

B.Sc. Semester - 6 (CBCS) Examination**April/May-2022 (OLD COURSE)****ORGANIC CHEMISTRY AND SPECTROSCOPY(CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

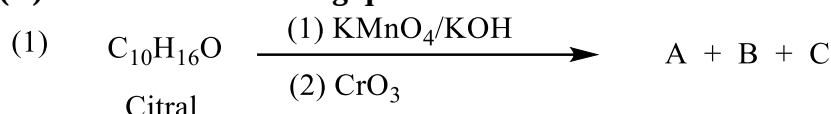
1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (A) Answer the following question (04)

- (1) Indole-3 Carbaldehyde + Hydantoin $\longrightarrow$
Complete the reaction with reference to Hydantoin method and give the name of final product.

Q. 1 (B) Answer any two questions (10)

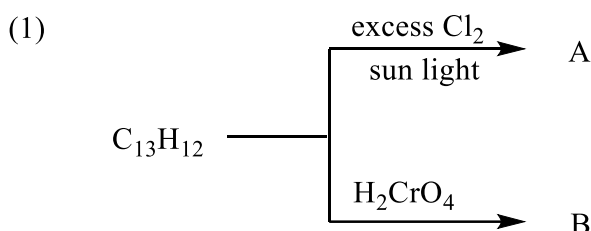
- (1) Give synthesis of Glycyl-alanine by Fischer's method.
- (2) Give the synthesis of Thyroxine.
- (3) What is essential and non-essential α -amino acids. Give two examples of each.

Q. 2 (A) Answer the following question (04)

Write the name and structure of A to C.

Q. 2 (B) Answer any two questions (10)

- (1) Give the synthesis of RDX by Hale and Wolfarm methods.
- (2) Give the synthesis and uses of Baygon and Carbendazim.
- (3) Give the synthesis and uses of Musk-xylene and Musk-ketone.

Q. 3 (A) Answer the following question (04)

Give the name and structure of A and B.

Q. 3 (B) Answer any two questions (10)

- (1) Give the Haworth synthesis for naphthalene and give oxidation reaction with (i) O_3 , (ii) acidic KMnO_4 & (iii) $\text{V}_2\text{O}_5/\text{H}_2\text{SO}_4$.
- (2) Give Fischer-Indole synthesis.
- (3) Give Skraup synthesis.

Q. 4 (A) Answer the following questions (04)

- (1) Give the no. of PMR signals and their multiplicity for following compounds.
(i) 3°-butyl bromide (ii) 2-chloropropene

Q. 4 (B) Answer any two questions (10)

- (1) Deduce the structure from the following data
M.F. :- $\text{C}_{10}\text{H}_{12}\text{O}_2$

Signal	δ_{ppm}	No of squares	Multiplicity
(a)	7.26	16.5	Singlet
(b)	4.30	6.2	Triplet
(c)	2.93	6.7	Triplet
(d)	2.08	10.2	Singlet

- (2) Explain the factors affecting chemical shift in NMR spectra.

- (3) What is equivalent and non-equivalent protons. Explain in brief.

Q. 5 (A) Answer the following question

(04)

(1) Deduce the structure from the following data and give the IUPAC name.

M.F. :- $C_4H_8O_2$

IR: 1740, 1239, 1049 cm^{-1}

NMR:

Signal	δ_{ppm}	No of Protons	Multiplicity
(a)	2.25	3H	Triplet
(b)	4.50	2H	Quartet
(c)	3.02	3H	Singlet

Q. 5 (B) Answer any two questions

(10)

- (1) What do you mean by Parent ion, Base peak, Negative peak and Metastable ion?
- (2) Explain McLafferty rearrangement with a suitable illustration.
- (3) Discuss the conformation of cyclohexane with energy diagram.

Spectroscopic data**IR:**

Alkyne C-H str	3350-3300 cm^{-1}
Aromatic C-H str	3100-3000 cm^{-1}
Alkane C-H str	3000-2900 cm^{-1}
Nitrile C-N str	2300-2200 cm^{-1}
Alkyne $C\equiv C$ str	2190-2100 cm^{-1}
Carbonyl C=O str	1800-1680 cm^{-1}
Alkane C-H bend	1470-1420 cm^{-1}
Ester C-O-C str	1300-1000 cm^{-1}

NMR:

Alkane C-H	0.9 – 1.5 δ_{ppm}
Alkyne C-H	2.5 – 3.2 δ_{ppm}
Alkene C-H	5.5 – 6.5 δ_{ppm}
Aromatic C-H	6.5 – 8.5 δ_{ppm}
Phenolic O-H	4.4 – 8.8 δ_{ppm}
Aldehydic C-H	8.0 – 10.0 δ_{ppm}
Acidic O-H	10.0 – 12.5 δ_{ppm}