

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2023.

Second Semester

Chemistry - Core

STEREOCHEMISTRY, ORGANIC REAGENTS AND
PHOTOCHEMISTRY

(For those who joined in July 2021 onwards)

Time : Three hours

Maximum : 75 marks

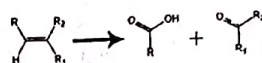
PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- Which among the following is a prochiral molecule?
(a) Lactic acid (b) propionic acid
(c) acetic acid (d) tartaric acid
- Biphenyl exhibits _____
(a) constitutional isomerism
(b) stereoisomerism
(c) atropisomerism
(d) topomerism

- Preferred conformation of 1,2-dichlorocyclohexane is
(a) cis - e, a (b) cis - a, e
(c) trans - e, e (d) trans - a, a
- Which is the most stable conformation of cis-1,4-di-t-butylcyclohexane
(a) chair (b) boat
(c) twist boat (d) gauche
- IBX oxidizes toluene to _____
(a) benzoic acid
(b) benzyl alcohol
(c) benzophenone
(d) benzaldehyde
- The reagent used for the following conversion



- Lemieux-Johnson reagent
- Lemieux-Von Rudloff reagent
- Luche reagent
- Fetizon's reagent

- Di-pi methane rearrangement involves _____ intermediate
(a) carbonium ion (b) carbanion
(c) carbene (d) biradical
- _____ reaction involves δ -H transfer
(a) Paterno-Buchi (b) Mc Lafferty
(c) Barton (d) di-pi methane
- Claisen rearrangement is
(a) 1,3-Sigmatropic reaction
(b) 3,3-Sigmatropic reaction
(c) 1,5-Sigmatropic reaction
(d) 1,7-Sigmatropic reaction
- The reaction shown is a/an _____ reaction



- electrocyclic
- cycloaddition
- sigmatropic
- cheletropic

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

- (a) Explain Cram's chelation model with an example.

Or

- Discuss asymmetric synthesis using enzymes.

- (a) Analyze the conformations of 1,2-disubstituted cyclohexane and explain related properties.

Or

- Draw the most stable conformation for following molecules and explain why?

- trans-1,2-dichlorocyclohexane
- cis-1,3-dihydroxycyclohexane

- (a) Compare the mechanism and stereochemistry of Woodward and Prevost hydroxylation.

Or

- Discuss the speciality of 1,3-dithiane in Umpolung synthesis.

14. (a) Briefly discuss Norrish Type I and Type II reactions

Or

- (b) Write a short note on cis-trans isomerization.

15. (a) Thermal cyclisation of 1,3-butadiene is a conrotatory process. Substantiate using FMO method.

Or

- (b) Using FMO method discuss the stereochemistry of 1,5-sigmatropic migration.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Giving examples differentiate stereospecific and stereoselective synthesis.

Or

- (b) Explain how allenes and spiranes exhibit optical isomerism though they do not have asymmetric atoms.

17. (a) Discuss the various conformations and properties of perhydrophenanthrene.

Or

- (b) State Curtin-Hammett principle. Briefly discuss two applications.

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18. (a) How are the following used in organic synthesis?

- (i) Merrifield resin (ii) Vaska's catalyst

Or

- (b) Write short notes on (i) Gilman's reagent (ii) Luche reagent

19. (a) Explain (i) quantum efficiency (ii) Paterno-Buchi reaction.

Or

- (b) Write short notes on (i) Jablonski diagram (ii) Di-pi methane rearrangement

20. (a) Using correlation diagram method discuss the stereochemical course of 4+2 cycloaddition.

Or

- (b) Write short notes on (i) Cope rearrangement (ii) Fluxional tautomerism

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