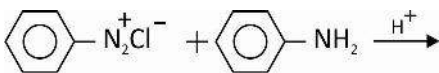


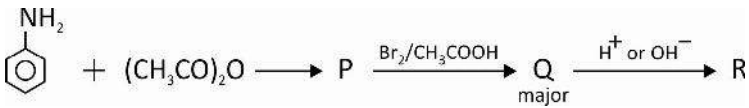
UNIT-13: AMINES

One mark questions:	
1. What is the shape of trimethyl amine?	K
2. Write the IUPAC name of $(\text{CH}_3)_3 \text{N}$.	K
3. Write the structure of ethane-1,2 - diamine	K
4. Write the IUPAC name of simplest arylamine.	K
5. The bond angle C–N–C in an aliphatic amine is less than 109.5° . Give reason.	U
6. What is the product obtained when a nitro compound is reduced using H_2 / Pd ?	K
7. Scrap iron and hydrochloric acid is preferred as reducing agent during the preparation of primary amines from nitrocompounds. Give reason.	U
8. Identify the major product X in the following reaction: $\text{RCN} \xrightarrow{\text{H}_2/\text{Ni}} \text{X}$.	K
9. $\text{CH}_2=\text{CHCH}_2\text{Cl} + \text{NH}_3 \longrightarrow \text{X}$. X is a primary amine. Give its IUPAC name.	K
10. Write the general formula of Quaternary ammonium salt.	K
11. Write the structure of an amide which gives propanamine by Hoffmann bromamide reaction.	U
12. Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis. Why?	U
13. Why is aniline soluble in aqueous HCl?	U
14. Between NH_3 and CH_3NH_2 , which has higher pK_b value?	U
15. Why are amines less acidic than alcohols of comparable molecular mass?	U
16. Why is pyridine used during the acylation of primary amines by acid chloride?	U
17. $\text{C}_6\text{H}_5\text{COCl} + \text{CH}_3\text{NH}_2 \longrightarrow \text{CH}_3\text{NHCOC}_6\text{H}_5 + \text{HCl}$. Name the reaction.	K
18. What is the gas liberated when methanamine is treated with nitrous acid.	K
19. Primary aliphatic amines quantitatively evolves nitrogen gas with nitrous acid. Mention one application of this reaction.	A
20. Write the chemical name of Hinsberg's reagent.	K
21. Which one of the following reacts with $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$ to give a product insoluble in aqueous alkali? $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$, $\text{C}_2\text{H}_5\text{NHCH}_3$, $(\text{C}_2\text{H}_5)_3 \text{N}$	U
22. A foul smelling gas is liberated when aniline is heated with chloroform and ethanolic potassium hydroxide solution. Name the gas.	K
23. $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2 \xrightarrow{\text{NaNO}_2/\text{HCl at } 0^\circ\text{C}} \text{X}$. Write the structure of X.	K
24. Diazonium salts are not stored. Why ?	U

25. Name the diazonium salt that is insoluble in water and stable at room temperature.	K
26. Give reason: Although amino group is ortho and p-directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.	U
27. Write the structure of the product obtained when aniline reacts with bromine water at room temperature.	K
28. Aniline does not undergo Friedel-Craft reaction. Why?	U
29. Write the zwitter ion form of sulphanilic acid.	K
30. Complete the coupling reaction : 	K
Two mark questions:	
1. What are A and B in: $RX \xrightarrow{\text{alc.KCN}} A \xrightarrow{H_2/Ni} B$?	K
2. $RCOOH \xrightarrow{NH_3, \Delta} A \xrightarrow{(i) LiAlH_4 \text{ ii) } H_2O} B$. Write the structures of A and B.	K
3. $C_6H_6 \xrightarrow{\text{conc. } H_2SO_4 + HNO_3 \text{ and heat}} A \xrightarrow{Sn/HCl} B$. Give the IUPAC names of A and B.	K
4. How is nitrobenzene converted to N - methylaniline? Write the equation.	K
5. Benzyl chloride $\xrightarrow{\text{ammonolysis}} A$ (1° amine) $\xrightarrow[2 \text{ moles of chloromethane}]{}$ B. Name the products A and B.	K
6. Complete the following acid–base reaction and name the product: $(C_2H_5)_3N + HCl \longrightarrow$	K
7. Name any two effects that decide the basic strength of alkylamine in aqueous solution.	K
8. Arrange the following as directed: i) $C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$ (increasing order in their solubility in water) ii) $C_2H_5NH_2$, $(C_2H_5)_3N$, $(C_2H_5)_2NH$ (decreasing order in base strength in aqueous medium)	U
9. Explain carbylamine reaction for methanamine with an equation.	K
10. Write the IUPAC names of A and B: $C_6H_5N_2Cl \xrightarrow[\text{alc.KCN}]{CuCN} A \xrightarrow{LiAlH_4} B$	K
11. Complete the following equation and name the reaction: $C_6H_5N_2Cl \xrightarrow{Cu_2Cl_2/HCl} A + B$	K
12. If : $C_6H_5N_2X \xrightarrow{R} C_6H_5Cl + N_2 + CuX$ is an example for Gatterman reaction, what should be the reagents R?	K K

13. How is aniline converted into phenol? Write the equation.	U
14. Write the name of the main products A and B . $\text{C}_6\text{H}_5\text{NH}_2 \xrightarrow{\text{NaNO}_2/\text{HCl at } 0^\circ\text{C}} \text{A} \xrightarrow{\text{H}_3\text{PO}_2/\text{H}_2\text{O}} \text{B}$	U
15. Between aniline and acetanilide which is more reactive towards electrophilic substitution reaction. Give reason.	
Three mark questions	
1. Write the equations for the reactions involved in the conversion of Primary amine to quaternary ammonium salt. (General equation).	K
2. Explain Gabriel phthalimide synthesis reaction for the preparation of methanamine. Write the equations.	K
3. Give reasons: i) Lower aliphatic amines are soluble in water. ii) Methanamine is a stronger base than ammonia. iii) pK_b of aniline is much higher than that of ammonia.	U
4. Arrange : $(\text{CH}_3)_3\text{N}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$, $\text{CH}_3\text{NHCH}_2\text{CH}_3$, as directed i) Increasing order in their base strength in gas phase. ii) Decreasing order in their base strength in aqueous medium. iii) Increasing order in their solvation in aqueous medium.	U
5. Arrange the following in the increasing order of their base strength. Give reason: Aniline, p-nitroaniline, p-toluidine.	U
6. Discuss briefly the separation of primary, secondary and tertiary amines using Hinsberg reagent.	K
7. An isocyanide on reduction gives a secondary amine. Using this as hint, name X, Y and Z: $\text{C}_6\text{H}_5\text{CN} \xrightarrow{\text{H}_2/\text{Ni}} \text{X} \xrightarrow[\Delta]{\text{CHCl}_3 + \text{alc. KOH}} \text{Y} \xrightarrow[2) \text{H}_2\text{O}]{1) \text{LiAlH}_4} \text{Z}$	A
8. What do you mean by acylation for an amine? Write the equation for the acylation of ethanamine with acetylchloride. Name the product formed.	K
9. Among the different isomers corresponding to molecular formula $\text{C}_3\text{H}_9\text{N}$ write the structure of the isomer, i) that reacts with Hinsberg reagent to form a product insoluble in an alkali ii) (any one) that forms a quaternary ammonium salt with 3 moles of R-X? iii) that does not undergo acylation	A
10. What is diazotization? Give an example for a diazonium salt. Mention one aromatic compound synthesized from a diazonium salt.	U

11. Aniline is nitrated in 3 steps to get p-nitroaniline as a major product. Name the reactions involved in three steps in the correct sequence.	U
12. What is the reagent/s (X) and products Y and Z in the following sequence of reaction: <div style="text-align: center;"> </div>	A
13. An aromatic compound "A" on treatment with aqueous ammonia and heating forms compound "B". B on heating with Br ₂ and KOH forms a compound "C" of molecular formula C ₆ H ₇ N. The compound C can form a diazonium salt. Give the IUPAC names of the compounds A, B and C.	A
14. Give the structures of A, B and C in the following reactions: $\text{C}_6\text{H}_5\text{N}_2\text{X} \xrightarrow{\text{CuCN/KCN}} \text{A} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{B} \xrightarrow{\text{NH}_3/\text{heat}} \text{C}$	U
15. Aniline is converted to Fluorobenzene. Write the equations for the reaction involved.	U
Five mark questions	
1. Identify A, B and C in the following conversion. $\text{C}_6\text{H}_5\text{NO}_2 \xrightarrow{\text{Fe/HCl}} \text{A} \xrightarrow{\text{NaNO}_2/\text{HCl at } 0^\circ\text{C}} \text{B} \xrightarrow{\text{CuCN/KCN}} \text{C}.$ Name the reaction involved in the conversion of A to B and B to C.	A
2. a) $\text{CH}_3\text{CONH}_2 \xrightarrow{\text{Br}_2/\text{KOH}} \text{X} \xrightarrow{\text{HNO}_2} \text{Y}$. Write the IUPAC names of X and Y. b) Name the inorganic reagent that helps to convert : i) $\text{ArN}_2^+\text{Cl}^-$ into ArI ii) $\text{ArN}_2^+\text{Cl}^-$ into ArOH c) Arrange these in the increasing order of their boiling points: $(\text{CH}_3)_3\text{N}$, $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$, $\text{CH}_3\text{NHCH}_2\text{CH}_3$	A
3. What are X, Y and Z? Name the two inorganic reagents that are used to convert Z into nitrobenzene. <div style="text-align: center;"> </div>	A
4. a) Between N-methylethanamine and propan-2-amine, which will liberate N ₂ gas on treatment with nitrous acid. Write the equation for the reaction. b) What should be the reagents X and Y to bring about the following conversions? <div style="text-align: center;"> </div>	

<p>c) Phenols or aryl amines + A $\xrightarrow{H^+ \text{ or } OH^-}$ azo dyes. What should be A?</p>	
<p>5. a) Give reason :</p> <p>i) Aryl diazonium salts are more stable than aliphatic diazonium salts.</p> <p>ii) Tertiary amine cannot form intermolecular hydrogen bond.</p> <p>b) $C_6H_5CONH_2 \xrightarrow{i) LiAlH_4 \text{ ii) } H_2O} P \xrightarrow{C_6H_5SO_2Cl} Q$. Write the structure of P and Q.</p> <p>c) Arrange the following in the decreasing order of their pK_b value.</p> <p>$C_6H_5NH_2$, $(C_2H_5)_2NH$, NH_3</p>	<p>A</p>
<p>6. a) Give the general equation for Hoffmann bromamide degradation reaction. Why is this called degradation reaction? Explain the migration involved in the reaction.</p> <p>b) Benzenediazonium chloride reacts with phenol in presence of OH^- to form an orange dye. Write the structure of the dye.</p> <p>c) pK_b values of amines A, B, C are 3.25, 9.3, 4.7 respectively. Arrange the amines A, B, C in increasing order of their basic strength.</p>	<p>U</p>
<p>7. An aromatic amide 'A' with the formula C_7H_7ON on reaction with NaOBr forms a compound 'B'. 'B' reacts with HNO_2 at $0^\circ C$ to form 'C'. C is reduced using ethanol. The products formed contains two organic compounds D and E, one of which is an aromatic compound. What are A,B,C,D and E?</p>	<p>U</p>
<p>8. a) Write the structure of P,Q,R.</p> <div style="text-align: center;">  </div> <p>b) Name the family of compounds that gives carbylamine reaction. Give the general equation for the reaction.</p>	<p>A</p> <p>K</p>