Exam. Code: 103206
Subject Code: 1393

B.A./B.Sc. 6th Semester

CHEMISTRY

(Organic Chemistry—IV)

Time Allowed—Three Hours] [Maximum Marks—35

PART—A (Compulsory)

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

1. A compound with molecular formula $C_3H_6O_2$ shows a strong absorption band at 1718 cm^{-1} and a broad absorption band at 3000-2500 cm^{-1}. Deduce the structure giving reasons.
2. What is chemical shift ?
3. What are homopolymers and copolymers ? Give one example each.
4. Acetylacetone has pK_a 9.0 while that of acetone is 20. Explain.
5. Why glucose and fructose give same osazone ? Explain.
6. What are essential amino acids ? Name any two.
7. Define Lambert-Beer law.
8. What are mercaptans ? Why are they named so ?

1×8=8

PART—B

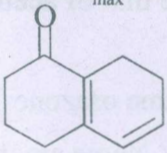
Note :— Attempt **TWO** questions from each of the following sections. Each question carries 4½ marks.

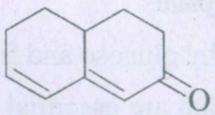
SECTION—I

9. Describe the following :—
   (a) Anisotropic effect
   (b) Spin-spin splitting
   (c) Effect of solvent in UV spectroscopy. 1.5 each

10. (a) Distinguish between the following pairs of compounds by the method indicated :—
   (i) $CH_3COOC_2H_5$ and CH_3COOCH_3 (NMR spectroscopy)
   (ii) $CH_3COC_6H_5$ and $C_6H_5OCH_3$ (IR spectroscopy)
   (iii) cis and trans stilbene (UV spectroscopy). 3
   (b) Sketch the NMR spectrum of ethyl alcohol. 1.5

11. Calculate λ_{max} for the following compounds :

(i) 

(ii) 

(iii) 

1.5 each

SECTION—II

12. (a) What are enamines ? How are they prepared ? 1.5

(b) How will you prepare :

(i) 4-oxopentanoic acid from ethyl acetoacetate

(ii) Pentanoic acid from diethylmalonate

(iii) 2-Butanone from ethyl acetoacetate ? 3

13. (a) Give mechanism of Zeigler Natta polymerization and outline its advantages. 2.5

(b) How will you convert :—

(i) Bromobenzene to methyl phenyl thioether.

(ii) Allyl alcohol to allyl disulphide. 2

14. An organic compound having molecular formula C_7H_8O gave the following spectroscopic data :

UV : λ_{max} 222, 272 nm.

IR : 3065-3005, 2950-2850, 604, 1498, 1250, 1040, 750, 688 cm^{-1}.

NMR : δ 3.70(s, 3H), 6.85 (m, 3H), 7.15 (m, 2H).

Assign suitable structure to the compound giving explanation. 4.5

SECTION—III

15. Write brief notes on :—

(a) Killani Fischer synthesis

(b) Ruff's degardation

(c) Anomers and epimers. 1.5 each

16. What are proteins ? Discuss their primary, secondary, tertiary and quaternary structures. 4.5

17. Explain :—

    (a) Sanger's method

    (b) Zwitterion structure of alpha amino acids

    (c) Mutarotation and its mechanism. 1.5 each