

Total number of printed pages-8

3 (Sem-4/CBCS) CHE HC2

2023

CHEMISTRY

(Honours Core)

Paper : CHE-HC-4026

(Organic Chemistry-III)

Full Marks : 60

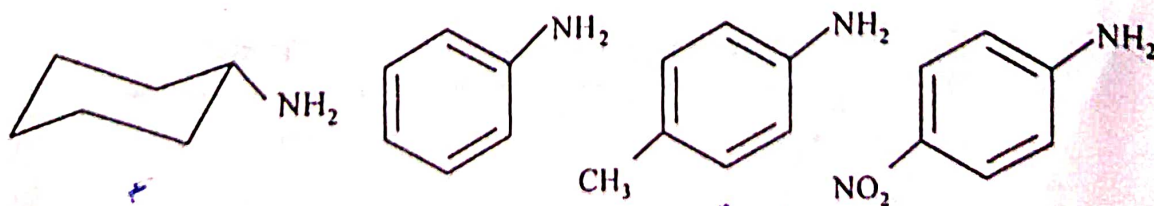
Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 7 = 7$

(i) Draw and name the isomer of nitromethane.

(ii) Arrange the following in the decreasing order of basicity :

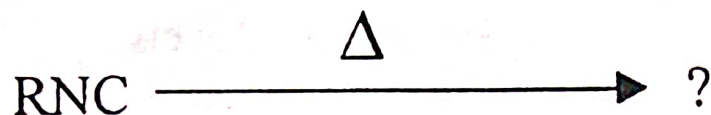


Contd.

(iii) Mention one medicinal importance of hygrine.

(iv) Draw the Z-form of citral.

(v) Write the product of the following :



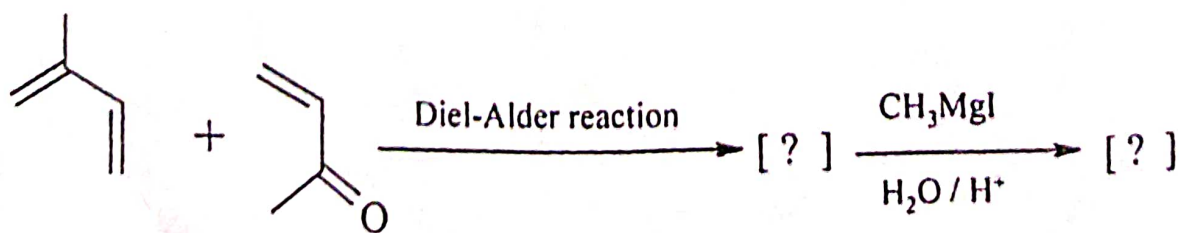
(vi) What happens when a mixture of acetylene and HCN is passed through red hot tube ?

(vii) What class of alkaloid does nicotine belong to ?

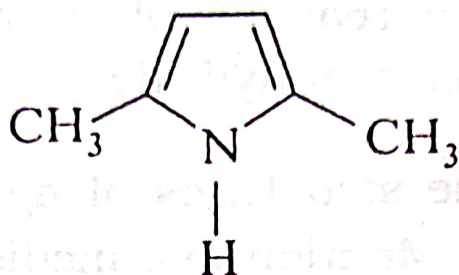
2. Answer the following questions : $2 \times 4 = 8$

(a) Define terpenoids using special isoprene rule.

(b) Identify the products :



- (c) Write down the Paal-Knorr synthesis of the following :



- (d) Define and classify PAH.

3. Answer **any three** questions from the following : 5×3=15

- (a) How will you prepare $\text{CH}_3\text{CH}_2\text{NH}_2$ by Gabriel synthesis ? Elaborate Hinsberg test to distinguish 1° , 2° and 3° amine.

2+3=5

- (b) Alkylhalide reacts with KCN to give alkylcyanide while it reacts with AgCN to give alkylisocyanide. Explain with mechanism.

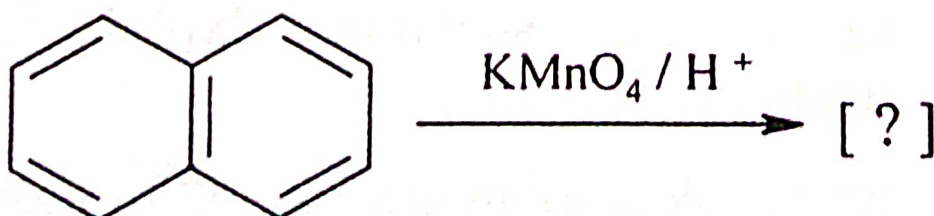
- (c) Write Skraup synthesis of quinoline with mechanism.

(d) Give the structure and name of a 5-membered heterocyclic compound which shows Diel-Alder reaction. Write Diel-Alder reaction of your compound with maleic anhydride. $2+3=5$

(e) Write the structures of morphine and cocaine. Mention one medicinal use in each case. $2+2+1=5$

4. Answer **any three** questions from the following : $10 \times 3 = 30$

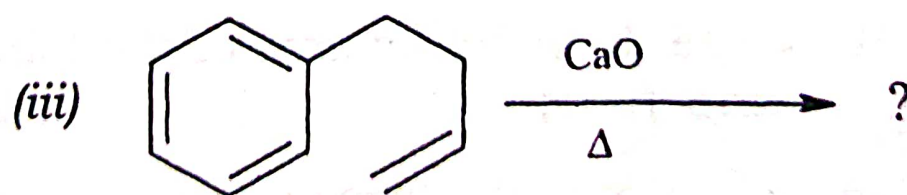
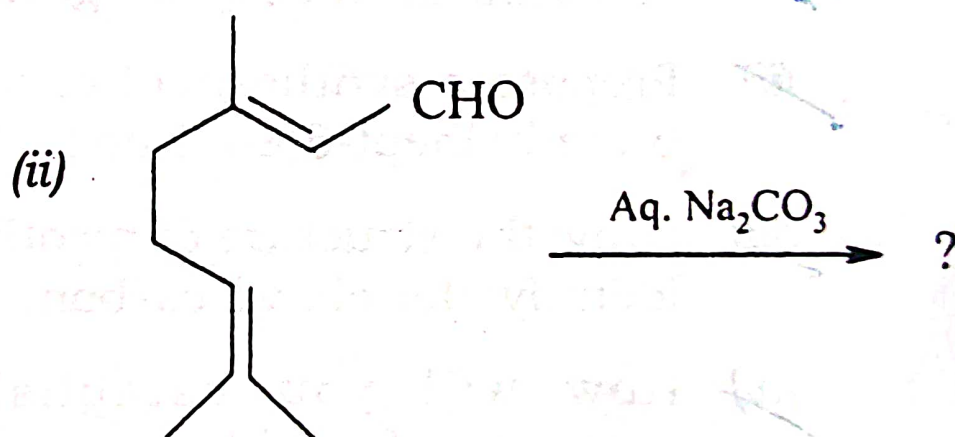
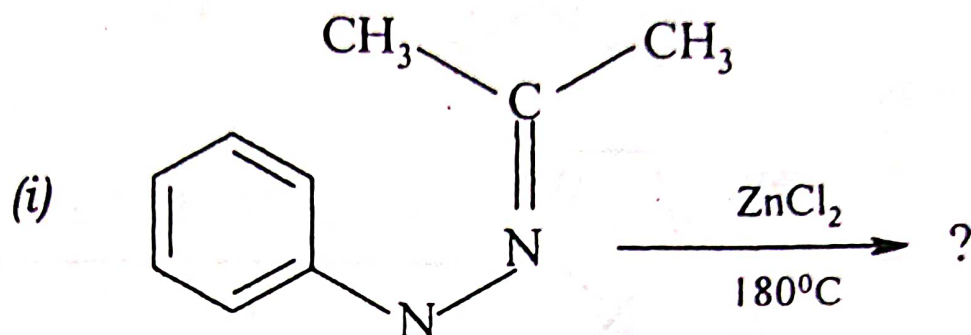
(a) Mention a method of synthesis of naphthalene. Draw the resonating structures of naphthalene and apply Fries rule to identify the most stable structures. Explain why naphthalene undergoes electrophilic substitution reaction preferably at α -position. Write down the product of the following reaction :

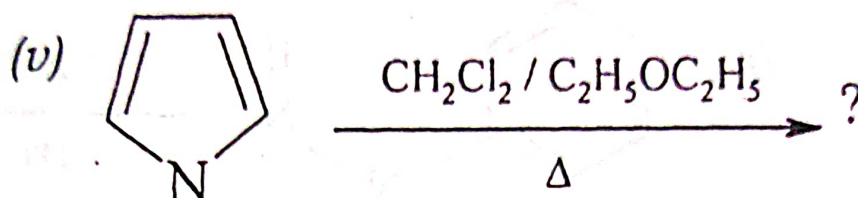
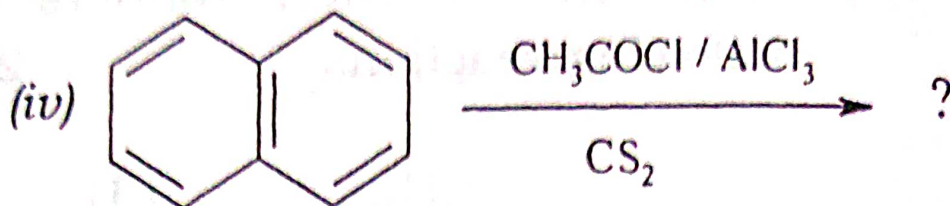


$$2+2+2+3+1=10$$



(b) Write the product/products of the following reactions : $2 \times 5 = 10$





(c) (i) How will you confirm that citral contains an aldehydic group ? 2

(ii) Propose a synthesis of citral from 6-methylhept-5-en-2-one. 4

(iii) Draw the structure of nicotine and identify the chiral carbon. 1

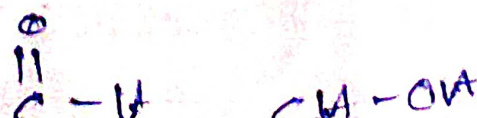
(iv) How will you establish the presence of pyridine nucleus in nicotine. 3

(d) Write the mechanisms of the following :
(any four) $2\frac{1}{2} \times 4 = 10$

(i) Hoffman degradation of amide

(ii) Reaction of diazotised aniline with alkaline β -naphthol

(iii) Chichibabin reaction



(iv) Hydrolysis of alkyl cyanide

(v) Conversion of indole into quinoline

(vi) Mannich reaction

(vii) Bischler-Napieralskiol synthesis of isoquinoline

(e) Starting from Ph-NO₂ (Nitrobenzene), how will you prepare the following ?

2×5=10

(i) Ph-OH $\xrightarrow{\text{NO}_2} \text{Ph-NO}_2 \xrightarrow{\text{Fe/HCl}} \text{Ph-NH}_2 \xrightarrow{\text{NaNO}_2/\text{HCl}} \text{Ph-N}^+\equiv\text{N}^-$

(ii) Ph-COOH $\xrightarrow{\text{H}_2\text{O}} \text{Ph-CO}_2\text{H} \xrightarrow{\text{H}_2\text{O}} \text{Ph-COOH}$

(iii) Ph-H $\xrightarrow{\text{H}_2\text{O}} \text{Ph-H}$

(iv) Ph-Br $\xrightarrow{\text{CuBr}/\text{HBr}}$

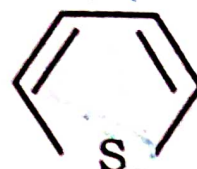
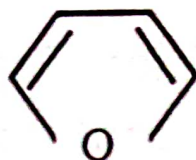
(v) Sym-tribromobenzene

(f) (i) How can you detect the presence of amino group in aniline using the diazotisation process ? Write the reactions involved. 3

(ii) What product is obtained when naphthalene is sulphonated at 80 °C ? What will happen if the temperature is raised to 165 °C ?

2

(iii) Arrange the following in order of decreasing reactivity towards electrophiles and explain : 2



(iv) How are terpenoids classified ?
Give one example each of the different class of terpenoids. 3
