

(Pages: 3)

15P112

Name: .....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE EXTERNAL EXAMINATION FEBRUARY 2016**

(2015 Admission)

**CC15P CH1 C03 – Structure and reactivity of Organic compounds**

(Chemistry)

**Time: Three Hours**

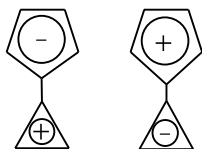
**Maximum: 36 Weightage**

**Section A** (Short answer type)

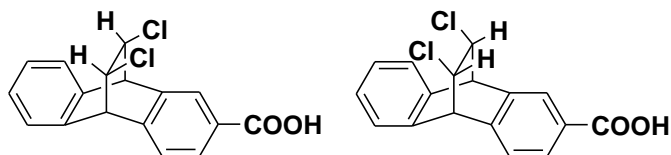
Answer **all** questions

*Each question carries 1 weightage*

1. What is meant by early transition state and late transition state?
2. Why maleic acid is stronger than fumaric acid?
3. What is meant by cross conjugation and homo conjugation?
4. Which resonance form is more reasonable and why?



5. Among the following which is the stronger acid and why?



6. What is Baeyer strain?
7. What is the stable conformation of ethylene glycol? Justify your answer.
8. Among *cis*- and *trans*-ethyl 4-*tert*-butylcyclohexanecarboxylates which is more easily saponified and why?
9. Identify the most stable conformation of methyl-4-*tert*-butylcyclohexane-1-carboxylate. Justify your answer.
10. What are chiral auxiliaries? Give an example.
11. Using a Fischer projection of phenylacetaldehyde, identify its pro-R and pro-S hydrogens.

12. Distinguish between stereoselectivity and stereospecificity.

(12 x 1 = 12 weightage)

**Section B** (Short essay type)

Answer any **eight** questions

*Each question carries 2 weightage*

13. What are alternant and nonalternant hydrocarbons? Give examples.

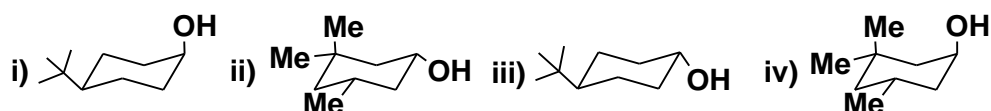
14. Discuss the conformers and their stability of 1,2-dichloroethane and ethylene glycol.

15. With the help of Frost's circle, draw the HMO energy level diagrams for cyclic polyenes with  $n = 3$  to  $n = 6$

16. What are Hammett acidity functions and how is it related to pH?

17. Discuss the relative rates of esterification of isomeric menthols.

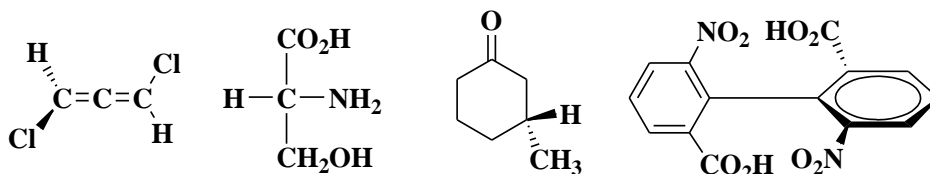
18. Arrange the following in the increasing order of reactivity towards chromic acid oxidation. Justify your answer.



19. Predict the different products formed from the four diastereomeric 2-bromo-4-phenylcyclohexanols when treated with base or  $\text{Ag}_2\text{O}$ .

20. Distinguish between relative configuration and absolute configuration? Give suitable examples.

21. Assign [R]/[S] notations for the following compounds.



22. Discuss the stereochemistry involved in Sharpless's asymmetric epoxidation.

23. Explain primary and secondary kinetic isotopic effects with suitable examples.

24. Explain the mechanism of diastereoselective aldol reaction using Zimmermann and Traxler model.

(8 x 2 = 16 weightage)

**Section C** (Essay type)

Answer any **two** questions

*Each question carries 4 weightage*

25. (a) Explain the Hammett and Taft equations and their significance in studying reactivity of organic compounds  
(b) Explain aromaticity using Hückel MO theory
26. (a) Draw the PE diagram for the different conformations of Cyclohexane  
(b) Discuss the effect of conformation on  $S_N1$  and  $S_N2$  reactions of equatorial leaving groups in flexible and rigid cyclohexanes.
27. (a) Give an account on enantiotopic, homotopic, diastereotopic hydrogens.  
(b) Explain the different kinds of chiral molecules with suitable examples.
28. Discuss the various approaches in asymmetric synthesis.

**(2 x 4 = 8 weightage)**

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