

[This question paper contains 6 printed pages.]

Sr. No. of Question Paper : 2360 F-4 Your Roll No.....

Unique Paper Code : 2171401

Name of the Course : B.Sc. (H) Chemistry

Name of the Paper : Organic Chemistry (Paper-10)

Semester : IV

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt Six questions in all.
3. Question No. 1 carries 15 marks.
4. All other questions are of 12 marks each.

1. (a) Two moles of an ester A ( $C_4H_8O_2$ ) on Claisen condensation give compound B ( $C_6H_{10}O_3$ ). Compound B on treatment with sodium in ethanol followed by treatment with ethyl chloride gives compound C ( $C_8H_{14}O_3$ ). Compound C on ketonic hydrolysis gives D ( $C_5H_{10}O$ ) which gives iodoform test. Deduce the structure of A, B, C and D. (4)

(b) Give reasons for the followings (any three) :

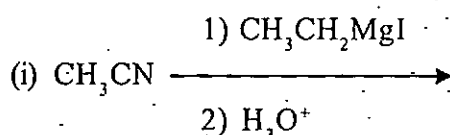
- (i)  $C_1-C_2$  bond of Naphthalene has a greater double bond character than  $C_2-C_3$  bond.
- (ii) Pyridine does not undergo Friedel Crafts alkylation.
- (iii) 1-Nitronaphthelene cannot be prepared from nitrobenzene by Haworth synthesis.

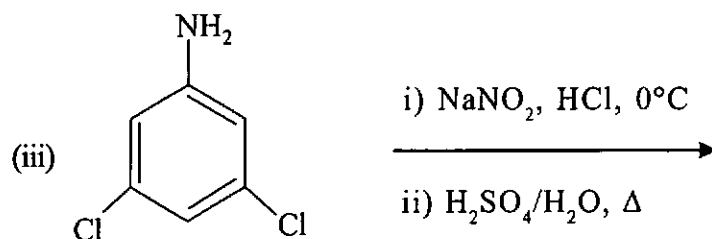
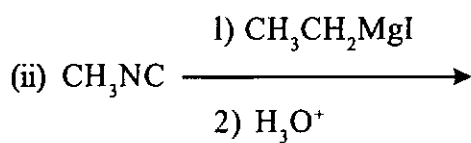
P.T.O.

- (iv) Anthracene undergoes electrophilic substitution at 9-position in preference to 1-position. (2×3=6)
- (c) What are the two factors responsible for acidity of methylene hydrogens in ethyl acetoacetate? (3)
- (d) Enol form of acetyl acetone is more stable than that of acetone. (2)
2. (a) The most important property of nitroalkanes is their acidity. Justify this statement. (2)
- (b) What products are obtained by reduction of nitrobenzene under alkaline condition? (3)
- (c) Convert nitrobenzene to 1,3,5 -tribromobenzene or 3-bromo-chlorobenzene. (4)
- (d) Discuss the mechanism of Curtius rearrangement or Schmidt rearrangement. (3)
3. (a) Give an account of Eschweiler Clarke methylation.

OR

- How will you distinguish between aniline, N-methylaniline and N, N-dimethyl aniline using Hinsberg test? (3)
- (b) Explain why nitriles are less basic than primary amines. (2)
- (c) Discuss the mechanism of base-catalysed hydrolysis of nitriles to amides. (3)
- (d) How is phenyl isocyanide formed? (1)
- (e) Complete the following reactions :





(1×3=3)

4. Give reasons for the following :

- Cope elimination of amine oxide is a cis elimination reaction.
- 2, 4, 6-Trinitro-N, N-dimethylaniline is a much stronger base than 2,4, 6-Trinitroaniline.
- Propanamide on treatment with bromine and NaOH gives ethylamine.
- Strong acidic condition prevents coupling reaction of arylamines.

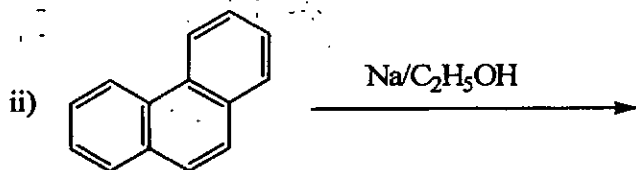
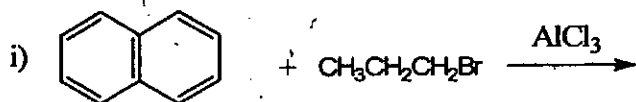
(3×4=12)

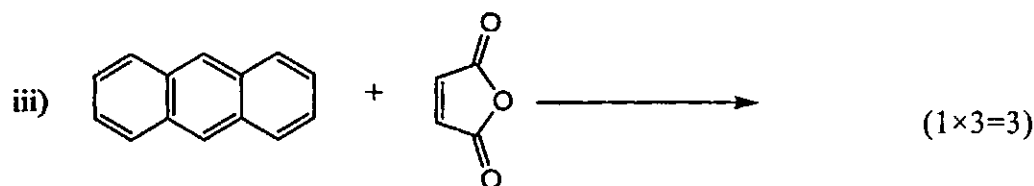
5. (a) Elucidate the structure of Naphthalene. (3)

(b) Synthesize Phenanthrene by Haworth synthesis. (4)

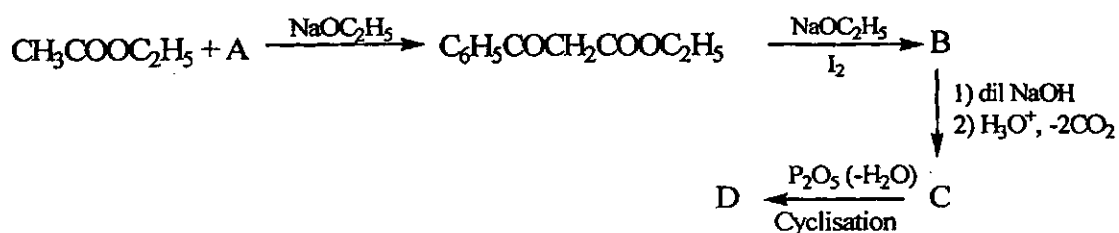
(c) Why does oxidation reaction takes place at 9, 10 position in anthracene. (2)

(d) Complete the following reactions





6. (a) Identify compounds (A) to (D)



(4)

(b) Give suitable reasons for the following :

(i) Electrophilic substitution in pyridine is favoured at 3-position.

(ii) Pyrrole is as reactive as phenols and aryl amines.

(iii) Piperidine is more basic than pyridine.

(iv) Pyridine and sodamide gives 2-aminopyridine. (2×4=8)

7. (a) Explain why electrophilic substitution occurs at 5 and 8 position and nucleophilic substitution at 1-position in isoquinoline. (4)

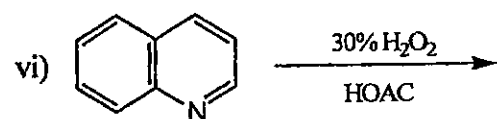
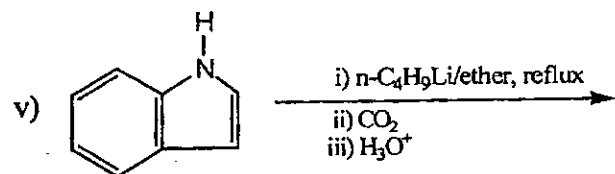
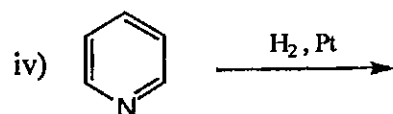
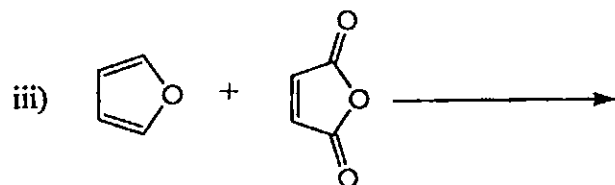
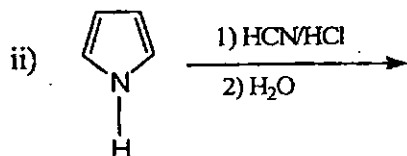
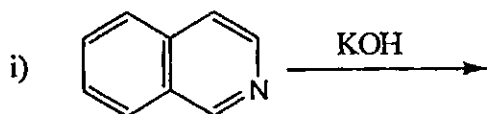
(b) Write short notes (any two) of following :

(i) Hantzsch synthesis of substituted pyrrole or pyridine

(ii) Fischer-Indole synthesis

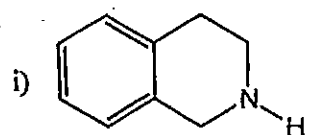
(iii) Skraup synthesis of quinoline (4×2=8)

8. (a) Complete the following reactions (any five) :

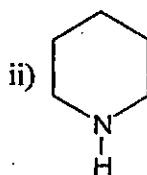


(1×5=5)

(b) Indicate the product of Hofmann exhaustive methylation followed by Hofmann elimination in any one of the following compounds.



1,2,3,4-tetrahydroisoquinoline



Piperidine

(3)

(c) Synthesise any two of the following using a suitable active methylene compound.

(i) Crotonic acid

(ii) Antipyrine

(iii) Acetylacetone

(2×2=4)