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3 (Sem-4/CBCS) CHE HC 2

2025

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 : 1×7=7

- (a) Why does colourless aniline on storage turn brown ?
- (b) The aliphatic diazonium compound are unstable, why ?
- (c) What are heterocyclic compounds ?
- (d) Give one example of quinoline alkaloid.
- (e) In which class of alkaloid Nicotine belongs to ?

- (f) Which position of anthracene undergoes electrophilic substitution reaction under vigorous condition ?
- (g) Which monoterpene is present in lemon grass oil ?

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

- (a) How will you distinguish N-methylaniline and N, N-dimethylaniline ?
- (b) Why electrophilic substitution of pyridine undergoes at 3-position ?
- (c) How will you synthesize TNT from toluene ?
- (d) Write the structure of nicotine and mention *one* of its medicinal use.

3. Answer **any three** questions from the following : $5 \times 3 = 15$

- (a) Why do aliphatic nitro compounds dissolve in aqueous alkali ? How can CH_3CN and CH_3NC be prepared ? What do you get when they are subjected to acid hydrolysis ?
- $1 + 2 + 2 = 5$

- (b) Why electrophilic substitution of naphthalene predominantly give α -products ? Write the Haworth synthesis of naphthalene. $2 + 3 = 5$

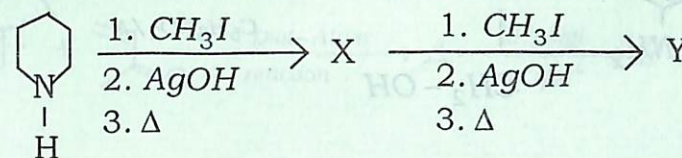
- (c) How is pyrrole synthesized ? What happens when pyrrole is treated with following reagents ? $2 + 3 = 5$

(i) Nitric acid in acetic anhydride at -10°C

(ii) Sulphur trioxide in pyridine

(iii) Bromine in alcohol

- (d) What are alkaloids ? What are the different classifications of alkaloids ? Find the products of the following reactions : $1 + 2 + 2 = 5$



- (e) What is the relationship between geraniol and nerol ? How will you establish the structure of geraniol ? $2 + 3 = 5$

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

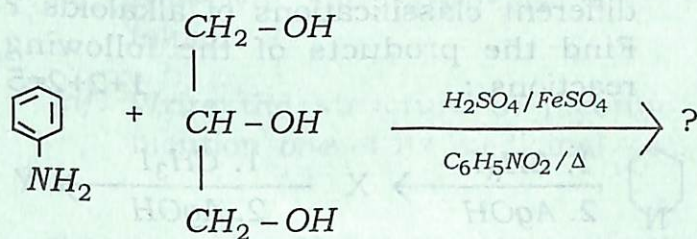
(a) (i) Explain why

(a) Pyridine is more basic than pyrrole.

(b) Pyridine doesn't undergoes Friedel-Crafts reaction.

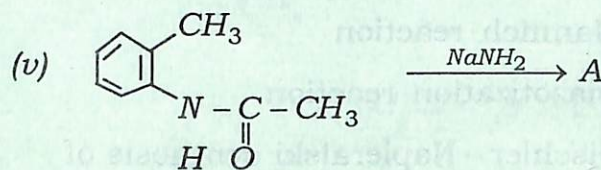
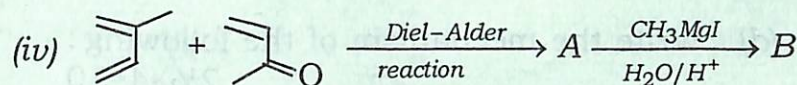
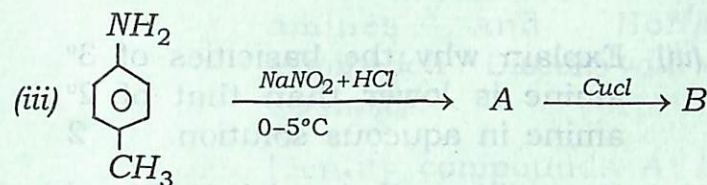
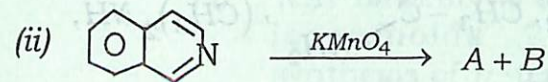
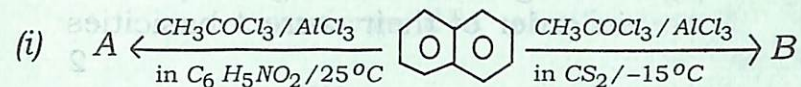
$2+2=4$

(ii) Write the products of the following reaction and also explain the mechanism :



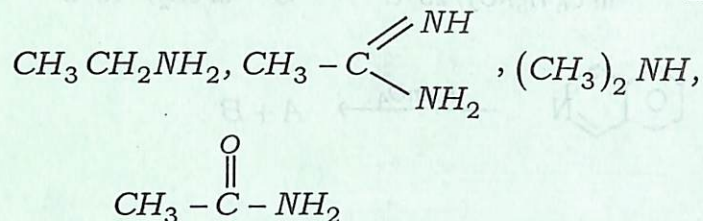
What is the role of FeSO_4 in the above reaction? $1+4+1=6$

(b) Write the products A and B in the following reactions : $2 \times 5 = 10$



(c) (i) Write down Hantzsch synthesis of pyridine. 2

(ii) Arrange the following compounds in order of their correct basicities 2



(iii) Explain why the basicities of 3° amine is lower than that of 2° amine in aqueous solution. 2

(iv) How will you distinguish 1°, 2° and 3° amines using nitrous acid? 4

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

(i) Gabriel synthesis

(ii) Mannich reaction

(iii) Diazotization reaction

(iv) Bischler – Napieralski synthesis of isoquinoline

(e) (i) Explain the significance of Emde modification with suitable example. What type of alkaloids undergo this modification? 4+1=5

(ii) Why terpenoids are also known as isoprenoids? Discuss the synthesis of α -terpeniol from ethyl malonate. 1+4=5

(f) (i) What is exhaustive methylation of amines and Hoffmann's elimination? Discuss with suitable examples. 5

(ii) Identify compounds A, B, C, D and E in the following sequence of reactions: 5

