

CBSE Class 12 Chemistry Chapter 13 Amines Worksheet with Answer– Set 2

Q1. How many isomeric amines with the formula C_7H_9N contain a benzene ring?

- (a) Five
- (b) Four
- (c) Three
- (d) None of the above

Answer:

(a) Five isomeric amines with the formula C_7H_9N contain a benzene ring.

Q2. The oxidation of aniline with $K_2Cr_2O_7 / H_2SO_4$ produces

- (a) Benzoic acid
- (b) p- Benzo quinone
- (c) p- Nitro phenol
- (d) None of the above

Answer:

(b) The oxidation of aniline with $K_2Cr_2O_7 / H_2SO_4$ produces p- Benzo quinone.

Q3. The electrolytic reduction of nitro benzene in a strongly acidic medium produces

- (a) Aniline
- (b) Phenyl hydroxy amine
- (c) p- amino phenol
- (d) None of the above

Answer:

(c) The electrolytic reduction of nitro benzene in a strongly acidic medium produces p- amino phenol.

Q4. In the nitration of benzene with concentrated nitric acid and concentrated sulphuric acid, the electrophile is

- (a) NO_2^+
- (b) NO_2^-
- (c) NO_2
- (d) None of the above

Answer:

(a) In the nitration of benzene with concentrated nitric acid and concentrated sulphuric acid, the electrophile is NO_2^+ .

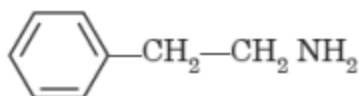
Q5. An organic amino compound reacts with aqueous nitrous acid at low temperatures to produce an oily nitrosamine. The compound is

- (a) $(\text{C}_2\text{H}_5)_3\text{N}$
- (b) $(\text{C}_2\text{H}_5)_2\text{NH}$
- (c) $\text{C}_2\text{H}_5\text{NH}_2$
- (d) None of the above

Answer:

(b) $(\text{C}_2\text{H}_5)_2\text{NH}$ reacts with aqueous nitrous acid at low temperatures to produce an oily nitrosamine.

Q6. Write the IUPAC and common name of the following compound.



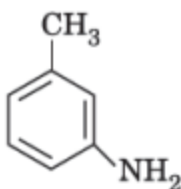
Answer:

The IUPAC name of the compound mentioned above is 2- Phenyl Ethanamine, while its common name is β - Phenyl Ethanamine or 2- Phenyl Aminoethane.

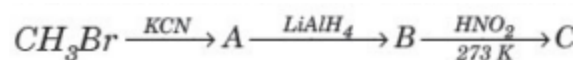
Q7. Draw the structure of m- toluidine.

Answer:

The structure of m- toluidine is given below.



Q8. Identify A, B and C in the reaction mentioned below.



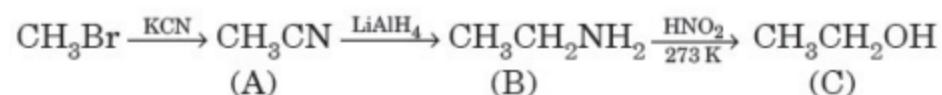
Answer:

Here,

A = Methyl cyanide,

B = Ethyl amine

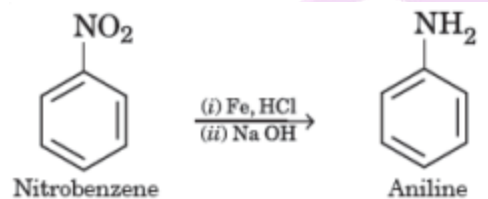
C = Ethyl alcohol.



Q9. Convert nitrobenzene to aniline.

Answer:

We can convert nitrobenzene to aniline by reacting it with iron in the presence of hydrochloric acid, followed by the reaction with sodium hydroxide.



Q10. Why does methyl amine have a lower boiling point than methanol?

Answer:

Methyl amine is polar and can form intermolecular hydrogen bonds. However, its tendency to form intermolecular hydrogen bonds is less than that of methanol (CH_3OH), which has a highly electronegative oxygen atom. As a result, CH_3NH_2 has a lower boiling point than CH_3OH .

Q11. Why is methyl amine a more substantial base than ammonia?

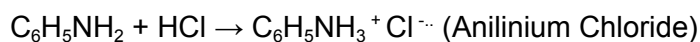
Answer:

Methyl amine is a more significant base than ammonia because the alkyl group in methyl amine has a + I inductive effect and is electron-releasing in nature. As a result, its electron releasing tendency becomes more. Thus, methyl amine is a more significant base than ammonia.

Q12. Why does aniline dissolve in an aqueous hydrochloric acid solution?

Answer:

Aniline dissolves in an aqueous hydrochloric acid solution is due to the formation of the water-soluble salts.



Q13. Why is it difficult to prepare pure amines by the ammonolysis of alkyl halides?

Answer:

It is difficult to prepare pure amines by the ammonolysis of alkyl halides because the ammonolysis of alkyl halides forms a mixture of primary, secondary and tertiary amines.



It is difficult to separate primary, secondary and tertiary amines. Thus, it is challenging to prepare pure amines by the ammonolysis of alkyl halides.

Q14. Convert toluene to p- Iodotoluene.

Answer:

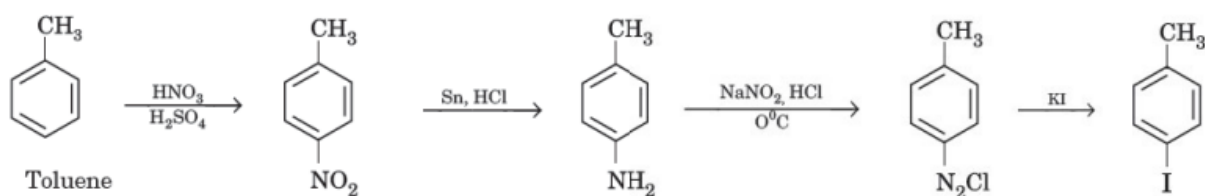
We can convert toluene to p- Iodotoluene in four steps.

Step 1: Toluene to p- nitro toluene: Foremost, we will react toluene with the nitric acid in the presence of the sulphuric acid.

Step 2: p- nitro toluene to p- toluidine: We will reduce p- nitro toluene to p- toluidine by the reducing agent Sn metal in the presence of hydrochloric acid.

Step 3: p- toluidine to Toluene diazonium chloride: We will react p- toluidine with the sodium nitrite and hydrochloric acid at $< 0^\circ \text{C}$ leading to the formation of toluene diazonium chloride.

Step 4: Toluene diazonium chloride to p- Iodotoluene: At last, we will react toluene diazonium chloride with potassium iodide leading to the formation of resulting p- Iodotoluene.



Q15. What is Hinsberg reagent?

Answer:

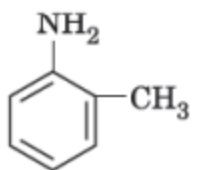
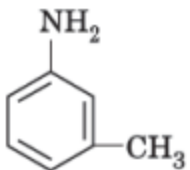
The Hinsberg reaction is a test for detecting primary, secondary and tertiary amines. In this test, the amine is shaken well with the Hinsberg reagent in the presence of aqueous alkali.

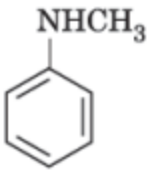
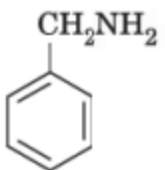
- A primary amine will form a water-soluble sulfonamide salt. Acidification of sulfonamide salt precipitates the sulfonamide of the primary amine.
- A secondary amine will form an insoluble sulfonamide salt.
- A tertiary amine will not react with the benzene sulfonyl chloride and will remain insoluble. After adding dilute acid, it will convert into a water-soluble ammonium salt.

Q16. Draw the structure, IUPAC names, and indicate primary, secondary and tertiary to the five isomeric amines with the formula C_7H_9N containing a benzene ring.

Answer:

The five isomeric amines with the formula C_7H_9N containing a benzene ring are mentioned below.

C_7H_9N			
S. No.	Structure	IUPAC	Type
1.		2- Methyl Benzenamine or 2- Methyl amino benzene.	1°
2.		3- Methyl Benzenamine or 3- Methyl amino benzene.	1°

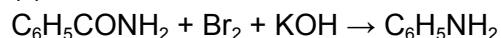
3.		4- Methyl Benzenamine or 4- Methyl amino benzene.	1°
4.		N- Methyl Benzenamine or N- Methyl amino benzene.	2°
5.		Phenyl amino ethane.	1°

Q17. An aromatic compound A on treatment with aqueous ammonia and heating forms compound B, which on heating with Br and KOH forms a compound C of molecular formula C_6H_7N . Write the structures and IUPAC names of compounds A, B and C.

Answer:

(i) Since the compound C of molecular formula C_6H_7N is formed from B on treatment with bromine and KOH (Hoffmann bromamide reaction). Therefore, compound B must be an amide and C must be an amine. The only aromatic amine having the molecular formula C_6H_7N is $C_6H_5NH_2$ (aniline).

(ii) Since C is aniline, the amide from which is formed must be benzamide ($C_6H_5CONH_2$).



Thus, B is benzamide.

(iii) Since B is formed from A with aqueous ammonia and heating. Therefore, compound 'A' must be benzoic acid.



Thus, A = C_6H_5COOH (Benzoic Acid),

B = $C_6H_5CONH_2$ (Benzamide),

C = $C_6H_5NH_2$ (Aniline).

Q18. Write the chemical equation for the following reactions.

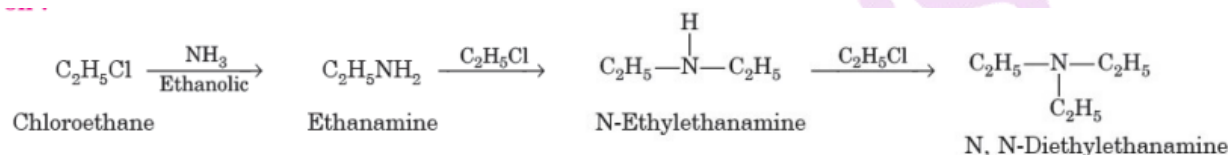
(a) The reaction of ethanolic NH_3 with $\text{C}_2\text{H}_5\text{Cl}$.

(b) Ammonolysis of benzyl chloride and amine reaction formed with two moles of CH_3Cl .

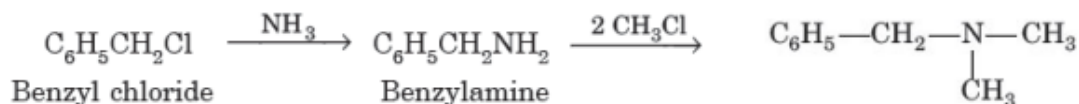
Answer:

The chemical equations are mentioned below.

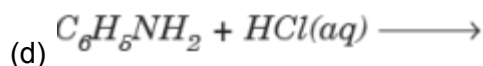
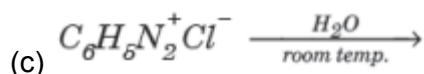
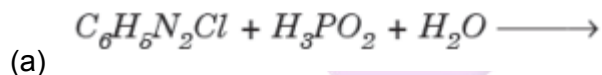
(a) The reaction of ethanolic NH_3 with $\text{C}_2\text{H}_5\text{Cl}$.



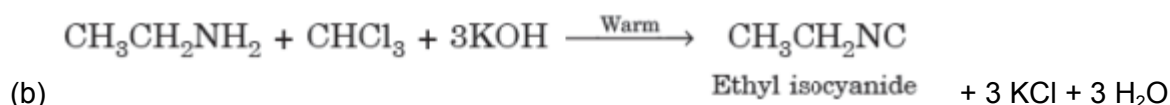
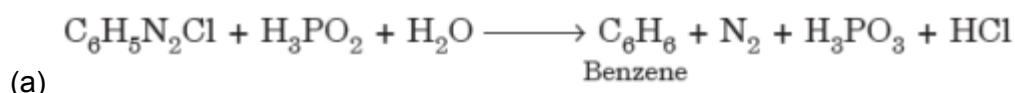
(b) Ammonolysis of benzyl chloride and amine reaction formed with two moles of CH_3Cl .

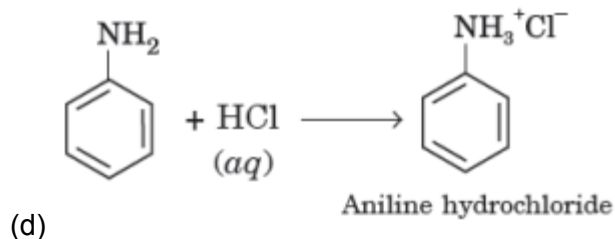
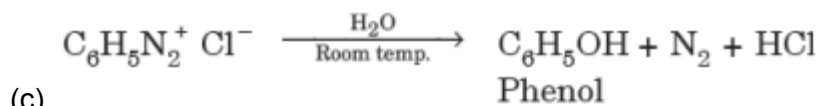


Q19. Complete the following reactions.



Answer:





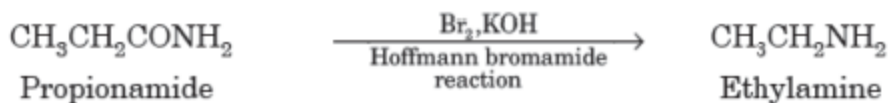
Q20. How will you convert?

- (a) Propionamide to Ethyl amine?
- (b) Aniline to Phenol
- (c) Aniline to Acetanilide.

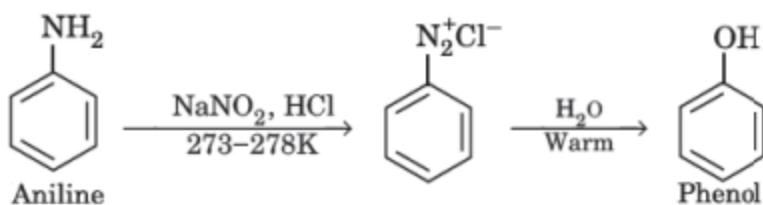
Answer:

We can convert the following as mentioned below.

(a) Propionamide to Ethyl amine: We can convert propionamide to ethyl amine by the Hoffmann bromamide reaction, i.e. reacting it with bromine in the presence of the alcoholic potassium hydroxide.



(b) Aniline to Phenol: We can convert aniline to phenol by reacting it with the nitrous acid followed by hydrolysis.



(c) Aniline to Acetanilide: We can convert aniline to acetanilide by reacting it with acetyl chloride in the presence of the pyridine.

