

2022
M.Sc.
First Semester
 CORE – 02
CHEMISTRY
 Course Code: MCHC 1.21
 (Organic Chemistry – I)

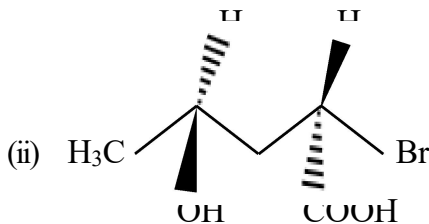
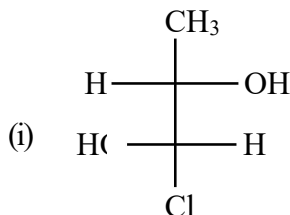
Total Mark: 70
 Time: 3 hours

Pass Mark: 28

Answer five questions, taking one from each unit.

UNIT-I

1. (a) Assign R and S configuration of chiral carbons of the following compounds: 2+2=4



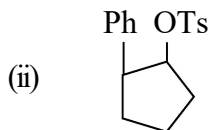
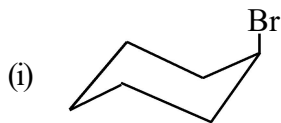
- (b) Define the following terms with their suitable examples: 2+2=4
- (i) Axial chirality
 - (ii) Planar chirality
- (c) Draw Flying Wedge, Fisher and Newman projection formula for the compound 1-Bromo propane-1, 2-diol. Convert its Fisher projection into Sawhorse and Newman projection. 6
2. (a) Discuss the conformers of 1,2-dimethyl cyclohexane and draw its potential energy diagram. 4
- (b) What are stereoselectivity and stereospecificity? Explain them with suitable examples. 4
- (c) Discuss the stereochemical aspects of addition of HBr to propene. 4
- (d) Write a short note on Racemic modification. 2

UNIT-II

3. (a) What is SHAB theory and what is its role in nucleophilic substitution reaction? 5
(b) What is acid base catalysis? Explain with suitable examples. 4
(c) How does a π -bond act as neighbouring group and participating to accelerate nucleophilic substitution reactions? 5
4. (a) Draw and discuss Hammett plot and Hammett equation. 5
(b) What is Tschitschibabin reaction? Give an example and explain its mechanism. 4
(c) Under what conditions a benzene ring undergoes nucleophilic substitution reaction and explain the mechanism of hydroxylation of nitrobenzene with its mechanism. 5

UNIT-III

5. (a) What is E1CB(E₁CB) elimination reaction? Give an example and discuss its mechanism. Mention one of the favourable conditions. 5
(b) Discuss the stereochemistry of E₂ elimination of threo isomer of 1-chloro-1, 2-diphenylpropane including its anti-periplanar, syn-periplanar and anti-clinal conformers. 8
(c) Mention the percentage feasibility of syn and anti-elimination of cyclohexyl bromide. 1
6. (a) What is α -elimination? Give an example. 1
(b) Discuss the syn-anti-elimination of the following compounds: 4



- (c) Discuss the effect of leaving group, attacking base and substrate structure towards elimination reactions. 9

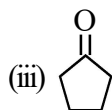
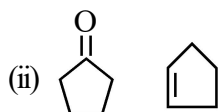
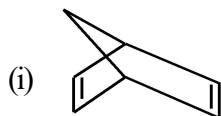
UNIT-IV

7. (a) Explain Paterno-Buchi photoaddition reaction with suitable example. 6
 (b) Write the mechanism of the following reactions: 5



- (c) Write the conditions for donor-acceptor relationship to function. 3

8. (a) Explain Photo-Fries rearrangement of anilides and ester with mechanism. 4+4=8
 (b) Define the term photosensitization. 1½
 (c) Complete the following reactions: 1½×3=4½



UNIT-V

9. (a) Explain electrocyclic reaction of 1,3,5-hexatriene by F.M.O. approach. 5

- (b) Explain cycloaddition reaction of two molecules of 1,3-butadiene and indicate the mode of reaction. 5
- (c) Explain Cope and Aza-Cope rearrangement with suitable examples and mechanism. 4
10. (a) Explain 1,5-sigmatropic hydrogen shift by F.M.O. taking a suitable example. 4
- (b) Explain 1,3-dipolar cycloaddition reaction of ethane with azomethine imine ($\text{CH}_2^- - \text{N}=\text{N}^+$) with suitable diagram. 4
- (c) Define chelotropic reaction. Explain addition of carbene to an alkene with suitable diagram. 1+3=4
- (d) Write the end product of the reaction: 2

