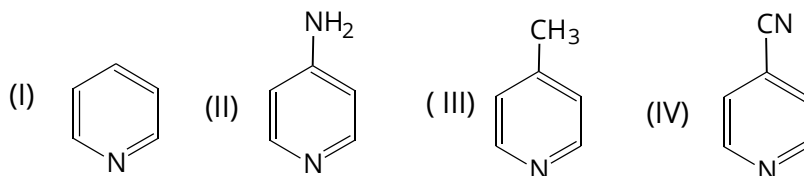


# IUPAC Nomenclature

1. The correct order of increasing basicity for the following compounds is



- (a)  $IV < I < III < II$                       (b)  $I < II < III < IV$   
(c)  $IV < III < II < I$                       (d)  $II < IV < I < III$

Answer: (a)

Explanation

Basicity increases in the presence of +I groups and decreases in the presence of -I groups.

CN is electron withdrawing group (-I group) and CH<sub>3</sub>, NH<sub>2</sub> are electron releasing groups (+I).

Thus, the correct order of basicity is-

2. How many primary amines are possible for the formula

C<sub>4</sub>H<sub>11</sub>N

- (a) 1    (b) 2  
(c) 3    (d) 4

Answer: (d)

Explanation-

The possible four primary amines are-

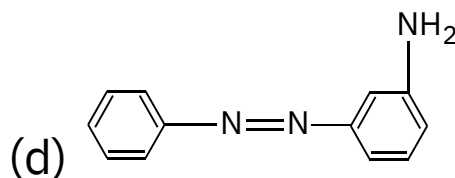
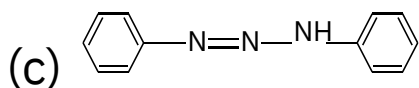
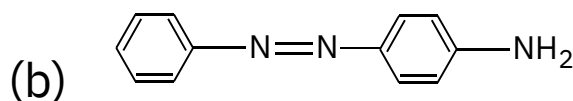
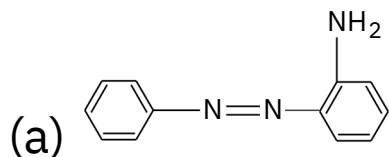
Butane 1-amine      CH<sub>3</sub>-CH<sub>2</sub>-CH<sub>2</sub>-CH<sub>2</sub>-NH<sub>2</sub>

Butane 2-amine      (CH<sub>2</sub>)<sub>2</sub>-CH-CH<sub>2</sub>-N H<sub>2</sub>

2-methylpropane-1-amine  $\text{CH}_3\text{-CH}_2\text{-CH}(\text{CH}_3)\text{-NH}_2$

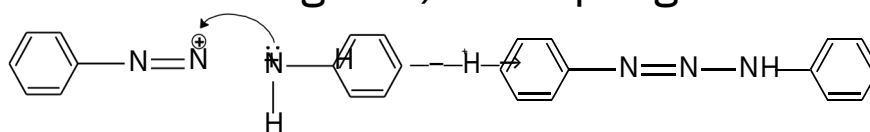
2-methylpropane-2-amine  $(\text{CH}_3)_2\text{C-NH}_2$

3. When aniline is treated with benzene diazonium chloride at low temperature in weakly acidic medium, the final product obtained is

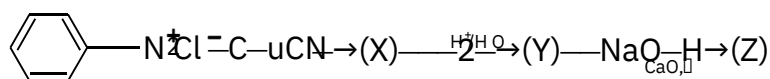


Answer: (c)

Diazonium cation reacts with aniline in weakly acidic medium resulting in N, N-coupling rather than C-coupling.



4. The end product (Z) of the following reaction is



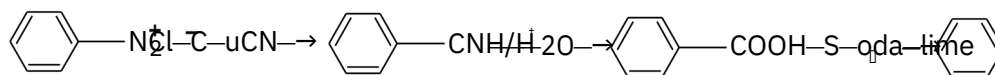
(a) a cyanide

(b) a carboxylic acid

(c) an amine

(d) an arene.

Answer: (d)



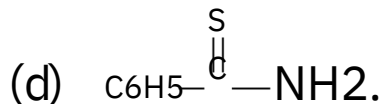
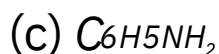
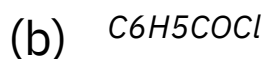
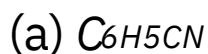
5. Phenyl cyanide on reduction with  $\text{Na}/\text{C}_2\text{H}_5\text{OH}$  yields

(a)  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$

(b)  $\text{C}_6\text{H}_5\text{NHCH}_3$

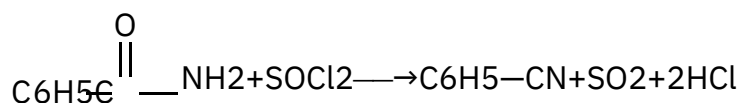


8. When benzamide is heated with thionyl chloride, the main product of the reaction is

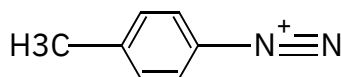
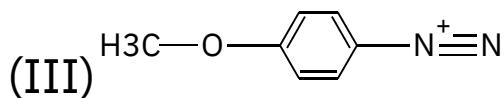
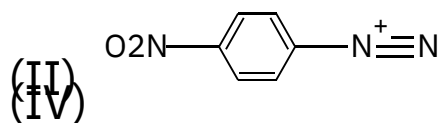
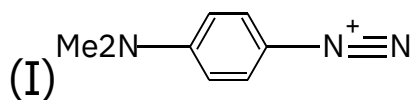


Answer: (a)

$\text{SOCl}_2$  here can only act as a dehydrating agent.



9. Consider the following ions.



The reactivities of these ions in azo-coupling reactions (under similar conditions) will be such that




Answer: (b)

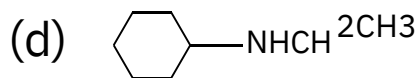
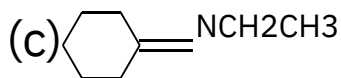
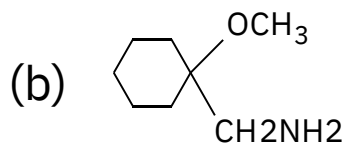
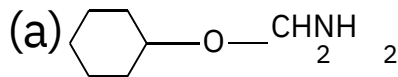
Stability of any compound has inversely proportional to their reactivity.

The less stable diazonium salt will be more reactive.

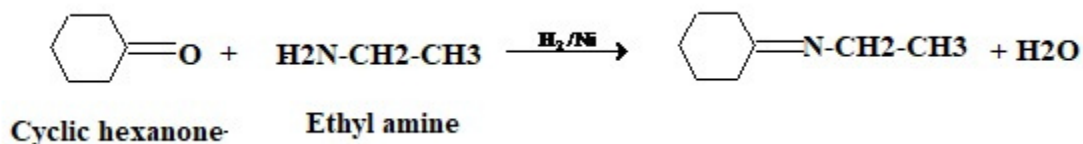
Thus, correct reactivity order of following ions in the azo coupling reaction is - I < III < IV < II.

10. In the reaction  + CH<sub>3</sub>CH<sub>2</sub>NH<sub>2</sub>  $\xrightarrow{H_2/Ni}$  (X) .

The product (X) is



Answer: (d)

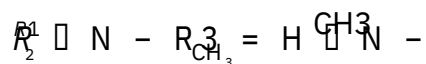


11. The compound  $R_1R_2R_3N$  forms nitroso amines when the substituents are

- (a)  $R_1 = CH_3, R_2 = R_3 = H$
- (b)  $R_1 = R_2 = H, R_3 = C_2H_5$
- (c)  $R_1 = H, R_2 = R_3 = CH_3$
- (d)  $R_1 = CH_3, R_2 = C_2H_5, R_3 = C_3H_7$

Answer: (c)

$R_1 = H$  and  $R_2 = R_3 = CH_3$



sec. Amine reacts with Nitrous acid to form nitroso amine yellow liquid.

12. Aniline when diazotized in cold and then treated with dimethyl aniline gives an coloured product. Its structure

would be

- (a)
- (b)
- (c)
- (d)

Answer: (a)

Explanation:

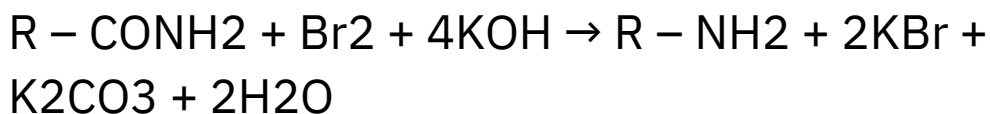
Aliphatic and aromatic primary amines react with  $\text{CHCl}_3$  and  $\text{KOH}$  to give a foul smelling isocyanides.

13. Indicate which nitrogen compound amongst the following would undergo Hofmann's reaction (i.e. reaction with  $\text{Br}_2$  and strong  $\text{KOH}$ ) to furnish the primary amine ( $\text{R} - \text{NH}_2$ )

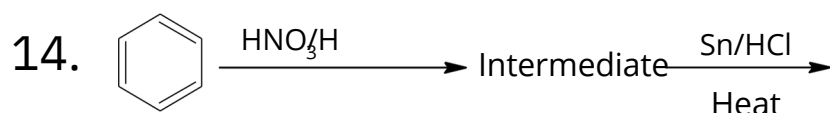
- (a)  $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NH} \cdot \text{CH}_3$                       (b)  $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{O} \cdot \text{NH}_4$
- (c)  $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NH}_2$                       (d)  $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{NHOH}$

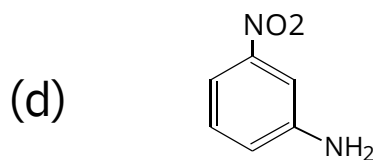
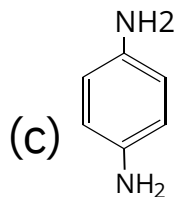
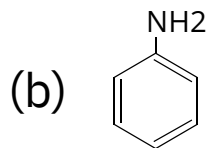
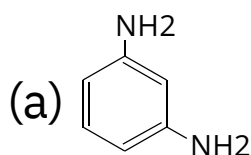
Answer: (c)

Hofmann degradation of amide

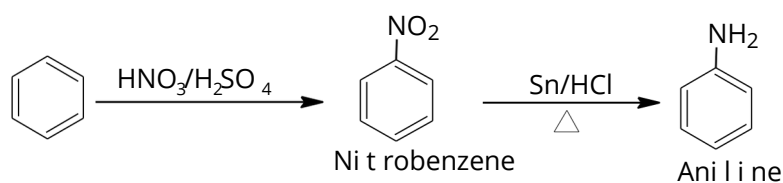


primary amine





Answer: (b)



15. Which of the following would be least reactive towards nitration

(a) Benzene

(b) Nitro benzene

(c) Toluene

(d) Chloro benzene

Answer: (b)

Nitro group deactivates the benzene ring.

16. Aniline reacts with acetaldehyde to form

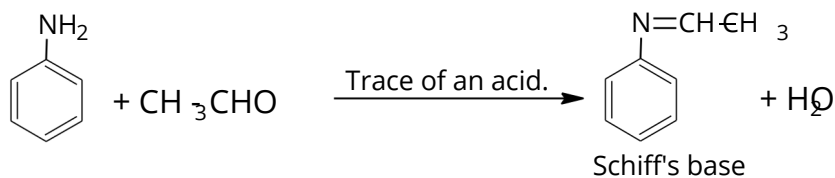
(a) Schiff's base

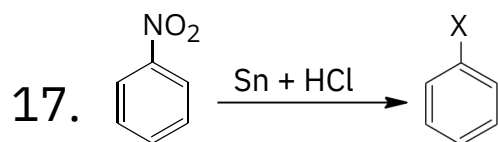
(b) Carbylamine

(c) Immine

(d) None of these

Answer: (a)





In the above reaction 'X' stands for

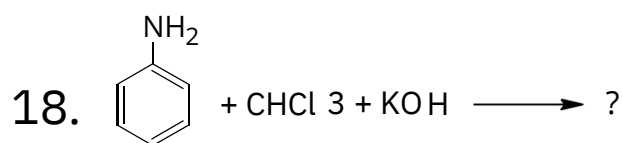
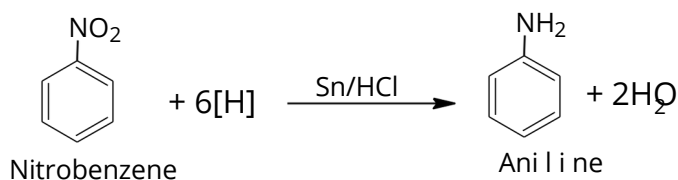
(a) NH<sub>2</sub>

(b) SnCl<sub>2</sub>

(c) Cl

(d) NH<sub>4</sub><sup>+</sup>Cl<sup>-</sup>

Answer: (a)



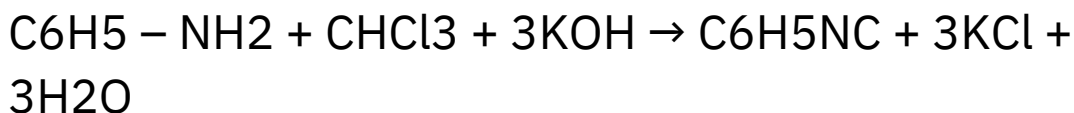
(a) Phenyl isocyanide

(b) Benzyl amine

(c) Benzyl chloride

(d) none of these

Answer: (a)

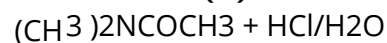


19. The refluxing of (CH<sub>3</sub>)<sub>2</sub>NCOCH<sub>3</sub> with acid gives

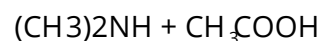
(a) 2CH<sub>3</sub>NH<sub>2</sub> + CH<sub>3</sub>COOH (b) 2CH<sub>3</sub>OH + CH<sub>3</sub>COOH

(c) (CH<sub>3</sub>)<sub>2</sub>NH + CH<sub>3</sub>COOH (d) (CH<sub>3</sub>)<sub>2</sub>NCOOH + CH<sub>4</sub>

Answer: (c)



□

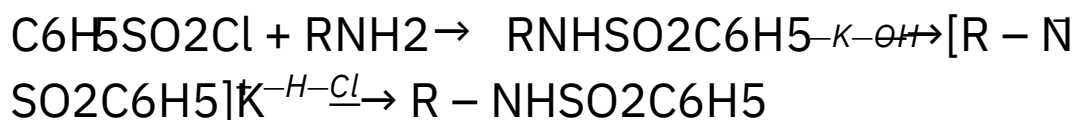




20. RNH<sub>2</sub> reacts with C<sub>6</sub>H<sub>5</sub>SO<sub>2</sub>Cl in aqueous KOH to give a clear solution. On acidification a precipitate is obtained which is due to the formation of

- (a)  $\text{R} - \overset{\text{H}}{\underset{\text{H}}{\text{N}^+}} - \text{SO}_2\text{C}_6\text{H}_5\text{OH}$       (b)  $[\text{R} - \text{NSO}_2\text{C}_6\text{H}_5]\text{K}^+$   
 (c)  $\text{R} - \text{NHSO}_2\text{C}_6\text{H}_5$       (d)  $\text{C}_6\text{H}_5\text{SO}_2\text{NH}_2$

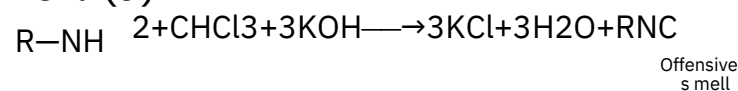
Answer: (c)



21. Which one of the following compound when heated with KOH and primary amines give carbylamine test:

- (a) CHCl<sub>3</sub>      (b) CH<sub>3</sub>Cl  
 (c) CCl<sub>4</sub>      (d) CH<sub>3</sub>NC.

Answer: (a)

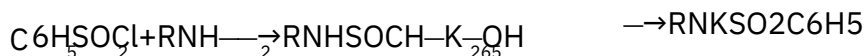


22. The primary, secondary and tertiary amines can be distinguished by:

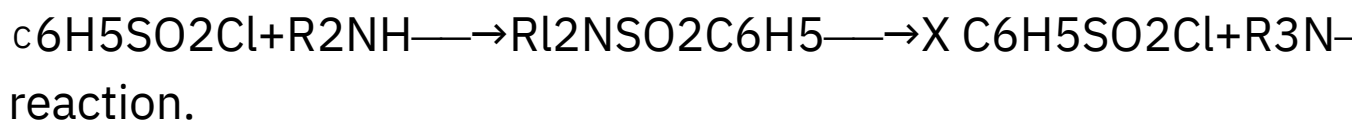
- (a) Hinsberg's reagent      (b) Grignard's reagent  
 (c) Fehling's solution      (d) Tollen's reagent.

Answer: (a)

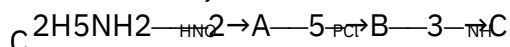
Hinsberg reagent C<sub>6</sub>H<sub>5</sub>SO<sub>2</sub>Cl reacts with primary amines and gives alkali soluble benzene sulphonamide; with secondary amine it gives alkali insoluble benzene sulphonamide, with tertiary amines it does not react.



soluble in KOH

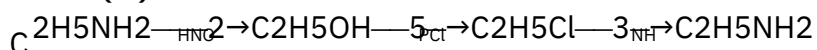


23. What is the end product in the following sequence of reactions,



- (a) Ethyl cyanide                      (b) Ethylamine  
 (c) Methylamine                        (d) Acetamide.

Answer: (b)



24. Which of the following compounds gives carbylamine when heated with chloroform and alcoholic potash:

- (a) Aldehyde                              (b) Primary amine  
 (c) Secondary amine                      (d) Phenol

Answer: (b)

Only primary amines give carbylamine reaction.

25. Which of the following is least basic?

- (a) pyridine                                (b) piperidine  
 (c) methyl amine                        (d) dimethyl amine

Answer: (a)

Correct basicity order of the following compounds is-  
 Dimethyl amine > Methyl amine > Piperidine > Pyridine

The lone pair of electrons are delocalised in the benzene nucleus of pyridine. Hence it becomes least basic among all.

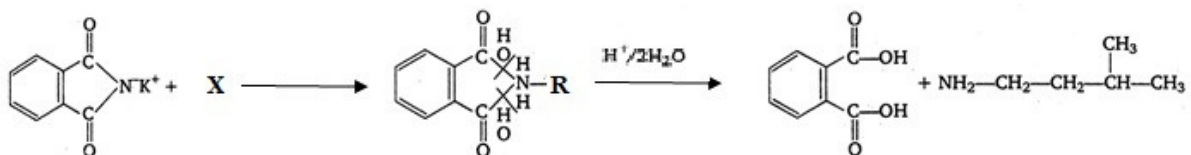
26. When 4 carbon containing primary amine reacts with Br and NaOH then \_\_\_\_ carbon containing primary amine will form.

- (a) 5 (b) 3  
(c) 4 (d) None of these

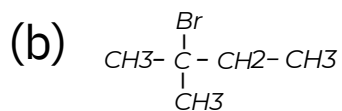
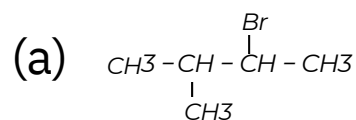
Answer: (b)

When primary amine reacts with Br and NaOH then one carbon less resulted amine has formed. This reaction is known as Hoffman-bromamide reaction. It is also known as degradation reaction.

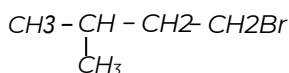
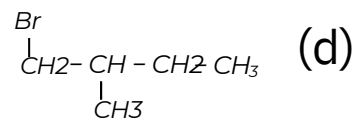
27. In the following reaction



X is-

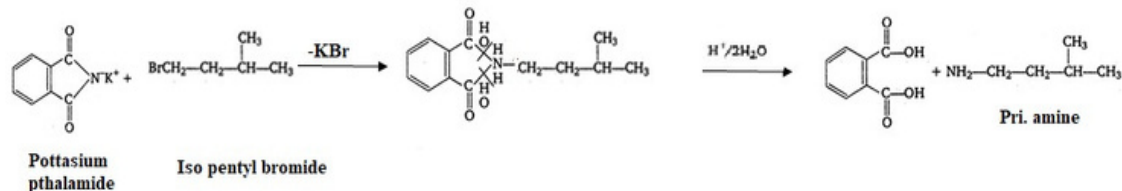


(c)

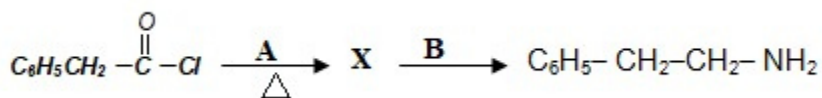


Answer: (d)

Primary amines forms, when potassium phthalamide reacts with primary halide. It is known as Gabriel Pthalamide reaction.



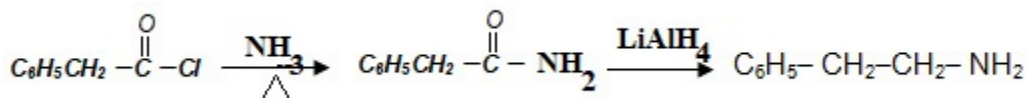
28. Observe the reaction and choose the correct option



- |   |   |
|---|---|
| <p>(a)</p> <p>KOH (b)</p> <p>(c)</p> <p>(d)</p> | <p>A is NaNO<sub>2</sub> and B is Br<sub>2</sub> +</p> <p>A is NH<sub>3</sub> and B is LiAlH<sub>4</sub></p> <p>A is LiAlH<sub>4</sub> and B is NH<sub>3</sub></p> <p>A is KOH and X is CH<sub>3</sub>CHO</p> |
|---|---|

Answer: (b)

When benzoyl chloride heated with ammonia then benzoyl amide is formed which on reduction with LiAlH<sub>4</sub>, Primary amine is formed.



29. Among the following amines namely ethylmethyl amine, propyl amine, trimethyl amine, the amine with the lowest boiling point is

- (a) Trimethyl amine

- (b) Ethylmethyl amine
- (c) Propyl amine
- (d) All have same boiling point

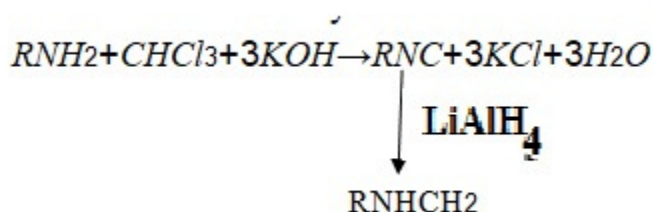
Answer: (a)

30. When a compound "X" reacts with  $\text{CHCl}_3$  in the presence of  $\text{NaOH}$  then a foul smelling gas is formed. Compound "X" is-

- (a) Secondary amine
- (b) primary amine
- (c) Cyanide
- (d) Isocyanide

Answer: (a)

When a primary amine reacts with  $\text{CHCl}_3$  in the presence of  $\text{NaOH}$  then a foul smelling gas "Isocyanide" is formed, which on further reduction form secondary amine. This reaction is known as carbylamines reaction.



31. When compound "X" reacts with Aq. Solution of sodium-bicarbonate then a gas "Y" released which temporary turns lime water milky.

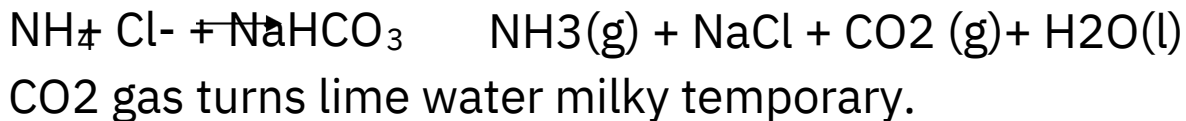
The compound "X" is-

- (a) alcohols
- (b) amines

(c) Sulphates  
chlorides

(d) Salts of ammonium

Answer: (d)

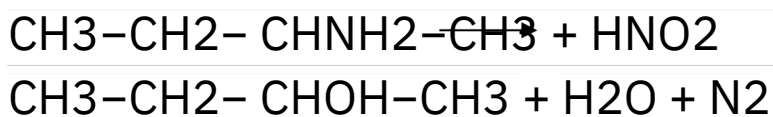


32. Identify an optically active compound "X" whose molecular formula is C<sub>4</sub>H<sub>11</sub>N forms C<sub>4</sub>H<sub>9</sub>OH on reaction with HNO<sub>2</sub>.

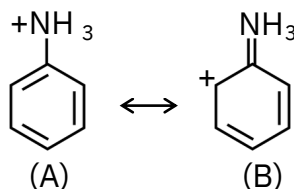
- (a) 2-aminobutane
- (b) N-methyl propaneamine
- (c) N,N-dimethyl ethanamine
- (d) 1-aminobutan-2-ol

Answer: (a)

In 2-aminobutane (CH<sub>3</sub>-CH<sub>2</sub>-CHNH<sub>2</sub>-CH<sub>3</sub>) all valency of 2nd carbon atom is satisfied with four different groups, hence it is optically active compound.



33. Observe the anilinium ion structures (A) and (B) and choose the correct statement.



- (a) (B) is less stable than (A) so it is not acceptable. (b) (A) is non-aromatic so it is acceptable. (c) Both structures possess 8 valence electrons whereas N of (B) possess 10 valence electrons so Structure (A) is acceptable and (B) is not. (d) Both Structures are acceptable.

Answer: (c)

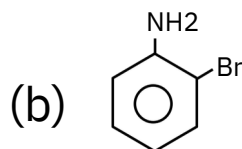
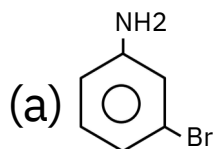
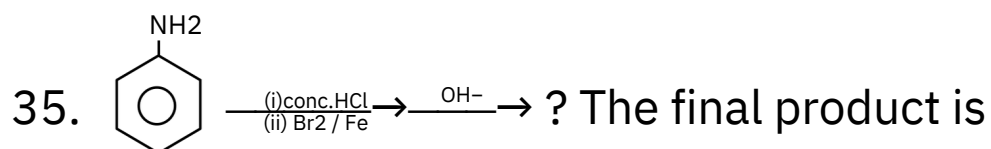
Structure (A) is aromatic and has 8 electrons in its outer most shell hence it is acceptable anilinium ion structure.

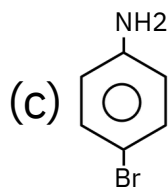
34.  $\text{CH}_3\text{CH}_2\text{NH}_2$  is soluble in

- (a) dilute HCl (b)  $\text{CuSO}_4$  solution  
(c)  $\text{AgNO}_3$  (d) All of these.

Answer: (d)

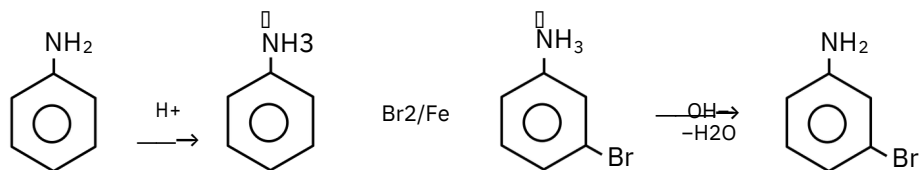
Amines being basic in nature dissolve in dilute HCl. they can also coordinate with  $\text{Cu}^{2+}$  and  $\text{Ag}^+$  ions to form soluble complexes as they can act as good ligands



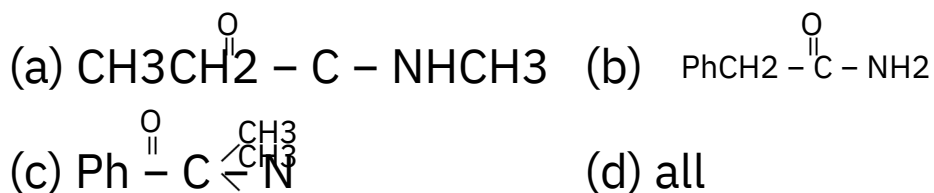


(d) Both (b) and (c)

Answer: (a)



36. Which of the following undergoes Hoffmann's degradation when reacted with Br<sub>2</sub> and NaOH?



Answer: (b)

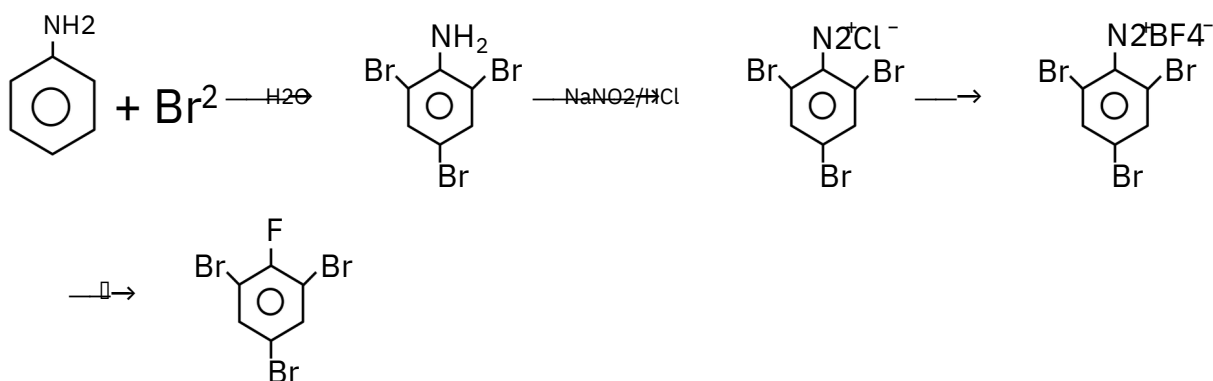
Hoffmann's degradation is given by  $-\text{CONH}_2$  group.

37. Aniline is reacted with Br<sub>2</sub>/H<sub>2</sub>O and the resulting product is treated with an aqueous solution of sodium nitrite in presence of dil. HCl. The compound formed is converted into tetrafluoroborate which is subsequently heated dry. The final product is

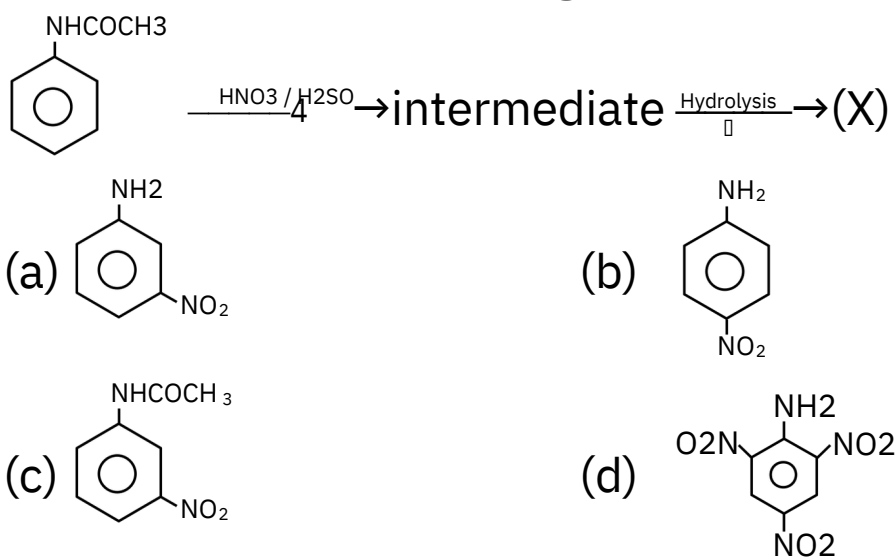
- (a) 1,3,5-tribromobenzene
- (b) p-bromofluorobenzene
- (c) p-bromoaniline
- (d) 2,4,6-tribromofluorobenzene



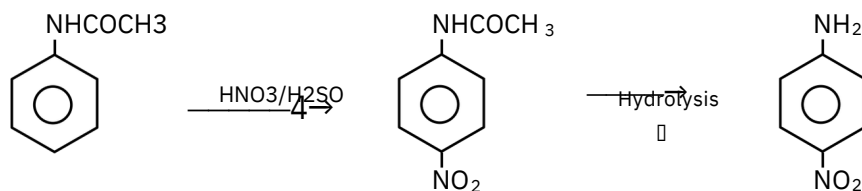
Answer: (d)



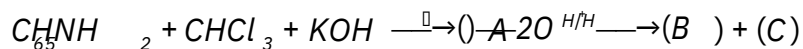
38. Identify (X) in the following reaction sequence.



Answer: (b)



39. Consider the following reaction,



The compounds (B) and (C) are:

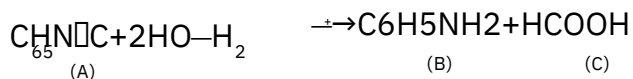
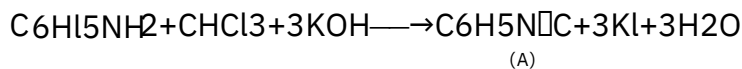
(a)  $\text{C}_6\text{H}_5\text{COOH}$  and  $\text{NH}_3$  respectively

(b)  $C_6H_5NH_2$  and  $HCOOH$  respectively

(c)  $C_6H_5NH_2$  and  $H_2O$  respectively

(d) None of these.

Answer: (b)



40. Reduction of nitrobenzene in the presence of  $Zn/NH_4Cl$

gives

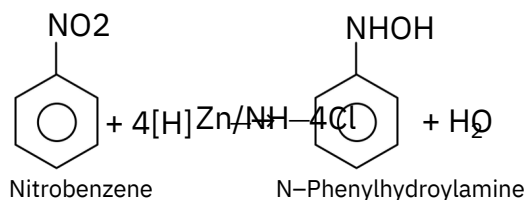
(a) hydrazobenzene

(b) aniline

(c) azobenzene

(d) N-phenyl hydroxyl amine

Answer: (d)



41. Hydrazobenzene can be obtained by reducing nitrobenzene with

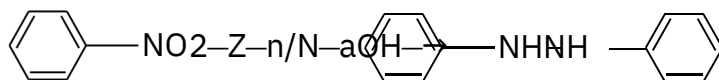
(a)  $Sn + HCl$

(b)  $Zn + NH_4Cl$

(c)  $Na_3AsO_3 + NaOH$

(d)  $Zn + NaOH$ .

Answer: (d)



42. Which of the following name reaction used to form Amines through amides?

- (a) Cannizzaro (b) Claisen  
 (c) Hoffmann bromamide (d) Schmidt  
 Answer: (c)

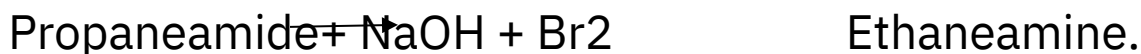
By Hoffmann bromamide reaction, amides are converted to one carbon less primary amines, thus this reaction is also known as degradation reaction.

43. Identify X in the given reaction



- (a) PCl<sub>5</sub> (b) NaOH + Br<sub>2</sub>  
 (c) NaOH + Water (d) HNO<sub>3</sub>

Answer: (b)



This reaction is Hoffmann bromamide reaction.

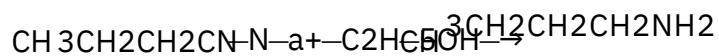
44.  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CN} \xrightarrow[\text{LiAlH}_4]{\text{NaOH}}$

The product X is

- (a) CH<sub>3</sub>CH<sub>2</sub>CONH<sub>2</sub> (b) CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>NH<sub>2</sub>  
 (c) C<sub>4</sub>H<sub>10</sub> (d) CH<sub>3</sub>CH<sub>2</sub>NHCH<sub>3</sub>  
 CH<sub>2</sub>CH<sub>3</sub>

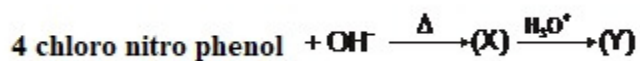
Answer: (b)

Alkylcyanide is reduced to primary amine in the presence of reducing agent sodium-ethoxide.



45.

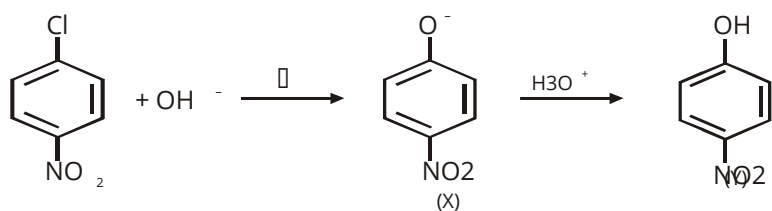
Identify the product (Y)



- A. Para nitro phenol
- B. 2 bromo, 3 nitro phenol
- C. Meta nitro phenol
- D. 2,4,6 tri nitro phenol

Answer: (A)

Explanation:



Y is meta nitro phenol.