REV-01
BSC/01/05

2023/06

SET A

B.Sc. CHEMISTRY
FOURTH SEMESTER
ORGANIC CHEMISTRY-III
BSC – 402 [REPEAT]
[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs. Full Marks: 70

(**Objective**)

Time: 30 min. Marks: 20

Choose the correct answer from the following: ***1X20=20***

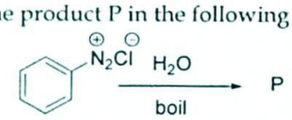
1. Which of the following methods is used to prepare nitriles?
   a. Hydration of amines
   b. Dehydration of acids
   c. Reduction of acids
   d. Dehydration of amides

2. When acetamide is allowed to react with Br_2/NaOH it results in the formation of
   a. Ethylamine
   b. Urea
   c. Methylamine
   d. Acetyl bromide

3. Acetonitrile when is subjected to reduction with $LiAlH_4$ it gives
   a. Methylamine
   b. Dimethylamine
   c. Ethylamine
   d. Trimethylamine

4. Nitromethane on being reduced with Sn/HCl gives
   a. Methyl amine
   b. Ethyl amine
   c. n-Propyl amine
   d. Isopropyl amine

5. The product P in the following reaction is



   a. Chlorobenzene
   b. Aniline
   c. Phenol
   d. Nitrobenzene

6. The presence of -N-CH_3 group in an alkaloid can be established by
   a. Herzig-Meyer reaction
   b. Hofmann reaction
   c. Emde's reaction
   d. Sandmeyer reaction

7. The alkaloid used as sedatives is
   a. Hygrine
   b. Morphine
   c. Reserpine
   d. Nicotine

8. An alkaloid is known to have used to relieve pain. The name of the alkaloid is
   a. Nicotine
   b. Morphine
   c. Reserpine
   d. Hygrine

9. Nicotine when is treated with $ZnCl_2$, zincichloride is produced. This product on being treated with lime gives
   a. Pyridine, pyrrole and methylamine
   b. Pyrrolidine, piperdine, and methylamine
   c. Pyridine, pyrrole and ethylamine
   d. Pyrrolidine, piperdine, and ethylamine

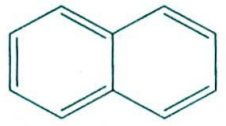
10. Nicotine belongs to the class of
   a. Pyrrolidine alkaloid
   b. Pyridine alkaloid
   c. Pyridine-pyrrolidine alkaloid
   d. None of these

11. When Benzene and Phthalic anhydride reacts, it produces
   a. Anthracene
   b. Phenanthrene
   c. Naphthalene
   d. Pyridine

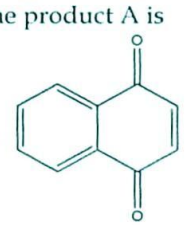
12. Naphthalene when treated with conc. HNO_3 and conc. H_2SO_4 it produces majorly
   a. 1-nitronaphthalene
   b. 2-nitronaphthalene
   c. 3-nitronaphthalene
   d. 1-aminonaphthalene

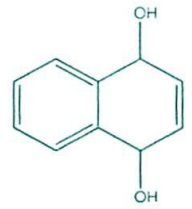
13. β-naphthol when treated with NH_3, $NaHSO_3$ gives
   a. α-naphthylamine
   b. β-naphthylamine
   c. γ-naphthylamine
   d. None of these

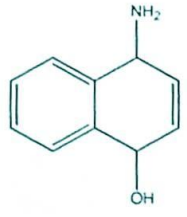
14. When Benzene reacts with anhydride of succinic acid it gives
   a. Naphthalene
   b. Pyridine
   c. Pyrrole
   d. Anthracene

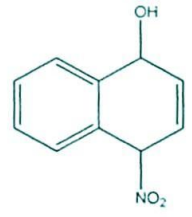
15. 

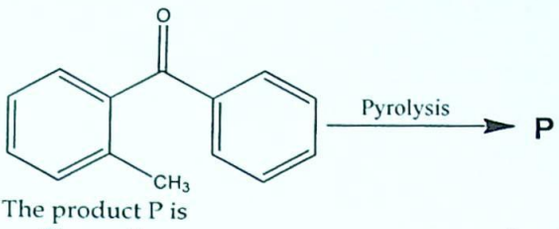
The product A is

a. 

b. 

c. 

d. 

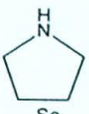
16. 

The product P is

a. Phenanthrene
b. Anthracene
c. Naphthalene
d. None of these

17. THF correspond to the structure

a. 

b. 

c. 

d. 

18. Indole is

a. Non-aromatic
b. Anti-aromatic
c. Aromatic
d. None of theses

19. Pyridine is

a. more basic than pyrrole
b. less basic than pyrrole
c. equally basic with pyrrole
d. acidic in nature

20. Hantzsch synthesis is used to prepare

a. Naphthalene
b. Benzene
c. Pyridine
d. Formaldehyde

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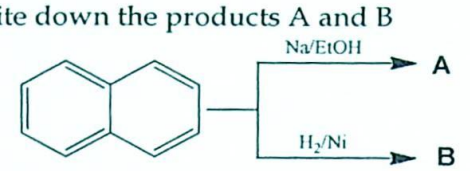
Descriptive

Time : 2 hrs. 30 mins. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

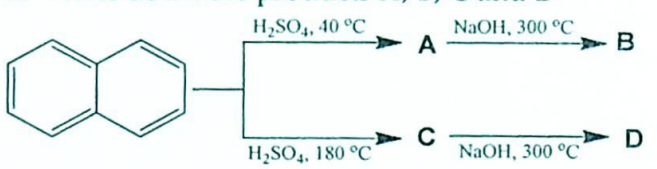
1. **a.** Describe Haworth synthesis Naphthalene. 3+2+2+3 =10

   b. Write down the products A and B



   c. Explain Hofmann elimination. What are the products formed when Hofmann elimination is carried out with piperidine?

2. **a.** Write down the products A, B, C and D 4+3+3 =10



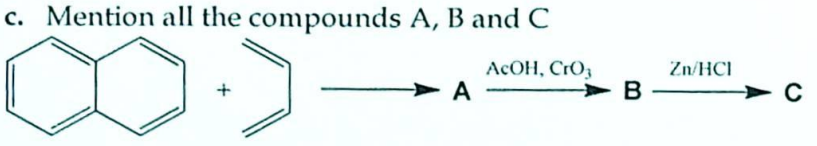
   b. Convert 2-naphthol to Naphthalene-2-carboxylic acid

   c. How will you prepare Naphthalene-1-carboxylic acid from (i) naphthalene and (ii) 1-Naphthylamine.

3. **a.** What will happen when anthracene reacts with maleic anhydride? 3+4+3 =10

   b. Show the synthesis of anthracene using benzene and Phthalic anhydride.

   c. Mention all the compounds A, B and C



4. a. Write down the structure of pyrrole, thiophene, imidazole, oxazole and pyrazole. **5+2+3 =10**

   b. Furan is aromatic in nature but tetrahydrofuran is not aromatic-Why?

   c. Describe paal-knorr synthesis of thiophene.

5. a. Write down the structure of Indole. Show the preparation of indole using Fischer indole synthesis. **1+4+2+1 +2=10**

   b. Write one method of preparation of nitroalkane. What will be the product formed when nitromethane is treated with Cl_2 and NaOH? Identify the products A and B in the following sequence of reactions

$$CH_3CH_2CH_2Br + AgCN \longrightarrow A \xrightarrow[\text{Hydrolysis}]{H^+ / H_2O} B$$

6. a. How would you distinguish between primary, secondary, and tertiary amines with nitrous acid? Explain with chemical reactions. **3+3+4 =10**

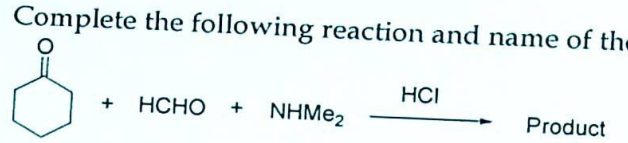
   b. Justify the following order of the basic strength of amines based on inductive effect, hydration effect and steric effect
   $(CH_3)_2NH > CH_3NH_2 > CH_3)_3 N$

   c. Complete the following reactions and identify the products formed.

(i) $CH_3CH_2CN + CH_3MgBr \xrightarrow[(ii)\ H_2O]{(i)\ \text{Ether}}$ Product

(ii)  $+ CH_3CH_2CN \xrightarrow[(ii)\ H_2O]{(i)\ \text{Ether}}$ Product

a. Complete the following reaction and name of the product **2+3+5 =10**



b. What are alkaloids? Discuss the general features of alkaloids?

:. Write the structure of hygrine. To which class does it belong? How did Hess synthesize hygrine starting from pyrrylmagnesium bromide? Explain.

. How will you show that, hygrinic acid obtained from hygrine is N-methyl pyrrolidine-2-carboxylic acid? Write the Willstatter's synthesis of hygrinic acid. **5+5=10**

. Write the structure of nicotine. How will you suggest that (i) nicotine contains one $-N-CH_3$ group and (ii) the side chain of nicotine is saturated?

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