QP Code: P25DRIS021

Reg. No : .....

Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

I SEMESTER (CBCSS-PG) DEGREE EXAMINATIONS, NOVEMBER 2025

(Regular/Improvement/Supplementary)

M. Sc. Chemistry

CHE1C03 : STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS

2024 Admission Onwards

(Credits: 3)

Time: 3 Hours **Maximum Weightage: 30**

Section A

Answer **any eight** questions. Weightage **1** for each. **(8x1 = 8 Weightage)**

1. Why hydrates of glyoxal and ninhydrin are stable whereas hydrate of acetaldehyde is not?
2. Discuss aromaticity in fused ring systems.
3. How do polar protic and aprotic solvents affect reaction mechanisms?
4. Explain the term asymmetric synthesis and its significance.
5. Discuss the conformational analysis of chlorohydrins.
6. What is a conformationally biased molecule?
7. Write a brief note on Bredt's rule.
8. Draw the Newman projections for the possible staggered conformations of 1,2-dichloroethane.Which projection is stable?
9. Specify the configurational isomers of 1-bromo -1,2 - dichloroethene.
10. What are enantiotopic hydrogen atoms? Write an example.

Section B

Answer **any six** questions. Weightage **2** for each question. **(6x2 = 12 Weightage)**

11. Discuss the aromaticity in polycyclic benzenoid compounds.
12. Differentiate between benzenoid aromatic compounds and non-benzenoid aromatic compounds.
13. Explain the terms localized bonds and delocalized bonds with illustrative examples.

Turn Over

14. Explain Marcus theory of electron transfer.

15. Discuss semipinacolic deamination of erythro and threo 1,2-diphenyl-1-(p-chlorophenyl)-2-aminoethanol.

16. Analyse the stereochemistry of norbornane and identify any bridgehead restrictions.

17. (i)What is meant by enantiomeric excess? How is it determined?
    (ii) The (+) enantiomer of compound A has an optical rotation of 100^0.
    If a pure sample of compound A has an optical rotation of 125^0, what is the composition of the sample?

18. Using the Zimmerman–Traxler model, explain the diastereoselectivity in aldol reactions.

Section C

Answer **any two** questions. Weightage **5** for each question. **(2x5 = 10 Weightage)**

19. Write a note on Electron displacement effects in organic molecules.

20. Discuss the conformational analysis in Monosubstituted cyclohexane–methyl and t-butyl cyclohexanes flexible and rigid systems.

21. (i) Discuss Pyrolytic cis-elimination of esters.(ii) Illustrate how the stability of conformers affect product structure in dehydrochlorination of menthyl and neomentyl chlorides.

22. Evaluate the stereochemical principles behind Sharpless asymmetric epoxidation and dihydroxylations. How do the reagent components interact with the substrate to induce enantioselectivity?

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