

Total number of printed pages-7

3 (Sem-4/CBCS) CHE HC 2

2021

CHEMISTRY

(Honours)

Paper : CHE-HC-4026

(Organic Chemistry - III)

Full Marks : 60

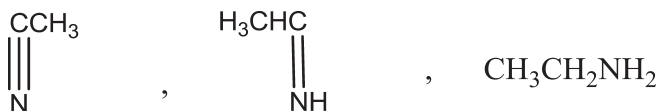
Time : Three hours

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

Group-A

1. Answer all questions : 1×5=5

(a) Arrange the following in order of decreasing basicity 1

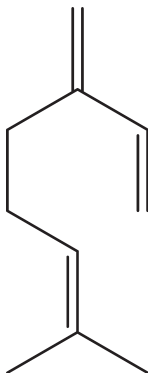


(b) What product is obtained when 2,4-hexanedione is heated with ammonium carbonate? 1

(c) Draw the structure of cocaine and give one medicinal use. 1

Contd.

- (d) What is the index of hydrogen deficiency of the compound given below? 1



- (e) Write the name and structure of *one* vitamin that contain a heterocyclic ring. Specify the heterocyclic ring. 1

2. Answer **all** questions : 2×5=10

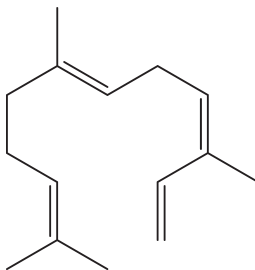
(a) Pyrrole is an extremely weak base. Explain. 2

(b) Pyridine is bad at electrophilic substitution. Why? 2

(c) Can biphenyl form a picrate derivative? Give reasons to justify your answer. 1+1=2

(d) What is the source of nicotine? What class of alkaloid does it belong to? 1+1=2

- (e) Identify the isoprene units in the molecule given 2



3. Answer **any three** among (a), (b), (c), (d) and (e):
5×3=15

(a) (i) Using appropriate chemical reactions to show that nicotine contains a pyridine nucleus.

(ii) Suggest a synthesis of nicotine. Write the reactions involved.

2+3=5

(b) What are terpenes? Describe their classification. Give *one* example of each classification.

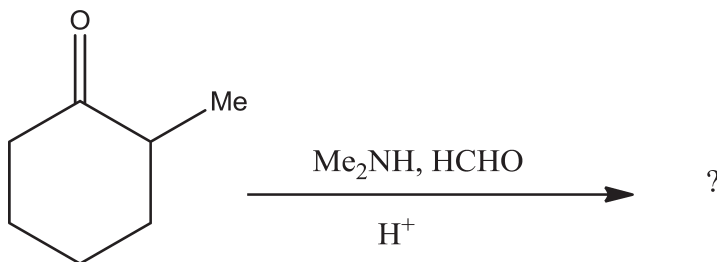
1+4=5

(c) (i) Explain why diazonium ion in a benzene ring cannot be used to direct incoming electrophile to the meta position.

(ii) How can you convert aniline to 1, 3, 5-tribromobenzene?

(iii) Why are diazonium salts explosive in nature? 2+2+1=5

- (d) Predict the product(s) likely to be formed in the following reaction and identify the major one. Propose a mechanism for the same. 5



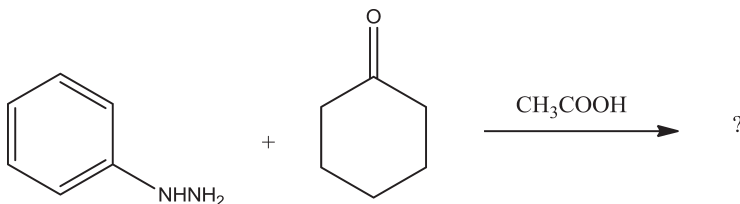
- (e) What happens when citral reacts with (a) Na-Hg (b) NH_2OH (c) O_3 (d) KMnO_4 ; CrO_3 (e) KHSO_4 ? Write the reactions involved in each case. 5

Group-B

Answer **any three** questions among **4, 5, 6, 7** and **8**: $10 \times 3 = 30$

4. (a) Distinguish between a primary, secondary and tertiary amine. Write the reactions involved. 3
- (b) Outline the reactions and reagents used to establish the structure of piperidine by exhaustive methylation and Hofmann elimination. 4

- (c) Arrange methylamine, dimethylamine and trimethylamine in increasing order of basicity. Explain the proposed order. 3
5. (a) Arrange pyrrole, furan and thiophene in order of decreasing aromaticity and provide an explanation. 2
- (b) Which position of furan is readily attacked by electrophiles and why? 3
- (c) Starting with glycerol, suggest a method for the synthesis of quinoline. Write all the steps involved, explaining in brief each step. 5
6. (a) Predict the product of the following reaction. Propose a mechanism for the reaction, clearly mentioning each step in brief. 5



(b) What happens when 2+2=4

(i) Pyrrole reacts with *DMF* and *POCl₃*?

(ii) Phenethylamide is treated with $POCl_3$?

Write the reactions involved.

(c) Name a medicinal compound in which quinoline is an important component.

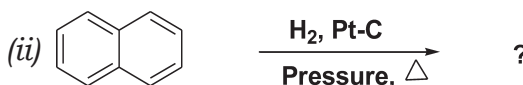
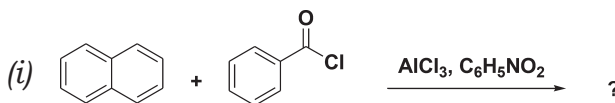
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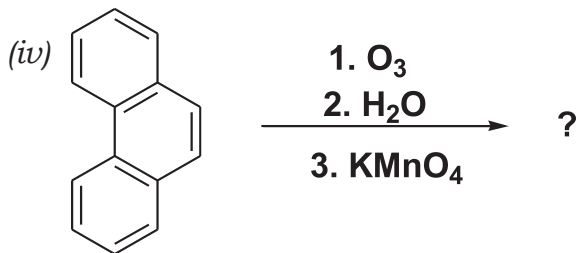
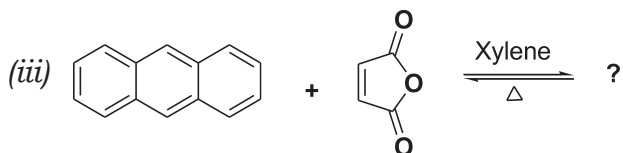
7. (a) "Naphthalene undergoes electrophilic substitution generally at 1-position." Explain. 3

(b) How can you obtain 2-Naphthyl amine starting from β -naphthol? Show the mechanistic steps involved. 3

(c) How Elbs reaction can be utilized to synthesize anthracene? Why does anthracene undergo addition reaction comparatively easier than other similar aromatic systems? 3+1=4

8. (a) Predict the product of the following reactions : 4×1=4





(b) Describe the Friedlander's method of synthesis of quinoline. 3

(c) Distinguish between the isoprene and special isoprene rule. 3
