647510 **BSc5CheC502x** **Seat No :_____**

B.Sc. Semester - 5 (*CBCS*) Examination
Oct/Nov - 2023 (NEW 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.

Que-1(A) Answer the following question. (04)

- ❖ Give synthesis and uses of Benzoic sulfimide.

Que-1(B) Answer the following questions. (Any two) (10)

1. Give synthesis of Thyronine from Tyrosine.
2. Give synthesis of synthesis of glycylalanylvaline tripeptide using Fischer's method.
3. Give five differences between enantiomers and diastereomers.

Que-2(A) Answer the following question. (04)

- ❖ Discuss Curtius rearrangement with mechanism.

Que-2(B) Answer the following questions. (Any two) (10)

1. Give synthesis of Papaverine from Veratrole.
2. Give difference between σh, σv and σd planes of symmetry.
3. Giving point group construct multiplication table for *trans*-Dichloroethene.

Que-3(A) Answer the following question. (04)

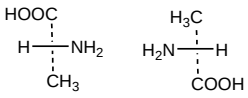
- ❖ Write a note on mass spectra of alkanes.

Que-3(B) Answer the following questions. (Any two) (10)

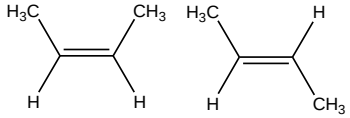
1. Give synthesis:
   (I) Ibuprofen from Isobutylbenzene **(II)** Chrysodine G from Benzene.
2. Give difference between chemical shift and coupling constant j.
3. Explain how NMR is useful in identifying type of H-bonding and keto enol tautomerism. Also write one limitation of NMR.

Que-4(A) Answer the following question. (04)

1. Identify relationship (Homomers, enantiomers, diastereomers) between pair of molecules.

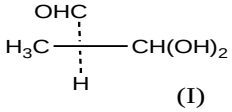


(I)

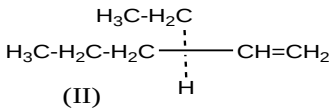


(II)

2. Determine chirality (R/S) for the following molecules.



(I)



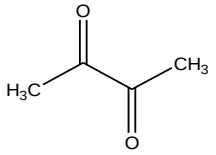
(II)

Que-4(B) Answer the following questions. (Any two) (10)

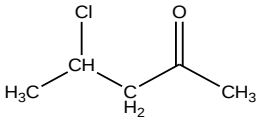
1. Give name and structures of all products formed when Papaverine is treated with **(I)** dilute $KMnO_4$ at different temperature **(II)** hot concentrated $KMnO_4$.
2. Draw chair, boat and twist boat conformations of cyclohexane. Give their point group and the energy difference due to various interactions in each.
3. Explain the following shortly. (1,1 and 3 marks for a, b and c respectively)
   a) Base peak.
   b) Molecular ion.
   c) Anisotropic effect in 18-annulene.

Que-5(A) Answer the following question. (04)

1. Write difference between Geminal and Vicinal protons.
2. How many signals will be obtained for the following molecules.



(I)



(II)

Que-5(B) Answer the following questions. (Any two) (10)

1. Explain Erlenmeyer Azlactone Synthesis method for amino acid synthesis by taking an example of 4-Hydroxybenzaldehyde as one of the starting material.
2. Answer the following.
   a) Give point group for the following molecules.
      1) Carbon dioxide
      2) Allene
      3) Borontrifluoride
   b) Write symmetry elements present in ammonia, give its point group and calculate order of its group.
3. A molecule with formula $C_9H_{11}NO_2$ shows the following NMR signals. Deduce the possible constitution of the organic compound.

Signal	δ ppm	Multiplicity	Integral area
1	7.9	doublet	17.5
2	6.6	doublet	17.5
3	4.3	quartet	18
4	4.0	Broad singlet disappears with D_2O (cold)	17.5
5	1.4	triplet	27

NMR Data

CH-C**H**$_3$	0.9-1.5 δ	**H**C-O-CO-R	3.3-4.9 δ
C**H**-CH$_3$	0.9-1.5 δ	**H**-Ar	6.0-8.9 δ
HC-OR	3.3-3.9 δ	**H**N-R	broad signal

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