2022

Time - 3 hours

Full Marks - 60

*Answer **all groups** as per instructions.*
Figures in the right hand margin indicate marks.
Candidates are required to answer
in their own words as far as practicable.

GROUP – A

1. Answer all questions and fill in blanks as required. [1 × 8

(a) The active species involved in the nitration of benzene is _____.

(b) Gabriel phthalimide synthesis is used for the preparation of _____.

(c) What is diazotization ?

(d) Naphthalene on oxidation with CrO_3 acetic acid gives _____.

(e) Which is more aromatic among Pyrrole, Furan and Thiophene ?

(f) Skraup synthesis is used for the preparation of _____.

(g) Which element must be present in an alkaloid ?

(h) What is the structure of camphor ?

GROUP – B

2. Answer any eight of the following questions within two to three sentences each. [1½ × 8

(a) Why nitrobenzene does not undergo Friedel-Craft alkylation ?

(b) Which one is more basic : alkyl or aryl amine ? Explain.

(c) Convert aniline to 1,3,5-Tribromobenzere through benzenediazonium chloride (BDC).

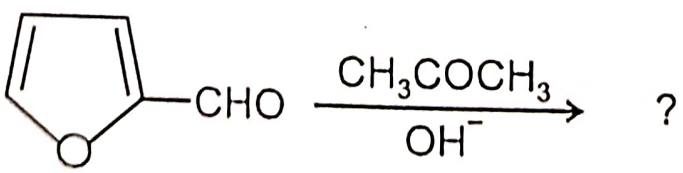
(d) What happens when naphthalene undergoes oxidation with alk. $KMnO_4$?

(e) What happens when anthracene undergoes oxidation with sodium dichromate and sulphuric acid ?

(f) Which is more basic : pyrrole or pyridine ? Give reason.

(g) What happens when pyridine undergoes reduction with nickel ?

(h) Name the reaction and write the product :



(i) What do you mean by monocyclic terpenoids ?

(j) What do you know about the carbon skeleton of Citral ?

GROUP – C

3. Answer any eight of the following questions within 75 words each. [2 × 8

(a) Nucleophilic substitution in 2,4-dinitrochlorobenzene is easier than in chlorobenzene. Explain.

(b) Write the order of basicity of 1^0, 2^0 and 3^0 amines with reasons.

(c) How can you synthesize 1,3,5-Tribromobenzene and p-dinitrobenzene from Aniline ?

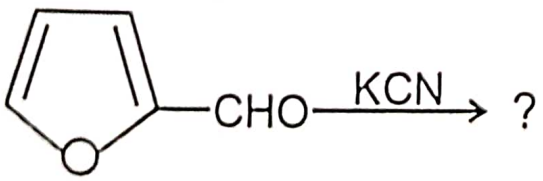
(d) Why α-position of Naphthalene is more reactive than β-position ?

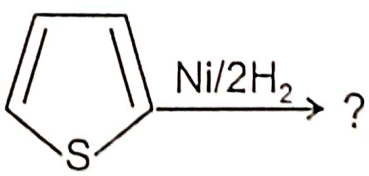
(e) Describe the sulphonation of anthracene.

(f) Why is position-2 more reactive in pyrrole than position-3 ?

(g) Why thiophene is more aromatic among the five-membered heterocyclic compounds ?

(h) Complete the following reactions :

(i) 

(ii) 

(i) What do you understand by reductive degradation ?

(j) What is isoprene rule ? Explain.

GROUP – D

*Answer **any four** questions within 500 words each.*

4. Write two methods of preparation of Nitrobenzene. Discuss its reduction in acidic, alkaline and neutral medium. [6

5. Discuss Hofmann exhaustive methylation of amines with mechanism. [6

6. Write the synthesis and applications of Aryl diazonium salts. [6

7. Elucidate the structure of anthracene. [6

8. Write the orbital structure of Furan and describe its electrophilic substitution reactions. [6

9. Write notes on within 250 words each. [3 + 3

   (a) Paal-knorr synthesis

   (b) Fischer-Indole synthesis

10. Define Bredt's rule. Give the classification of terpenes with examples. [6

11. Elucidate the structure of Nicotine and describe its synthesis. [6