

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE, Course Code: **CHEM-2301**, Course Title: **Chemistry**

Time: 2 hours 30 minutes

Full Marks: 50

Answer all the questions. The figures in the right-hand margin indicate full marks.

Course Outcomes (COs) of the Questions	
CO1	Develop chemical engineering knowledge and understanding of the chemical behavior, and physical properties of the common substances.
CO2	Demonstrate basic proficiency to solve chemical problems and discussing the interactions between matter and energy at the atomic and molecular levels.

Part A

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|-----------|--|------------|------|----------|
| 1) a) | Define the following terms:
i) Transport Number, ii) Molar Conductance, and iii) Ionic Mobility | CO1 | R/Un | 5 |
| | b) If 1-ampere current passing for 1 second, how many amounts of a substance are deposited in the Electrolytic dissociation process? | CO2 | An | 5 |
| 2) a) | What is a dilute solution? Explain Raoult's law of lowering vapor pressure. | CO1 | R/Un | 5 |
| | b) What happened when a solute is mixed or shaken up with two liquids which are immiscible with each other? | CO2 | An | 5 |
| OR | | | | |
| 2) a) | Exhibit the electrolysis process in a cell with an example. | CO2 | An | 4 |
| | b) When are the laws on colligative properties valid? | CO1 | Un | 2 |
| | c) State and explain Henry's law with limitations and applications. | CO2 | Un | 4 |

Part B

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|-------|---|------------|------|----------|
| 3) a) | Define Chemical kinetics. | CO1 | R | 2 |
| | b) Define zero-order reaction and Pseudo-unimolecular reaction with examples. | CO1 | Un | 4 |
| | c) Derive the integrated rate equation for a first-order reaction. Mention some properties of a first-order reaction. | CO2 | Un | 4 |
| 4) a) | What do you mean by 'Reaction rate', 'Rate law', and Order of reaction'? | CO1 | R/Un | 5 |
| | b) State and explain Nernst distribution law with limitations and applications. | CO2 | Un | 5 |
| 5) a) | Write the lyophilic, lyophobic and emulsion solution. | CO1 | R/Un | 5 |
| | b) Prove that $K = \frac{1}{t} \frac{x}{a(a-x)}$ Where symbols have usual meanings. | CO2 | Ev | 5 |

OR

- | | | | | |
|-------|---|------------|------|----------|
| 5) a) | What is physical and chemical adsorption? Give example. | CO1 | R/Un | 5 |
| | b) What is the equilibrium constant? Derive the equilibrium constant of the following reaction and find the relation between Kp and Kc: | CO2 | Ev | 5 |

