- a) Discuss the characteristics and kinetic properties of sols. (7)
  - b) Name the methods available for the preparation of sols. Discuss aggregation method in detail. (7)
- Q-6 Attempt all questions: (14)**
- a) Discuss the following terms: i) Concentration cell, ii) Degree of hydrolysis, and iii) L.J.P. (7)
  - b) Define pH. How the pH value can be determine by different electrodes. (7)
- Q-7 Attempt all questions: (14)**
- a) What is fugacity? How fugacity related with Raoult's law and activity. (7)
  - b) Derive Gibbs-Helmholtz equations and provide one application of this equation. (7)
- Q-8 Attempt all questions: (14)**
- a) Explain in detail the concentration cell with and without transference. (7)
  - b) Write note on ionic product of water with suitable example. (7)

