

B.Sc. Semester - 5 (CBCS) Examination
December -2020 (NEW COURSE)
Organic Chemistry and Spectroscopy (Core)

Time: 1:30 Hours**Marks: 42****Instructions:**

1. Figures to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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Q. 1 (A) Answer the following question. (4)

- (1) Draw Fischer projection formula for all the four stereoisomers of 3-Bromo-2-Butanol. Specify Erythro and Threo forms and assign R,S Descriptors to each of their asymmetric carbon atoms.

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

- (1) Explain Hydantoin method for the synthesis of amino acids in detail.
- (2) Explain Bergmann method for synthesis of peptide in detail.
- (3) a. Give synthesis and a use of Dulcin. (3-Marks)
b. What is α amino acid? Give name of main two types (ways) of classification used with an example. (2-Marks)

Q. 2 (A) Answer the following question. (4)

- (1) Explain Arndt Eistert reaction in detail.

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

- (1) Give synthesis of nicotine by Spath and Bretschneider.
- (2) Give difference between various planes of symmetry.
- (3) Prove with an example of eclipsed ethane that $S_n^n \neq E$ but $S_n^{2n} = E$ when n is odd..

Q. 3 (A) Answer the following question. (4)

- (1) What are molecular ion and base peak? Give two important points of mass spectra of alkane.

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

- (1) Give synthesis and uses of adrenaline.
- (2) What is magnetic anisotropic effect? Draw only scientific figures showing such effect in ethene, acetylene and 18-Annulene.
- (3) Deduce constitution of the molecules giving following NMR signals.
 - a) For a Fluorine containing organic compound $C\% = 54.5$, $H\% = 2.28$ and Heat density = 66 only one signal is obtained. 1) 7.8 δ singlet. Deduce the constitution.
 - b) $C_5H_{10}Br_2$ Two signals are obtained 1) 6H Triplet $\delta = 1$ and 2) 4H Quartet $\delta = 2.4$ Deduce the constitution.

Q. 4 (A) Answer the following question.**(4)**

- (1) Give point group of Allene.
- (2) If a molecule belongs to C_2 point group, its enantiomer will havepoint group.
- (3) Give order of C_{3v} point group.
- (4) The point group of the diastereomer of cis-1,2-Dichloroethene is.....

Q. 4 (B) Answer the following questions. (Any two)**(10)**

- (1) Draw chair, boat and twist boat conformations of cyclohexane and give their point group.
Also discuss potential energy level diagram for ring inversion.
- (2) Explain constitution of Coniine in detail.
- (3) Explain difference between chemical shift and coupling constant.

Q. 5 (A) Answer the following question.**(4)**

- (1) How many signals are obtained for 1-Chloroethene in PMR?
- (2) Give signals with splitting pattern for CH_2D-CH_2-OH .
- (3) How many signals will be obtained for 1-Bromocyclobutane.
- (4) If δ for a H in 100 MHz instrument is 2, its τ in 200 MHz will be

Q. 5 (B) Answer the following. (Any two)**(10)**

- (1) Give five reactions of amino acid due both $-NH_2$ and $-COOH$ functional groups.
- (2) Construct multiplication table for C_{2v} point group.
- (3) For a molecule having mol. Formula $C_6H_{14}O$, the following NMR signals are obtained. Deduce its constitution.
a) Singlet 0.8 δ (12 sq) b) Doublet 1.1 δ (4.59 sq) c) Singlet 1.8 δ (1.3 sq) d) Quartet 3.4 δ (1.4 sq)

NMR Spectral data

Type	Type of proton	Chemical shifts (approximate) in δ ppm
Primary	$R-CH_3$	0.9-1.0
Secondary	R_2-CH_2	1.3-1.5
Tertiary	R_3-CH	1.5-1.8
Aromatic	Ar-H	7.0-8.0
Benzylic	Ar-C-H	2.2-3.0
Flourides	HC-F	4.0-4.5
Bromides	HC-Br	2.5-4.0
Alcohols	HC-OH	3.4-4.0
Ethers	HC-OR	3.3-4.0
Aldehyde	R-CHO	9.0-10.0
Hyroxylic	R-OH	1.0-5.5
Phenolic	Ar-OH	4.0-12.0
Enolic	$C=C-OH$	15.0-17.0
