**CLASS : XII**

**SUBJECT : CHEMISTRY(amines)**

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| **Sr. No.** | **Knowledge Based** | **Marks** |
| 1. | Classify the following amines as primary, secondary or tertiary: | 1 each |
| 2. | (i) Write structures of different isomeric amines corresponding to the molecular  formula, C4H11N.  (ii) Write IUPAC names of all the isomers.  (iii) What type of isomerism is exhibited by different pairs of amines? | 3 |
| 3 | Write IUPAC names of the following compounds and classify them into primary,  secondary and tertiary amines.  (i) (CH3)2CHNH2 (ii) CH3(CH2)2NH2 (iii) CH3NHCH(CH3)2  (iv) (CH3)3CNH2 (v) C6H5NHCH3 (vi) (CH3CH2)2NCH3  (vii) *m*–BrC6H4NH2 | 1 each |
| 4 | Write IUPAC names for the following:  i)(C6H5)-N-(CH3)2  ii) CH3-N(C2H5)-CO-CH3  iii) CH2=CH-CN iv) CH2=CH-CH2-NH2 | 1 each |
| 5 | Write reactions of the final alkylation product of aniline with excess of methyl  iodide in the presence of sodium carbonate solution. | 2 |
| 6 | Write chemical reaction of aniline with benzoyl chloride and write the name of  the product obtained. | 2 |
| 7 | Which is the best reagent to convert nitrile to primary amine? | 2 |
| 8 | Why do amines behave as nucleophiles? | 2 |
| 9 | Mention the chief use of quaternary ammonium salts derived from long chain amines. | 3 |
| 10 | What is the role of pyridine in the acylation of amines? | 2 |
| 11 | Foe an amine, write the expression for Kb to indicate its strength. | 2 |
| 12 | Describe a method for the identification of primary, secondary and tertiary amines.  Also write chemical equations of the reactions involved. | 2 |
| 13 | Write short notes on the following:  i)ammonolysis ii) Gaberial pthalimide synthesis  iii) Hoffmann bromide degradation iv) Acylation  v) Carbylamine reaction | 1 each |
| 14 | Write the reactions of (i) aromatic and (ii) aliphatic primary amines with nitrous  acid. | 1 each |
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| **S. No.** | **Understanding Based** |  |
| 1. | Trimethyl amine has a bond angle of 1080. Give reasons. | 2 |
| 2. | Why cannot aromatic primary amines be prepared by Gabriel phthalimide  synthesis? | 1 each |
| 3 | Give reasons for the following:   1. Aliphatic amines are stronger bases than ammonia. 2. Lower aliphatic amines are soluble in water 3. Alkylamines are stronger bases than ammonia 4. Aniline is more stable than anilinium ion 5. NH2 is ortho para directing and powerful activating group | 1 each |
| 4 | Arrange the following in increasing order of their basic strength:  (i) C2H5NH2, C6H5NH2, NH3, C6H5CH2NH2 and (C2H5)2NH  (ii) C2H5NH2, (C2H5)2NH, (C2H5)3N, C6H5NH2  (iii) CH3NH2, (CH3)2NH, (CH3)3N, C6H5NH2, C6H5CH2NH2. | 1 each |
| 5 | Complete the following acid-base reactions and name the products:  (i) CH3CH2CH2NH2 + HCl  (ii) (C2H5)3N + HCl | 1 each |
| 6 | Arrange the following:  i)In decreasing order of the p*Kb* values:  C2H5NH2, C6H5NHCH3, (C2H5)2NH and C6H5NH2  (ii) In increasing order of basic strength:  C6H5NH2, C6H5N(CH3)2, (C2H5)2NH and CH3NH2  (iii) In increasing order of basic strength:   1. Aniline, *p*-nitroaniline and *p*-toluidine   (b) C6H5NH2, C6H5NHCH3, C6H5CH2NH2.  (iv) In decreasing order of basic strength in gas phase:  C2H5NH2, (C2H5)2NH, (C2H5)3N and NH3  (v) In increasing order of boiling point:  C2H5OH, (CH3)2NH, C2H5NH2  (vi) In increasing order of solubility in water:  C6H5NH2, (C2H5)2NH, C2H5NH2. | 1 each |
| 7 | Although trimethylamine and n-propylamine have the same molecular weight, but the former boils at a lower temperature(276K) than the latter (322K). Explain. |  |
| 8 | Give one chemical test to distinguish between the following pairs of compounds.  (i) Methylamine and dimethylamine (ii) Secondary and tertiary amines  (iii) Ethylamine and aniline (iv) Aniline and benzylamine  (v) Aniline and N-methylaniline. | 1 each |
| 9 | Convert:  i)3-methylaniline to 3-nitrotoluene.  (ii) Aniline into 1,3,5 - tribromobenzene. | 2 |
| 10 | Give plausible explanation for each of the following:  (i) Why are amines less acidic than alcohols of comparable molecular masses?  (ii) Why do primary amines have higher boiling point than tertiary amines?  (iii) Why are aliphatic amines stronger bases than aromatic amines? | 1 each |
| 11 | Give the structures of A, B,C | 2 each |
| **S. No.** | **Application** |  |
| 1. | How will you convert  (i) Benzene into aniline (ii) Benzene into N, N-dimethylaniline  (iii) Cl–(CH2)4–Cl into hexan-1,6-diamine? | 1 each |
| 2. | Write structures of different isomers corresponding to the molecular formula,  C3H9N. Write IUPAC names of the isomers which will liberate nitrogen gas on  treatment with nitrous acid. | 3 |
| 3 | Account for the following:  i)pKb of aniline is more than that of methylamine.  (ii) Ethylamine is soluble in water whereas aniline is not.  (iii) Methylamine in water reacts with ferric chloride to precipitate hydrated ferric oxide.  (iv) Although amino group is *o–* and *p–* directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of *m*-nitroaniline.  (v) Aniline does not undergo Friedel-Crafts reaction.  (vi) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.  (vii) Gabriel phthalimide synthesis is preferred for synthesising primary amines. | 1 each |
| 4 | How will you convert:  (i) Ethanoic acid into methanamine  (ii) Hexanenitrile into 1-aminopentane  (iii) Methanol to ethanoic acid  (iv) Ethanamine into methanamine  (v) Ethanoic acid into propanoic acid  (vi) Methanamine into ethanamine  (vii) Nitromethane into dimethylamine  (viii) Propanoic acid into ethanoic acid? | 1 each |
| 5 | Accomplish the following conversions:  (i) Nitrobenzene to benzoic acid  (ii) Benzene to *m*-bromophenol  (iii) Benzoic acid to aniline  (iv) Aniline to 2,4,6-tribromofluorobenzene  (v) Benzyl chloride to 2-phenylethanamine  (vi) Chlorobenzene to *p*-chloroaniline  (vii) Aniline to *p*-bromoaniline  (viii) Benzamide to toluene  (ix) Aniline to benzyl alcohol. | 1 each |
| 6 | Complete the following reactions: | 1 each |
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| **S.No.** | **Value Based** |  |
| 1. | Sameer and his friends were playing Holi with natural colours. Some of his friends came to play with synthetic colours and eggs. Sameer persuaded them to play with natural ones. He explained how synthetic one could lead to skin allergy. They agreed to him   1. Mention the values shown by Sameer 2. Write the reaction for preparation of two azo dyes 3. Write the name of two pigments present in natural colours. How are natural colours prepared? | 3 |
| 2. |  |  |
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| **S.No.** | **HOTS** |  |
| 1. | An aromatic compound ‘A’ on treatment with aqueous ammonia and heating  forms compound ‘B’ which on heating with Br2 and KOH forms a compound ‘C’  of molecular formula C6H7N. Write the structures and IUPAC names of compounds  A, B and C. | 3 |
| 2. | Aniline gets coloured on standing in air for a long time. Why? | 2 |
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