

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
Oct/Nov-2022 (NEW COURSE)
Stereochemistry (Core (New))

Time: 2:30 Hours

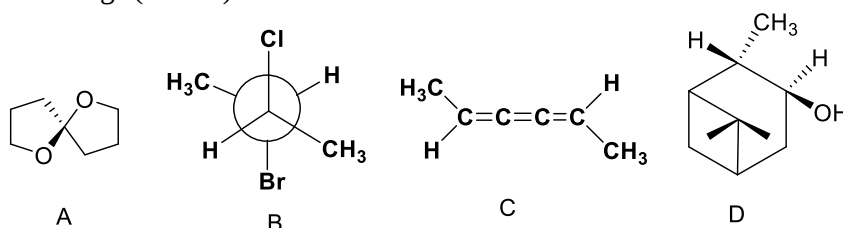
Marks: 70

Instructions:

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

Q.1 (A) Answer the following**4 Marks**

- (1) What is stereocenter? Assign absolute configuration at each stereocenter for followings (A to D):



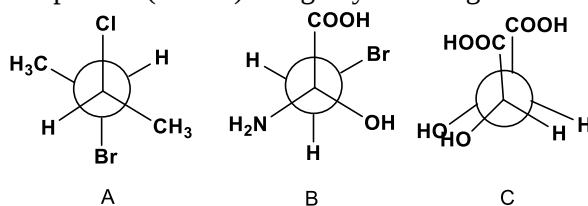
- (2) Draw the following compound in Fischer projection and convert it to Newman and Sawhorse projection:
 (3R,4S)-4,5-dimethylhex-1-en-3-amine

Q.1 (B) Answer any two questions out of three.**10 Marks**

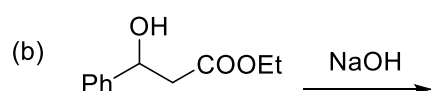
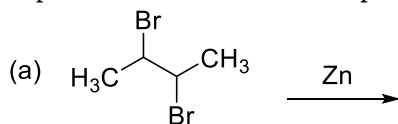
- (1) Discuss the chirality of following:
 - (a) Meso compound
 - (b) Allenes
- (2) What is Racemic modification? Discuss the application of following for resolution:
 - (a) (R,R)-Tartaric acid
 - (b) Acylase Enzyme.
- (3) Discuss the Atropisomerism with two examples.

Q.2 (A) Answer the following**4 Marks**

- (1) What is prostereoisomerism? Discuss pro(R) and pro(S) ligands.
- (2) What are conformers? Assign conformational descriptor for each of following compounds (A to C) using Klyne-Prelog conformational terminology:

**Q.2 (B) Answer any two questions out of three.****10 Marks**

- (1) Explain with suitable example that the Face of cis-2-butene is homotopic while that of trans-2-butene is enantiotopic.
- (2) Explain anti-elimination from preferred conformation of following:



- (3) Draw and discuss preferred conformations of following compounds: (a) 1,2-dichlorobutane (b) Propionaldehyde

Q.3 (A) Answer the following **4 Marks**

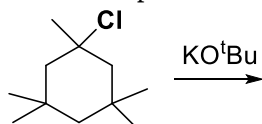
- (1) Draw possible conformations of Cis-1-tert-butyl-4-methyl cyclohexane and deduce preferred conformation with justification.
- (2) Draw Chair & Boat conformation of cyclohexane and discuss any two factors affecting their stability.

Q.3 (B) Answer any two questions out of three. **10 Marks**

- (1) Discuss stereoisomerism in (a) trans-1,3-dimethyl cyclohexane and (b) cis- 1,2-dimethyl cyclohexane.
- (2) Discuss the following terms with suitable example:
 - (a) Epimers
 - (b) Mutarotation
- (3) Discuss conformational isomerism in N-Ethylpiperidine.

Q.4 (a) Answer the following **4 Marks**

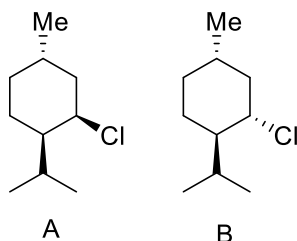
- (1) Predict the product of the following reaction and explain its mechanism:



- (2) Discuss E1CB mechanism using suitable example.

Q.4 (b) Answer any two questions out of three. **10 Marks**

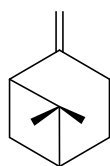
- (1) Discuss anti-elimination reaction on following substrate (A & B):



- (2) What is Neighboring Group Participation? Discuss NGP of Acetate group with one example.
- (3) Explain $\text{S}_{\text{N}}\text{i}$ mechanism with suitable example.

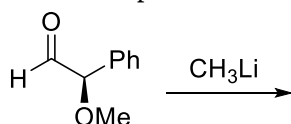
Q.5 (a) Answer the following **4 Marks**

- (1) Show the stereoselectivity of hydroboration-oxidation reaction using any one example.
- (2) What product will form when following substrate react with $\text{Hg}(\text{OAc})_2/\text{NaBH}_4$ reagent.



Q.5 (b) Answer any two questions out of three. **10 Marks**

- (1) Predict the product of the following reaction with mechanism:



- (2) Discuss the following with one example:
 - (a) Cram's model
 - (b) Limitation of Cram's model
- (3) Discuss stereoselective dihydroxylation reaction using:
 - (a) OsO_4
 - (b) Prevost reagent
