

**M Sc DEGREE (CSS) EXAMINATION, DECEMBER 2023****First Semester****CORE - CH500102 - STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY**

M Sc CHEMISTRY, M Sc ANALYTICAL CHEMISTRY, M Sc APPLIED CHEMISTRY, M Sc
PHARMACEUTICAL CHEMISTRY, M Sc POLYMER CHEMISTRY

2019 ADMISSION ONWARDS

25741C71

Time: 3 Hours

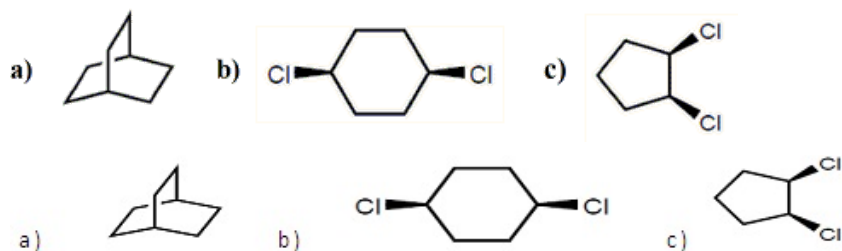
Weightage: 30

Part A (Short Answer Questions)

Answer any **eight** questions.

Weight **1** each.

1. Analyze the orientation effect of nitrobenzene towards an incoming electrophile.
2. What is $S_{RN}1$ mechanism?
3. Briefly explain thermal reorganization of isonitriles to nitriles on the basis of HSAB concept.
4. Explain Norrish type II reactions
5. Can the molecules shown below be properly described as a meso compound? Validate your answer.



6. Assign R and S configurations to the stereo centres of D-erythrose.
7. Draw the E and Z isomers of 1-Bromo-1-Chloropropene





8. Draw the conformers of 1,4-dimethyl cyclohexane.
9. Briefly elaborate on the conformational analysis of sucrose.
10. Discuss the stereochemistry of the product obtained from the reaction of tert-butanol with SOCl_2 .

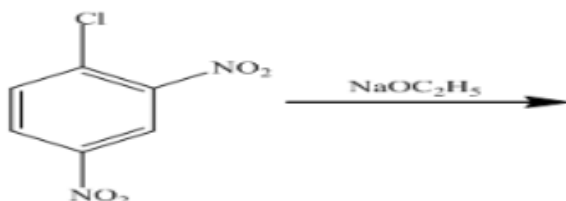
(8×1=8 weightage)

Part B (Short Essay/Problems)

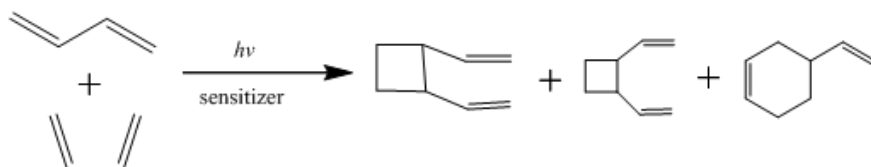
Answer any **six** questions.

Weight 2 each.

11. Using NMR spectroscopy explain the aromaticity of [18] annulene.
12. Explain the importance of Hammond postulate in predicting organic reaction mechanisms.
13. Explain the important photochemical reactions of butadiene
14. What are axial enantiomers? Explain how configurational nomenclature is assigned to these molecules, citing appropriate examples.
15. Discuss the optical activity observed in spiranes and alkylidene cycloalkanes by providing relevant examples.
16. Discuss the deamination of cis and trans isomers of 2-amino cyclohexanol.
17. *Predict the product of the reaction and suggest a mechanism*



18. Explain the mechanism of the given reaction



(6×2=12 weightage)





Part C (Essay Type Questions)

Answer any **two** questions.

Weight **5** each.

19. a) Write short note on the bonding and hybridisation of organic compounds b) Explain the MO picture of butadiene and allyl systems
20. a) Discuss the Hammett equation and explain the importance of Hammett parameters and how can we consider the Hammett equation to be a linear free energy relationship. b) Discuss in detail the power of Hammett plots in deciphering mechanisms.
21. Illustrate Barton nitrite ester reaction, Paterno-Buchi reaction, Di- π -methane rearrangement, and Photo-Fries rearrangements.
22. Explain homotopic, enantiotopic and diastereotopic hydrogens with examples and explain how NMR can be used as a tool to differentiate these hydrogens

(2×5=10 weightage)

