[Time: Three Hours]   **[Marks:80]**

Please check whether you have got the right question paper.

N.B: 1. Question No.1 is compulsory.
         2. Attempt any three questions from Q. No.2 to Q. No.6.

Q.1   Answer any four of the following.   **20**
   a) Explain how HPLC and paper chromatography are similar. Give any two applications of HPLC.
   b) Explain with example catalytic poisoning and catalytic promoters.
   c) Explain Ketoenol tautomerism with example.
   d) Explain the separation of Lanthanides by ion exchange method.
   e) State Huckels rule and explain the Aromaticity of pyrrole.
   f) Explain the Debye Huckel theory of strong electrolytes.
   g) Define and explain the electrophoresis as electrokinetic phenomenon.

Q.2 a) Explain Donan membrane equilibrium with its significance.   **05**
   b) Explain the effect of dilution and temperature on conductance.   **05**
   c) What is meant by Flipping of protons and precessional frequency of Nucleus in NMR spectroscopy? **05**
      Explain in detail.
   d) Explain the role of complexing agents in solvent extraction.   **05**

Q.3 a) Explain the concept of electrical double layer using Helmholtz and stern model.   **05**
   b) Write the syathesis of following compounds from acetoacetic ester   **05**
      i. Adipic acid   ii) cyclobutane carboxylic acid
   c) The distribution ratio of I_2 between CCl_4 and H_2O is 80 in favour of CCl_4 50 ml of an aqueous   **05**
      solution (1.45×10^{-3} m) is equilibrated with 30 ml portion of CCl_4. Calculate the amount of I_2 left
      unextracted for single and double extraction.
   d) Describe the working of flame photometer.   **05**

Q.4 a) Define and explain the mechanism of Benzil Benzilic acid rearrangement.   **05**
   b) What are the advantages and limitations of conductometric titrations?   **05**
   c) Describe the mechanism of Acid-base catalyzed reaction.   **05**
   d) Define aromaticity and explain the structure and bonding of Napthalene.   **05**

Q.5 a) Define activation energy and explain the adsorption theory of catalysis.   **05**
   b) How would you prepare the following compounds from diethyl malonate.   **05**
      i) Succinic acid   ii) Barbituric acid
   c) What are the advantages of potentometric titrations? Give its limitations.   **05**
   d) Predict for sample $CH_3OC_2H_5$ and CH_3CH_2OH **05**
      i) The no. of peaks
      ii) The splitting

Q.6 a) 100 cm^3 of an aqueous solution containing 0.200gm of a solute was shaken with 50cm^3 of organic   **05**
      solvent. If the distribution ratio $D_{o/w} = 120$. Calculate the amount of solute unextracted and the % of
      extraction.
   b) Write the mechanism and applications of Reformatsky reaction.   **05**
   c) Compare between UV and IR spectroscopy.   **05**
   d) Write a short note on transport number.   **05**

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