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Class: 12
Subject: chemistry
Topic: Amines
No. of Questions: 25

1. Which of the following compounds does not give a positive test in the Lassaigne's test for nitrogen?

a. Glycine

b. Phenyl hydrazine

c. Urea

d. Diazonium salt

Sol.(c)Infact diazonium salts lose N_2 on heating much before they have a chance to react with fused sodium

2. Directions: The following question has four choices out of which ONLY ONE is correct.

Among the following compounds which will react with acetone to give a product containing C = N – ?

a. $C_6H_5NH_2$

b. $(CH_3)_3N$

c. $C_6H_5NH\ C_6H_5$

d. $C_6H_5NHNH_2$

Sol.(d)

$$C_6H_5NH\ NH_2 + O = C\begin{matrix}CH_3\\CH_3\end{matrix}$$

$$\rightarrow C_6H_5 - NHN = C\ (CH_3)_2 + H_2O$$

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3. Directions: The following question has four choices out of which ONLY ONE is correct.

Which of the following is obtained in a carbylamine reaction?

a. $C_6H_5NH_2$

b. $COCl_2$

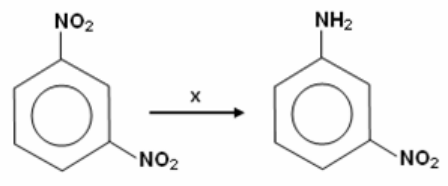
c. $C_6H_5CONH_2$

d. C_6H_5NC

Sol.(d) Carbylamine reaction involves the reaction of a primary amine with chloroform in presence of alkali. In this reaction, an offensive odorous compound, isocyanide, is obtained e.g.

$$C_6H_5NH_2 + CHCl_3 + 3KOH \longrightarrow C_6H_5NC + 3KCl + 3H_2O$$

4. In the following reaction, X is



a. SiC

b. H_2SO_4

c. $KMnO_4$

d. Fe/HCl

Sol.(d)Iron in the presence of hydrochloric acid is used as a reducing agent in the given reaction.

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5. The number of isomeric forms that are represented by C_7H_9N is

a. 4

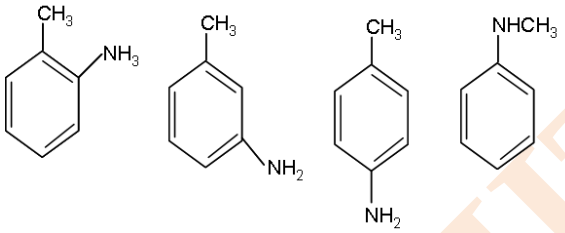
b. 5

c. 6

d. 7

Sol.(a)

Forms are



6. Directions: The following question has four choices out of which ONLY ONE is correct.

Which of the following compounds is obtained, when chlorobenzene reacts with ammonia at 475 k under high pressure and in the presence of a catalyst?

a. Phthalic acid

b. Aniline

c. Benzyl amine

d. Acetanilide

Sol.(b)Aniline can be prepared from chlorobenzene by the action of ammonia at 475 k under high pressure and in the presence of a catalyst(Cu_2O).

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7. Directions: The following question has four choices out of which ONLY ONE is correct.

Which one of the following is correct about amines?

a. Amines behave as lewis acid(s)

b. Amines behave as lewis base(s)

c. $CH_3CH_2CH_2NH_2$ is solid in nature

d. An aliphatic amine is a weaker base than ammonia

Sol.(b)An amine has an unshared pair of electron on nitrogen atom due to which it has nucleophilic centre. The group which has nucleophilic centre behaves as lewis base, so amines behave as lewis base(s).

8. Which of the following would not react with benzene sulphonyl chloride in an aqueous NaOH?

a. N – ethyl aniline

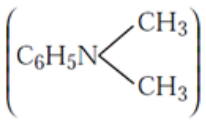
b. p – toluidine

c. N, N – dimethyl aniline

d. Aniline

Sol.(c)

N, N-dimethyl aniline is a tertiary amine and has no replaceable H-atom.



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9. Directions: The following question has four choices out of which ONLY ONE is correct.

Stephan's reaction is the reduction of

a. acyl halide in the presence of $Pb/BaSO_4$

b. alkyl isocyanide with Na and alcohol

c. alkyl cyanide with $SnCl_2$ and HCl

d. alkyl cyanide with $LiAlH_4$

Sol.(c)

Stephan's reaction is the reduction of alkyl cyanide with $SnCl_2$ and HCl

$$\underset{\text{Alkyl cyanide}}{R{-}CN} \xrightarrow{SnCl_2 + HCl} \underset{\substack{\text{Alkyl}\\ \text{aldehyde}}}{RCHO} + NH_4Cl + SnCl_4$$

10. Directions: The following question has four choices out of which ONLY ONE is correct.

Friedel Craft's reaction using $CH_3COCl/AlCl_3$ is not successful in case of

a. $C_6H_5CH_3$

b. $C_6H_5NO_2$

c. C_6H_5OH

d. C_6H_6

Sol.(b) Friedel Craft's reaction using $CH_3COCl/AlCl_3$ is not successful in the case of $C_6H_5NO_2$ because $-NO_2$ deactivate the ring for Friedel Craft's reaction (Electrophilic substitution).

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11. Directions: The following question has four choices out of which ONLY ONE is correct.

Aniline on treatment with sodium nitrite and dilute hydrochloric acid at 0^0 C yields

a. phenol

b. benzene diazonium chloride

c. nitro aniline

d. chloroaniline

Sol.(b) Following reaction takes place in this case:
$NaNO_2 + HCl \rightarrow HNO_2 + NaCl$
$C_6H_5NH_2 + HCl + HNO_2 \rightarrow C_6H_5N = NCl + 2H_2O$

12. Methyl ethyl propylamine forms non-superimposable mirror images but it does not show optical activity because

a. of rapid flipping

b. amines are basic in nature

c. nitrogen has a lone pair of electrons

d. none of these

Sol.(a)Methyl ethyl propylamine forms non-superimposable mirror images but it does not show optical activity because of rapid flipping

13. Directions: The following question has four choices out of which ONLY ONE is correct.

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The basic character of amines can be explained

a. in terms of Lewis as well as Arhhenius Concept

b. only in terms of Lowry-Bronsted Concept

c. in terms of Lewis as well as Lowry-Bronsted Concept

d. only in terms of Lowry Concept

Sol.(c) The basic character of amines can be explained in terms of Lewis as well as Lowry-Bronsted Concept

14. Laboratory preparation of aniline involves

a. heating chlorobenzene with ammonia

b. reduction of nitrobenzene with $LiAlH_4$

c. reduction of nitrobenzene with Sn/HCl

d. none of these

Sol.(c)

$$C_6H_5NO_2 + 6H \xrightarrow[HCl]{Sn} C_6H_5NH_2 + 2H_2O$$

15. Directions: The following question has four choices out of which ONLY ONE is correct.

Oxidation of aniline with acidified potassium dichromate under controlled condition gives

a. benzoic acid

b. p-benzoquinone

c. quinol

d. none of these

Sol.(b)

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Controlled oxidation of aniline with $K_2Cr_2O_7$ and H_2SO_4 gives p-benzoquinone.

$C_6H_5NH_2 \xrightarrow{K_2Cr_2O_7/H_2SO_4} O = C_6H_4 = O$ (p-benzouinone)

16. Aniline reacts with acetyl chloride to form

a. acetanilide

b. benzanilide

c. methyl amine

d. chlorobenzene

Sol.(a)Aniline reacts with acetyl chloride to form acetanilide

17. Directions: The following question has four choices out of which ONLY ONE is correct.

The compound most reactive towards electrophilic nitration is

a. methyl benzene

b. benzene

c. benzoic acid

d. nitro benzene

Sol.(a)Since methyl group increases the electron density on the benzene ring, so methyl benzene is most reactive towards electrophilic nitration.

18. Nitro-acinitro tautomerism is exhibited by

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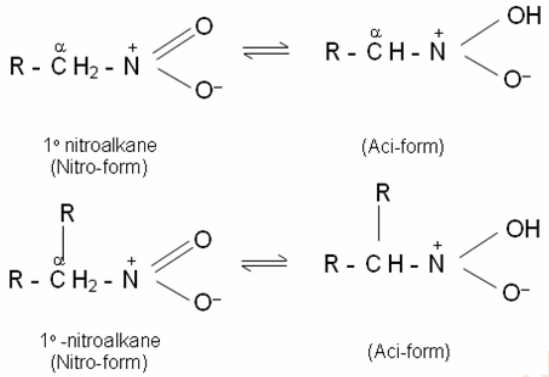
a. nitrobenzene

b. nitromethane

c. chloropictin

d. o-toluidine

Sol.(b)



19. Directions: The following question has four choices out of which ONLY ONE is correct.

Conversion of benzene diazonium chloride to chlorobenzene is called

a. Sandmeyer's reaction

b. Stephen's reaction

c. Gomberg's reaction

d. Schotten-Baumann's reaction

Sol.(a)Conversion of benzene diazonium chloride to chlorobenzene is called Sandmeyer's reaction.

20. Which of the following is not the characterstic of amines?

a. They smell like ammonia.

b. They are inflammable in air.

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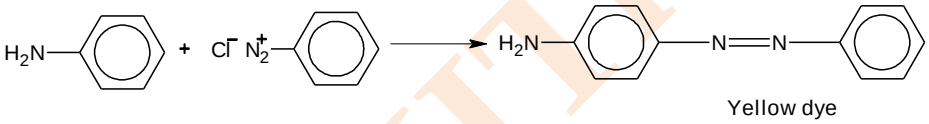
c. They show the property of hydrogen bonding.

d. They are amphoteric in nature.

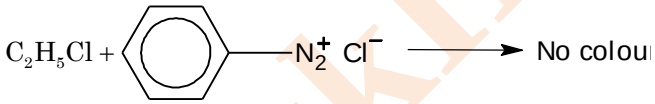
Sol.(b)Amines are not inflammable in air.

21. How will you distinguish between aniline and ethyl amine?

Sol. Aniline reacts with benzene diazonium chloride to form yellow coloured dye but ethyl amine does not.



Yellow dye

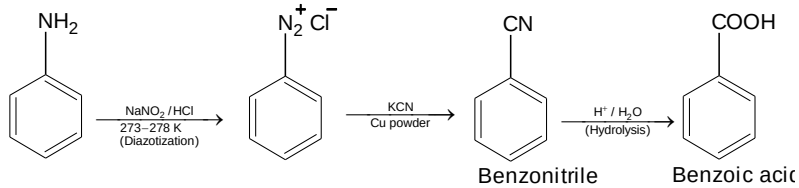


22. Convert:

(i) Aniline to Benzoic acid

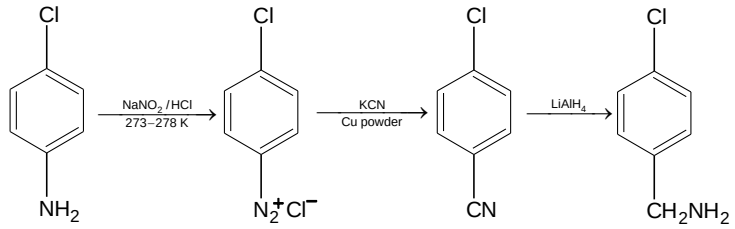
(ii) p – chloro aniline to p – chloro benzylamine

Sol. (i)



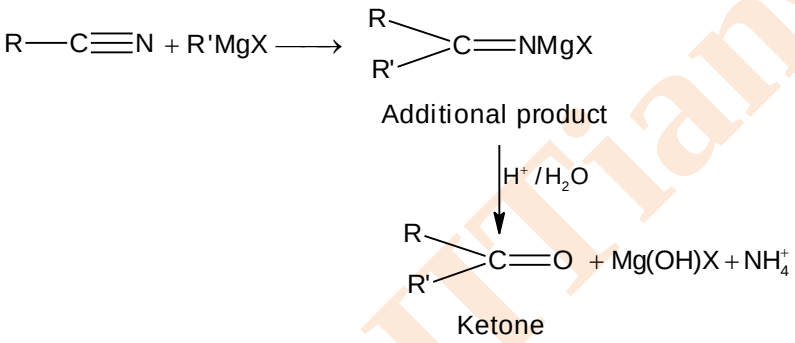
Benzonitrile Benzoic acid

(ii)



23. How is it that an ester reacts with Grignard's reagent to form a tertiary alcohol but in the reaction of nitrile with Grignard's reagent, a ketone is formed?

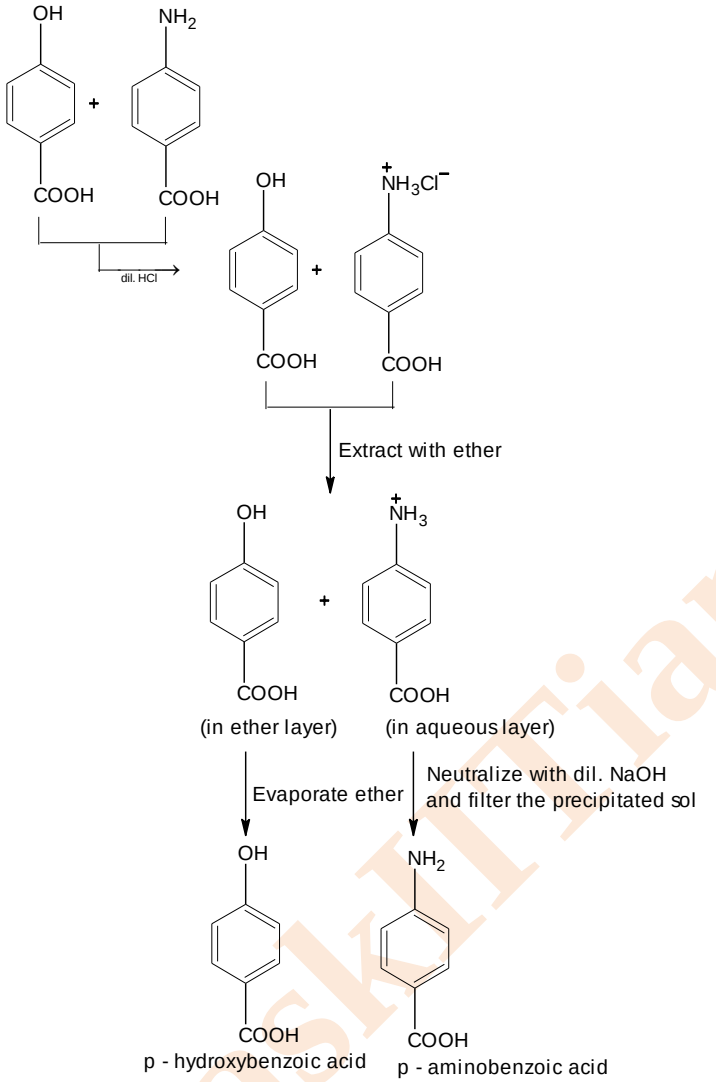
Sol. The addition product in case of nitriles does not decompose under the conditions of the reaction but does so only upon hydrolysis with an acid.



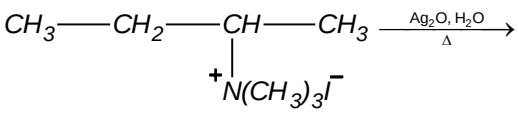
However addition product in case of esters decomposes under the conditions of the reaction to form a ketone which further reacts with Grignard's reagent to form the corresponding tertiary alcohol.

24. There is a solution of p – hydroxy benzoic acid and p – aminobenzoic acid. Discuss one method by which we can separate them.

Sol.The mixture is separated by treating with dil. HCl when p – aminobenzoic acid forms the salt leaving p – hydroxybenzoic acid as such.



25. Write the major product in the following reaction:



Sol. In Hofmann elimination reaction, it is the less sterically hindered $\beta-$hydrogen that is removed and hence less substituted alkene is the major product.

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