

May 2023

B.Sc. VI SEMESTER

Organic Chemistry-V (BCH-602)

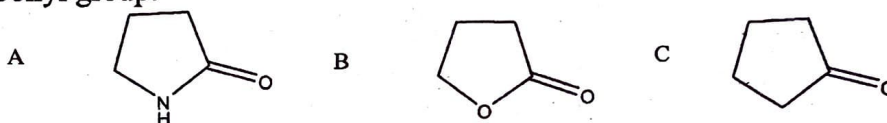
Time: 3 Hours

Max. Marks:75

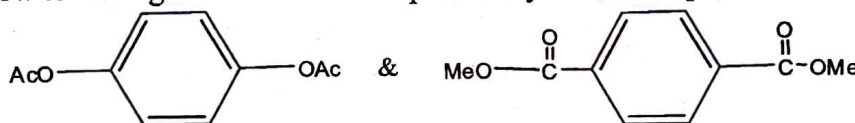
- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
 2. Answer any four questions from Part -B in detail.
 3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

- Q1 (a) Explain magnetically equivalent and non-equivalent protons with example? (1.5)
 (b) What do you understand by the term hypochromic shift? (1.5)
 (c) Why TMS is used as a reference while recording a NMR spectrum? (1.5)
 (d) Arrange the following compound in increasing IR stretching frequency (in cm^{-1}) of the carbonyl group: (1.5)



- (e) How to distinguish these two compounds by $^1\text{H-NMR}$ spectroscopy (1.5)



- (f) Write the Number of $^1\text{H-NMR}$ signals (peaks) in given molecule. (1.5)

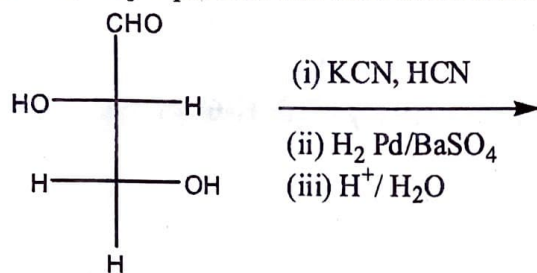


- (g) Write monomer of Buna-S and Buna-N? (1.5)
 (h) Write the structure of two edible dyes? (1.5)
 (i) How to distinguish aldehyde and ketone by IR spectroscopy? (1.5)
 (j) Write the Structural formula of Sucrose and Lactose? (1.5)

PART -B

- Q2 (a) What are thermosetting and thermo softening polymers? Give at least two (10)
 example of each of these polymers.
 (b) Explain in detail the Ruff degradation and how it is different from Killiani (5)
 Fischer synthesis?
 Q3 (a) Acetylenic protons are more shielded than ethylenic proton, although the (5)
 former are attached to a more electronegative sp -carbon. Explain.

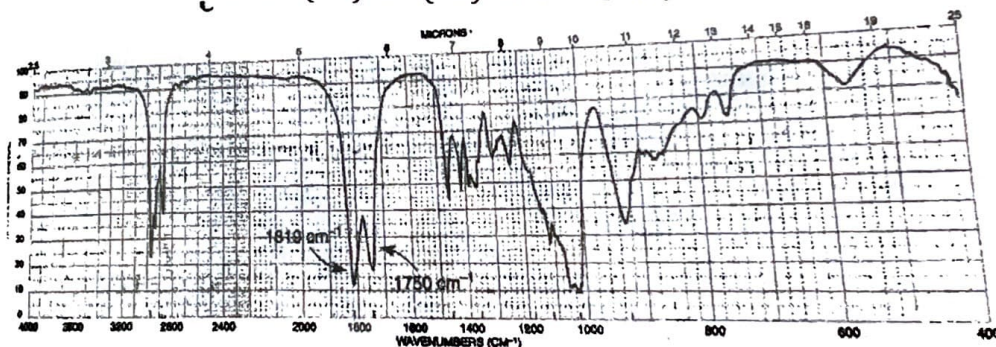
(b) Write the major product and their mechanism in the following reactions sequences (10)



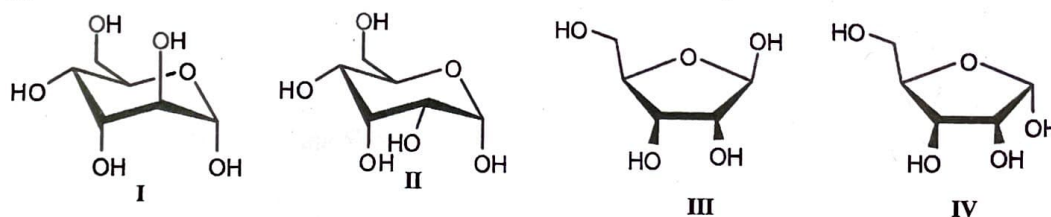
Q4 An Organic Compound having molecular formula $\text{C}_7\text{H}_{12}\text{O}_2\text{Br}$ exhibits the following peaks in ^1H NMR spectrum. δ 7.10(1H, dt, $J=16$ and 7Hz), 5.90 (1H, dt, $J=16\text{Hz}$ and 2Hz), 4.1 (2H, q, $J = 7.2$ Hz) 2.10 (2H, m); 1.25 (3H, t, $J=7.2\text{Hz}$), 0.90 (3H, t, $J=7.2$ Hz) ppm Draw the structure of compounds. (15)

Q5 (a) Choose the structure that best fits the infrared spectrum and provide the explanation? (5)

- A. $\text{H}_3\text{-CH}_2\text{-C(=O)-C(=O)-CH}_2\text{-CH}_3$
- B. $\text{CH}_3\text{-CH}_2\text{-C(=O)-CH}_2\text{-C(=O)-CH}_2\text{-CH}_3$
- C. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-C(=O)-Cl}$
- D. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-C(=O)-O-C(=O)-CH}_2\text{-CH}_2\text{-CH}_3$



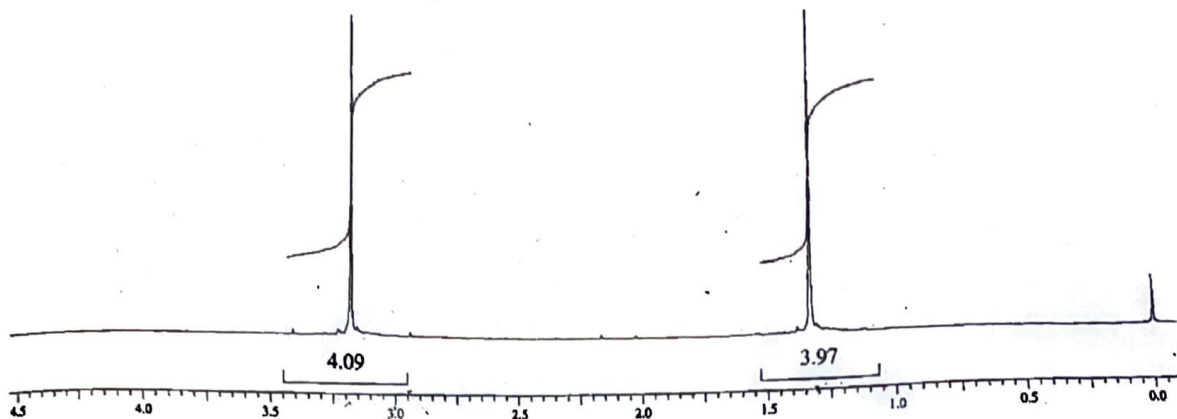
(b) Identify the correct stereochemical relationship among the following monosaccharide I-IV (10)



Q6 (a) Explain the following terms with proper example. (10)

[a] Epimer and Anomer [b] Osazone formation of Glucose and Fructose

(b) Draw the structure of an ether with the formula $\text{C}_5\text{H}_{12}\text{O}_2$ that fits in the below NMR spectrum: (5)



Q7

- (a) Explain Chromophore and Auxochrome with proper example.
- (b) Explain the synthesis and color change of Methyl orange dyes.
- (c) Calculate number of bending mode of vibrations in CO_2 , SO_2 and SnCl_2 ?
- (d) How to synthesize Chloroprene and Neoprene; which is better and why?
- (e) Explain Mutarotation with proper example?

(15)
