

NITROGEN CONTAINING COMPOUNDS

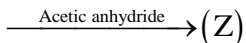
1. Alkyl Nitrites, Nitroalkane

- Q 1. Which of the following is not nitrogen containing Compounds?
 (A) R – NC (B) R – CN
 (C) R – O – NO (D) None of these
- Q 2. The two form of HNO₂ is
 (A) HONO, HNO₂ (B) HO₂N, HNO₂
 (C) HNOO, HNO₂ (D) NHO₂, HNO₄
- Q 3. Which of the following is called ester of NO₂
 (A) Nitroalkane (B) Alkyl nitrites
 (C) Oxime (D) Alkyl isocyanid
- Q 4. In the reaction
 $2C_2H_5OH + N_2O_3 \rightarrow$ product, is
 (A) C₂H₅NO₂ (B) C₂H₅ONO
 (C) CH₃NOC₂H₅ (D) C₂H₅OC₂H₅
- Q 5. Which compound has characteristics smell of apple?
 (A) RNO₂ (B) RNC
 (C) R – ONO (D) R – C = N – OH
- Q 6. In the reaction
 $Cl-CH_2-COOH + NaNO_2 \xrightarrow{\Delta}$
 The product A is
 (A) O₂N – CH₂COOH (B) CH₃NO₂
 (C) Cl – CH₂ – CONO₂ (D) None of these
- Q 7. In the reaction
 $CH_3NO_2 \xrightarrow{Cl_2/NaOH}$ product, is
 (A) CCl₃NO₂ (B) CHCl₃
 (C) CH₃CN (D) None of these
- Q 8. Which of the following nitroalkanes gives red colour with HNO₂?
 (A) (CH₃)₃CNO₂ (B) (CH₃)₂CHNO₂
 (C) CH₃CH₂NO₂ (D) None of these
- Q 9. Write the product in the following reactions:
 (A) C₂H₅NO₂ $\xrightarrow{Sn + HCl}$
 (B) C₂H₅NO₂ $\xrightarrow{Zn\ dust + NH_4Cl}$

- Q 10. Which of the following Nitroalkane doesn't undergo hydrolysis?
 (A) (CH₃)₃CNO₂ (B) (CH₃)₂CHNO₂
 (C) CH₃CH₂NO₂ (D) All of these
- Q 11. In basic medium, reduction of C₂H₅NO₂ with SnCl₂ + HCl gives
 (A) CH₃CH₂NHOH
 (B) CH₃CH = N – ON
 (C) both a & b
 (D) None of these
- Q 12. In the reaction
 $R-CH_2-NO_2 + R'MgX \rightarrow$ Product is
 (A) R'CH₂NO₂ (B) R'H
 (C) R – CH = N – OH (D) None of these
- Q 13. In the reaction
 $R_2CH-NO_2 \xrightarrow{HCl}$ Product
 (A) R₂C = O (B) R₂CHO
 (C) R₂C(NO₂)Cl (D) None of these

2. Alkane Nitrile & Isonitrile, Amines

- Q 1. Butanonitrile may be prepared by
 (A) propyl alcohol + KCN
 (B) butyl alcohol + KCN
 (C) butyl chloride + KCN
 (D) propyl chloride + KCN
- Q 2. The best method for preparation of Me₃C-CN is
 (A) to react Me₃C – OH with HCN
 (B) to react Me₃C – Br with NaCN
 (C) to react Me₃C – Br with ClCn
 (D) to react Me₃C – Li with NH₂CN
- Q 3. $CH_3CH_2Cl \xrightarrow{NaCN} (X) \xrightarrow{Ni/H_2} (Y)$

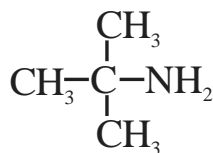


(Z) in the above reaction sequence is

- (A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{NHCOCH}_3$
 (B) $\text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$
 (C) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CONHCH}_3$
 (D) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CONHCOCH}_3$
- Q 4. Which of the following is obtained in carbylamine reaction ?
 (A) $\text{C}_2\text{H}_5\text{NH}_2$ (B) COCl_2
 (C) $\text{C}_6\text{H}_5\text{CN}$ (D) $\text{C}_6\text{H}_5\text{NC}$
- Q 5. Ethyl chloride on heating with AgCN forms a compound (X). The functional isomer of (X) is
 (A) $\text{C}_2\text{H}_5\text{NC}$ (B) $\text{C}_2\text{H}_5\text{NH}_2$
 (C) $\text{C}_2\text{H}_5\text{CN}$ (D) None of these
- Q 6. State the product available by the following reaction:

$$\text{CH}_3\text{CH}_2\text{CN} + \text{ethanol} + \text{H}_2\text{O} \xrightarrow[\Delta]{\text{conc. H}_2\text{SO}_4}$$

 (A) ethyl formate + NH_3
 (B) ethyl propanoate + NH_3
 (C) ethyl butanoate + NH_3
 (D) ethyl acetate + NH_3
- Q 7. $\text{CH}_3\text{NH}_2 + \text{CHCl}_3 + \text{KOH} \rightarrow$ nitrogen containing compound is
 (A) $\text{CH}_3 - \text{C} \equiv \text{N}$ (B) $\text{CH}_3 - \text{NH} - \text{CH}_3$
 (C) $\text{CH}_3 - \text{N} \equiv \text{C}^+$ (D) $\text{CH}_3 - \text{N}^+ \equiv \text{C}^-$
- Q 8. Carbylamine test is not answered by
 (A) aprotic acid (B) neutral compound
 (C) Lewis acid (D) Lewis base
- Q 9. Write the products in the following reactions:
 (A). $\text{CH}_3 - \text{C} \equiv \text{N} + \text{H}_2\text{O} \longrightarrow$
 (B). $\text{CH}_3 - \text{C} \equiv \text{N} + \text{Ni}/\text{H}_2 \longrightarrow$
 (C). $\text{CH}_3 - \text{C} \equiv \text{N} + \text{SnCl}_2/\text{HCl} \longrightarrow$
 (D). $\text{CH}_3 - \text{C} \equiv \text{N} + \text{CH}_3\text{MgCl} \longrightarrow$
- Q 10: (A). $\text{R} - \text{N} \equiv \text{C} + \text{S}_8 \longrightarrow ?$
 (B). $\text{R} - \text{N} \equiv \text{C} + 2\text{HgO} \longrightarrow ?$
 (C). $\text{R} - \text{N} \equiv \text{C} + \text{O}_3 \longrightarrow ?$



- Q 11. is a
 (A) primary amine
 (B) secondary amine
 (C) tertiary amine
 (D) quaternary salt
- Q 12. The reaction between primary amine, chloroform and few drops of alcoholic KOH is known as
 (A) Hofmann's reaction
 (B) Kolbe's reaction
 (C) Carbylamine reaction
 (D) Reimer - Tiemann's reaction
- Q 13. Gabriel phthalimide synthesis can be used to prepare
 (A) ethanamine
 (B) N-methylmethanamine
 (C) N,N-dimethylmethanamine
 (D) p-toluidine
- Q 14. Primary amines are identified by
 (A) Hofmann's reaction
 (B) Carbylamine reaction
 (C) Friedel-Crafts reaction
 (D) Biuret reaction
- Q 15. In the given reaction

$$\text{CH}_3 - \text{CH}_2 - \underset{\text{NOH}}{\underset{\parallel}{\text{C}}} - \text{CH}_3 \xrightarrow[\text{H}_2\text{O}/\text{H}^+]{\text{H}_2\text{SO}_4}$$

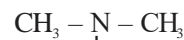
 (A) and (B) are
 (A) CH_3COOH and $\text{C}_2\text{H}_5\text{NH}_2$
 (B) $\text{CH}_3\text{CH}_2\text{COOH}$ and CH_3NH_2
 (C) CH_3NH_2 and $\text{C}_2\text{H}_5\text{NH}_2$
 (D) CH_3COOH and $\text{CH}_3\text{CH}_2\text{COOH}$
- Q 16. Hinsberg's reagent is
 (A) benzene sulphonamide
 (B) benzene sulphonic acid
 (C) benzene sulphuryl chloride
 (D) benzene sulphonyl chloride
- Q 17. Which one of the following on reduction with LiAlH_4 yields a secondary amine ?
 (A) Methyl cyanide (B) Nitroethane
 (C) Methyl isocyanide (D) Acetamide
- Q 18. By passing the mixture of the vapours of alcohol

and excess of ammonia over heated alumina at 623K, the main product obtained is

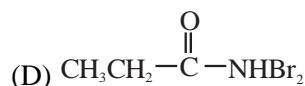
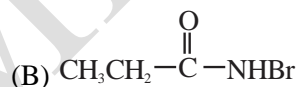
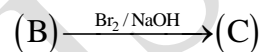
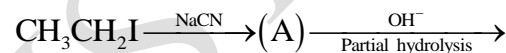
- (A) primary amine
 (B) secondary amine
 (C) tertiary amine
 (D) a mixture of pri- sec- & tert-amines

3. Test of Amines, Reaction of Amines

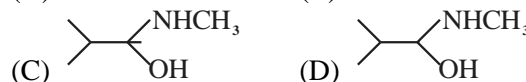
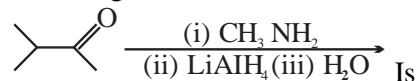
- Q 1. Secondary amine forms yellow oily liquid with nitrous acid, which on warming with phenol and conc. H_2SO_4 gives a brown or red colour and which at once changes into blue – green. This reaction is called as
 (A) Carbylamine reaction
 (B) Liebermann's nitroso reaction
 (C) Gabriel phthalimide reaction
 (D) Hofmann's mustard oil reaction
- Q 2. Tertiary amines dissolve in cold nitrous acid to form salt, which on warming decomposes to give
 (A) $R_3N.HNO_2$ (B) $R_2N.NO$
 (C) ROH (D) $R_2N.NO + ROH$
- Q 3. Acetamide reacts with NaOBr in alkaline medium to form:
 (A) NH_3 (B) CH_3NH_2
 (C) CH_3CN (D) $R_2N.NO + ROH$
- Q 4. The compound that will react most readily with NaOH to form methanol is
 (A) $(CH_3)_4N^+I^-$ (B) CH_3OCH_3
 (C) $(CH_3)_3S^+I^-$ (D) $(CH_3)_3CCl$
- Q 5. An organic compound, C_3H_9N (A) when treated with nitrous acid gave an alcohol and N_2 gas was evolved. (A) on warming with $CHCl_3$ and caustic potash gave (C) which on reduction gave isopropyl methylamine. Predict the structure of (A).
 (A) $CH_3CH_2CH_2NH_2$



- Q 6. Ethyl isocyanide on hydrolysis in acidic medium gives :
 (A) ethanoic acid and ammonium salt
 (B) propanoic acid and ammonium salt
 (C) ethylamine salt and methanoic acid
 (D) methylamine salt and ethanoic acid
- Q 7. In the following sequence of reaction, the major product (C) is



- Q 8. The major organic product formed from the following reaction,

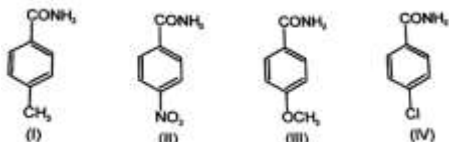


- Q 9. In order to distinguish between $C_2H_5NH_2$ and $C_6H_5NH_2$, which of the following reagents is useful ?
 (A) Hinsberg reagent (B) β - naphthol
 (C) $CHCl_3 / KOH$ (D) NaOH
- Q 10. An organic compound 'A' containing nitrogen, on acid catalysed hydrolysis produces a water soluble organic compound 'B' and a gaseous compound 'C' When methyl magnesium bromide

is slowly added to 'A' in 1 : 1 ratio and hydrolysed, it produces a compound which can be obtained by dry distillation of calcium salt of 'B'. The compound 'A' is

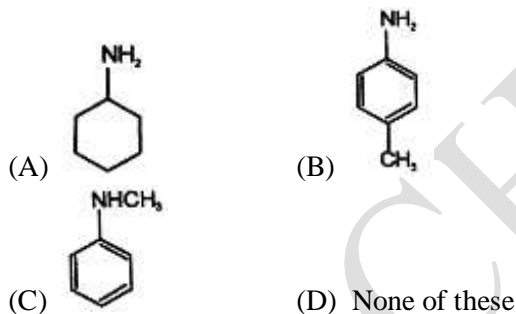
- (A) N-methyl methanamide
 (B) N-ethyl methanamide
 (C) N,N-dimethyl methanamide
 (D) methyl isocyanide

Q 11. The rate Hofmann's bromamide degradation with following amide will follow the order

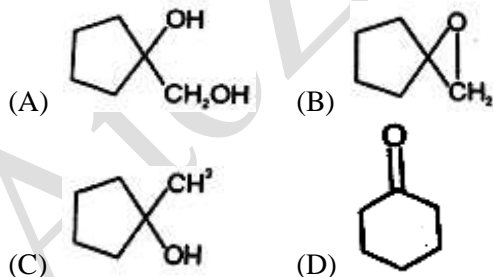


- (A) III > I > IV > II
 (B) II > IV > I > III
 (C) I > II > III > IV
 (D) I > III > IV > II

Q 12. The amines that will give off N_2 upon treatment with $NaNO_2$ and dil. H_2SO_4 is/are at 0 to $5^\circ C$

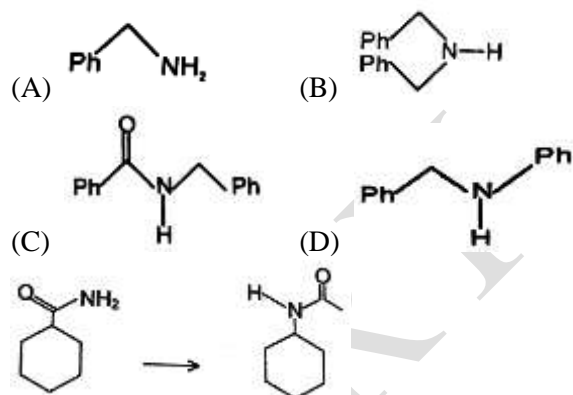


Q 13. A (major)



Q 14.

The end product B of the above reaction is

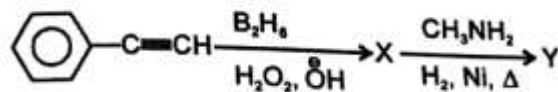


Q 15.

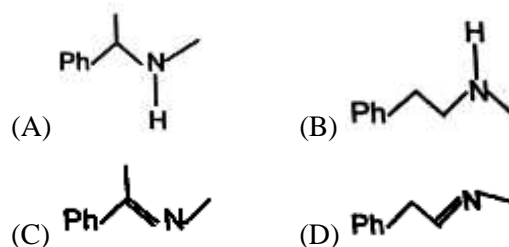
The correct route for the above transformation is

- (A) (i) Br_2/KOH (ii) H_2/Pt (iii) CH_3COOH
 (B) (i) $P_2O_5/Heat$ (ii) H_2/Pt (iii) $(CH_3CO_2)_2O$
 (C) (i) $(CH_3CO)_2O$ (ii) H_2/Pt (iii) Br_2/KOH
 (D) (i) Br_2/KOH ; (ii) CH_3COCl

Q 16.



The final product (Y) is



Answer Key

1. Alkyl Nitrites, Nitroalkane

- (1). B (2). A (3). B
(4). B (5). C (6). B
(7). A (8). C
(9). (A). $C_2H_5NH_2$ (B). C_2H_5NHOH
(10). C (11). C (12). B
(13). A

2. Alkane Nitrile & Isonitrile, Amines

- (1). D (2). C (3). A
(4). D (5). C (6). B
(7). D (8). B
(9). (A). CH_3COOH (B). $CH_3CH_2NH_2$
 (C). CH_3CHO (D). CH_3COCH_3
(10). (A). $R-N=C=O$ (B). $R-N=C=O$
 (C). $R-N=C=O$
(11). A (12). C (13). A
(14). B (15). A (16). D
(17). C (18). A

3. Test of Amines, Reaction of Amines

- (1). B (2). D (3). B
(4). A (5). C (6). C
(7). A (8). B (9). B
(10). A (11). A (12). D
(13). A (14). D (15). B