(3 Hours) **Marks 80**

N.B: (1) Question **No.1** is **compulsory**.
(2) Attempt any **three** questions from remaining **five** questions.

Q.1.Answer **any fou**r of the following 20

A) Write the mechanism and applications of Benzil – Benzilic acid rearrangement.

B) Explain with example autocatalysis and induced catalysis.

C) Describe in detail batch process used in liquid – liquid extraction.
Name the other two methods used for liquid – liquid extraction.

D) Explain aromaticity concept with example of furan.

E) Explain following terms with reference to NMR spectroscopy:-
(i) Chemical shift (ii) Shielding and deshielding of proton.

(F) Discuss Debye – Huckel theory of strong electrolytes.

Q.2.A) What is electro – osmosis? How is it demonstrated? . 05

B) Explain the technique of determination of solubility of sparingly soluble AgCl. 05

C) Explain with respect to NMR spectroscopy shielding and deshielding in following compounds:
(i) Propane (ii) Acetone 05

D) Explain briefly the principles of solvent extraction. 05

Q.3.A) What is colloid? Explain the phenomenon of electrophoresis. 05

B) Explain the concept of Keto-enol tautomerism in acetoacetic ester. How cyclopentane carboxylic acid is prepared from malonic ester. 05

C) Describe the technique of thin layer chromatography. 05

D) Discuss the applications of ion exchange technique. 05

Q.4.A) Predict the product Ⓐ and Ⓑ in the following reaction and write the name and mechanism of the reaction. 05

B) Describe application of conductometry in the titration of weak acid and strong base. 05

C) Describe the mechanism of enzyme catalyzed reaction. 05

D) Discuss aromatic character of pyrrole. 05

Q.5.A) Define catalysis. Explain the concept of catalysis with Intermediate compound formation theory. 05

B) How is malonic ester prepared? Write preparation of 2-butenoic acid from malonic ester. 05

C) Define & explain the terms specific Conductance, equivalent conductance and molar conductance. 05

D) Explain the spin-spin interaction of NMR for the following compounds: 05
(i) $CH_3COOC_2H_5$ (ii) $CH_3 - CH_2 - CHO$

Q.6.A) The distribution ratio D is 10 in favour of the organic solvent for a particular system. Calculate the percentage extraction for a volume ratio V_0/ V_w of (i) 1 and (ii) 10 for a single extraction. 05

B) Write a note on Fischer-Indole synthesis. 05

C) What is the basic requirement for IR radiation absorption? Write any two applications of IR spectroscopy. 05

D) Write a short note on Quinhydrone electrode. 05

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