(i) **Printed Pages: 4** **Roll No. .....**

(ii) **Questions : 9** **Sub. Code : 0 4 5 2**

Exam. Code : 0 0 0 5

B.A./B.Sc. (General) 5th Semester

(2122)

CHEMISTRY

(Same for B.Sc. Microbiology & Food Technology)

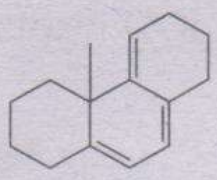
Paper–XVIII (Organic Chemistry–A)

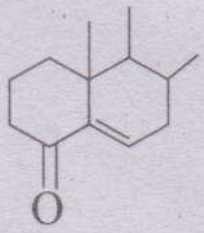
Time Allowed : Three Hours] **[Maximum Marks : 22**

Note :—Attempt **five** questions in all, including Question No. **9** (Section E) which is compulsory and selecting **one** question each from Section A to Section D.

SECTION—A

1. (a) Calculate the λ_{max} the UV spectrum of the following compounds :

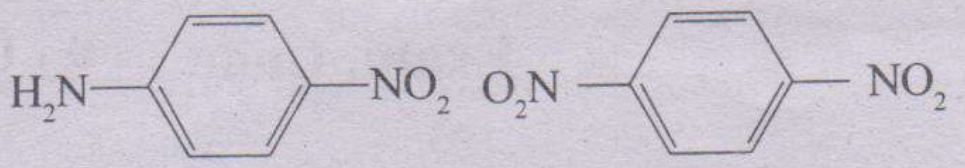
(i) 

(ii) 

3

(b) Both CH_4 and C_2H_6 undergoes only $\sigma \rightarrow \sigma^*$ transition, yet C_2H_6 absorbs at longer wavelength. Why ? 1

2. (a) Amongst following two molecules, which one is expected to absorb at longer wavelength and why ?



(i) (ii)

2

(b) Butadiene shows absorption at higher wavelength than ethene. Why ? 2

SECTION—B

3. (a) How can one differentiate o-hydroxy benzoic acid from m-hydroxy benzoic acid by using IR spectroscopy ? 2

(b) Deduce the structure of a compound with molecular formula of $C_4H_8O_2$ displaying following spectral data :

IR : 1750–1735, 2850 cm^{-1}

^1H NMR : δ 1.30 (t, 3H); 2.01 (s, 3H), 4.12 (q, 2H) 2

4. (a) Deduce the structure of a compound with explanation with molecular formula of C_7H_6O displaying following IR spectral data :

(i) 3080 cm^{-1}

(ii) 2680 cm^{-1}, 2780 cm^{-1}

(iii) 1700 cm^{-1}

(iv) 1600 cm^{-1}. 2

(b) Give an order for carbonyl stretching frequencies of acetic acid, acetyl chloride and acetamide. Discuss the order. 2

SECTION—C

5. (a) Why do NMR signals split ? Explain in detail. 2

(b) Propose the structure consistent with the NMR data of the compound C_4H_8O δ9.8 (t, 1H), 2.4 (sextet, 2H), 1.7 (m, 2H), 0.97 (t, 3H). Give reason for each assignment. 2

6. (a) How the splitting pattern of 1-chloropropane differs from 2-chloropropane in ^1H NMR spectra ? 2

(b) Show the splitting pattern of ^1H-NMR signals in the following compounds. Give approximate chemical shift (δ value) :

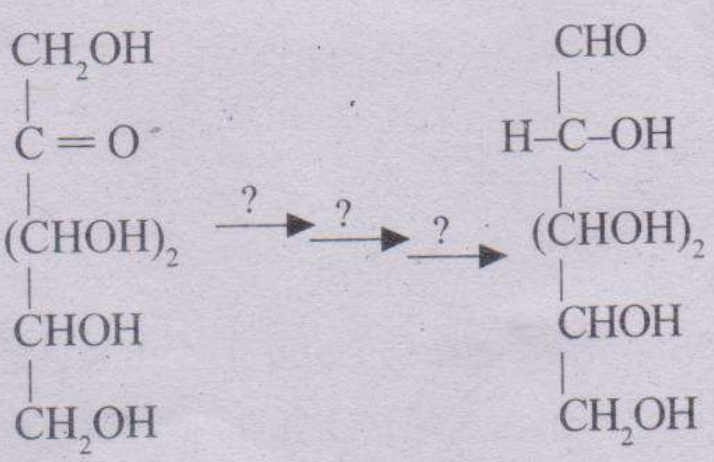
(i) Ethyl Acetate

(ii) Toluene. 2

SECTION—D

7. (a) What is Mutarotation ? Explain its mechanism. 2

(b) Give the mechanism for the following conversion :



2

8. (a) Describe the synthesis of D-Glucose from D-Arabinose by Killiani-Fischer synthesis method. 2

(b) Write short note on structural polysaccharide of plant cell by writing the names, structures and linkages of the monosaccharides involved. 2

SECTION—E

9. (a) Ultraviolet spectrum shows broad absorption bands or sharp peaks and why ?

(b) Why symmetrical stretching vibration in linear triatomic CO_2 molecule is infrared inactive ?

(c) Which internal standard is used in the NMR spectroscopy and why ?

(d) Explain why sucrose, a disaccharide, is a non-reducing sugar; while maltose (also a disaccharide) is a reducing sugar ? 1.5 marks each