

**D 72748**

(Pages : 3)

Name.....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2019**

(CUCSS)

Chemistry

CH 1C 03—STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS

(2015 Admissions)

Time : Three Hours

Maximum : 36 Weightage

**Section A**

*Answer all twelve questions.*

*Each question carries 1 weightage.*

1. How does hydrogen bonding effect the acidity of carboxylic acids ?
2. Represent the molecular orbitals of allyl radical.
3. What is Hammett acidity function ?
4. What are nonclassical carbocations ?
5. What is meant by erythro and threo nomenclature ?
6. Draw one eclipsed conformation in Newman Projection by looking down C1 and C2 bond of 2-methyl pentane.
7. Comment on the conformation and chirality of decalin.
8. Comment on the conformation of *cis*-1, 4-dit.butyl cyclohexane.
9. What do you mean by the term resolution of racemic mixture ?
10. Draw the geometrical isomers of 2-Butene. Among these isomers, which one has zero dipole moment ?
11. What are the types of asymmetric induction ?
12. What is chiral pool synthesis ?

(12 × 1 = 12 weightage)

**Section B**

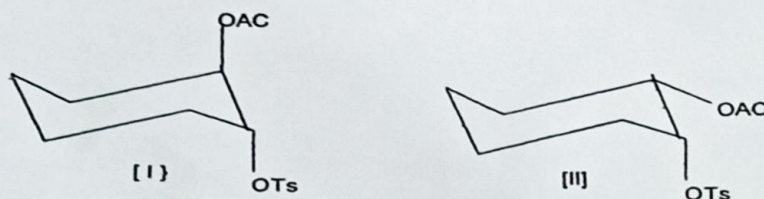
*Answer any eight questions.*

*Each question carries 2 weightage.*

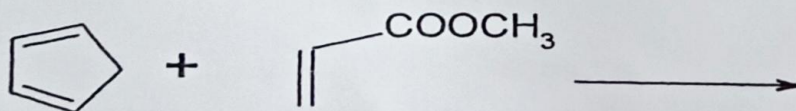
13. Represent the molecular orbitals of 1,3-butadiene and indicate the HOMO and LUMO under thermal and Photochemical conditions.

**Turn over**

14. Explain the conditions of aromatic nature of neutral and charged aromatic system with suitable examples.
15. Explain why the trans isomer (I) undergoes acetolysis 650 times faster than cis isomer (II), and both products have the same stereochemistry in both cases.



16. What is Evans - Polyani Principle ? Explain.
17. Explain why cis-4-hydroxycyclohexane carboxylic acid undergoes lactonization?
18. The IR Spectra of 1,2,2,6,6-Pentamethyl-4-hydroxy-4-phenylpiperidine indicates intramolecular hydrogen bonding. Explain.
19. Optically active 2-methyl-1, 2-Butandiol undergoes Wagner - Meerwein rearrangement to give a racemic mixture of products. Explain ?
20. What do you mean by dihedral angle ? Explain the variation of energy against dihedral angle of conformations of ethane.
21. a) What are the factors affecting the conformational stability ?  
b) Draw Newman and sawhorse projection formula of ethane.
22. Give the conformations of methyl cyclohexane. Which is more stable ? Why ?
23. Explain Cram's rule of asymmetric induction with a suitable example.
24. Predict major product for the reaction and explain :



(8 × 2 = 16 weightage)

**Section C**

*Answer any two questions.*

*Each question carries 4 weightage.*

25. Explain (a) Asymmetric induction - chiral auxiliaries and chiral pool (b) Asymmetric epoxidation using Jacobsen's catalyst.
26. (a) Define : (i) stereo isomerism (ii) optical isomerism.  
(b) Explain the concept of chirality.  
(c) Explain the Cis- Trans isomerism in cyclic compounds.  
(d) Explain the conformations of n-butane using potential energy level diagram.
27. (a) Elimination of HBr from 2 - bromobutane gives both cis and trans 2 - butane. Why ?  
(b) Explain the dehalogenation of stereomers of 2, 3-dibromobutanes.
28. What are the different factors affecting nucleophilic substitution reactions ? Explain.  
(2 × 4 = 8 weightage)