Exam. Code : 103206
Subject Code : 1331

B.A/B.Sc. 6th Semester

CHEMISTRY (Organic Chemistry–A)

Time Allowed—3 Hours] [Maximum Marks—35

PART—A (Compulsory)

Note :— Attempt **ALL** questions. Each question carries **1** mark.

1. Why do thioethers act as stronger nucleophiles as compared with ethers ?
2. Which organosulphur compound is added to LPG for detection of its leakage ?
3. What do you mean by vulcanization of rubber ?
4. What is TMS ? What are the reasons for choosing it as a reference compound during ^{1}H-NMR spectroscopy ?
5. What is the fingerprint region in IR spectroscopy ? What are its uses ?
6. Why is the solubility of amino acid minimum at its isoelectric point ?
7. How will you study the progress of oxidation of 2-propanol to propanone using IR spectroscopy ?
8. Draw the Haworth formulae of :
   (i) σ – D – (+) – glucose
   (ii) β – D – (+) – glucose

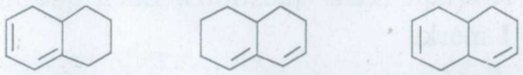
PART—B

Note :— Attempt **TWO** questions from each of the following sections. Each question carries **4½** marks.

SECTION—I

9. (a) What is the principle difference between Infrared and ultraviolet spectroscopy ? 1.5

(b) How would you distinguish between the following isomeric dienes with the help of UV spectroscopy ?



A B C

2

(c) Why was λ max for $n \rightarrow \alpha^*$ transition shift to longer wavelength in moving from CH_3Cl to CH_3Br to CH_3I ? 1

10. (a) What is Chemical Shift ? Discuss the factors that influence the chemical shift. 2.5

(b) A compound having the molecular formula $C_{10}H_{14}$ gave the following PMR data :

(a) Singlet, τ 9.12 (δ0.88), 9H

(b) Singlet, τ 2.72 (δ7.28), 5H

Assign a structure to the compound on the basis of the above data. 2

11. (a) Sketch the PMR spectrum of ethylbromide. 1.5

(b) Of ethylbenzene and styrene which one will absorb at longer wavelength in UV spectroscopy and why ? 1

(c) Explain shielding and deshielding of protons with suitable examples. 2

SECTION—II

12. (a) Give the mechanism of sulphonation of benzene. 1.5

(b) How will you prepare the following :

(i) Nylon–66

(ii) Neoprene

(iii) Teflon 3

13. (a) Discuss Claisen condensation reaction and its mechanism. 1.5

(b) Give chemical equations for the preparation of the following from benzene sulphonic acid :

(i) Benzene

(ii) Phenol

(iii) Aniline 3

14. An organic compound with the molecular formula C_8H_8O gave the following spectroscopic data :

UV : 319 (E50) nm

IR : 2960–2850 (w), 1683(s), 1600(m), 1580(m) 1460 cm^{-1}.

NMR : δ2.45, singlet (3H), δ7.5–7.8, multiplet (3H), δ 8.05–8.20, multiplet (2H)

Deduce the structure of the organic compound. 4.5

SECTION—III

15. Discuss the following :

(a) Zwitter ion structure of amino acids. 1½

(b) Gabriel pH thalimide synthesis of α-amino acids. 1½

(c) What are peptides and peptide linkages ? 1½

16. Explain the following terms :

(i) Isoelectric point of an amino acid 1½

(ii) Mutarotation and its mechanism 1½

(iii) Anomers and epimers. 1½

17. (a) How is glucose converted into fructose ? 1.5

(b) What are carbohydrates ? How are they classified ? 2

(c) What are essential and non-essential amino acids ? 1