

## 16.1 ALIPHATIC AMINES- QUESTIONS

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### Introduction

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1. What are Amines? How are they classified? 2
  2. Mention an example of each primary, secondary and tertiary amine. 1
  3. Write the possible isomeric amines of  $C_3H_9N$  and give their IUPAC and common names. And classify them. 2
  4. Write the structure of isomeric Amines of Propanamine and their IUPAC names. 2
  5. There are three possible isomeric amines of  $C_3H_9N$ . One of them is Propanamine. Write the other two isomers and give their IUPAC names. 2
  6. Write down the structure of a primary amine and a secondary amine from  $C_3H_9N$  and give their IUPAC names. 2
  7. Write down the structure of a tertiary amine and a secondary amine from  $C_3H_9N$  and give their IUPAC names. 2
  8. Write the IUPAC name of  $CH_3-CH_2-CH(CH_3)CH(NH_2)-CH_3$ . 2
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1. The number of possible structural isomers of  $1^\circ$  amines of molecular formula  $C_4H_{11}N$  is
    - a. 1
    - b. 2
    - c. 3
    - d. 4
  2. Which of the following is an unsymmetrical amine?
    - a. Dimethyl amine
    - b. Diethyl amine
    - c. ethyl methyl amine
    - d. none of them

### Separation of $1^\circ$ , $2^\circ$ , and $3^\circ$ amines by Hoffmann's method

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9. Give principle and procedure for the Separation of  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  amines by Hoffmann's method. 5
  10. Write short notes on Separation of  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  amines by Hoffmann's method. 5
  11. How would you separate  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  amines by Hoffmann's method? 5
  12. Describe a suitable method for the separation of different amines from their mixtures. 5
  13. Discuss any one method that can be used for the separation of primary, secondary and tertiary amines. 5
  14. How do you separate the isomers of  $C_3H_9N$  by Hoffmann's method? Explain with suitable chemical equations. 4
  15. Write down an example each of  $1^\circ$  amine,  $2^\circ$  amine and  $3^\circ$  amine with IUPAC names. Give a test to distinguish  $1^\circ$  amine from  $2^\circ$  amine. 5
  16. If you are given the mixture of methanamine, N-methylmethanamine and N,N-dimethylmethanamine, how will you separate them using Hoffmann's method? 5
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3. The primary, secondary and tertiary amines can be separated using
    - a.  $HNO_2$
    - b. conc.  $H_2SO_4$
    - c. alc.  $KOH/CHCl_3$
    - d. diethyl oxalate
  4. Primary amines and secondary amines can be separated by
    - a. Carbylamine test
    - b. Victor Meyer's test
    - c. Hoffmann's method
    - d. Nitrous acid test

### Preparation of primary amines

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17. Give an example of Hoffmann's Bromamide reaction. 1
18. How is Ethanamine prepared from Propanamide? 1
19. Write an example of a decarbonylation reaction? 1

20. How is Ethanamine prepared from Ethanenitrile?

1

21. Mention any three methods of preparation of primary amines.

3

5. Which, on reduction, does give primary amine?

- a.  $\text{CH}_3\text{CN}$       b.  $\text{C}_2\text{H}_5\text{CN}$       c.  $\text{CH}_3\text{CONH}_2$       c. All of these

6. In the reaction  $\text{A} \xrightarrow{\text{KCN}} \text{B} \xrightarrow{[\text{H}]} \text{C}_2\text{H}_5\text{NH}_2$

- a. A is  $\text{CH}_3\text{I}$       b. B is  $\text{CH}_3\text{NC}$       c. A is  $\text{C}_2\text{H}_5\text{I}$       d. B is  $\text{C}_2\text{H}_5\text{NC}$

7. Hoffmann's ammonolysis of alkyl halides gives

- a. Primary amines      c. Secondary amines  
b. Tertiary amines      d. All of the above

8.  $\text{CH}_3\text{Cl} + \text{alc. AgCN} \rightarrow \text{A} + \text{LiAlH}_4 \rightarrow \text{B}$

What would be the product B?

- a. Methanamine      c. ethanamine  
b. N-methylmethanamine      d. N-methylethanamine

### Conversion

22. An unsaturated hydrocarbon  $\text{C}_3\text{H}_6$ , undergoes Markovnikov's addition

## Physical Properties

9. Which of the following has the highest boiling point?

- a. ethyl amine      c. ethyl alcohol  
b. formic acid      d. trimethyl amine

## Chemical Properties

### Chemical Reactions of Primary Amines

23. Give an example of a carbylamine reaction.

1

24. Give the action of Chloroform upon aniline in the presence of aqueous NaOH.

1.5

10. The reaction of chloroform with primary amine in an ethanolic solution of KOH is termed

- a. Hoffmann's reaction  
b. Carbylamine reaction  
c. Reimer-Tiemann reaction  
d. Kolbe's reaction

11. Which of the following compounds gives a positive carbylamine reaction?

- a.  $(\text{CH}_3)_2\text{NH}$   
b.  $(\text{CH}_3)_4\text{N}^+$

- b.  $(\text{CH}_3)_3\text{N}$   
d.  $\text{CH}_3\text{NH}_2$

12. The reduction of which of the following compounds would yield a secondary amine?

- a. Alkyl nitrile      c. Carbyl amine  
b. Secondary nitro compound      d. primary amine

13. A compound that will form an offensive smell when heated with chloroform and alcoholic potash is

- a)  $\text{C}_2\text{H}_5\text{NH}_2$       b)  $(\text{C}_2\text{H}_5)_2\text{NH}$       c)  $(\text{CH}_3)_3\text{N}$       d)  $\text{CH}_3\text{CN}$

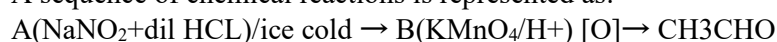
14. The reaction of chloroform with  $1^\circ$  amine in the presence of alcoholic KOH is

- a. Frankland reaction      b. Cannizzaro's reaction      c. Wurtz reaction      d. Carbylamine reaction

15. Reaction of ethyl amine with  $\text{CHCl}_3$  in alcoholic KOH produces

- a.  $\text{CH}_3\text{OH}$       b.  $\text{CH}_3\text{CN}$       c.  $\text{C}_2\text{H}_5\text{NC}$       d.  $\text{C}_2\text{H}_5\text{CN}$

25. A sequence of chemical reactions is represented as:



- Identify the compounds (A) and (B).
  - Write the laboratory test of compound (B).
  - Starting from compound(B), how would you obtain nitrolic acid?
  - Predict the product when compound (A) is heated with chloroform in an alcoholic medium.
- 1+1+2+1

### 1. Test of 1°, 2° and 3° amines with nitrous acid

26. Give a suitable chemical test to distinguish Ethanamine from N-Methylmethanamine. 2
27. What happens when Ethanamine is treated with  $\text{NaNO}_2 + \text{HCl}$  at low temperature? 1
28. You are given a mixture of two compounds, A and B.  
 $\text{A} = \text{CH}_3\text{CH}_2\text{CH}_2\text{-NH}_2$   $\text{B} = \text{CH}_3\text{CH}_2\text{NH}_2\text{CH}_3$   
 How would you separate their mixture by applying Hoffmann's method? Give nitrous acid test to distinguish between compounds A and B. 3+2

16. Reaction of nitrous acid on 1° aliphatic amines in cold will give  
 a. A diazonium salt      b. A nitrile      c. An alcohol      d. A dye
17. Reaction of nitrous acid on 1° aliphatic amines in cold will give:  
 b. A diazonium salt      b. An alcohol      c. A nitrile      d. a dye
18. Primary amines and secondary amines can be distinguished by  
 a. Iodoform test      c. Victor Meyer's test  
 d. Hoffmann's method      b. Nitrous acid test
19. What does the action of nitrous acid on ethylamine produce?  
 a. Ethane      c. ethylnitrite  
 b. Nitroethane      d. ethyl alcohol
20. Primary and secondary amines are distinguished by  
 a.  $\text{Br}_2/\text{KOH}$       c.  $\text{HClO}$   
 b.  $\text{HNO}_2$       d.  $\text{NH}_3$
21. The reaction of chloroform with 1° amine in the presence of alcoholic KOH is  
 a. Frankland reaction  
 b. Cannizzaro's reaction  
 c. Wurtz reaction  
 d. Carbylamine reaction
22. Reaction of ethylamine with  $\text{CHCl}_3$  in alcoholic KOH produces  
 a.  $\text{CH}_3\text{OH}$   
 b.  $\text{CH}_3\text{NC}$   
 c.  $\text{C}_2\text{H}_5\text{NC}$   
 d.  $\text{C}_2\text{H}_5\text{CN}$

### Conversions

29. How would you convert Methanamine into Ethanamine and vice versa? 3
30. Convert Methanamine to Ethanamine. 2
31. Convert  $\text{CH}_3\text{-CH}_2\text{-NH}_2$  into  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-NH}_2$ . 2
32. Convert Ethylamine to Methylamine. 2
33. Give a suitable chemical test to distinguish an aliphatic amine from an aromatic amine. 2
34. Convert Chloroform to Dimethylamine. 2.5
35. Represent a regular sequence of chemical reactions of the following sets of organic compounds using suitable reagents, catalysts or conditions, giving proper reasons.  
 $\text{CH}_3\text{CH}_2\text{NC}$   $\text{CH}_3\text{CH}_2\text{Br}$ ,  $\text{CH}_3\text{CH}_2\text{NHCH}_3$ ,  $\text{CH}_3\text{CH}_2\text{NH}_2$