



I Semester M.Sc. Degree Examination, January 2015
(2010 – 11 Onwards Scheme) (NS)
CHEMISTRY
C 102 : Organic Chemistry – I

Time : 3 Hours

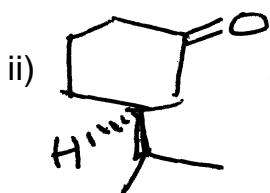
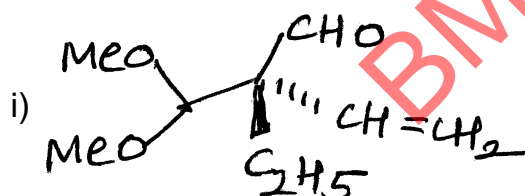
Max. Marks : 80

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

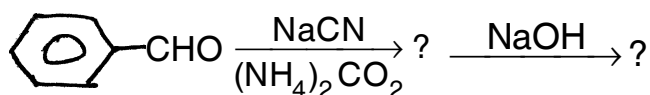
Answer **any ten** of the following :

(2×10=20)

1. a) Based on HMO approach, define bonding and antibonding orbitals.
- b) What are singlet and triplet nitrenes ? Which is more stable and why ?
- c) Which of the following is stronger acid and why ?
 $\text{ClCH}_2\text{CH}_2\text{COOH}$ and $\text{CH}_3\text{CHClCOOH}$
- d) What are ambident nucleophiles ? Give examples.
- e) Write the Fisher projection formula for threo-3-chloro-2-butanol.
- f) Assign the configuration (R or S) for :



- g) Predict the product in the following :



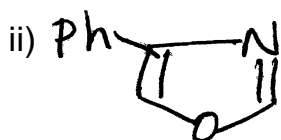
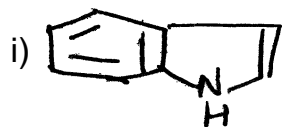
- h) Give the structures of dipeptides obtained by the condensation of tyrosine and phenyl alanine.
- i) Write the structures of C – 2 and C – 3 epimers of D – (+) – glucose.

P.T.O.

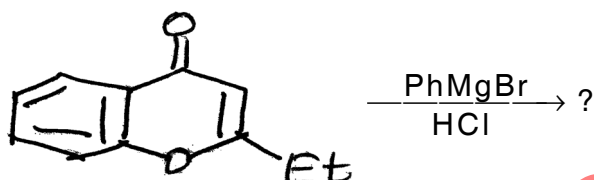


j) Explain Hudson's lactone rule.

k) Give the IUPAC name of the following compounds :



l) Predict the product and propose mechanism :



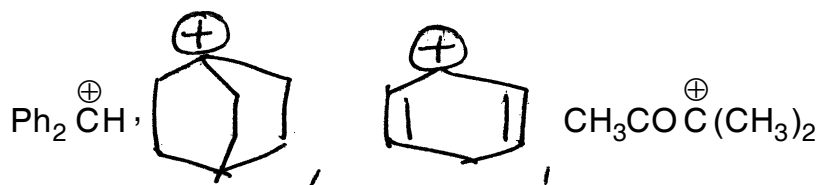
2. a) What are antiaromatic and homoaromatic compounds ? Give examples.

b) Indicate whether the following compounds are aromatic or not on the basis of HMO theory.



c) State and explain Curtin-Hammett principle with suitable examples. (3×4=12)

3. a) Arrange the following carbocations in the order of increasing stability. Give reasons.



b) Write briefly on the study of intermediates in the determination of reaction mechanisms.

c) Discuss the effect of substrate and leaving group in $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ reactions. (3×4=12)

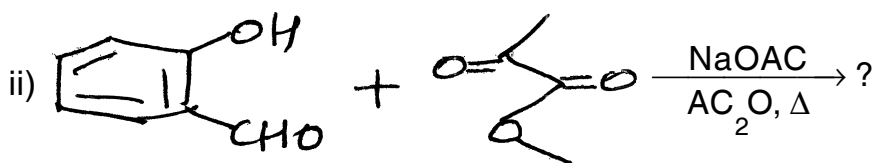
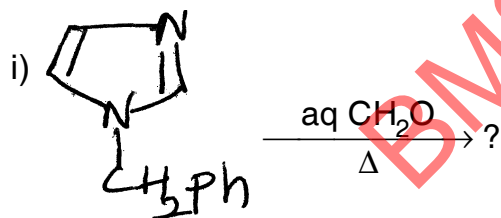


4. a) Explain the optical isomerism in allenes and spiranes.
b) Give an account of conformational analysis of 1, 3– and 1, 4–cyclohexanediols.
c) Discuss the relationship between optical activity and elements of symmetry. **(3×4=12)**

5. a) Outline the synthesis of alanine using malonic ester.
b) Describe any two methods of determination of N-terminal amino acid of a polypeptide.
b) Give an account of Merrifield synthesis of the following tripeptide.
 $\text{H}_2\text{N} - \text{Ala} - \text{Gly} - \text{Cys} - \text{CO}_2\text{H}$ **(3×4=12)**

6. a) Explain the mechanism of mutarotation.
b) Give the steps involved in Kiliani – Fischer synthesis.
c) Discuss the various steps involved in structural elucidation of sucrose. **(3×4=12)**

7. a) Complete the following reactions and suggest suitable mechanism :



- b) Give any two methods for the synthesis of following heterocycles.
i) imidazole
ii) pyrimidine
iii) flavone. **(6+6=12)**
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