



I Semester M.Sc. Examination, January 2015
(CBCS)
Chemistry
C-102: ORGANIC CHEMISTRY – I

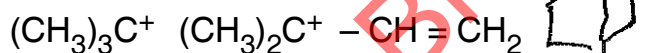
Time : 3 Hours

Max. Marks : 70

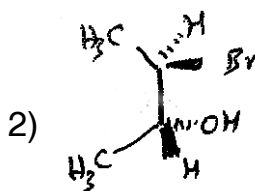
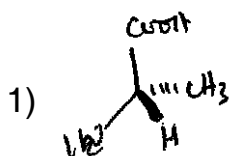
Instruction : Answer question No. 1 and **any five** of the remaining questions.

1. Answer **any ten** of the following. (2×10=20)

- What is hyper conjugation ?
- Tropylium bromide behaves as an ionic compound. Why ?
- What is called a homo aromatic compound ? Give an example.
- Arrange the following carbocations in order of their increasing stability with reasons.



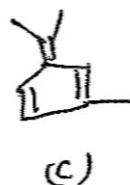
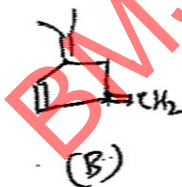
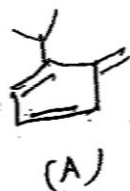
- What is Curtin-Hammet principle ?
- Benzoic acid is less acidic than 2, 6-dimethyl benzoic acid. Explain this observation.
- What is Taft equation ?
- Assign the R/S notations for the following compounds



- Outline the synthesis of Gluconic acid.



- j) A compound with formula $C_3H_8O_2$ has two OH groups and is chiral. What is its structure ?
- k) Write the structures of product(s) obtained from the reaction of indole with
- $HCHO + (CH_3)_2NH$.
 - Perbenzoic acid.
- l) Outline the synthesis of 2, 5, 6-triamino- 4- hydroxy pyrimidine (used in the synthesis of Folic acid).
2. a) One of the following hydrocarbons is much more acidic than the other two. Justify your answer considering the stability of their conjugate bases.



- b) Explain the concept of thermodynamic and kinetic control of a reaction using the example of the reaction of an unsymmetrical ketone with a base. **(5+5=10)**
3. a) Azulene possesses dipole moment 1.0D and electrophilic substitution in it occurs at the position-1 of the five membered ring. Provide explanation.
- b) Write a note on isotope label studies in determining organic reaction mechanisms with a suitable example.
- c) Discuss briefly the following two factors influencing the relative reactivity in substitution reactions.
- The nature of the nucleophile
 - The nature of the leaving group.
- (3+3+4=10)**



4. a) Define :
- i) enantiomers and
 - ii) diastereoisomers.
- Give examples.
- b) Isomers of $\text{CH}_3\text{CH}=\text{CHCH}_3$ differ widely in chemical properties but those of $\text{CH}_3\text{CH}=\text{C}=\text{CHCH}_3$ do not – Why ?
- c) Explain why cis-5-t-butyl-2-methyl cyclohexanone is isomerised to the trans-isomer in the presence of a base. **(3+3+4=10)**
5. a) What are the topicities of H atoms of the $-\text{CH}_2-$ group and faces of the $\text{>C}=\text{O}$ group in benzyl methyl ketone ($\text{CH}_3\text{COCH}_2\text{Ph}$) ? How are the topicities of methylene and carbonyl carbon changed when they are separately converted into a chiral centre ?
- b) State and explain Cram's rule with suitable examples. **(5+5=10)**
6. a) Give a brief note on conformational analysis of D-Glucose.
- b) Elucidate the structure of sucrose. **(5+5=10)**
7. a) Discuss the various methods of formation of pyrazole and isothiazole. What are the important chemical reactions of pyrazole and isothiazole ?
- b) How would you prepare:
- i) Coumarin and
 - ii) quinoxaline ?
- Discuss some typical chemical reactions of coumarin. **(5+5=10)**
8. a) How would you establish the nature of the sulphur atom in biotin ? Outline the synthesis of biotin.
- b) Write a note on Vitamin K_1 and vitamin K_2 . **(5+5=10)**
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