

B.Sc. Semester - 5 (CBCS) Examination
Oct/Nov - 2021 (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.

Q-1 A) Answer the following question.**[04]**

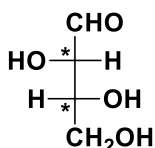
(1) Give the synthesis of thyroxine.

Q-1(B) Answer any two questions out of three.**[10]**

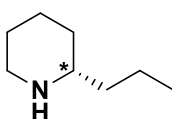
(1) Give the synthesis of dipeptide (Ala-Gly) by Bergemann method and Sneechn's method.

(2) Give R/S notation to chiral centre of following compounds.

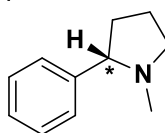
a)



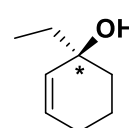
b)



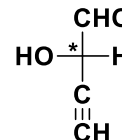
c)



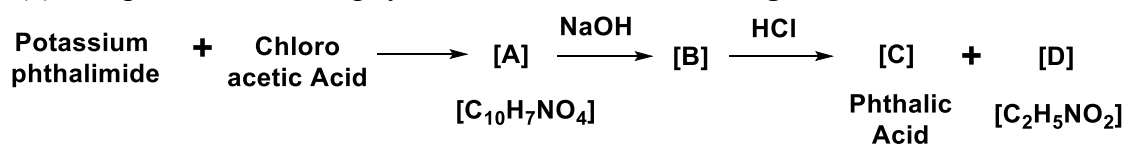
d)



e)

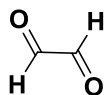


(3) (a) Give the synthesis of Saccharin and its uses.

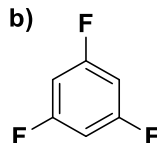
(b) Complete the following synthesis of α -amino acid and give the name [D] .**Q-2 A) Answer the following question.****[04]**(i) Give the difference between σ_v , σ_h & σ_d .**Q-2(B) Answer any two questions out of three.****[10]**

(1) Give point group and order of the point group of following molecules,

a)



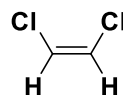
b)



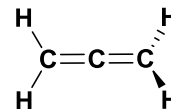
c)



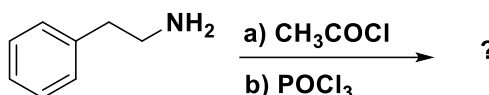
d)



e)



(2) Complete the following reaction with proper Mechanism and also give the Name of reaction.



(3) Find out structure of alkaloid (saturated heterocyclic compound) having molecular weight 127 gm/mole from following statements (define each statement),

- a) Element analysis result, C: 75.52 %; H: 13.47 % and N: 11.01 %,
- b) It form quaternary ammonium salt by consuming two mole of Methyl Iodide,
- c) It undergo oxidation to give pyridine 2-carboxylic acid,
- d) It undergoes Von braun's degradation to give 1,5 dibromooctane(alkaloid + Benzoyl chloride + PBr_5 + low temp., Distillation).

Q-3(A) Match the following pair:

[04]

Molecule		No. of PMR signals	
1	2-butanol	a	3
2	1-propene	b	5
3	4-ethylaniline	c	6
4	p-xylene	d	4
		e	2

Q-3 (B) Answer any two questions out of three.

[10]

- (1) Give the synthesis and uses of Ibuprofen and Chrysodine-G.
- (2) Write a note on: Mc-Lafferty rearrangement with example.
- (3) Explain: Magnetic anisotropic effect with two examples.

Q-4(A) Answer the following question.

[04]

- (1) Discuss the different conformation of Cyclohexane and compare it through their potential energy diagram.

Q-4 (B) Answer any two questions out of three.

[10]

- (1) Prove that $S_3^3 = \sigma_h \& S_3^6 = E$ by example of eclipsed ethane.
- (2) a) Explain: Deuterium labelling method.
b) Why TMS is used as a reference in NMR spectroscopy?
- (3) a) Give the synthesis of Adrenaline by using Catechol and Monochloro acetyl chloride.
b) Give the reaction of Glycine with Ethanol, HNO_2 and Acetic anhydride in pyridine.

Q-5(A) Answer the following question.

[04]

A quartet observed at 2.870, 2.855, 2.835 & 2.820 δ_{ppm} , if instrument operate at 400MHz then calculate coupling constant in Hz.

Q-5 (B) Answer any two questions out of three.

[10]

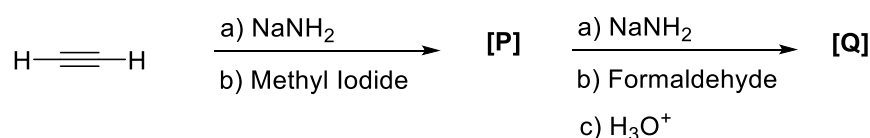
- (1) Determine the structure from following PMR data:

Molecular Mass=146gm/mole, C=74%, H=4.2%

(a) 5H, s, 7.5 δ_{ppm} , (b) 1H, s, 11.5 δ_{ppm}

- (2) a) Prove the presence of methylene group in Papaverine.

b) Complete the following reaction.



- (3) Give the example of C_{2v} point group and construct its multiplication table.

Chemical Shift:

Aldehydic proton: 9.8-10.0 δ_{ppm}

Carboxylic acid proton: 10.0-12.5 δ_{ppm}

Aromatic proton: 6.5-8.5 δ_{ppm}

Allylic proton: 1.5-2.5 δ_{ppm}
