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Reg. No. : .....

Code No. : 5412

Sub. Code : ZCHM 21

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

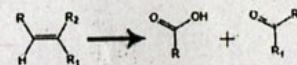
- Which is the most stable conformation of cis-1,4-di-t-butylcyclohexane

(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



(a) Lemieux–Johnson reagent  
(b) Lemieux–Von Rudloff reagent  
(c) Luche reagent  
(d) Fetizon's reagent





7. Di-pi methane rearrangement involves \_\_\_\_\_ intermediate

- (a) carbonium ion      (b) carbanion  
(c) carbene              (d) biradical

8. \_\_\_\_\_ reaction involves  $\delta$ -H transfer

- (a) Paterno-Buchi      (b) Mc Lafferty  
(c) Barton              (d) di-pi methane

9. Claisen rearrangement is

- (a) 1,3-Sigmatropic reaction  
(b) 3,3-Sigmatropic reaction  
(c) 1,5-Sigmatropic reaction  
(d) 1,7-Sigmatropic reaction

10. The reaction shown is a/an \_\_\_\_\_ reaction



- (a) electrocyclic  
(b) cycloaddition  
(c) sigmatropic  
(d) cheletropic

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**PART B — (5 × 5 = 25 marks)**

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

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

Or

- (b) Discuss asymmetric synthesis using enzymes.

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

Or

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

- (i) trans-1,2-dichlorocyclohexane  
(ii) cis-1,3-dihydroxycyclohexane

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

Or

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

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[P.T.O.]





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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