



**UNIVERSITY OF NORTH BENGAL**  
B.Sc. Honours 4th Semester Examination, 2021

**CC9-CHEMISTRY**  
**ORGANIC**

Full Marks: 40

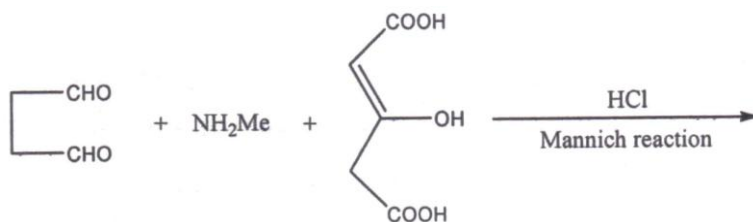
**ASSIGNMENT**

*The figures in the margin indicate full marks.  
All symbols are of usual significance.*

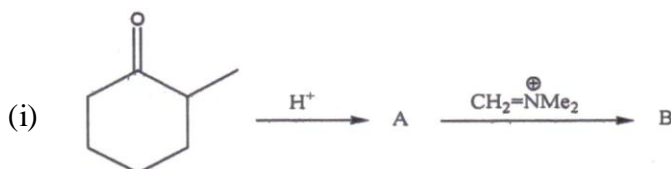
**Answer any four questions of the following**

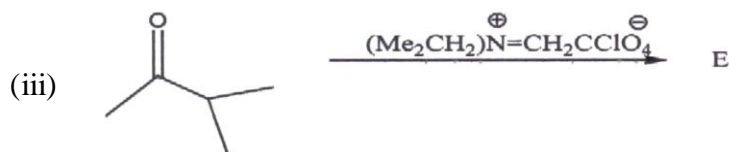
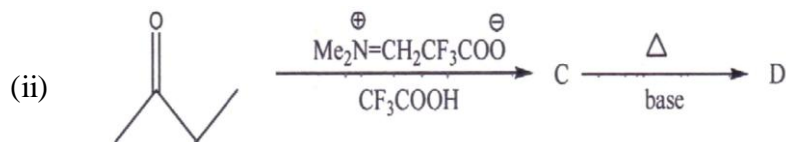
10×4 = 40

1. (a) Justify that cyanide ion is an ambident nucleophile. 2
- (b) Discuss the following reactions of methyl cyanide 3
  - (i) Hydrolysis.
  - (ii) Reaction with alcohols.
  - (iii) Reduction.
- (c) What happens when primary, secondary and tertiary nitroalkanes react with nitrous acid? 2
- (d) Predict the product: 3



2. (a) State the Hofmann empirical rule regarding thermal decomposition of quaternary ammonium salts. Illustrated the Hofmann elimination with suitable examples and mechanism. 2+2
- (b) Write down the three isomeric amines represented by the molecular formula  $C_6H_9N$ . Give a chemical method to distinguish them. 3+1
- (c) Why coupling reactions do not occur in strong acidic or strong alkaline medium? 2
3. (a) How would you differentiate between nitro alkanes and alkyl nitrites? 2
- (b) Give evidence that the beta carbon in Mannich Base comes from imminium ion. 3
- (c) Identify A – E: 5



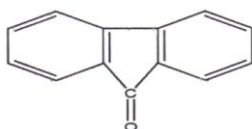


4. (a) Describe the Ing-Manske modification of Gabriel synthesis with an example. 2

(b) How can you carry out the following conversions? 2+2

(i) Phthalic acid into 9-methyl anthracene.

(ii) Phenanthrene into



(c) Account for the fact that anthracene undergoes many reactions across the 9, 10 positions. 2

(d) Explain why naphthalene undergoes electrophilic substitution preferentially at 1-position? 2

5. (a) Outline the Haworth synthesis of anthracene. 3

(b) How do you prove the bicyclic nature of naphthalene? 2

(c) Justify that pyridine-N-Oxide is more reactive compared to pyridine towards electrophilic and nucleophilic substitution reaction. 2

(d) Describe the Fischer Indole synthesis with mechanism. 3

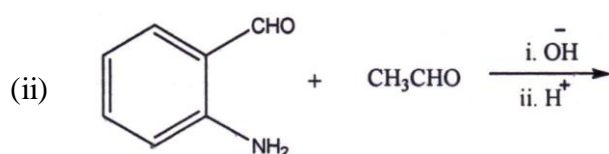
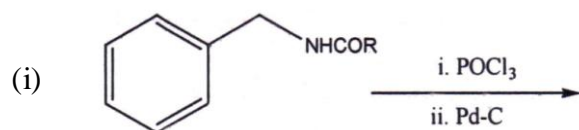
6. (a) What happens when Indole reacts with 3

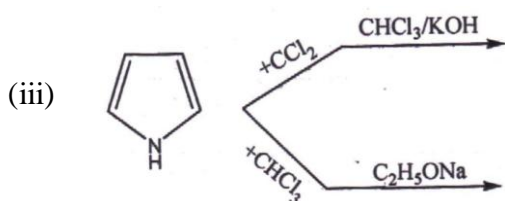
(i)  $\text{CHCl}_3$ , KOH

(ii)  $\text{C}_6\text{H}_5\text{N}_2\text{Cl}$ ,  $\text{H}^+$

(iii)  $\text{C}_6\text{H}_5\text{CO}_3\text{H}$

(b) Predict the products with plausible mechanism 2+2+3





7. (a) Prove that: 2+2+2

(i) 2- or alpha position of N-methylpyrrolidine ring is attached to 3-or beta position of pyridine nucleus in nicotine.

(ii) Citral is a di-unsaturated aldehyde.

(iii) Hygrinic acid is an N-methyl pyrrolidine.

(b) What is the structural difference between neral and geranial? 2

(c) How will you convert benzaldehyde into isoquinoline? 2

8. (a) Convert the following: (2½+2½+2½)

(i) Nicotine into nicotinic acid 2½

(ii) Succinimide into nicotine

(iii) Acetoacetic ester into hygrine

(b) Prepare citral using acetone and ethyne. 2½

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