

B.A/B.Sc - 6th Semester

(2721)

Paper: Chemistry (Organic Chemistry-IV)

Time Allowed: 2 hrs.

Max. Marks: 35

Note: There are EIGHT questions of equal marks. Candidates are required to attempt any FOUR questions.

1. a) What is the principle difference between Infrared and ultraviolet Spectroscopy? (1)
- b) Why is no PMR Spectrum obtained for ccl_4 ? (1)
- c) Explain how an auxochrome exerts a bathochromic shift on a $C = C$ chromophore. (2 $\frac{3}{4}$)
- d) Catalytic hydrogenation of triene (A) with One equivalent of H_2 could give three isomers with molecular formula, $C_{10}H_{14}$ write their structures. Explain how λ_{max} values could distinguish among these isomers? (4)



2. (a) How can PMR spectroscopy be used in differentiating ethane, ethylene and acetylene? (2 $\frac{1}{2}$)
- (b) PMR Spectrum of an aromatic hydrocarbon (molecular mass 120) exhibits three signals at $\delta 1.2(d, 6H)$, $\delta 2.8(m, 1H)$ and $\delta 7.2(s, 5H)$. Work out a structure for the compound. (3 $\frac{3}{4}$)
- (c) How can you distinguish cis-and trans-stilbenes by UV? (2 $\frac{1}{2}$)
3. (a) Outline the synthesis of Bakelite. Give its two important uses. (3)

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(2)

- (b) What is meant by free radical vinyl polymerisation? Illustrate its mechanism by taking a suitable example. (3)
- (c) What are enamines? How can they be formed? What is their synthetic utility? (2 $\frac{3}{4}$)
4. (a) Give the reaction and mechanism of synthesis of ethylacetoacetate (2 $\frac{1}{2}$)
- (b) An organic compound having the molecular formula $C_5H_{10}O$ gave the following spectroscopic data:-
 $uv = \lambda_{max} 278nm$
 $IR = 2960 - 2850(m); 1718(s); 1460(m)cm^{-1}$
 $PMR = \delta 1.1 \text{ doublet}(6H); \delta 2.1 \text{ singlet}(3H) \text{ and } \delta 2.45 \text{ Septet}(1H)$
 Deduce the structure of the organic compound showing your reasoning. (3 $\frac{3}{4}$)
- (c) What is SBR? How is it synthesised? (2 $\frac{1}{2}$)
5. (a) Illustrate with example the detailed steps of Kiliani-Fischer synthesis. (4)
- (b) Draw the structures of starch and cellulose indicating their point of difference. (2 $\frac{1}{2}$)
- (c) How will you convert Glucose into Fructose? (2 $\frac{1}{4}$)
6. (a) Unlike glucose, neither α - nor β - methyl glucoside reduces Tollen's reagent or Fehling's solution? (1 $\frac{1}{4}$)
- (b) Give a detailed description of mutarotation alongwith its mechanism. Why does Glucose not react with sodium bisulphite and Schiff's reagent even though it contains an aldehyde group. (5)
- (c) What are Erythro and Threo Diastereomers. (2 $\frac{1}{2}$)
7. (a) What is isoelectric point? Why is the solubility of amino acid minimum at its isoelectric point? (2 $\frac{1}{2}$)

(3)

- (b) Give two methods of preparation of alanine. $(2\frac{1}{4})$
- (c) What are peptides? Using Benzyloxy-carbonyl chloride, sketch the synthesis of a dipeptide. (4)
8. (a) Discuss the structure of DNA and its functions. $(3\frac{1}{4})$
- (b) What are proteins. Give an account of the classification of proteins. (4)
- (c) What do the following abbreviations stand for in peptide chemistry (i) DCC (ii) BOC (iii) Z ? $(1\frac{1}{2})$

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