

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
Oct/Nov. -2019 - [NEW COURSE]
Stereochemistry (Core (New))

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
 2. Figures to the right indicate marks.
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UNIT-1 (14 marks)Answer **ALL** questions**Q.1 (a) Answer the following** **4 Marks**

- (1) Discuss (i) Chirality (ii) Asymmetric center (iii) enantiomeric excess(ee).
- (2) Why meso-compounds are optically inactive ? Explain with example.

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

- (1) Discuss following methods for racemic modifications:
(a) Diastereomers formation
(b) Enzymatic reaction
- (2) Draw (2S,3R)-2-methyl-3-phenylbutanal in staggered wedge-dash projection and convert it into Fischer, Newman and Sawhorse projection.
- (3) What is axial chirality ? Discuss with suitable examples.

UNIT-2 (14 marks)Answer **ALL** questions**Q.2 (a) Answer the following** **4 Marks**

- (1) What is torsional angle? Discuss klyne-prelog terminology for conformational analysis.
- (2) Explain Re-Si nomenclature system for C=C faces.

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

- (1) What is topicity of ligand? Discuss at least three heterotopic ligands with suitable examples.
- (2) Explain conformation and reactivity of acyclic compounds with at least two examples.
- (3) Describe enantiotopic and diastereotopic carbonyl faces with suitable examples.

UNIT-3 (14 marks)Answer **ALL** questions**Q.3 (a) Answer the following** **4 Marks**

- (1) Give exo & endo nomenclature for Bicyclo[2,2,1] heptane.
- (2) Draw cis & trans decalin. Why cis decalin is optically inactive.

Q.3 (b) Answer any two question out of three. **10 Marks**

- (1) Draw hawarth projection of α - & β -D-glucose and convert them into chair conformation. Explain mutarotation.
- (2) Describe conformational isomerism in the N-methyl piperidine by pyramidal inversion and ring inversion.
- (3) Explain chirality of various conformations of for 1,2 dimethyl and 1,3 dimethyl cyclohexanes.

UNIT-4 (14 marks)
Answer ALL questions

Q.4 (a) Answer the following

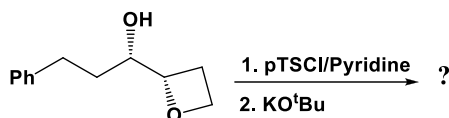
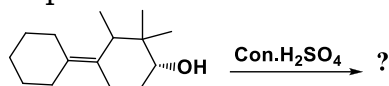
4 Marks

- (1) What product will form when Menthylchloride react with NaOEt. Justify your answer
- (2) Explain regioselectivity in the E1CB mechanism.

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

10 Marks

- (1) What is anchimeric assistance? Discuss at least two examples.
- (2) Why SN² reaction is always stereospecific as well as stereoselective? Explain with example.
- (3) Give appropriate product for following two reaction sequence. Explain its mechanism.



UNIT-5 (14 marks)
Answer ALL questions

Q.5 (a) Answer the following

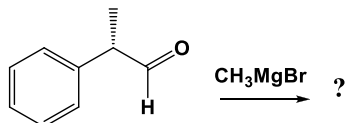
4 Marks

- (1) Explain stereoselectivity of hydroboration-oxidation reaction on alkene with suitable example.
- (2) Write the reaction mechanism of cis-dihydroxylation of olefins by OsO₄.

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

10 Marks

- (1) Describe stereoselectivity of following metal hydride reagents on 4-tert-butylcyclohexanone. Justify your answer.
 - (a) NaBH₄
 - (b) LiAlH₄
 - (c) L-selectride
- (2) Predict the diastereoselectivity of the following reaction using Felkin-Ahn model and write corresponding product.



- (3) Complete the following reaction sequence with mechanism:

