

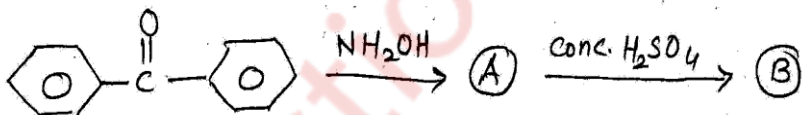
[Time: Three Hours]

[ Marks:80]

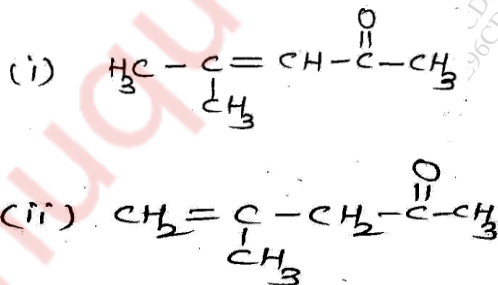
Please check whether you have got the right question paper.

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

- Q.1** Attempt **any four** of the following: **20**
- a.** Calculate transport number of  $H^{\oplus}$  ions and  $Cl^{-}$  ions from the following data obtained by moving boundary method using cadmium chloride as indicator electrolyte:
- concentration of HCl solution = 0.25 N
  - Mass of silver deposited in the coulometer = 0.15g
  - movement of boundary = 8.0cm
  - Cross section of tube =  $0.58\text{cm}^2$
  - Equivalent weight of silver = 108
- b.** A cyclic compound with molecular formula  $C_4H_8$  gives one peak in proton NMR spectrum. Predict the structure of the compound with justification. **05**
- c.** Discuss aromaticity of thiophene **05**
- d.** Write mechanism and application of Benzil-Benzilic acid rearrangement
- e.** Write a note on streaming potential. How is it related to zeta potential.
- f.** Discuss in brief any two applications of Ion-exchange method.
- g.** Describe a method to titrate strong acid with strong base without using an indicator. Explain the principle involved in it.
- Q.2 a.** Predict **A** and **B** in following reaction and write the name and mechanism of the reaction. **05**



- b.** What is the principle of UV- visible spectroscopy? Which of the following isomers will absorb at longer wavelengths and why? **05**



- c.** Explain why pyridine is aromatic in nature. **05**
- d.** Explain any two of the following terms with examples. **05**
- Negative catalysis
  - Auto catalysis
  - Induced catalysis

- Q.3**
- A certain extraction system has a distribution ratio of 10. If 300 mg solute is dissolved in 100ml of solvent A, find out total amount of solute extracted by two extractions with 50 ml of solvent B which is immiscible with solvent A. (The solute has molecular weight 71) **05**
  - Write the principle and applications of thin layer chromatography. **05**
  - Derive an expression for the e.m.f. of concentration cell with transference with respect to cations. **05**
  - Write a short note on Donnan membrane equilibrium and its significance. **05**
- Q.4**
- Write preparation of following compounds from acetoacetic ester
    - 3,4 dimethylpentan-2-one
    - Isobutyric acid
  - What is electro-osmosis? How is it demonstrated? **05**
  - Explain following terms with respect to NMR spectroscopy. **05**
    - Chemical shift
    - shielding & deshielding
  - Give an account of Ion-exchange resins **05**
- Q.5**
- Write the characteristics and mechanism of enzyme catalysis. **05**
  - Explain Huckel's rule of aromaticity with examples. **05**
  - Explain how e.m.f. measurements can be used to determine the solubility of a sparingly soluble salt. **05**
  - Write principle and two applications of HPLC **05**
- Q.6**
- Give an account of the Debye-Huckel theory of strong electrolytes. Explain what is meant by asymmetry effect? **05**
  - Write a note on Paal-knorr synthesis of pyrrole. **05**
  - Discuss the principle underlying potentiometric titration. How can a potentiometric titration be carried out of a solution of  $\text{AgNO}_3$  against a standard solution of  $\text{KCl}$ ? **05**
  - Describe in detail batch process used in liquid-liquid extraction. Name the other two methods used for liquid-liquid extraction. **05**

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