

Seat No.	
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M.Sc. (Part - I) (Semester - I) Examination, March - 2023

CHEMISTRY - I (NEP)

CC-102 : Organic Chemistry - I (Paper - II)

Sub. Code : 87850

Day and Date : Thursday, 22 - 06 - 2023

Total Marks : 80

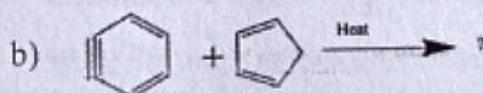
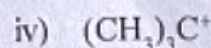
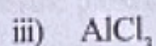
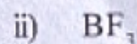
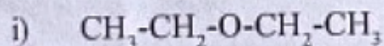
Time : 02.30 p.m. to 05.30 p.m.

- Instructions :
- 1) Attempt any five questions.
 - 2) Question no. 1 is compulsory.
 - 3) All questions carry equal marks.
 - 4) Answers to the all questions (Section-I AND II) must be written in the same answer book.
 - 5) Figure to the right indicate marks.
 - 6) Attempt at least two questions from section-I and any two questions from Section-II.

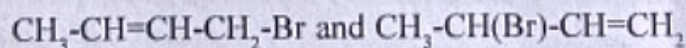
Q1) Answer the following :

[16]

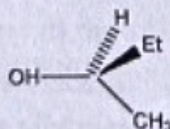
a) Which of the following is not an electrophile?



c) Identify the chiral and achiral from the following pair and justify your observation _____

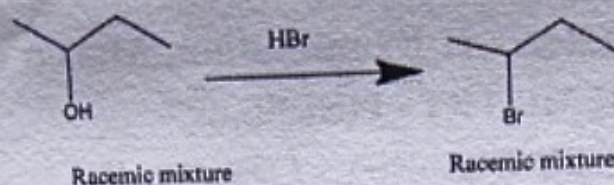


d) Assign R or S configuration to the following molecule.



P.T.O.

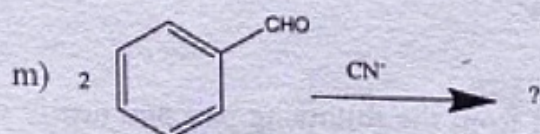
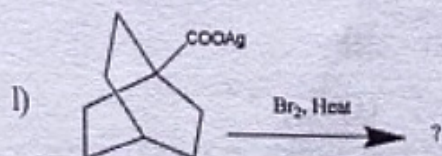
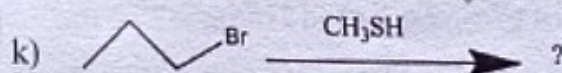
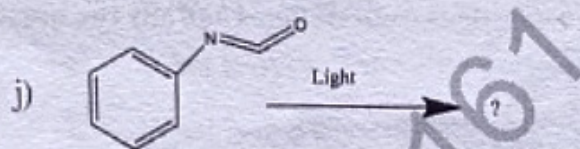
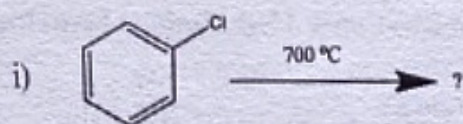
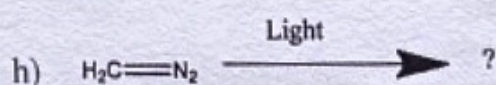
- e) Comment your opinion on the following observation with respect to stereochemistry of the product and reactant.



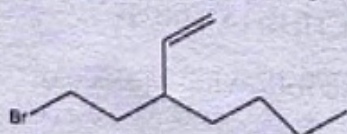
- f) A Homolytic bond cleavage produces _____ as an intermediate.

- g) The weakest base is _____.

- i) Br^- ii) Cl^-
 iii) I^- iv) F^-



- n) Name the following using systematic IUPAC nomenclature.



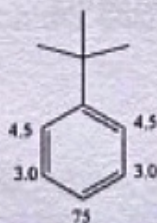
- o) Enlist the main types of reactions in organic chemistry.
 p) Which product will be formed in nitration of salicylic acid?

SECTION - I

- Q2) a)** A single organic product was obtained when 1-bromo-1-chloro propane was allowed to react with one molar equivalent of sodium cyanide in aqueous ethanol. What was this product? Write the reaction involved in it and justify your answer. [4]
- b)** Suggest a structure of the product of nucleophilic substitution obtained by solvolysis of tert-butyl bromide in methanol. Outline a reasonable mechanism involved in it and comment on the stereochemistry of the product with reason. [8]
- c)** Put your opinion on the reactive rate of S_N2 displacement of 1-bromobutane by azide in the following solvents. [4]
- | | |
|--------------------------|------------------------------|
| i) Methanol | ii) Water |
| iii) Dimethyl sulphoxide | iv) N,N'-dimethyl formamide. |

- Q3) a)** Explain the mechanism and applications of the Dakin and Vilsmeier Haack reaction. [8]
- b)** Write a note on the stereochemistry of allenes. [4]
- c)** Discuss the mechanism of halogenations in aromatic systems. [4]

- Q4) a)** Give the structure of the compound obtained when benzene is acylated with succinic anhydride in the presence of $AlCl_3$. Elaborate on the mechanism of this reaction and give some applications of acylation in synthetic organic chemistry. [8]
- b)** The rates of nitration relative to a single position of benzene of the various positions of ter-butyl benzene are as follows. [8]

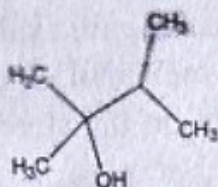


Based on this observation answer the following questions

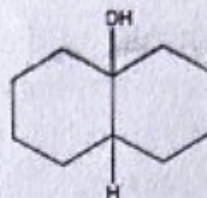
- i) How reactive is ter-butyl benzene to words nitration compared with benzene?
- ii) How reactive is ter-butyl benzene to words nitration compared with toluene?

SECTION - II

- Q5) a) Each of the following alcohols has been subjected to acid-catalyzed dehydration and yields a mixture of two isomeric alkenes. Identify the two alkenes in each case and predict which one is the major product on the basis of the Zaitsev rule. [4]



I



II

and

- b) Describe the aromatic properties of tropolone. [4]
 c) Discuss the following reactions with respect to their mechanism and applications. [8]
 i) Benzoin Condensation ii) Robinson Annulation

- Q6) a) Discuss the resolution of a racemic mixture of phenyl ethyl amine using (S) (-) malic acid as a resolving agent. [8]
 b) Which of the isomeric alcohols has the mol. formula $C_5H_{12}O$ are chiral? Which are achiral? [4]
 c) Identify the more stable conformation with its structure in the following pair and give the reason for your choice. [4]
 Cis or trans-1-isopropyl-2-methyl cyclohexane.

- Q7) Write notes on any four of the following : [16]

- Generation of nitrenes
- Reactivity of Carbene.
- Stobbe Condensation
- Prochiral relationship
- Neighbouring group participation. (NGP)

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