

19P112

(Pages: 2)

Name:

Reg. No.

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2019

(CUCSS PG)

CC19P CHE1 C03 – STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS

(Chemistry)

(2019 Admission Regular)

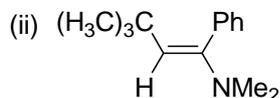
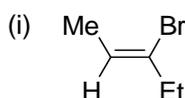
Time: Three Hours

Maximum: 30 Weightage

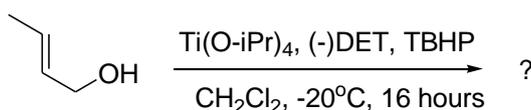
Section A

Answer any *eight* questions. Each question carries 1 weightage.

1. Comment on the stability of hydrates of glyoxal, chloral and ninhydrin.
2. Explain Bredt's rule with suitable example.
3. Illustrating examples, explain thermodynamic control and kinetic control of reactions.
4. State and explain Hammond's postulate.
5. Giving examples, briefly explain any two factors that affect conformational stability of molecules.
6. Draw and explain the most stable conformation of *cis*-1-*tert*-butyl-4-methylcyclohexane.
7. The bridgehead adamantyl tosylate does undergo S_N1 reaction extremely slowly and it does not undergo S_N2 reaction. Validate the statement.
8. Assign the *E* or *Z* notation for the following compounds.



9. Giving examples, differentiate stereoselective and stereospecific reactions.
10. Predict the product of the following reaction with stereochemistry.



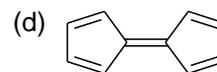
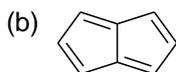
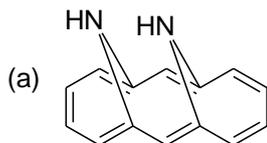
(8 x 1 = 8 Weightage)

Section B

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

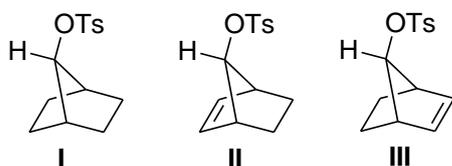
11. Classify the following compounds as aromatic, *anti*-aromatic or non-aromatic.

Rationalize your answer.

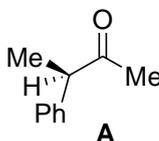


12. Write a brief note on different methods of resolution.
13. State Curtin-Hammett principle. How do you apply this principle in the dehydrochlorination of chlorocyclohexane.

14. Arrange the following compounds **I**, **II** and **III** in the increasing order of their rate of reaction on acetolysis. Find out the product with stereochemistry in each case and give reason.



15. Explain dehydrohalogenation of *erythro*- and *threo*-bromo-1,2-diphenylpropane.
 16. Explain the asymmetric hydroboration reaction using IPCBH_2 and IPC_2BH .
 17. Describe optical isomerism in: (i) Biphenyls; (ii) Allenes.
 18. Draw the structure of Felkin-Ahn model for the LiAlH_4 reduction of **A** and predict the major and minor product.



(6 x 2 = 12 Weightage)

Section C

Answer any *two* questions. Each question carries 5 weightage.

19. (a) Emphasizing the significances of Hammett parameters, explain Hammett equation. (2wt.)
 (b) What are linear free energy relationships? Derive Hammett linear free energy relationship. (1 wt.)
 (c) Explain Taft equation and its advantages over Hammett equation. (2 wt.)
 20. Illustrating examples, explain aromaticity, *anti*-aromaticity, *homo*-aromaticity and *hetero*-aromaticity.
 21. Using conformational arguments, compare and explain the course and rate of reactions in:
 (i) Esterification of methanol, isomenthol, neomenthol, and neoisomenthol. (2 wt.)
 (ii) Eliminations of *cis* and *trans* isomers of 4-*t*-butylcyclohexyl tosylate and phenylcyclohexanol. (2 wt.)
 (iii) Oxidation of the conformers of cyclohexanols by chromic acid. (1 wt.)
 22. With appropriate examples, illustrate the use of chiral pool, chiral auxiliary, chiral reagent and chiral catalysts in asymmetric synthesis. Mention the merits and demerits in each case.

(2 x 5 = 10 Weightage)
