

16P112

(Pages:3)

Name: .....

Reg. No.....

**FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2016**

(Regular/Supplementary/Improvement)

(CUCSS-PG)

**CC15P CH1 C03 – STRUCTURE AND REACTIVITY OF ORGANIC COMPOUNDS**

(Chemistry)

(2015 Admission Onwards)

Time: Three Hours

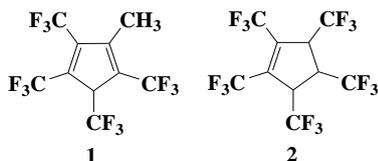
Maximum: 36 Weightage

**Section A** (Short answer type)

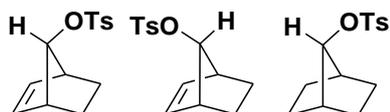
Answer **all** questions

*Each question carries 1 weightage*

1. What are inclusion compounds?
2. What are classical and nonclassical carbocations? Give examples.
3. Why cyclobutane has a puckered conformation?
4. Among the following which is more acidic and why?

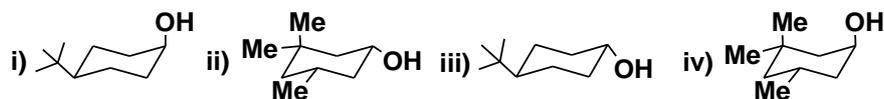


5. The rate of acetolysis of the three tosyl derivatives shows marked difference. Explain.



6. What are ylids? Give an example.
7. What are conformationally biased molecules? Give an example.
8. Among neomenthyl chloride and menthyl chloride which undergoes **E2** elimination more easily and why?
9. Draw the chair conformations of *cis*- and *trans*-decalins.
10. Using a Fischer projection of phenylacetaldehyde, identify its pro-**R** and pro-**S** hydrogens.
11. Define optical purity.

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



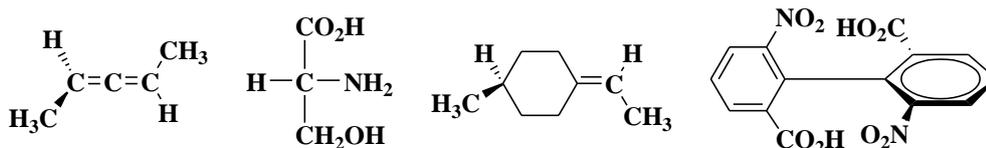
(12 x 1 = 12 weightage)

**Section B** (Short essay type)

Answer any **eight** questions

Each question carries **2** weightage

13. Explain cross conjugation and homo conjugation with examples.  
 14. Azulene is blue coloured where as naphthalene is colorless even though both are isoelectronic species. Why?  
 15. What is Marcus theory? What is its significance?  
 16. What are Hammett acidity functions and how is it related to pH?  
 17. Draw the PE diagram for the different conformations of n-butane.  
 18. The saponification rate of *cis*-ethyl 4-*tert*-butylcyclohexanecarboxylate is about 20 times less than that of the *trans*- isomer. Explain.  
 19. Discuss about the relative rates of esterification of isomeric menthols.  
 20. Discuss about the conformers and their stability of 1,2-dichloroethane and ethylene glycol.  
 21. Assign [R]/[S] notations for the following compounds.



22. Explain the stereochemistry involved in Sharpless's asymmetric epoxidation.  
 23. Explain the different kinds of chiral molecules 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) What are annulenes? How is NMR technique useful in determining the aromaticity of annulenes.
- (b) Derive Hammett equation and explain its significance.
26. (a) Predict the different products formed from the four diastereomeric 2-bromo-4-phenylcyclohexanols when treated with base or  $\text{Ag}_2\text{O}$ .
- (b) Discuss the effect of conformation on  $\text{S}_{\text{N}}1$  and  $\text{S}_{\text{N}}2$  reactions of equatorial leaving groups in flexible and rigid cyclohexanes.
27. (a) Explain the various methods for resolution of racemates.
- (b) Give an account on enantiotopic, homotopic, diastereotopic hydrogens.
28. Discuss about
- (a) Felkin-Ahn model of Cram's rule in predicting the stereochemistry of the reaction between Grignard reagent and chiral aldehydes.
- (b) Chiral auxiliaries and their use in asymmetric Diels-Alder reaction.

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

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