

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
Oct/Nov-2021 (NEW COURSE)
Stereochemistry (Core (New))

Time: 2:30 Hours

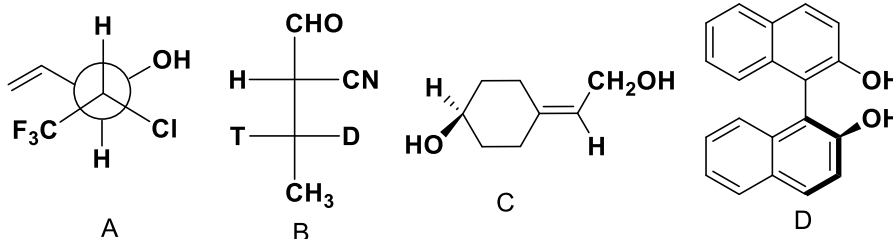
Marks: 70

Instructions:

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

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

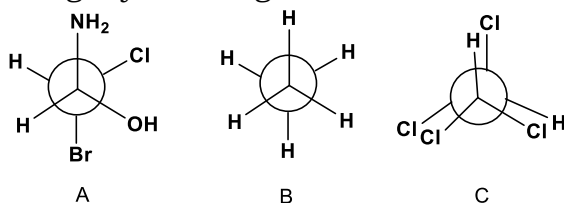
- (1) Discuss the following with suitable example: 2
 - (a) Chirality Vs Asymmetry
 - (b) Enantiomer Vs Diastereomer
- (2) Assign absolute configuration at each stereocenter for followings (A to D): 2

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

- (1) (a) Draw (2R,3R)-2-Amino-3-phenylbutanal in staggered wedge-dash projection and convert it into Fischer, Newman and Sawhorse projection 5
 - (b) Justify the statement with suitable example: two group exchange across the stereocenter retain the configuration.
- (2) (a) What is racemic mixture? Discuss the application of (R,R) Tartaric acid and (-)(L)-Brucine as Chiral resolving agents. 5
 - (b) Justify the statement with suitable example: *Meso compound has chiral center, but it is optically inactive.*
- (3) (a) Discuss the minimum conditions for Allene compounds to be optically active. 5
 - (b) Why cis cyclooctene is achiral but trans cyclooctene is optically active?

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

- (1) What is prosteroisomerism? Explain with suitable examples. 2
- (2) Assign conformational descriptor for each of following compounds (A to C) using Klyne-Prelog conformational terminology. 2

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

- (1) Discuss topicity of cis & trans 2-butene by its reaction with (a)molecular bromine and (b) mCPBA. 5
- (2) Draw and discuss preferred conformations of following compound: (a) 2,3-difluorobutane (b)2,3-dihydroxybutane 5
- (3) Discuss Cahn Conformation selection rule with suitable examples. 5

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

- (1) Draw Newman projection of following cyclohexane conformation and discuss its stability: (a)Chair (b) Boat 2
- (2) Draw cis and trans decalin in chair conformation and discuss their stereoisomerism by ring flipping phenomena. 2

Q.3 (B) Answer any two question out of three. (10)

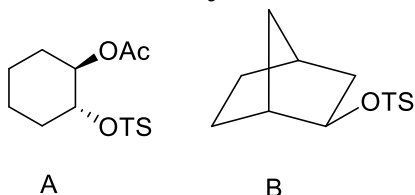
- (1) Discuss anomeric effect with suitable example. 5
- (2) Draw following stereoisomers in their preferred conformation and discuss stability: 5
 - (a) Cis-1-tert-butyl-4-methyl cyclohexane
 - (b) Trans-1-methyl-4-phenyl cyclohexane
- (3) Why stereoisomers of trans-1,3-dimethyl cyclohexane are resolvable while that of cis-1,2-dimethyl cyclohexane are not resolvable. 5

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

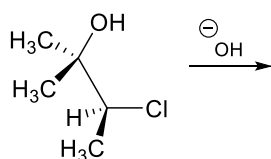
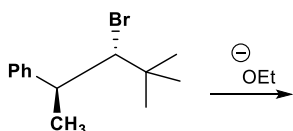
- (1) Discuss why S_N2 reactions are always stereospecific using suitable example. 2
- (2) What product will form when (S)-2-heptanol react with thionyl chloride in the presence of pyridine? Discuss mechanism and stereochemistry. 2

Q.4 (B) Answer any two question out of three. (10)

- (1) Discuss acetolysis reaction on following substrate (A & B): 5

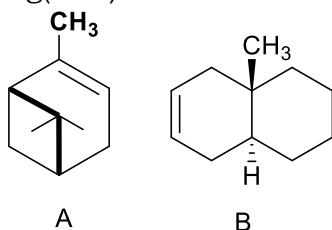


- (2) Discuss Saytzeff vs Hoffmann elimination reaction using suitable examples. 5
- (3) Give appropriate product for following two reaction sequence. Explain its mechanism. 5



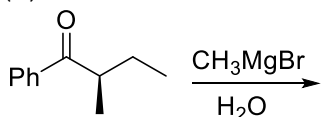
Q.5 (A) Answer the following (4)

- (1) Show with one example that hydroboration-oxidation is a syn and anti-Markovnikov addition reaction. 2
- (2) What product will form when following substrate (A and B) react with $Hg(OAc)_2$ in H_2O followed by reduction using $NaBH_4$. 2



Q.5 (B) Answer any two question out of three. (10)

- (1) Discuss stereoselective dihydroxylation reaction using Woodward and Prevost reagent with suitable example. 5
- (2) Predict the diastereoselectivity of following reaction using (a) Cram's model (b) Felkin-Ahn model. 5



- (3) Describe diastereoselective aldol reaction by employing boron enolate with suitable example. 5
