QP CODE: 24045531

24045531

Reg No : .....

Name : .....

M.Sc DEGREE (CSS) EXAMINATION, DECEMBER 2024

First Semester

CORE - CH500102 - STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY

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

2019 ADMISSION ONWARDS

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Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Explain the acidity of the following compounds CH_3-COOH, CH_2Cl-COOH, $CHCl_2$-COOH, CCl_3COOH
2. Distinguish between the aromaticities of benzene and cyclobutadiene using NMR spectroscopy.
3. Arrange the following into hard and soft bases. Give reasons. F^-, H_2O, C_6H_6, Cl^-, I^-, CN^-
4. What is Norrish type I reaction?
5. Assign R and S configurations to the stereo centres of D-erythrose.
6. Draw the erythro and threo isomers of 2,3-dihydroxybutanoic acid and assign absolute configuration to each asymmetric carbon.
7. What are enantiotopic hydrogens? Give an example.
8. Draw the most stable conformation of cis-1,2-dimethylcyclohexane and trans-1,2-dimethylcyclohexane.
9. Compare the stability of trans-decalin and 9-methyl trans-decalin.
10. Give the deamination product of *Cis*-2-amino cyclohexanol.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Discuss S_NAr mechanism.
12. Explain the mechanism of the following reaction: $CH_3COOCMe_3 + H_2O^{18} + H_2SO_4 \rightarrow CH_3COOH + Me_3CO^{18}H$

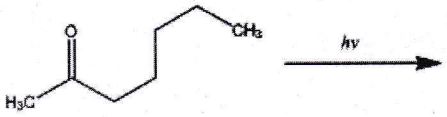
13. Elaborate on the synthetic importance of Di-π-methane rearrangement.

14. What characterizes helical enantiomers? Elaborate on the assignment of configurational nomenclature to these molecules, including relevant examples.

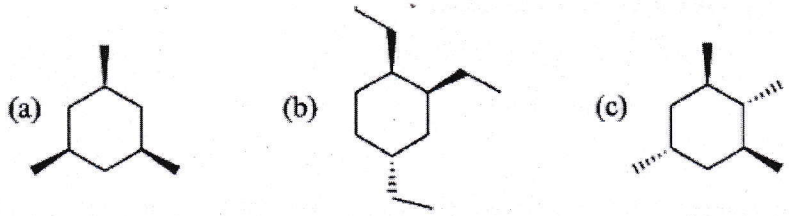
15. Discuss in detail the stereochemical and absolute configuration displayed by allenes and biphenyls, by providing pertinent illustrations.

16. Secondary alcohol substitution reactions with $SOCl_2$ alone result in the retention of stereochemistry, while the combination of $SOCl_2$ and pyridine leads to inversion. Elaborate on this phenomenon.

17. Predict the product and explain the mechanism



18. Draw both chair conformations for each of the following. Label the highest and lowest energy chair conformation in each case.



(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Explain the Electrophilic substitution reactions in aromatic systems.

20. Describe how primary and secondary kinetic isotope effects play a significant role in understanding reactions with appropriate examples.

21. a) Write a detailed description of the important photochemical reactions of butadiene; b) Discuss in detail the photochemical processes involved in vision.

22. a) Taking suitable examples explain methods for the interconversion of geometrical isomers.
b) IR and UV spectroscopy are useful tools in the study of cis-trans isomerism.Explain with examples.

(2×5=10 weightage)