SEMESTER EXAMINATION-2021
CLASS – B.SC III SEM
SUBJECT: CHEMISTRY
PAPER CODE: BCH-C301
PAPER TITLE: Solutions, Phase Equilibria, Conductance, Electrochemistry &
Functional Group Organic Chemistry-II

Time: 3 hour   **Max. Marks: 70**
                                                                                                     Min. Pass: 40%

Note: Question Paper is divided into two sections: **A and B.** Attempt both the sections as per given instructions.

SECTION-A (SHORT ANSWER TYPE QUESTIONS)

Instructions: Answer any five questions in about 150 words each. Each   (5 X 6 = 30
question carries six marks.   Marks)

Question-1: Define the following terms:
        (i) Mole fraction
        (ii) Isotonic solutions
        (iii) van't Hoff factor

Question-2: How we can calculate the Hydrolysis constant, degree of hydrolysis and pH of salt
        Solution

Question-3: State Raoult's law. A 1.00 molal aqueous solution of trichloroacetic acid
        (CCl_3COOH) is heated to its boiling point. The solution has the boiling point of
        100.18°C. Determine the van't Hoff factor for trichloroacetic acid. (K_b for water =
        0.512 K kg mol^{-1}).

Question-4: Non-ideal solutions exhibit either positive or negative deviations from Raoult's
        law. What are these deviations and why are they caused? Explain with diagram &
        one example for each type

Question-5: Draw and discuss the phase diagram of sulphur which exhibit the phenomenon of
        enantiotropy.

Question-6: Differentiate between Hofmann elimination and Seytzeff elimination using suitable
        Example

Question-7: How one can synthesize
        (i) Benzene diazonium salts from aromatic amines
        (ii) Amino acid from Phthalimide
        (iii) Phenol from Benzene diazonium salts

Question-8: Explain Schotten–Baumann Reaction with one example

Question-9: Define
  (i) Electrophoresis.
  (ii) Carbylamine test
  (iii) Ninhydrin test

Question-10: Define Mutaroation. Explain the configuration of Glucose.

SECTION-B (LONG ANSWER TYPE QUESTIONS)

Instructions: Answer any FOUR questions in detail. Each question carries 10 marks. (4 X 10 = 40 Marks)

Question-11: What is steam distillation? Write the expression for determining the molar mass of a liquid using steam distillation.

Question-12: Define Solubility and solubility Product. Explain, how one can calculate solubility and solubility products of a sparingly soluble salt.

Question-13: Draw a well labelled phase diagram for two components system. Explain in detail the different regions in it.

Question-14: Derive the Clausius–Clapeyron equation and its importance in phase equilibria

Question-15: What is Electrophilic substitution? Give the Mechanism for the Bromination of Aniline

Question-16: (i) What do you understand by the Acidic and Alkaline Hydrolysis of Esters?
  (ii) Discuss Perkin condensation in detail using suitable example.

Question-17: Define Proteins. Explain primary, secondary, tertiary and quaternary structure of proteins using suitable diagram

Question-18: (i) Define Mutaroation. Explain the configuration of Glucose
  (ii) Draw the structure of Sucrose and Lactose.

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