**647510** **MSC3OrgC301x** **Seat No :_____**

# M.Sc.(Chem.) Semester - 3 (*CBCS*) Examination
## OCT/NOV-2024 (AS PER SYLLABUS YEAR JUNE-2019)
## 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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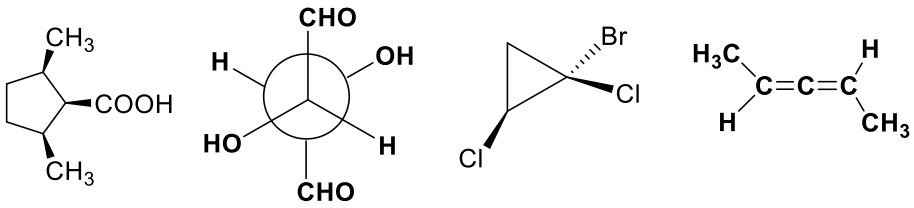
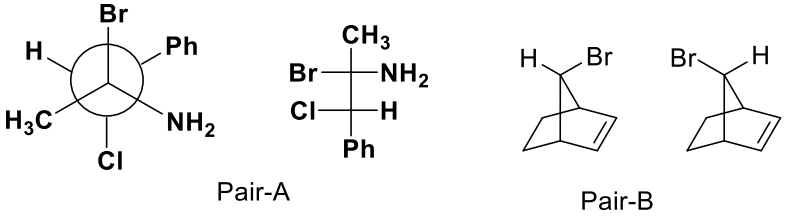
**Q.1 (A) Answer the following** **(04)**

1) Which of the following compounds are optically active?




2) Discuss the stereochemical relationship between the following pairs of isomers (A & B).

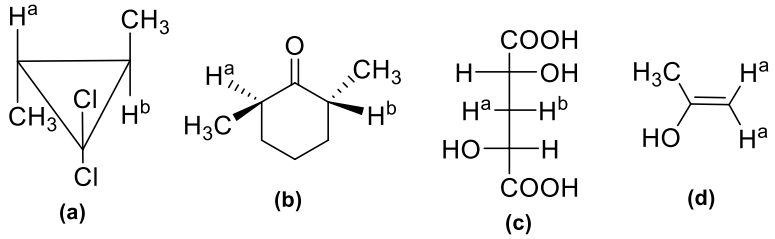



**Q.1 (B) Answer any two question out of three.** **(10)**

1) Discuss the following with example:
   (A) Molecular chirality due to chiral planes
   (B) Atropisomerism
2) What is racemic modification? Explain biochemical methods of resolution with example.
3) Draw (2R, 3R) Tartaric acid in Fischer projection and convert it to Zigzag and Newman projection.

**Q.2 (A) Answer the following** **(04)**

1) What is prosteroisomerism? Explain Pro(R) and Pro(S) ligand with suitable examples.
2) Determine the topicity of hydrogens ($H^a$ & $H^b$) in the following compounds (a to d):

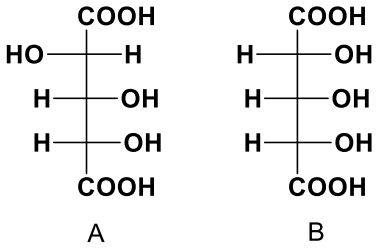



**Q.2 (B) Answer any two question out of three.** **(10)**

1) Draw various conformations of following compounds and arrange them as per their increasing order of stability:
   (A) 2,3-difluorobutane
   (B) 2,3-dihydroxybutane

2) Discuss topicity of cis & trans stilbene by its reaction with mCPBA.

3) Explain the term (A) chirotopic non-stereogenic
(B) achirotopic stereogenic using following examples:




**Q.3 (A) Answer the following** **(04)**

1) Define:
(A) Epimers
(B) Anomers

2) Draw possible conformations of Cis-1-tert-butyl-4-methyl cyclohexane and discuss their stability order

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

1) Write a note mutarotation of D-glucose with mechanism.

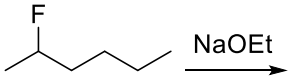
2) Discuss the conformations and stereoisomerism of following:
(A) N-methyl Piperidine
(B) 1,3-dimethyl piperidine

3) Discuss chirality of cis and trans-1,3-dimethyl cyclohexanes

**Q.4 (A) Answer the following** **(04)**

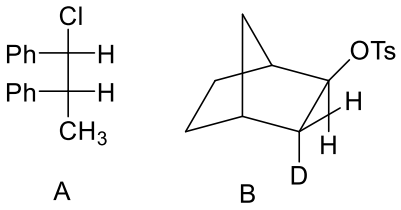
1) Enlist various nucleophiles and discuss the role of nucleophiles in $SN^1$ and $SN^2$ reactions.

2) Predict the product of the following reaction and write appropriate mechanism:

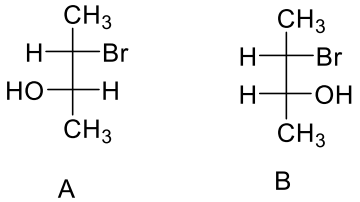



**Q.4 (B) Answer any two question out of three.** **(10)**

1) Discuss elimination reaction using NaOEt on following substrate with mechanism (A & B):



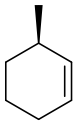

2) What is NGP? Explain NGP phenomena for following substrate by reacting with NaOH.



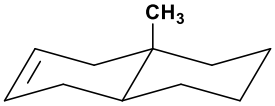

3) Discuss Saytzef Vs Hoffmann elimination with suitable examples.

**Q.5 (A) Answer the following** **(04)**

1) What product will form when following substrate will react with Woodward reagent? Discuss its mechanism.

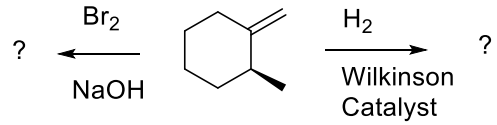


2) What product will form when following substrate will react with $OsO_4/NaHSO_3$ reagent? Discuss its mechanism



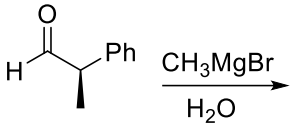

**Q.5 (B) Answer any two question out of three.** **(10)**

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

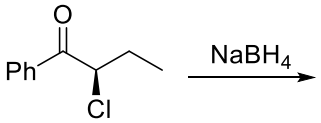



2) Answer the following:

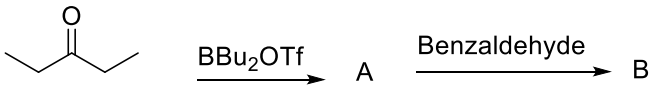
(A) Predict the diastereoselectivity of following reaction using Felkin-Ahn model.




(B) Predict the diastereoselectivity of following reaction using Crams model.




3) Complete the following reaction and describe diastereoselective:

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