## CBSE Test Paper - 02

## Class - 12 Chemistry (Amines)

1. Direct nitration of aniline yields significant amount of meta derivative. To obtain more p – nitro derivative, one or more of the below can be done
   a. All of these
   b. by increasing temperature
   c. controlling the nitration reaction
   d. reacting with acetic anhydride
2. The following amine can be classified as $(C_2H_5)_2CHNH_2$
   a. Tertiary
   b. Secondary
   c. Mixed
   d. Primary
3. Heating a(n) ____ results in a Cope elimination.
   a. imine
   b. amine oxide
   c. enamine
   d. oxime
4. Which of the following is an intermediate in the mechanism for amide synthesis through acylation?
   a. A
   b. B
   c. C
   d. D
5. Amide which gives propanamine by Hoffmann bromamide is:
   a. Pentanamide
   b. Hexanamide
   c. Butanamine
   d. Propanamine

6. Why does acetylation of $-NH_2$ group of aniline reduce its activating effect?

7. Mention one commercial use of N, N-Dimethyl aniline (DMA).

8. Write IUPAC name of the following compound and classify it into primary secondary and tertiary amine.
   $(CH_3CH_2)_2NCH_3$

9. Accomplish the following conversion: Nitrobenzene to benzoic acid.

10. Give a chemical test to distinguish between aniline and ethylamine.

11. Give one example of Hoffmann - bromamide degradation reaction.

12. A compound X having a molecular formula, $C_3H_7NO$ reacts with $Br_2$ in presence of KOH to give another compound Y. The compound Y reacts with $HNO_2$ to form ethanol and $N_2$ gas. Identify the compounds X and Y and write the reactions involved.

13. Arrange the following in increasing order of their basic strength:
    i. $C_2H_5NH_2$, $C_6H_5NH_2$, $NH_3$, $C_6H_5\ CH_2NH_2$ and $(C_2H_5)_2NH$
    ii. $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and $C_6H_5NH_2$
    iii. $CH3NH_2$, $(CH_3)_2NH$, $(CH3)_3N$, $C_6H_5NH_2$ and $C_6H_5CH_2NH_2$

14. Give reasons:
    Methylamine in water reacts with ferric chloride to precipitate ferric hydroxide.

15. Accomplish the following conversion: Aniline to benzyl alcohol.

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**Class - 12 Chemistry (Amines)**

**Solutions**

1. (d) reacting with acetic anhydride

   **Explanation:** Direct nitration of aniline yield significant amount of meta derivative, this is because the use of $HNO_3$ during nitration of aniline causes the formation of anilinium ion($C_6H_5NH_3^+$). Anilinium ion is responsible for the formation of metra nitro aniline. To prevent this, initial reaction of aniline with acetic anhydride acetylates -$NH_2$ group.

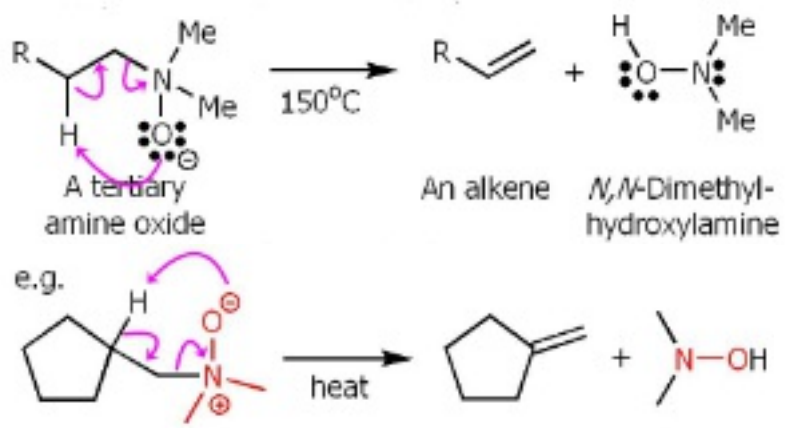
   $C_6H_5NH_2$ + $CH_3COOCOCH_3$ → $C_6H_5NHCOCH_3$.

   Now, -$NHCOCH_3$ is an activating group, which on nitration followed by hydrolysis form para nitro aniline as a major product.
2. (d) Primary

   **Explanation:** This is primary amine, because the Nitrogen of amine is only connected to one carbon.
3. (b) amine oxide

   **Explanation:** Heating of Amine oxide result in cope elimination which is cis/syn elimination.

   The Cope reaction or Cope elimination, is an elimination reaction of the N-oxide of a tertiary amine to form an alkene and a hydroxylamine.




4. (a) A

   **Explanation:** A is the intermediate formed by nucleophilic attack by $CH_3NH_2$ on the

carbonyl carbon of $CH_3COCl$.

5. (c) Butanamine

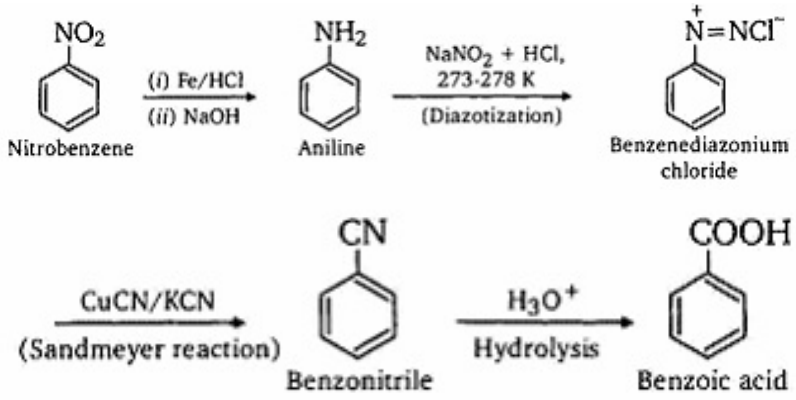
   **Explanation:** In Hoffmann bromamide reaction, the amine formed has one carbon less than the amide.

   $RCONH_2 + Br_2 + 4NaOH \rightarrow RNH_2 + Na_2CO_3 + 2NaBr + 2H_2O$

6. Due to resonance the lone pair of nitrogen is less available for donation.

7. It is used as raw materials in the preparation of a number of dyes for example: methyl orange, crystal violet, malachite green etc.

8. N-Ethyl-N-methylhexanamine (3°),

9. 


10. Aniline will give the azo dye test while ethylamine will not give. In azo dye test aromatic primary amines react with $NaNO_2$ and HCl at 273-278 K to form diazonium salts which on further reaction with alkaline solution of β -naphthol give orange red dye.

11. In Hoffmann – bromamide reaction an acid amide is reacted with bromine in presence of the aqueous or ethanolic solution of NaOH to give a primary amine having one carbon less than that present in amide.

    $CH_3CONH_2 + Br_2 + 4\ NaOH \rightarrow CH_3NH_2 + Na_2CO_3 + 2\ NaBr + 2\ H_2O$

12. $\underset{\substack{\text{'X' Propanamide} \\ (\text{Mol Formula} = C_3H_7NO)}}{CH_3CH_2CONH_2} + Br_2 + 4KOH \rightarrow \underset{\text{'Y' Ethanamine}}{CH_3CH_2NH_2} + HNO_2 \rightarrow CH_3CH_2OH + N_2 +$

$H_2O$

13. i. $C_6H_5NH_2 < C_6H_5CH_2NH_2 < NH_3 < C_2H_5NH_2 < (C_2H_5)_2NH$

    ii. $C_6H_5NH_2 < C_2H_5NH_2 < (C2H_5)_3N < (C_2H_5)_2NH$

    iii. $C_6H_5NH_2 < C_6H_5CH_2NH_2 < (CH_3)_3N < CH_3NH_2 < (CH_3)_2NH$

14. Methylamine being basic, accepts a proton from water as shown in the equation below. While doing so it liberates a $OH^-$ ion which combines with $FeCl_3$ to form a brown ppt of ferric hydroxide.

$$CH_3NH_2 + H_2O \rightarrow CH_3\overset{+}{N}H_3 + OH^-$$

$$FeCl_3 + 3OH^- \rightarrow \underset{(reddish\ brown\ ppt.)}{Fe(OH)_3} + 3Cl^-$$

15.