

C 32416

(Pages : 2)

Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2017

(CUCSS)

Chemistry

CH 1C 03—ORGANIC CHEMISTRY—I

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

**Section A**

*Answer all questions.*

1. Explain, with one example each, how (a) a C-C  $\sigma$  - bond, and (b) the  $\pi$  - system of a benzene ring respectively, could offer neighboring group participation in substitution reactions.
2. Comment on the aromaticity of (1E, 3Z, 5E, 7Z, 9Z)-[10]-annulene and its 1, 6-bridged derivatives.
3. Draw the Fischer projection of (2R, 3S)-2-methyl-3-phenylbutanal and one of its diastereomer.
4. Explain how chirality may arise based on molecular folding. Cite examples.
5. Illustrate the use of tartarate based chiral reagents in asymmetric synthesis.
6. Write an example of a dialkyl sulfoxide biased chiral auxillary and explain its synthetic use.
7. What is the use of conformationally biased systems in understanding reaction rates ? Explain with examples.
8. Comment on the rate of hydrolysis of isomenthol and neoisomenthol using conformational arguments.
9. What is the mechanism of nucleophilic addition to C = O bonds with O and N nucleophiles ? Why are such additions often followed by an elimination step ?
10. How can you oxidize cyclohexanol to cyclohexanone without using any of the usual oxidation reagents ? Write the reagents required and the steps involved.
11. Write one example each of two condensation reactions that PhCHO could undergo. Name these reactions and explain the mechanism.
12. What is the structure of cellulose and how can it be converted to rayon ?
13. Write the complete chemical structure of a piece of RNA containing just two nucleotides, but with a purine and the other with a pyrimidine base.
14. Write a short note on rubbers.

(14 × 1 = 14 weightage)

**Turn over**

**Section B**

*Answer any seven questions.  
Each question carries 2 weightage.*

15. Account for the antiaromaticity of cyclobutadiene by applying MO Theory.
16. What are the importance of the Hammett equation ?
18. What is meant by topicity ? Illustrate with examples, the different topicities.
19. Define chiral auxiliary. What are the uses of these compound in asymmetric synthesis ?
20. Write a brief note on Cram's rule and explain the Felkin-Ahn model with an example.
21. Show the effect of conformational factors on the nucleophilic substitution reactivity of rigid cyclohexanes.
22. Describe the conformers and their stability of : (a) butane, (b) 1, 2-dihydroxyethane and (c) threo-tartaric acid.
23. What are  $B_{AC}2$  and  $A_{AL}1$  mechanisms of ester hydrolysis ? What are their evidences ?
24. Describe how a peptide bond can be made during peptide synthesis.

(7 × 2 = 14 weightage)

**Section C**

*Answer any two questions.  
Each question carries 4 weightage.*

25. Discuss the application of perturbation theory to benzenoid systems.
26. Explain the common reactive intermediates in organic reactions. How do these form ? Describe their stability and physical and chemical detection methods.
27. Discuss the : (a) the significance of anchoring groups in conformational analysis of cyclic systems and (b) conformation and stability of the disubstituted cyclohexanes.
28. Discuss the effect of conformation on eliminations in cyclic systems.

(2 × 4 = 8 weightage)