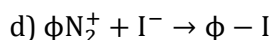
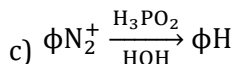
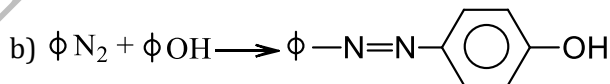


# AMINES

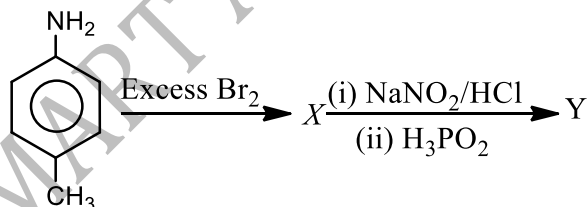
## CHEMISTRY

### Single Correct Answer Type

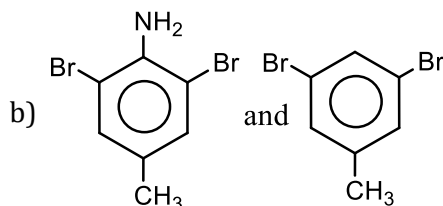
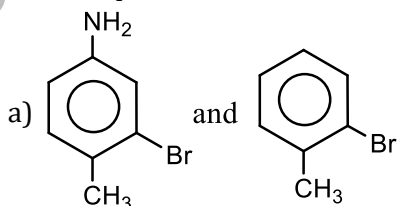
- Acetonitrile on reduction gives
  - Propanamine
  - Methanamine
  - Ethanamine
  - None of these
- Hofmann's rearrangement during the conversion of an amide to amine involves..... rearrangement.
  - Intermolecular
  - Intramolecular.
  - Both (a) and (b)
  - None of these
- The reduction of which of the following compound would yield secondary amine?
  - Alkyl nitrile
  - Carbylamine
  - Primary amine
  - Secondary nitro compound
- Which of the test is used for detection of secondary amines ?
  - Liebermann's nitroso test
  - Lucas test
  - Tollen's test
  - Carbylamine reaction
- From the following compounds which does not react with  $C_6H_5SO_2Cl$ ?
  - $C_2H_5.NH_2$
  - $CH_3.NH_2$
  - $(CH_3)_2NH$
  - $(C_2H_5)_3N$
- Which of the following statements is not correct?
  - Alkyl isocyanides have bad odours while alkyl cyanides have pleasant odours
  - Alkyl cyanides are not as poisonous as KCN
  - Alkyl cyanides have lower boiling points than the corresponding alkyl isocyanides
  - Acetonitrile is soluble in water but methylcarbylamine is not
- Which of the following reaction will not occur?



- Which of the following is not characteristic of amines?
  - They smell like ammonia
  - They are inflammable in air
  - They show the property of hydrogen bonding
  - They are amphoteric in nature
- In the following reaction sequence predict the compound X and Y.



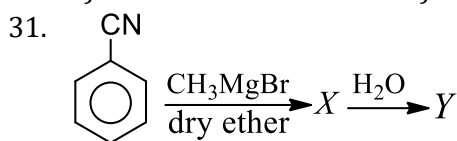
The compound X and Y are





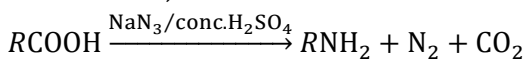


29. Choose the amide which on reduction with  $LiAlH_4$  yields a secondary amine
- a) Benzyl alcohol                      b) Benzaldehyde                      c) Benzonitrile                      d) Benzyl isocyanide
- a) Ethanamide                              b) N-methylethanamide
- c) N, N-dimethylethanamide                      d) Phenylmethanamide
30. Hofmann bromamide reaction is used to prepare
- a) 1° amine                              b) 2° amine                              c) 3° amine                              d) All of these



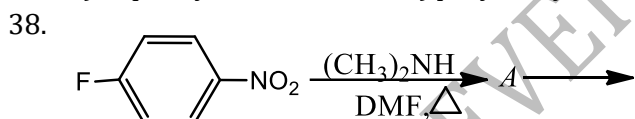
Identify Y

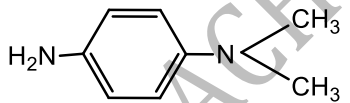
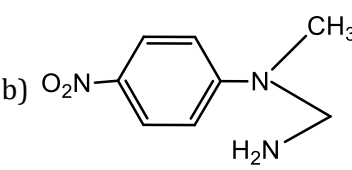

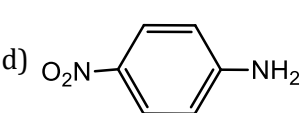
- a) Benzophenone                      b) Acetophenone                      c) Benzoic acid                      d) phenol
32. Which of the following compound does not undergoes Schotten-Baumann reaction?
- a) Phenol                              b) Primary amine                      c) Secondary amine                      d) Tertiary amine
33. Arrange the following  $CH_3NH_2$  (I);  $CH_3NH$  (II);  $C_6H_5NH_2$  (III);  $(CH_3)_3N$  (IV) in increasing order of basic nature in aqueous medium:
- a) II < I < IV < III                      b) III < IV < I < II                      c) I < II < III < IV                      d) II < III < I < IV
34. The reaction,



is known as

- a) Curtius reaction                      b) Lossen reaction                      c) Schmidt reaction                      d) Hofmann reaction
35. Which of the following compounds on treatment first with  $NaNO_2/HCl$  and then coupled with phenol produces *p*-hydroxyazobenzene ?
- a) Nitrobenzene                      b) Azobenzene                      c) Phenol                      d) Aniline
36. A compound which on reaction with aqueous nitrous acid gives an oily nitrosoamine is:
- a) Methylamine                      b) Ethylamine                      c) Diethylamine                      d) Triethylamine
37. Benzene diazonium chloride on reaction with phenol in weakly basic medium gives
- a) Diphenyl ether                      b) *p*-hydroxy azobenzene                      c) Chlorobenzene                      d) Benzene



- a) 
- b) 
- c) 
- d) 

39. 1 mole of ethyl amine on reaction with  $HNO_2$  gives at NTP
- a) 11.2 L of  $N_2$                       b) 5.6 L of  $N_2$                       c) 22.4 L of  $N_2$                       d) 1 L of  $N_2$

40. Dehydration of an amide gives:

- a) Cyanide                              b) Amine                              c) Isocyanide                              d) Fatty acid

41. In aqueous solutions, the basic strength of amines decreases in the order

- a)  $CH_3NH_2 > (CH_3)_2NH_2 > (CH_3)_3N$                       b)  $(CH_3)_2NH > (CH_3)_3N > CH_3NH_2$
- c)  $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2$                       d)  $(CH_3)_2NH_2 > CH_3NH_2 > (CH_3)_3N$

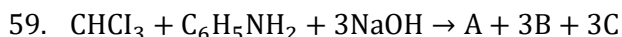
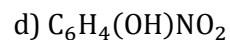
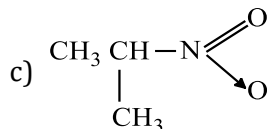
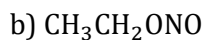
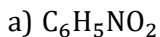
42. Methyl cyanide gives on hydrolysis

- a) Methyl amine                      b) Acetic acid                      c) Formic acid                      d) Ethyl amine

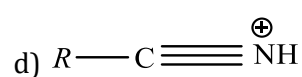
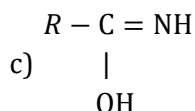
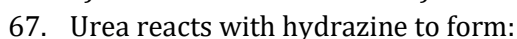
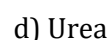
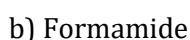
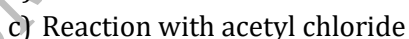
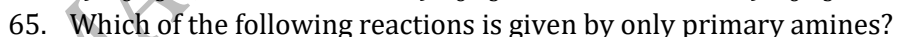
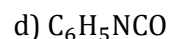
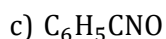
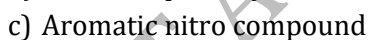
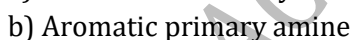
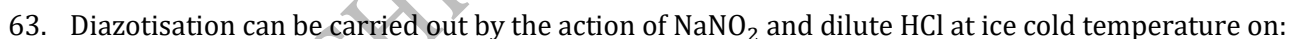
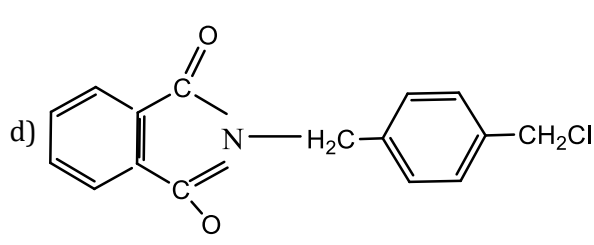
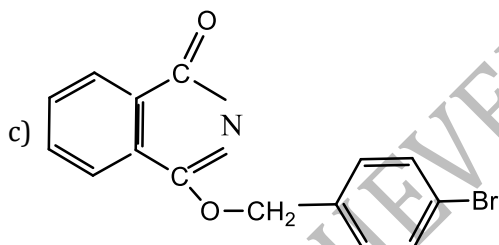
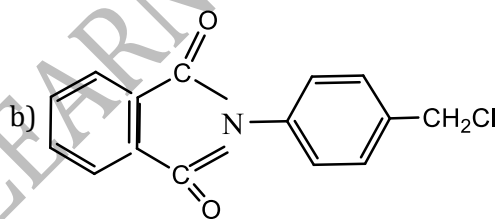
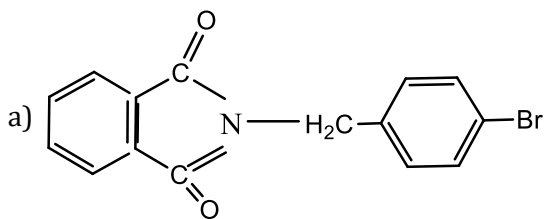
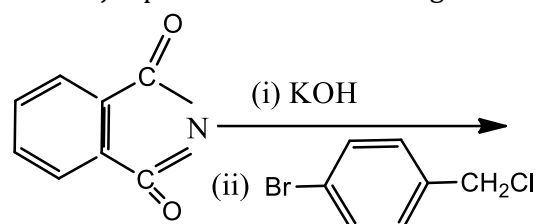
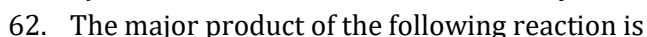
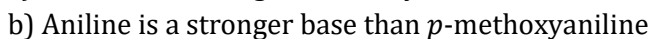
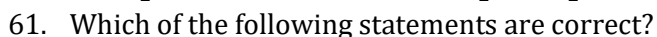
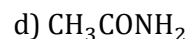
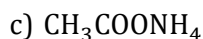
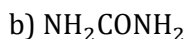
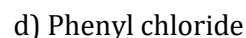
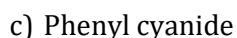
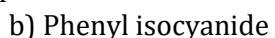
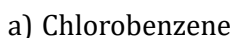
43. Alkyl nitrite on reduction with  $Sn/HCl$  gives:

- a) Alcohol                              b) Hydroxylamine                      c) Both (a) and (b)                      d) hydrazine

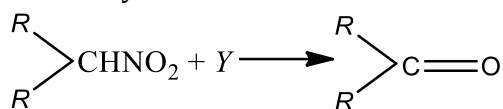
44. The molecular formula  $C_3H_9N$  cannot represent  
 a) 1° amine                      b) 2° amine                      c) 3° amine                      d) Quaternary salt
45. 2,4,6-tribromo aniline is a product of:  
 a) Electrophilic addition on  $C_6H_5NH_2$   
 b) Electrophilic substitution on  $C_6H_5NH_2$   
 c) Nucleophilic addition on  $C_6H_5NH_2$   
 d) Nucleophilic substitution on  $C_6H_5NH_2$
46. The value of  $K_b$  is highest in case of:  
 a) *p*-methoxy aniline              b) *p*-chloroaniline              c) *p*-nitroaniline              d) *p*-methylaniline
47.  $(CH_3)_3N \xrightarrow[(ii) H_2O, \Delta]{(i) BrCN} [X]$ , here  $[X]$  is  
 a)  $CH_3NH_2$                       b)  $(CH_3)_2NH$                       c)  $(CH_3)_3NO$                       d)  $(CH_3)_2NNO$
48. The decreasing order of basic characters of the three amines and ammonia is  
 a)  $NH_3 > CH_3NH_2 > C_2H_5NH_2 > C_6H_5NH_2$               b)  $C_2H_5NH_2 > CH_3NH_2 > NH_3 > C_6H_5NH_2$   
 c)  $C_6H_5NH_2 > C_2H_5NH_2 > CH_3NH_2 > NH_3$               d)  $CH_3NH_2 > C_2H_5NH_2 > C_6H_5NH_2 > NH_3$
49. Which compound will liberate  $CO_2$  from  $NaHCO_3$  solution?  
 a)  $CH_3CONH_2$                       b)  $CH_3NH_2$                       c)  $(CH_3)_4N^+OH^-$                       d)  $CH_3N^+H_3Cl^-$
50. Acetaldoxime reacts with  $P_2O_5$  to give:  
 a)  $CH_3CN$                       b)  $C_2H_5CNO$                       c)  $C_2H_5CN$                       d) All of these
51. Diethyl oxalate is used for distinguishing primary, secondary and tertiary  
 a) Alcohols                      b) Amines  
 c) Alkyl halides                      d) Hydrogens in hydrocarbons
52. Nitration of aniline in strongly acidic medium, result in the formation of *m*-nitroaniline also. This is because  
 a) Amino group is *meta* orienting during electrophilic substitution reaction.  
 b) Nitro group goes always to the *meta* position irrespective of the substituents.  
 c) Nitration of aniline is a nucleophilic substitution reaction in strongly acidic medium.  
 d) In strongly acidic conditions aniline is present as anilinium ion.
53. On heating benzyl amine with chloroform and ethanolic KOH, product obtained is  
 a) Benzyl alcohol                      b) Benzaldehyde                      c) Benzonitrile                      d) Benzyl isocyanide
54. An organic amino compound reacts with aqueous nitrous acid at low temperature to produce an oily nitroso amine. The compound is  
 a)  $CH_3NH_2$                       b)  $CH_3CH_2NH_2$   
 c)  $(CH_3CH_2)_3N$                       d)  $CH_3CH_2 - NHCH_2CH_3$
55. Nitrosoamines ( $R_2N - N = O$ ) are soluble in water. On heating them with conc  $H_2SO_4$ , they give secondary amines. The reaction is called  
 a) Perkin's reaction                      b) Fries reaction  
 c) Liebermann nitroso reaction                      d) Etard reaction
56. Which one of the following functional groups undergoes hydrolysis with alkali to yield an acid group?  
 a)  $-CN$                       b)  $-CHO$                       c)  $-COCH_3$                       d)  $-Br$
57. The correct set of the products obtained in the following reactions is
- |   |   |
|---|---|
| $(A) RCN \xrightarrow{\text{Reduction}}$  | $(B) RCN \xrightarrow[(II) H_2O]{(I) CH_3MgBr}$ |
| $(C) RNC \xrightarrow{\text{Hydrolysis}}$ | $(D) RNH_2 \xrightarrow{HNO_2}$                 |
- |    | A        | B             | C        | D        |
|----|----------|---------------|----------|----------|
| a) | 2° amine | Methyl ketone | 1° amine | Alcohol  |
| b) | 1° amine | Methyl ketone | 1° amine | Alcohol  |
| c) | 2° amine | Methyl ketone | 2° amine | Acid     |
| d) | 2° amine | Methyl ketone | 2° amine | aldehyde |
58. Which of the following is not a nitroderivative?



In the above reaction, the product 'A' is

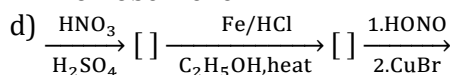
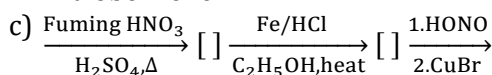
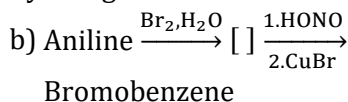
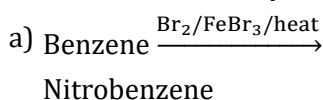


69. Secondary nitroalkanes can be converted into ketones by using *Y*. Identify *Y* from the following



- a) Aqueous HCl                      b) Aqueous NaOH                      c)  $\text{KMnO}_4$                       d) CO
70. Among the following compounds, the most basic is  
 a) Aniline                      b) Acetanilide                      c) *p*-nitroaniline                      d) Benzyl amine
71. Substitution of one alkyl group by replacing hydrogen of primary amines:  
 a) Increases the base strength  
 b) Decreases the base strength  
 c) Remains the same  
 d) None of the above
72. Ethylamine undergoes oxidation in the presence of  $\text{KMnO}_4$  followed by hydrolysis to form:  
 a) An acid                      b) An alcohol                      c) An aldehyde                      d) a N-oxide
73. Which of the following compounds will undergo carbylamine reactions?  
 a)  $(\text{CH}_3\text{CH}_2)_2\text{NH}$                       b)  $(\text{CH}_3)_2\text{NH}$                       c)  $\text{C}_6\text{H}_5\text{NH}_2$                       d)  $(\text{CH}_3)_3\text{N}$
74. Methylethylpropylamine forms non-superimposable mirror images but it does not show optical activity because:  
 a) Of rapid flipping  
 b) Amines are basic in nature  
 c) Nitrogen has a lone pair of electron  
 d) Of absences of asymmetric nitrogen
75. Urea on heating with ethanol gives:  
 a) Urethane                      b) Urea alcohol                      c) Ureides                      d) None of these
76. Aliphatic amines are soluble in water because:  
 a) They are basic  
 b) They are amino compounds  
 c) They are lighter than water  
 d) Of formation of hydrogen bonds with water
77. A positive carbylamine test is given by  
 a) N, N-dimethylaniline                      b) 2,4-dimethylaniline  
 c) N-methy-*o*-methylaniline                      d) N-methylbenzylamine
78. Which of the following amines form maximum hydrogen bonds within themselves?  
 a)  $\text{CH}_3\text{NH}_2$                       b)  $(\text{CH}_3)_2\text{NH}$                       c)  $(\text{CH}_3)_3\text{N}$                       d) None of these
79. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound of water during the reaction is continuously removed. The compound formed is generally known as  
 a) An amine                      b) An imine                      c) An enamine                      d) A Schiff's base
80. Benzene diazonium chloride on treatment with hypo phosphorous acid and water in presence of  $\text{Cu}^+$  catalyst produce  
 a) Benzene                      b) Toluene                      c) Aniline                      d) Chlorobenzene
81. Which one of the following does not have  $sp^2$  hybridised carbon?  
 a) Acetone                      b) Acetic acid                      c) Acetonitrile                      d) Acetamide
82. The product of Hofmann elimination of  
 $\text{C}_6\text{H}_{11}\text{CH}_2\text{N}^+(\text{CH}_3)_2\text{OH}^-$  is  
 a)  $\text{C}_6\text{H}_{11}\text{CH}_2\text{N}(\text{CH}_3)_2$                       b)  $\text{C}_6\text{H}_5\text{NH}_2 + (\text{CH}_3)_2\text{N}$   
 c)  $\text{C}_6\text{H}_5\text{CH}=\text{CH}_2 + (\text{CH}_3)_2\text{NOH}$                       d)  $\text{C}_6\text{H}_{11}\text{CH}_2\text{N}^+(\text{CH}_3)_4\text{OH}^-$

83. The best method to synthesise *m*-dibromobenzene is by using the reaction



84. Aniline is reacted with  $\text{Br}_2$  water and the resulting product is treated with an aqueous solution of sodium nitrite in the presence of dilute HCl. The compound so formed is converted into tetrafluoroborate which is subsequently heated dry. The end product is

a) *p*-bromofluorobenzene

b) *p*-bromoaniline

c) 2, 4, 6-tribromofluorobenzene

d) 1, 3, 5-tribromobenzene

85. Which of the following statements is correct?

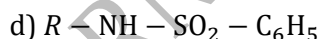
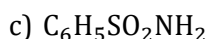
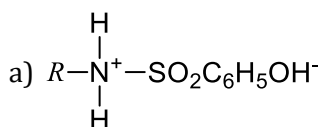
a) Aniline is stronger base than ammonia

b) Methylamine is a stronger base than aniline and ammonia

c) Aniline is stronger than ammonia, but weaker base than methylamine

d) Methylamine is stronger than aniline, but weaker base than ammonia

86.  $\text{RNH}_2$  reacts with  $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$  in aqueous KOH to give a clear solution. On acidification a precipitate is obtained which is due to the formation of



87. When  $\text{NaNO}_2$  and dilute HCl were added to an amine at  $0^\circ\text{C}$ , a colourless gas was evolved and an ionic compound is formed. The amine is:

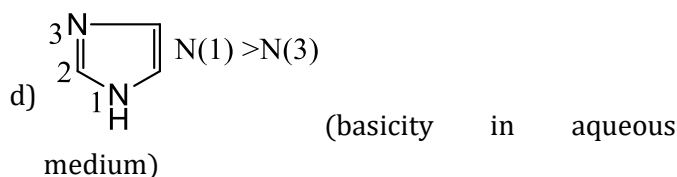
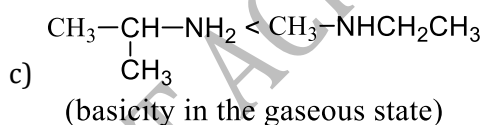
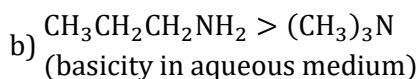
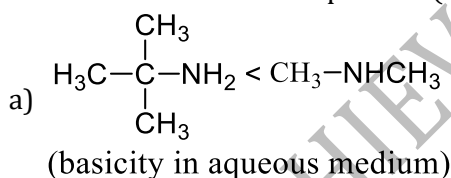
a) An primary amine

b) An aromatic primary amine

c) Any amine

d) None of the above

88. Choose the incorrect comparison(s)



89. Grignard reagent and acetyl chloride does not react with:

a)  $\text{RNH}_2$

b)  $\text{R}_2\text{NH}$

c)  $\text{R}_3\text{N}$

d) None of these

90. Which of the following can be used to distinguish acetamide and urea?

a) Fehling's solution

b) Biuret test

c) Hofmann's reaction

d) NaOH solution

91. Among the amines (A)  $\text{C}_6\text{H}_5\text{NH}_2$ , (B)  $\text{CH}_3\text{NH}_2$ , (C)  $(\text{CH}_3)_2\text{NH}$ , (D)  $(\text{CH}_3)_3\text{N}$ , the order of basicity is

a)  $A < B < D < C$

b)  $D < C < B < A$

c)  $A < B < C < D$

d)  $B < C < D < A$

92. Choose the incorrect statement

a) In the case primary, secondary and tertiary amines, the basic strength depends on the extent on the extent of hydrogen bonding in the protonated amines



- b) The presence of groups like  $-\text{OCH}_3$  and  $-\text{CH}_3$  increases the basic strength of amines  
 c) The presence of groups like  $-\text{NO}_2$ ,  $-\text{CN}$  and halogens reduces the basic strength of amines  
 d) The basic strength of amines depends on their concentration
93. An organic amino compound reacts with aqueous nitrous acid at low temperature to produce an oily nitrosoamine. The compound is  
 a)  $\text{CH}_3\text{NH}_2$                       b)  $\text{CH}_3\text{CH}_2\text{NH}_2$                       c)  $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_3$                       d)  $(\text{CH}_3\text{CH}_2)_3\text{N}$
94.  $\text{RMgX}$  on reacting with cyanogen chloride gives:  
 a)  $\text{R}-\text{NC}$                       b)  $\text{R}-\text{Cl}$                       c)  $\text{R}-\text{CN}$                       d) None of these
95. Ethyl isocyanide on hydrolysis in acidic medium generated  
 a) Ethyl amine salt and methanoic acid                      b) Propanoic acid and ammonium salt  
 c) Ethanoic acid and ammonium salt                      d) Methyl amine salt and ethanoic acid
96. Which of the following will give a primary amine on hydrolysis?  
 a) Nitroparaffin                      b) Alkyl cyanide                      c) Oxime                      d) Alkyl isocyanate
97. Urea when heated a white residue is formed. Its alkaline solution when treated with few drops of  $\text{CuSO}_4$  solution gives:  
 a) Red colour                      b) Violet colour                      c) Green colour                      d) Yellow colour
98. Which one of the following is most basic?  
 a)  $\text{FCH}_2\text{NH}_2$                       b)  $\text{FCH}_2\text{CH}_2\text{NH}_2$                       c)  $\text{C}_6\text{H}_5\text{NH}_2$                       d)  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$
99. The basicity of compounds I, II, III and IV  
 $\text{CH}_3\text{NH}_2$ ,  $(\text{CH}_3)_2\text{NH}$ ,  $(\text{CH}_3)_3\text{N}$ ,  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$   
 I                      II                      III                      IV  
 varies in the order  
 a)  $\text{I} > \text{II} > \text{III} > \text{IV}$                       b)  $\text{II} > \text{I} > \text{III} > \text{IV}$                       c)  $\text{III} > \text{I} > \text{II} > \text{IV}$                       d)  $\text{IV} > \text{I} > \text{II} > \text{III}$
100. A gaseous carbon compound is soluble in dilute  $\text{HCl}$ . The solution on treating with  $\text{NaNO}_2$  gives off nitrogen leaving behind a solution which smells of wood spirit. The carbon compound is  
 a)  $\text{HCHO}$                       b)  $\text{CO}$                       c)  $\text{C}_2\text{H}_5\text{NH}_2$                       d)  $\text{CH}_3\text{NH}_2$
101. The correct order of basic nature of the following compounds is:
- $$\begin{array}{c} \text{NH} \\ // \\ \text{CH}_3-\text{C} \\ \backslash \\ \text{NH}_2 \end{array}$$

(1)

$$\text{CH}_3\text{CH}_2\text{NH}_2$$

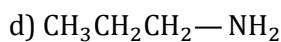
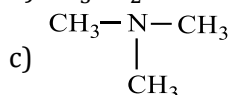
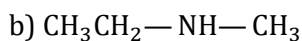
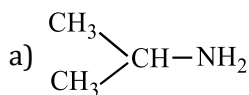
(2)

$$(\text{CH}_3)_2\text{NH}$$

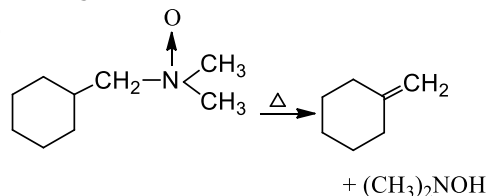
(3)

$$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3-\text{C}-\text{NH}_2 \end{array}$$

(4)
- a)  $2 > 1 > 3 > 4$   
 b)  $1 > 3 > 2 > 4$   
 c)  $3 > 1 > 2 > 4$   
 d)  $1 > 2 > 3 > 4$
102. The basic character of amines can be explained:  
 a) In terms of Lewis and Arrhenius concept  
 b) Only in terms of Lowry Bronsted concept  
 c) In terms of Lewis and Lowry Bronsted concept  
 d) Only in Lewis concept
103. Gas evolved during the reaction of sodium metal on ethyl amine is:  
 a)  $\text{N}_2$                       b)  $\text{C}_2\text{H}_2$                       c)  $\text{H}_2$                       d)  $\text{CO}_2$
104. When methyl cyanide is hydrolysed in presence of alkali, the product is:  
 a) Acetamide                      b) Methane                      c)  $\text{CO}_2 + \text{H}_2\text{O}$                       d) Acetic acid
105. An organic compound ( $\text{C}_3\text{H}_9\text{N}$ ) (A), when treated with nitrous acid, gave an alcohol and  $\text{N}_2$  gas was evolved. (A) on warming with  $\text{CHCl}_3$  and caustic potash gave (C) which on reduction gave isopropylmethylamine. Predict the structure of (A).



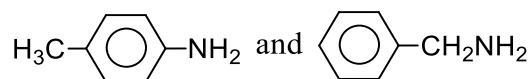
106.



This reaction is called

- a) Cope reaction                      b) Ritter reaction                      c) Schmidt reaction                      d) Gabriel reaction

107. Which of the following reagents will be useful as the basic for a simple chemical test to distinguish between?



- a)  $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$  and  $\text{OH}^-$  in  $\text{H}_2\text{O}$                       b)  $\text{HONO}$ , then  $\beta$ -naphthol  
c) Dilute  $\text{HCl}$                       d)  $\text{AgNO}_3$  in  $\text{H}_2\text{O}$

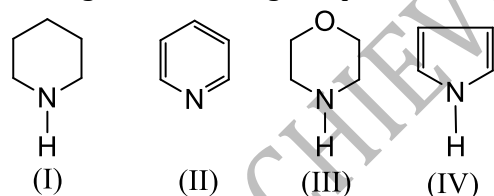
108. Alkanamide, which on Hofmann's reaction gives 1-phenylethylamine, is:

- a) 2-phenylpropanamide  
b) 3-phenylpropanamide  
c) 2-phenylethanamide  
d) *N*-phenylethanamide

109. Reduction of nitrobenzene in the presence of  $\text{Zn}/\text{NH}_4\text{Cl}$  gives

- a) Azobenzene                      b) Hydrazobenzene  
c) *N*-phenyl hydroxylamine                      d) Aniline

110. Arrange the following compounds in increasing order of basic strength



- a)  $\text{IV} > \text{I} > \text{III} > \text{II}$                       b)  $\text{III} > \text{I} > \text{IV} > \text{II}$                       c)  $\text{II} > \text{I} > \text{III} > \text{IV}$                       d)  $\text{I} > \text{III} > \text{II} > \text{IV}$

111. Which of the following reactions can be used to prepare ethyl isocyanide?

- a)  $\text{CH}_3\text{CH}_2\text{I} + \text{NaCN} \xrightarrow{\text{C}_2\text{H}_5\text{OH}/\text{H}_2\text{O}}$                       b)  $\text{CH}_3\text{CH}_2\text{I} + \text{KCN} \xrightarrow[\Delta]{\text{Alcohol}}$   
c)  $\text{CH}_3\text{CH}_2\text{NH}_2 + \text{CHCl}_3 + \text{KOH} \xrightarrow[\Delta]{\text{Alcohol}}$                       d) None of the above

112. An amine reacts with  $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$  and the product is soluble in alkali, amine is:

- a)  $1^\circ$                       b)  $2^\circ$                       c)  $3^\circ$                       d) All of these

113. Carbylamine reaction tubes are not thrown into sink, to avoid bad odour, but are treated with conc.  $\text{HCl}$  to give:

- a)  $\text{RCOOH} + \text{NH}_3$                       b)  $\text{RNH}_2$                       c)  $\text{RNH}_2 + \text{HCOOH}$                       d)  $\text{RCOOH} + \text{N}_2$

114. The product obtained when methylamine is treated with nitrous acid is:

- a)  $\text{CH}_3\text{OH}$                       b)  $\text{CH}_3-\text{ONO}$                       c)  $\text{CH}_3\text{OCH}_3$                       d) Both (b) and (c)

115. Correct order of basic nature of  $\text{CH}_3\text{NH}_2$  (A),  $\text{CH}_3\text{CN}$  (B) and  $\text{CH}_3\text{N}=\text{CHCH}_3$  (C) is

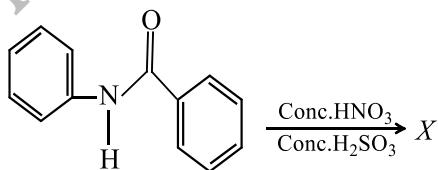
- a)  $A > B > C$                       b)  $B > C > A$                       c)  $A > C > B$                       d)  $C > A > B$

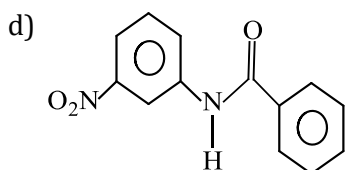
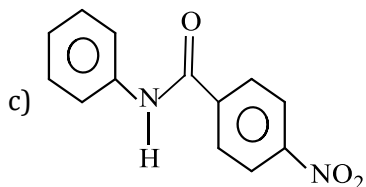
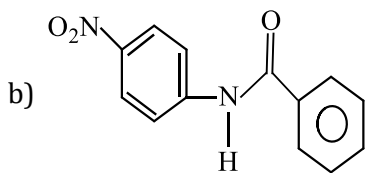
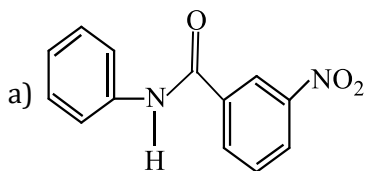
116. Which of the following reactions can produce aniline as main product?

- a)  $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn}/\text{KOH}$                       b)  $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn}/\text{NH}_4\text{Cl}$

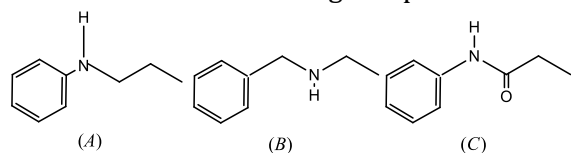


- b)  $\text{CH}_3\text{CONH}_2 + \text{CH}_3\text{OH}$   
 c)  $\text{CH}_3\text{CHO} + (\text{CH}_3)_2\text{NH}$   
 d)  $\text{CH}_3\text{COCH}_3 + \text{CH}_3\text{NH}_2$
133. The correct sequence of reactions to convert p-nitrophenol into quinol involves  
 a) Reduction, diazotization and hydrolysis      b) Hydrolysis, diazotization and reduction  
 c) Hydrolysis, reduction and diazotization      d) Diazotization, reduction and hydrolysis
134. Reaction of benzaldehyde with methylamine gives  
 a)  $\text{C}_6\text{H}_5\text{COOH}$       b)  $\text{C}_6\text{H}_5\text{N} = \text{NCl}$   
 c)  $\text{C}_6\text{H}_5 - \text{CH} = \text{N} - \text{CH}_3$       d)  $\text{C}_6\text{H}_5\text{NH}_2$
135. The compound formed when malonic ester reacts with urea is:  
 a) Cinnamic acid      b) Butyric acid      c) Barbituric acid      d) Crotonic acid
136. A colourless organic compound gave brisk effervescence with a mixture of  $\text{NaNO}_2$  and dil.  $\text{HCl}$ . It could be:  
 a) Glucose      b) Oxalic acid      c) Urea      d) Benzoic acid
137. A colourless, odourless and non-combustible gas is liberated when ethylamine reacts with:  
 a)  $\text{NaOH}$       b)  $\text{CH}_3\text{COCl}$       c)  $\text{NaNO}_2 + \text{HCl}$       d)  $\text{H}_2\text{SO}_4$
138. The compound obtained by heating a mixture of  $1^\circ$  amine and chloroform with ethanolic potassium hydroxide is  
 a) An alkyl isocyanide      b) An alkyl isothiocyanate  
 c) An amide      d) An amide and nitro compound
139.  $\text{CH}_3\text{CONH}_2 + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{A}$   
 Urea is obtained if product 'A' in the above reaction reacts with the following compound  
 a) Ethyl carbonate      b) Ethyl urethane      c) Phosgene      d) All of these
140. Which of the following amines can be directly oxidized to the corresponding nitro compound by potassium permanganate?  
 a)  $\text{CH}_3\text{NH}_2$       b)  $\begin{array}{c} \text{CH}_2 - \text{CH} - \text{CH}_3 \\ | \\ \text{NH}_2 \end{array}$       c)  $(\text{CH}_3)_2\text{NH}$       d)  $(\text{CH}_3)_3\text{C} - \text{NH}_2$
141. Which one of the following compound when heated with  $\text{KOH}$  and primary amines gives carbylamine test?  
 a)  $\text{CHCl}_3$       b)  $\text{CH}_3\text{Cl}$       c)  $\text{CCl}_4$       d)  $\text{CH}_3\text{NC}$
142. The hydrochlorides of amines form double salt with:  
 a)  $\text{PtCl}_4$       b)  $\text{AuCl}_3$       c) Both (a) and (b)      d) None of these
143. In the following reactions, reactants A, B and C are:  
 $\text{Cl}_2\text{H}_5\text{NH}_2 + \text{A} \rightarrow \text{C}_2\text{H}_5\text{N} = \text{CH} - \text{C}_6\text{H}_5 + \text{H}_2\text{O}$   
 Urea + B  $\rightarrow \text{H}_2\text{N} - \text{NHCONH}_2 + \text{NH}_3$   
 $\text{CH}_2\text{H}_5\text{NH}_2 + \text{C} \rightarrow \text{C}_2\text{H}_5\text{Cl} + \text{H}_2\text{O} + \text{N}_2$   
 a)  $\text{CH}_3\text{CHO}$ ,  $\text{NH}_2 - \text{NH}_2$  and  $\text{PCl}_5$       b)  $\text{C}_6\text{H}_5\text{CHO}$ ,  $\text{NH}_2 - \text{NH}_2$  and  $\text{SOCl}_2$   
 c)  $\text{C}_6\text{H}_5\text{CHO}$ ,  $\text{NH}_2 - \text{NH}_2$  and  $\text{NOCl}$       d)  $\text{CH}_3\text{CHO}$ ,  $\text{NH}_2 - \text{NH}_2$  and  $\text{PCl}_3$
144. Nitroparaffins on reduction give:  
 a) Amides      b) Alkylamines      c) Ammonium salts      d) Acetanilides
145. Aniline is prepared in presence of  $\text{Fe}/\text{HCl}$  from  
 a) Benzene      b) Nitrobenzene      c) Dinitrobenzene      d) None of these
146. In the following reaction, the product X is:





147. Which one of the following compound is most basic?

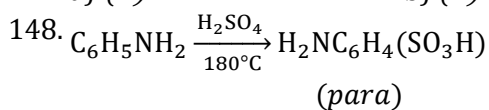


a) (A)

b) (B)

c) (C)

d) All are equally basic



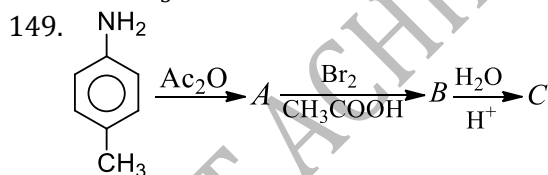
The true statement about the product is

a) It does not exist as Zwitter ion

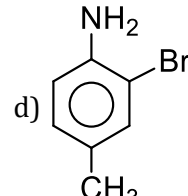
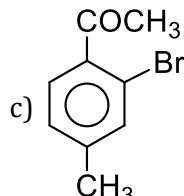
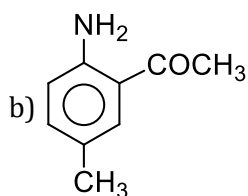
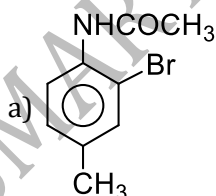
b)  $-\text{NH}_2$  displays a powerful basic character

c) It does not act as inner salt

d)  $-\text{SO}_3$  diminishes the basic character of  $-\text{NH}_2$



The final product 'C' in the above reaction is



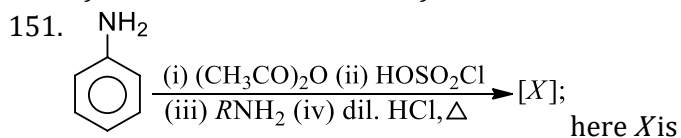
150. Which of the following compound reacts with chloroform and a base to form phenyl isocyanide?

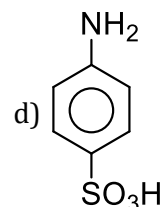
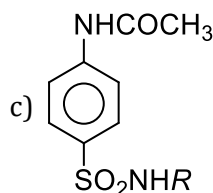
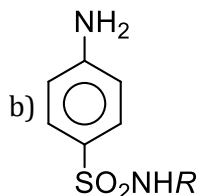
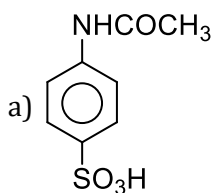
a) Phenol

b) Aniline

c) Benzene

d) Nitrobenzene





152. Amine is not formed in the reaction

- (A) Hydrolysis of  $RCN$   
 (B) Reduction of  $RCH = NOH$   
 (C) Hydrolysis of  $RNC$   
 (D) Hydrolysis of  $RCONH_2$

The correct answer is

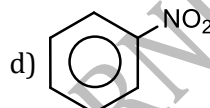
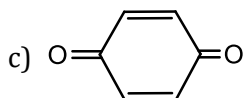
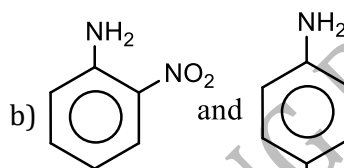
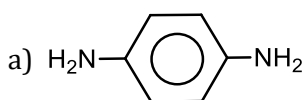
a) A, B, D

b) A, D

c) B, C

d) A, B, C

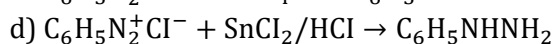
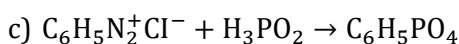
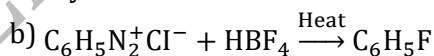
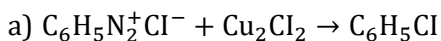
153. Aniline reacts with conc.  $HNO_3$  to give



154. The pri., sec. and ter. amines can be distinguished by:

- a) Hinsberg's reagent      b) Grignard reagent      c) Fehling's solution      d) Tollen's reagent

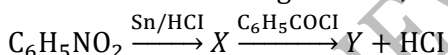
155. Which one of the following is not the correct reaction of aryl diazonium salts ?



156. The geometry of ethylamine is:

- a) Pyramidal      b) Tetrahedral      c) Triangular      d) Square planar

157. Consider the following reaction,



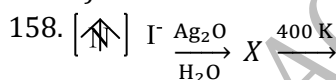
What is Y?

a) Acetanilide

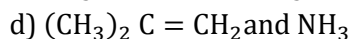
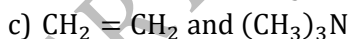
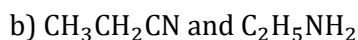
b) Benzanilide

c) Azobenzene

d) Hydrazobenzene

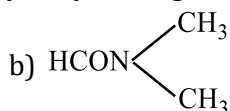


The products of above sequence of reactions are



159. Which of the following is hydrolysed to give secondary amine?

a) Alkyl



c) Nitroparaffins

d) Acidamide

160. Carbylamine reaction is given by aliphatic

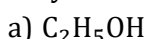
a) Primary amine

b) Secondary amine

c) Tertiary amine

d) Quaternary ammonium salt

161. Ethyl amine reacts with nitrous acid to form



162. Aniline reacts with ... to yield ... as the final product.

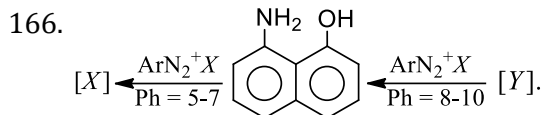
a) Bromine, 2-bromoaniline

b) Bromine, 2, 4, 6-tribromoaniline

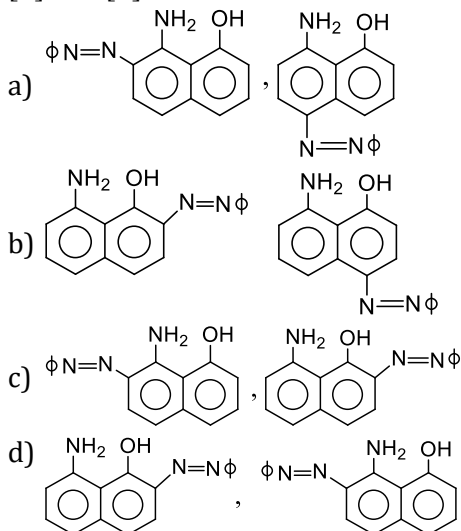
c) Chloroform/KOH, phenyl cyanide

d) Acetyl chloride, benzanilide

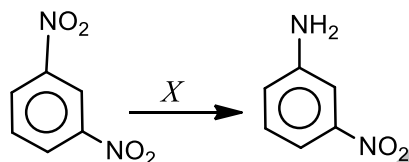
163. The amine which will not liberate nitrogen on reaction with nitrous acid is  
 a) Trimethyl amine      b) Ethyl amine      c) Sec-butyl amine      d) *t*-butyl amine
164. Which of the following reagents will convert nitromethane into methylamine?  
 a) Zn/HCl      b) Zn/NaOH      c) Zn/C<sub>2</sub>H<sub>5</sub>OH      d) Ni/H<sub>2</sub>
165. Tertiary nitroalkane cannot tautomerise because  
 a) Their tautomeric forms are highly unstable      b) They do not contain any multiple bond  
 c) They do not have labile H-atom      d) They are not basic in nature



[X] and [Y] are

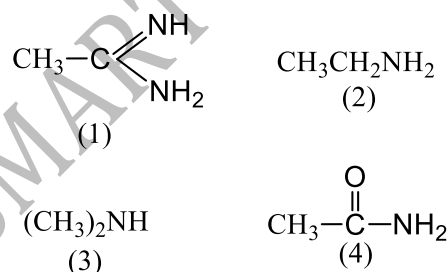


167. In the reaction

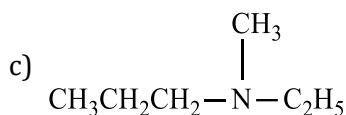


*X* is

- a) SiC      b) H<sub>2</sub>SO<sub>4</sub>      c) KMnO<sub>4</sub>      d) Fe/HCl
168. A compound *A* when reacted with PCl<sub>5</sub> and then with ammonia gave *B*. *B* when treated with bromine and caustic potash produced *C*. *C* on treatment with NaNO<sub>2</sub> and HCl at 0°C and then boiling produced orthocresol. Compound *A* is:  
 a) *o*-toluic acid      b) *o*-chlorotoluene      c) *o*-bromotoluene      d) *m*-toluic acid
169. The correct order of basicities of the following compound is



- a) 2>1>3>4      b) 1>3>2>4      c) 3>1>2>4      d) 1>2>3>4
170. Which of the following amines is optically active?  
 a) CH<sub>3</sub>NH<sub>2</sub>  
 b) CH<sub>3</sub>NHCH<sub>3</sub>



d) Sec. butylamine

171.  $\text{CH}_3\text{CH}_2\text{NH}_2$  contains a basic  $\text{NH}_2$  group, but  $\text{CH}_3\text{CONH}_2$  does not, because:

a) Acetamide is amphoteric in character

b) In  $\text{CH}_3\text{CH}_2\text{NH}_2$  the electron pair on N-atom is delocalised by resonance

c) In  $\text{CH}_3\text{CH}_2\text{NH}_2$  there is no resonance, while in acetamide the lone pair of electron on N-atom is delocalised and therefore less available for protonation

d) None of the above

172. Benzaldehyde condenses with N, N-dimethylaniline in presence of anhydrous  $\text{ZnCl}_2$  to give

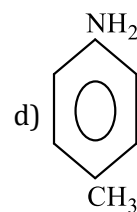
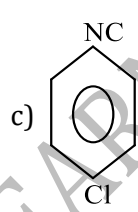
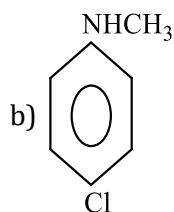
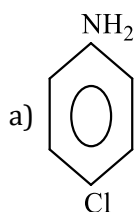
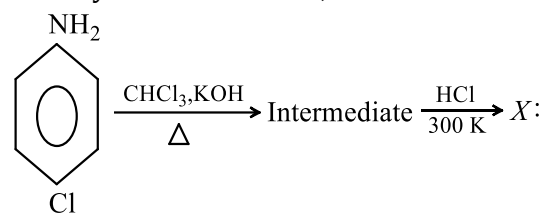
a) Azo dye

b) Malachite green

c) Michler's ketone

d) Buffer yellow

173. Identify X in the reaction,



174. Aliphatic nitriles are prepared by the treatment of alkyl halides with

a) Sodium cyanide

b) Sodium isocyanide

c) Sodium isocyanate

d) Cyanamide

175. Diethylamine on oxidation with  $\text{KMnO}_4$  gives:

a) Ethanal

b) Propanone

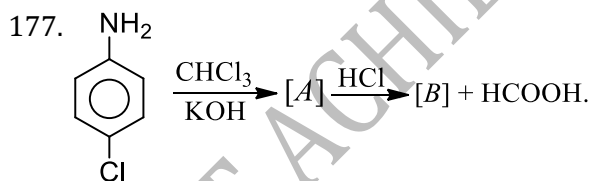
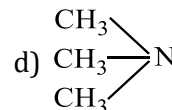
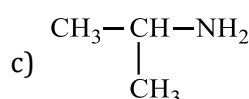
c) Tetraethyl hydrazine

d) None of these

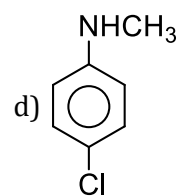
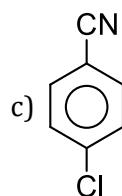
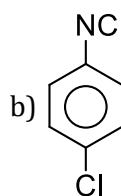
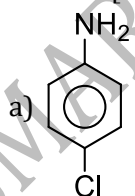
176. Which one of the following amines will not react with  $\text{HNO}_2$  acid to give nitrogen?

a)  $\text{CH}_3\text{NH}_2$

b)  $\text{CH}_3\text{CH}_2\text{NH}_2$



What is [B]?



178.  $\text{C}_5\text{H}_{13}\text{N}$  reacts with  $\text{HNO}_2$  to give an optically active alcohol. The compound is

a) Pentan-1-amine

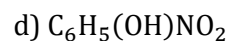
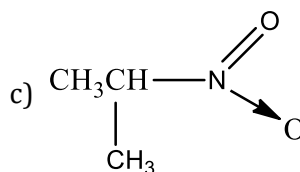
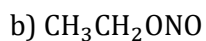
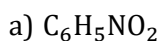
b) Pentan-2-amine

c) N, N-dimethylpropan-2-amine

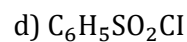
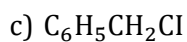
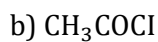
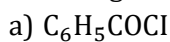
d) N-methylbutan-2-amine

179. Which of the following is not a nitro-derivative?

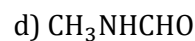
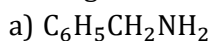




180. Hinsberg's reagent is



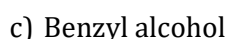
181. Among the following the weakest base is



182. A secondary amine is:

a) A compound with two  $-NH_2$  groupsb) A compound with 2 carbon atoms and a  $-NH_2$  groupc) A compound with a  $-NH_2$  group on the carbon atom in number 2 positiond) A compound in which 2 of the hydrogens of  $NH_3$  have been replaced by alkyl or aryl groups

183. Benzyl amine reacts with nitrous acid to give



184. Urea is not used:

a) As fertilizer

b) In manufacture of plastic

c) In preparation of medicines

d) In purification of water

185. Which of the following statements is not correct?

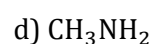
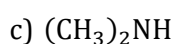
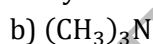
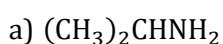
a) Primary amines show intermolecular hydrogen bonding

b) Secondary amines show intermolecular hydrogen bonding

c) Tertiary amines show intermolecular hydrogen bonding

d) Amines have lower boiling points as compared to those of alcohols and carboxylic acids of comparable molar masses

186. The structural formula of methyl amino methane is:



187. Aniline and ethylamine resembles in:

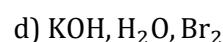
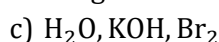
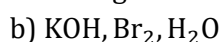
a) Solubility

b) Action with  $HNO_2$ 

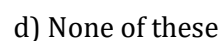
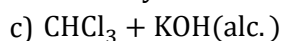
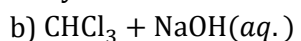
c) Action of Grignard reagent

d) Coupling reaction

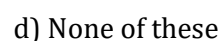
188. What is the proper sequence of reagent in the Hofmann's degradation reaction?



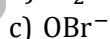
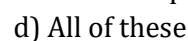
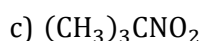
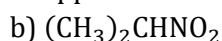
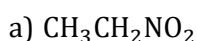
189. Primary, secondary and tertiary nitroalkanes can be identified by the action of:



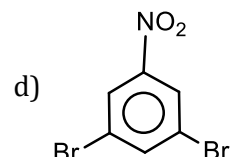
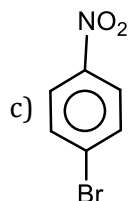
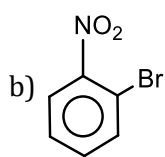
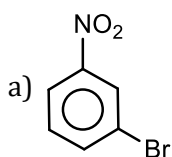
190. Primary, secondary and tertiary amines may be separated by using:



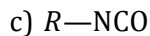
191. The active species produced in Hofmann's bromamide reaction is:

192. An aliphatic nitro compound turns red with the addition of a concentrated  $NaOH$  solution, followed by the addition of an excess of an  $NaNO_2$  solution and then dilute  $H_2SO_4$ . The colour disappears with the addition of the excess of an acid but reappears if the solution is made alkaline. The aliphatic nitro compound is193. Isopropylamine  $\xrightarrow{KMnO_4} X \xrightarrow{H_3O^+} Y$ . In the above sequence  $X$  and  $Y$  are respectively

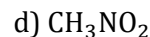
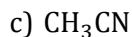
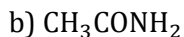
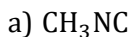
- a) Acetaldimine, ethanal  
c) Ketimine, acetone
194. Benzyl amine cannot be prepared by  
a)  $C_6H_5CONH_2 \xrightarrow[\text{ether}]{LiAlH_4}$   
c)  $C_6H_5CN \xrightarrow{LiAlH_4}$
- b) Ethanal, ketimine  
d) Acetone, propan-2-ol
- b)  $C_6H_5CH_2CONH_2 + Br_2 + KOH \rightarrow$   
d)  $C_6H_5CH_2NC \xrightarrow{LiAlH_4}$
195. When  $(NH_4)_2SO_4 + KCNO$  are heated, we get:  
a) Nitrogen  
b) Carbon dioxide  
c) Biuret  
d) Ammonium carbonate
196. Which of the following is most basic in aqueous medium?  
a)  $CH_3CH_2CH_2CH_2NH_2$   
c)  $CH_3-\overset{\overset{CH_3}{|}}{N}-CH_3$
- b)  $CH_3-CH_2-CH_2-NH_2$   
d)  $CH_3-CH_2-\overset{\overset{CH_3}{|}}{NH}-CH_3$
197. Diazomethane reacts with carboxylic acids to produce:  
a) Ester  
b) Alcohol  
c) Amine  
d) Imines
198. Hinsberg's method to separate amines is based on the use of:  
a) Benzene sulphonyl chloride  
b) Benzene sulphonic acid  
c) Ethyl oxalate  
d) Acetyl chloride
199.  $CH_3CONH_2$ ,  $Br_2$  and  $KOH$  give  $CH_3NH_2$  as the product. The intermediates of the reaction are  
(A)  $CH_3-\overset{\overset{O}{||}}{C}-NHBr$   
(C)  $CH_3NHBr$   
The correct answer is  
a) A, B  
b) A, C  
c) C, D  
d) B, D
- B)  $CH_3-N=C=O$   
(D)  $CH_3CONBr_2$
200. Which will not go for diazotization?  
a)  $C_6H_5NH_2$   
b)  $C_6H_5CH_2NH_2$
- c)  $\begin{array}{c} H_2N \\ \diagdown \\ C_6H_4 \\ \diagup \\ H_3C \end{array}$   
d)  $\begin{array}{c} H_2N \\ \diagdown \\ C_6H_4 \\ \diagup \\ O_2N \end{array}$
201. Amine may contain:  
a)  $-NH_2$  gp  
b)  $>NH$  gp.  
c)  $\Rightarrow N$  gp.  
d) All of these
202. Nitration of aniline also gives *m*-nitro aniline in strong acidic medium because  
a) In electrophilic substitution reaction amino group is *meta* directive  
b) In spite of substituents nitro group always goes to *m*-position  
c) In strong acidic medium aniline aniline present as anilinium ion  
d) None of the above
203. In the reaction  $RCONH_2 + X \rightarrow RNH_2$ , the reagent  $X$  is  
a) Soda lime  
b)  $PCl_5$   
c)  $NaOBr$   
d) All of these
204. The bad smelling substance formed by the action of alcoholic caustic potash on chloroform and aniline is  
a) Nitrobenzene  
b) Phenyl isocyanide  
c) Phenyl cyanide  
d) Phenyl isocyanate
205. How many primary amines are possible for the formula  $C_4H_{11}N$ ?  
a) 1  
b) 2  
c) 3  
d) 4
206.  $\text{Benzene ring} \xrightarrow[H_2SO_4]{HNO_3} A \xrightarrow[FeBr_3]{Br_2} B$   
The compound  $B$  is



207.  $R-N \equiv C + HgO \rightarrow A + Hg_2O$ ; What is  $A$ ?



208. Which of the following on reduction with  $LiAlH_4$  gives a secondary amine?



209. Aniline on treatment with  $NaNO_2$  in  $HCl$  at  $0^\circ C$  followed by treatment with alkaline  $\beta$ -naphthol gives

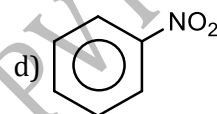
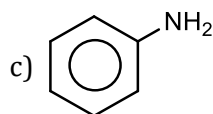
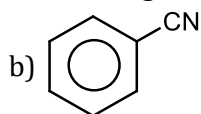
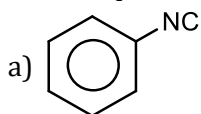
a) A violet solution

b) A red solution

c) A green solution

d) A blue precipitate

210. The compound with foul odour among the following is



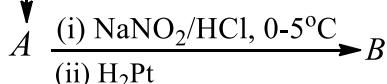
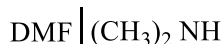
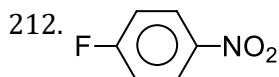
211. Aniline first reacts with acetyl chloride producing compound ' $A$ '. ' $A$ ' reacts with nitric acid/sulphuric acid mixture and produces compound ' $B$ ', which hydrolyses to compound ' $C$ '. What is the identify of ' $C$ '?

a) Acetanilide

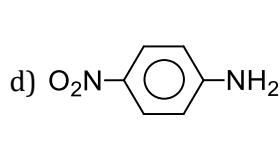
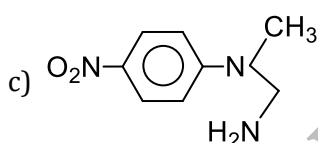
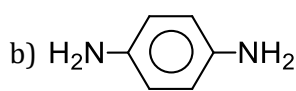
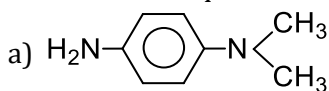
b)  $p$ -nitroacetanilide

c)  $p$ -nitroaniline

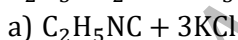
d) Aniline



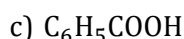
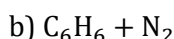
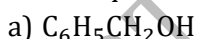
In the above sequence  $B$  is



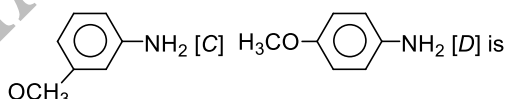
213. The product  $A$  and  $B$  in the reaction are:



214. When aqueous solution of benzene diazonium chloride is boiled, the product formed is



215. Correct order of basicity of  $\phi NH_2$  [ $A$ ], [ $B$ ],



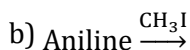
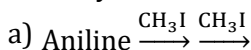
a)  $A > B > C > D$

b)  $D > C > A > B$

c)  $B > D > C > A$

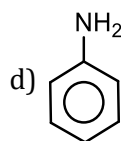
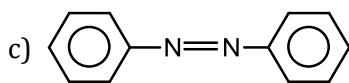
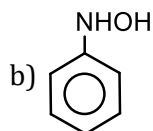
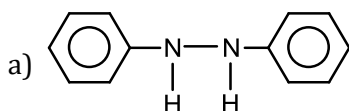
d)  $D > A > B > C$

216. Tertiary amine is obtained in the reaction

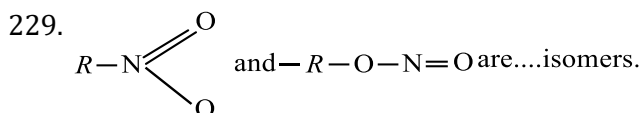


d) None of these

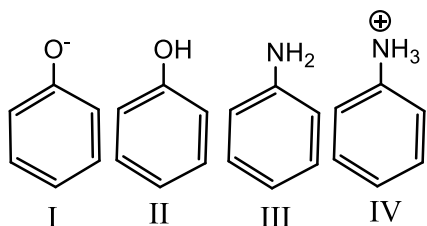
217. The structure of the compound formed, when nitrobenzene is reduced by lithium aluminium hydride ( $LiAlH_4$ ) is



218. Why do 2° and 3° amines fail to undergo the carbylamines test?
- They combine with chloroform to give a stable compound
  - They react with alcoholic KOH
  - The nitrogen atom of the amine group does not have the required number of hydrogen atoms
  - All the given reasons are correct
219. Nitrogen of nitrobenzene at 125°C with mixed acids gives
- meta*-dinitrobenzene
  - ortho*-dinitrobenzene
  - para*-dinitrobenzene
  - 1, 3, 5-trinitrobenzene
220. Complete the following reaction
- $$\text{RNH}_2 + \text{H}_2\text{SO}_4 \rightarrow$$
- $[\text{RNH}_3]^+ \text{HSO}_4^-$
  - $[\text{RNH}_3]_2^+ \text{SO}_4^{2-}$
  - $\text{RNH}_2 \cdot \text{H}_2\text{SO}_4$
  - No reaction
221. Ethylamine reacts with nitrosyl chloride (NOCl) to form:
- Ethyl chloride
  - Ethyl alcohol
  - Ethyl nitrite
  - Nitroethane
222. Reduction of aniline with acetyl chloride in presence of NaOH produce
- Aniline hydrochloride
  - Acetanilide
  - p*-chloroaniline
  - A red dye
223. Amino group is *ortho/para*-directing for aromatic electrophilic substitution. On nitration of aniline, a good amount of *m*-nitroaniline is obtained. This is due to
- In nitration mixture, *ortho, para*-activity of  $\text{NH}_2$  group is completely lost
  - $-\text{NH}_2$  because  $-\text{NH}_3^+$ , which is *m*-directing
  - $-\text{NH}_2$  becomes  $-\text{NH}^+ \text{SO}_4^-$ , which is *m*-directing
  - $-\text{NH}_2$  becomes  $-\text{NH}^- \text{NO}_2^+$ , which is *m*-directing
224. *p*-chloro aniline and anilinium hydrogen chloride can be distinguished by
- Sandmeyer reaction
  - Carbylamines reaction
  - Hinsberg's reaction
  - $\text{AgNO}_3$
225. Nitrobenzene on reduction with Al–Hg and water gives:
- Azobenzene
  - Aniline
  - Azoxy benzene
  - phenylhydroxylamine
226. Which of the following is most basic in nature?
- $\text{NH}_3$
  - $\text{CH}_3\text{NH}_2$
  - $(\text{CH}_3)_2\text{NH}$
  - $\text{C}_6\text{H}_5\text{N}(\text{CH}_3)_2$
227. The reaction of  $\text{CHCl}_3$  and alcoholic KOH with *p*-toluidine gives
- - 
  - 
  -
228. The IUPAC name of,  $\text{CH}_3-\text{CH}_2-\underset{\text{CH}_3}{\text{CH}}-\text{NH}_2$  is :
- 1-methyl-amino propane
  - 2-aminobutane
  - 2-methyl-2-aminopropane
  - None of the above

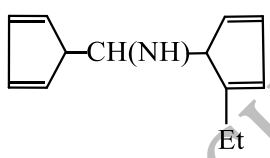
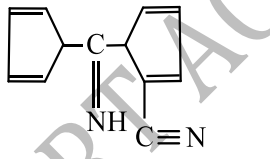
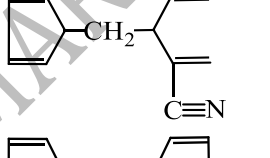
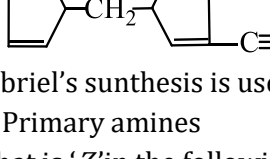


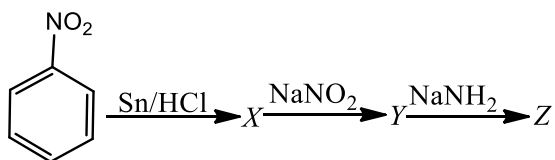
- a) Chain  
 b) Functional  
 c) Position  
 d) All of these
230. Which of the following is not used for nitration of organic compounds?  
 a) A mixture of concentrated  $\text{HNO}_3$  and concentrated  $\text{H}_2\text{SO}_4$   
 b) A mixture of concentrated  $\text{HNO}_4$  and acetic anhydride  
 c) Fuming nitric acid and concentrated sulphuric acid  
 d) Alcoholic potassium nitrate
231. *n*-propylamine yields a volatile compound *X* on warming with alc. alkali and chloroform. *X* has an offensive odour. The structure of *X* is  
 a)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{CN}$   
 b)  $(\text{CH}_3)_2\text{CHCN}$   
 c)  $\text{CH}_3\text{CH}_2\text{CH}_2\text{NC}$   
 d)  $(\text{CH}_3)_2\text{CHNC}$
232. *n*-butylamine (I), diethylamine (II) and *N,N*-dimethylethylamine (III) have the same molar mass. The increasing order of their boiling point is  
 a) III < II < I  
 b) I < II < III  
 c) II < III < I  
 d) II < I < III
233. Aniline reacts with acetaldehyde to form  
 a) Schiff's base  
 b) Carbylamine  
 c) Immine  
 d) None of these
234. Coupling of diazonium salts of following takes place in the order



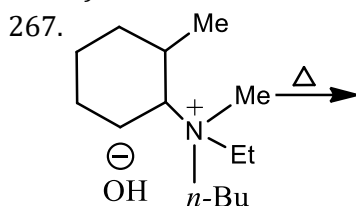
- a) IV < II < III < I  
 b) IV > III < II < I  
 c) II < IV < I < III  
 d) I < II < III < IV
235. The general formula of quaternary ammonium compound is:  
 a)  $R-\text{NH}_2$   
 b)  $R_3\text{N}$   
 c)  $[\text{R}_4\text{N}]^+\text{X}^-$   
 d)  $\text{NH}_4\text{X}$
236. Which of the following statement about primary amines is false?  
 a) Alkylamines are stronger base than arylamines  
 b) Alkylamines react with nitrous acid to produce alcohols  
 c) Arylamines react with nitrous acid to produce phenols  
 d) Alkylamines are stronger bases than ammonia.
237. The end product in the below reaction is  
 $\text{C}_2\text{H}_5\text{NH}_2 \xrightarrow{\text{HNO}_2} \text{A} \xrightarrow{\text{PCl}_5} \text{B} \xrightarrow{\text{NH}_3} \text{C}$   
 a) Ethyl cyanide  
 b) Ethyl amine  
 c) Methyl amine  
 d) Acetamide
238. In hypobromite reaction of amide, carbonyl carbon atom is lost as:  
 a) CO  
 b)  $\text{CO}_2$   
 c)  $\text{CO}_3^{2-}$   
 d) None of these
239. Identify the product *Z* in the following reaction scheme  
 $\text{C}_6\text{H}_5\text{NH}_2 \xrightarrow{\text{Ac}_2\text{O}} \text{X} \xrightarrow{\text{Br}_2/\text{CCl}_4} \text{Y} \xrightarrow{\text{HOH}} \text{Z}$   
 a) *p*-bromoaniline  
 b) *p*-bromoacetophenone  
 c) *p*-bromoacetanilide  
 d) *o*-bromoacetophenone
240. Which of the following is not correct?  
 a) Ethylamine and aniline both have  $\text{NH}_2$  group  
 b) Ethylamine and aniline both dissolve HCl  
 c) Ethylamine and aniline both react with  $\text{CHCl}_3$  and KOH to form unpleasant smell  
 d) Ethylamine and aniline both react with  $\text{NaNO}_2 + \text{HCl}$  to give hydroxyl compounds in cold
241. The reduction of  $\text{CH}_3\text{CN}$  to  $\text{CH}_3\text{CH}_2\text{NH}_2$  is called:

- a) Rosenmund's reduction  
 b) Clemmensen's reduction  
 c) Mendius reduction  
 d) Hofmann's reduction
242. Phenyl cyanide cannot be obtained by
- a)  $C_6H_5CONH_2 \xrightarrow{P_2O_5, \Delta}$   
 b)  $C_6H_5 - CH = NOH \xrightarrow{Ac_2O, \Delta}$   
 c)  $C_6H_5Cl \xrightarrow{alc. KOH}$   
 d)  $C_6H_5NH_2 \xrightarrow[2. CuCN]{1. NaNO_2/HCl}$
243. Which nitro compound will show tautomerism?  
 a)  $C_6H_5NO_2$                       b)  $(CH_3)_3CNO_2$                       c)  $CH_3CH_2NO_2$                       d) *o*-nitrotoluene
244. Alkyl halide (RX) on treatment with KCN followed by reduction leads to formation of:  
 a)  $RNH_2$                       b)  $RCH_2NH_2$                       c)  $RH + NH_3$                       d)  $RCH_3 + N_2$
245. Aniline gives a precipitate with bromine. The colour of precipitate is  
 a) Red                      b) Black                      c) Blue                      d) White
246. The reagent that reacts with nitromethane to form methyl hydroxylamine is  
 a) Zn/HCl                      b) Zn/NH<sub>4</sub>Cl                      c) Zn/NaOH                      d) Sn/HCl
247. Identify the product in the following sequence 3, 4, 5-tribromoaniline  
 (i) Diazotization  
 (ii) H<sub>3</sub>PO<sub>2</sub> → ?  
 a) 3, 4, 5-tribromobenzene                      b) 1, 2, 3-tribromobenzene  
 c) 2, 4, 6-tribromobenzene                      d) 3, 4, 5-tribromonitrobenzene
248. Production of amines by ammonia and alkyl halides is called  
 a) Frankland reaction                      b) Hofmann's ammonolysis  
 c) Hofmann's mustard oil reaction                      d) Hofmann's bromamide reaction
249. *m*-fluoronitrobenzene is best synthesized by using the reaction  
 a) Nitrobenzene  $\xrightarrow[H_2SO_4, heat]{Fuming HNO_3}$  [ ]  $\xrightarrow{NH_3/H_2S}$  [ ]  $\xrightarrow[2. HBF_4, \Delta]{1. HONO}$   
 b) Aniline  $\xrightarrow[heat]{F_2}$   
 c) Fluorobenzene  $\xrightarrow[H_2SO_4, heat]{HNO_3}$   
 d) *m*-C<sub>6</sub>H<sub>4</sub>(NH<sub>2</sub>)<sub>2</sub>  $\xrightarrow[2. CuNO_2, 3. HBF_4]{1. HONO}$
250. Allyl isocyanide contains .....and.....bonds.  
 a) 9σ, 3π                      b) 9σ, 9π                      c) 3σ, 4π                      d) 5σ, 7π
251. When  $\left[ \begin{array}{c} CH_3 \\ | \\ CH_3CH_2CH_2 - N^+ - CH_2CH_3 \\ | \\ CH_3 \end{array} \right] OH^-$   
 Is heated, then  
 a) Propene is the major product                      b) Ethane and C<sub>3</sub>H<sub>7</sub>N(CH<sub>3</sub>)<sub>2</sub> are the only product  
 c) Ethane and propene are obtained while ethane as the major product                      d) Equimolar amounts of ethane and propene are obtained
252. In the following reaction, X  $\xrightarrow{Bromination}$  Y  $\xrightarrow[+HCl]{NaNO_2}$  Z  $\xrightarrow[C_2H_5OH]{Boiling}$  tribromo benzene. X is  
 a) Benzoic acid                      b) Salicylic acid                      c) Phenol                      d) Aniline
253. Reaction of nitrous acid on 1° aliphatic amines in cold will give:  
 a) A diazonium salt                      b) An alcohol                      c) A nitrile                      d) A dye
254. Benzoyl chloride does not react with:  
 a) Primary or secondary amines  
 b) Aliphatic compounds  
 c) Aromatic compounds  
 d) Carboxylic acids
255. The compound, N-ethyl-N-methylpropanamine forms non- superimposable mirror image but does not show optical activity. This is due to

- a) Absence of a chiral N-atom  
 c) Presence of lone pair on N-atom
- b) Presence of a chiral N-atom  
 d) Rapid flipping of one from into another
256.  $\text{>C=O}$  compounds reacts with  $\text{NH}_3$  or amines followed by  $\text{H}_2/\text{Ni}$ . The reaction is called  
 a) Mendius reaction  
 c) Reductive amination  
 b) Hofmann bromamide  
 d) Gabriel's phthalimide
257. Decreasing order of basic nature in aqueous solutions  
 a)  $\text{C}_6\text{H}_5\text{NH}_2 > \text{NH}_3 > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH}$   
 c)  $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > \text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2$   
 b)  $\text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2 > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH}$   
 d)  $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > \text{NH}_3 > \text{C}_6\text{H}_5\text{NH}_2$
258. Comparing basic strength of  $\text{NH}_3$ ,  $\text{CH}_3\text{NH}_2$  and  $\text{C}_6\text{H}_5\text{NH}_2$  it may be concluded that  
 a) Basic strength remains unaffected  
 c) Basic strength of aryl amines is lowest  
 b) Basic strength of alkyl amines is lowest  
 d) Basic strength of  $\text{NH}_3$  is highest
259. Decreasing order of basicity of the three isomers of methoxyaniline is  
 a)  $p\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > o\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > m\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2$   
 b)  $p\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > m\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > o\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2$   
 c)  $o\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > p\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > m\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2$   
 d)  $o\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > m\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2 > p\text{-CH}_3\text{OC}_6\text{H}_4\text{NH}_2$
260. Which one of the following is the strongest base in aqueous solution?  
 a) Trimethylamine  
 b) Aniline  
 c) Dimethylamine  
 d) Methylamine
261. Which compound is known as alkyl carbylamines?  
 a)  $R\text{.CN}$   
 b)  $R\text{.NC}$   
 c)  $\text{Ar.CN}$   
 d)  $\text{Ar.NC}$
262. The product  $D$  in the following sequence of reactions is,  
 $\text{CH}_3\text{COOH} \xrightarrow{\text{NH}_3} A \xrightarrow{\text{Heat}} B \xrightarrow{\text{P}_2\text{O}_5} C \xrightarrow{\text{Na}+\text{C}_2\text{H}_5\text{OH}} D$   
 a) Ester  
 b) Amine  
 c) Acid  
 d) Alcohol
263.  $\text{C}_6\text{H}_5\text{NH}_2 \xrightarrow[\text{HCl}]{\text{NaNO}_2} X \xrightarrow{\text{Cu}_2(\text{CN})_2} Y \xrightarrow{\text{H}_2\text{O}/\text{H}^+} Z$   
 Z is identified as  
 a)  $\text{C}_6\text{H}_5\text{-NH-CH}_3$   
 b)  $\text{C}_6\text{H}_5\text{-COOH}$   
 c)  $\text{C}_6\text{H}_5\text{-CH}_2\text{-NH}_2$   
 d)  $\text{C}_6\text{H}_5\text{-CH}_2\text{COOH}$
264. The product [A] formed in the reaction;  
 $2\text{C}_5\text{H}_5\text{-CN} \xrightarrow[\text{Et}_2\text{O}]{\text{Na}} [\text{A}]$  is:
- a) 
- b) 
- c) 
- d) 
265. Gabriel's sunthesis is used frequently for the preparation of which of the following?  
 a) Primary amines  
 b) Primary alcohols  
 c) Tertiary amines  
 d) Tertiary alcohols
266. What is 'Z' in the following reaction ?



- a) Benzoic acid                      b) Cyanobenzoic acid                      c) Benzamide                      d) Aniline



The alkene formed as a major product in the above elimination reaction is

- a)                      b)  $\text{CH}_2 = \text{CH}_2$                       c)                      d)

268. Nitroalkane is acidic only towards :

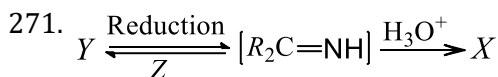
- a)  $\text{Na}_2\text{CO}_3$                       b)  $\text{NaOH}$                       c) Alcohol                      d) Liquid  $\text{NH}_3$

269. Nitrobenzene is reduced by Zn and alcoholic potash mixture to get

- a)  $\text{C}_6\text{H}_5 - \text{NH}_2$                       b)  $\text{C}_6\text{H}_5 - \text{NH} - \text{NH} - \text{C}_6\text{H}_5$   
 c)  $\text{C}_6\text{H}_5 - \text{N} - \text{N} - \text{C}_6\text{H}_5$                       d)  $\text{C}_6\text{H}_5 - \text{NH} - \text{CO} - \text{C}_6\text{H}_5$

270.  $\text{CH}_3\text{NH}_2 + \text{CHCl}_3 + \text{KOH} \rightarrow$  nitrogen containing compound +  $\text{KCl} + \text{H}_2\text{O}$ . 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)  $\text{CH}_3 \text{N}^+ \equiv \text{C}$

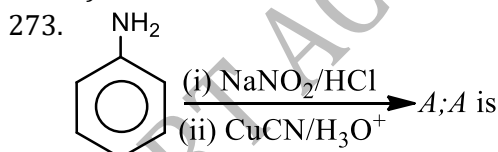


In the above sequence of reaction X, Y, Z are respectively

- a) Aldehyde, ketone,  $\text{NH}_3$                       b) Ketone,  $1^\circ$  amine,  $\text{KMnO}_4$   
 c) Ketone,  $2^\circ$  amine,  $\text{KMnO}_4$                       d) Ketimine,  $1^\circ$  amine,  $\text{H}_2\text{SO}_5$

272. Aniline is weaker base than ethylamine because:

- a) Lone pair of electrons of N-atom is not freely available for coordination with a proton due to resonance than in ethylamine  
 b) Its b. p. is higher than that of ethylamine  
 c) It does not produce sufficient concentration of  $\text{OH}^-$  ions in solution  
 d) It is insoluble in water while ethylamine is soluble in water



- a)                      b)                      c)                      d)

274. The compound will react most readily with  $\text{NaOH}$  to form methanol is

- a)  $(\text{CH}_3)_4\text{N}^+\text{I}^-$                       b)  $\text{CH}_3\text{OCH}_3$                       c)  $(\text{CH}_3)_3\text{S}^+\text{I}^-$                       d)  $(\text{CH}_3)_3\text{Cl}$

275.  $\text{N}_2$  gas is liberated when  $[\text{HCl} + \text{NaNO}_2]$  reacts with the following compounds

- (A)  $\text{CH}_3\text{CH}_2\text{NH}_2$                       (B) Urea  
 (C)  $\text{CH}_3\text{CONH}_2$                       (D)  $\text{C}_6\text{H}_5\text{NH}_2$

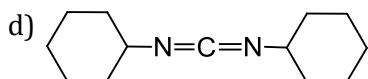
The answer is

- a) A, B, C                      b) B, C, D                      c) A, C, D                      d) A, B, D

276. Dye test can be used to distinguish







287. When aniline is heated with glacial acetic acid in presence of anhydrous  $ZnCl_2$ , the product is:

- a) Acetamide                      b) Acetanilide                      c) Phenyl acetamide                      d) Chlorobenzene

288. Acetonitriles on hydrolysis produce which of the following?

- a) Amine                      b) Acid                      c) Amides                      d) Carbonyl compounds

289. The number of  $\pi$ -bonds in the formula given below,  $NC-CH=CH-CN$  are:

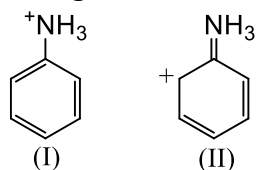
- a) 5                      b) 4                      c) 3                      d) 2

290. Hydrazobenzene  $\xrightarrow{NaIO_3}$  (X)  $\xrightarrow{CH_3CO_3H}$  (Y)

Both X and Y on reduction with Sn/HCl give Z. Which of the following does not represent X, Y or Z?

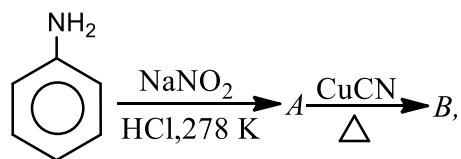
- a) Azobenzene                      b) Phenol                      c) Aniline                      d) Azoxybenzene

291. Examine the following two structures for the anilinium ion and choose the correct statement from the ones given below



- a) II is not acceptable as canonical structure because carbonium ions are less stable than ammonium ions  
 b) II is not an acceptable canonical structure because it is non-aromatic  
 c) II is not an acceptable canonical structure because in it N has 10 valence electrons  
 d) II is an acceptable as canonical structure

292. In the chemical reactions,



Compounds A and B respectively are

- a) Fluorobenzene and phenol                      b) Benzene diazonium chloride and benzonitrile  
 c) Nitrobenzene and chlorobenzene                      d) Phenol and bromobenzene

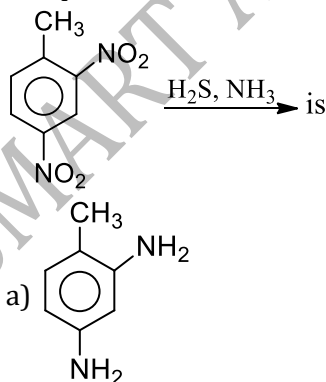
293. In the chemical reaction,



The compounds (A) and (B) are respectively

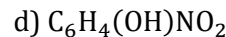
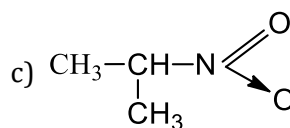
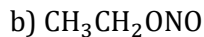
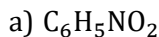
- a)  $CH_3CH_2CONH_2$  and  $3KCl$                       b)  $C_2H_5NC$  and  $K_2CO_3$   
 c)  $C_2H_5NC$  and  $3KCl$                       d)  $C_2H_5CN$  and  $3KCl$

294. The product obtained in the reduction

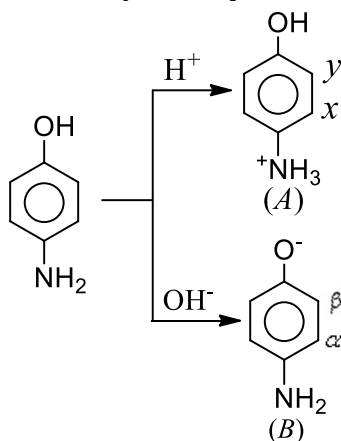




- a) Secondary amine      b) Primary amine      c) Tertiary amine      d) amide
303. General formula of an amine is:  
 a)  $C_nH_{2n+1}N$       b)  $C_nH_{2n+2}N$       c)  $C_nH_{2n+3}N$       d)  $C_nH_{2n}N$
304. Biuret test is not given by:  
 a) Proteins      b) Carbohydrates      c) Polypeptides      d) Urea
305. Which of the following is not a nitro derivative?



306. Consider *p*-aminophenol



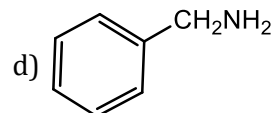
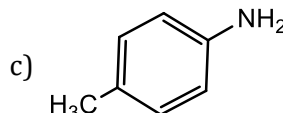
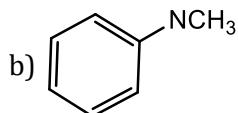
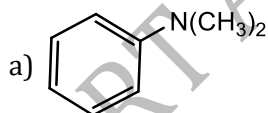
Which positions are activated for coupling reaction in acidic and basic media respectively?

- a)  $x$  in *A* and  $\beta$  in *B*      b)  $x$  in *A* and  $\alpha$  in *B*      c)  $y$  in *A* and  $\alpha$  in *B*      d)  $y$  in *A* and  $\beta$  in *B*
307. Diethyl carbonate on heating with ammonia gives:  
 a)  $C_2H_5NH_2$   
 b)  $(C_2H_5)_3N$   
 c)  $(C_2H_5)_2NH$   
 d) Urea

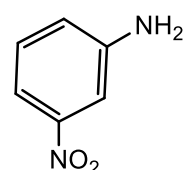
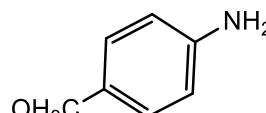
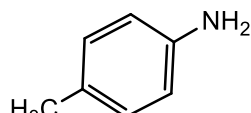
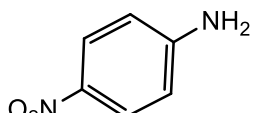
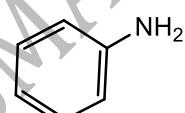
308. A primary amine heated with  $CS_2$  in presence of excess of  $HgCl_2$  gives isothiocyanate. The reaction is called:

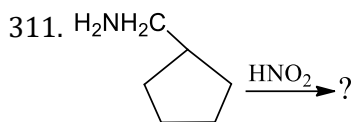
- a) Hofmann's bromamide reaction  
 b) Hofmann's mustard oil reaction  
 c) Perkin's condensation  
 d) Hofmann's elimination

309. Amongst the compound given, the one that would form a brilliant coloured dye on treatment with  $NaNO_2$  in dil. HCl followed by addition to an alkaline solution of  $\beta$ -naphthol is

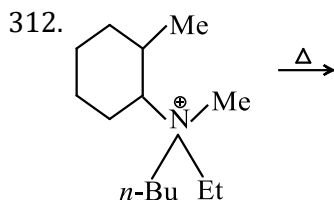
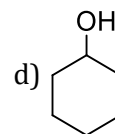
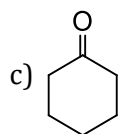
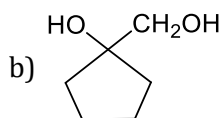
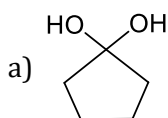


310. The correct order of increasing basic nature of the following bases is

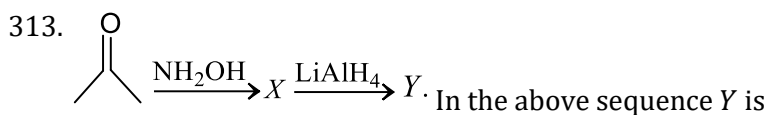
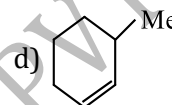
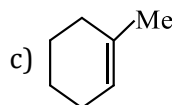
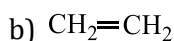
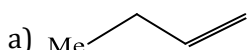




Product is



The alkane formed as a major product in the given elimination reaction is:



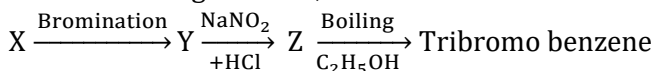
a) Tertiary amine

b) Secondary amine

c) Primary amine

d) 2-nitropropane

314. In the following reaction, X is



a) Benzoic acid

b) Salicylic acid

c) Phenol

d) Aniline

315. Ketones and  $1^\circ$  amines react to form:

a) Amides

b) Oximes

c) Urea

d) Anils

316. Gabriel's phthalimide reaction is used to prepare:

a) *p*-amine

b) *s*-amine

c) *t*-amine

d) All of these

317. Carcinogens are the products of the reaction between:

a)  $\text{R}_2\text{NH} + \text{HNO}_2$

b)  $\text{R}_3\text{N} + \text{HNO}_2$

c)  $\text{RNH}_2 + \text{HNO}_2$

d) None of these

318. Mendius method of preparation of amines consists of:

a) Catalytic reduction of alkyl cyanides

b) Reduction of amide with  $\text{LiAlH}_4$

c) Reduction of nitroparaffin with  $\text{Sn} + \text{HCl}$

d) Reduction of oximes with  $\text{Na} + \text{C}_2\text{H}_5\text{OH}$

319. Which one of the following compounds will dissolve in an alkali solution after it has undergone reaction with Hinsberg reagent?

a)  $\text{CH}_3\text{NH}_2$

b)  $(\text{CH}_3)_3\text{N}$

c)  $(\text{C}_2\text{H}_5)_2\text{NH}$

d)  $\text{C}_6\text{H}_5\text{NHC}_6\text{H}_5$

320. When aniline is treated with sodium nitrite and hydrochloric acid at  $0^\circ\text{C}$ , it gives

a) Phenol and  $\text{N}_2$

b) Diazonium salt

c) Hydrazo compound

d) No reaction takes place

321. Ethyl amine on acetylation gives

a) N-ethyl acetamide

b) Acetamide

c) Methyl acetamide

d) None of these

322. Primary amine ( $\text{RNH}_2$ ) reacts with nitrous acid to give

a)  $\text{RNH}_3^+\text{NO}_2$

b)  $\text{ROH}$

c)  $\text{ROR}$

d) None of these

323. On heating urea, a gas evolves along with formation of biuret. Identify the gas.

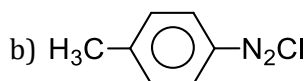
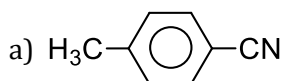
a)  $\text{CO}$

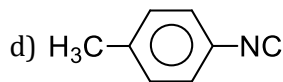
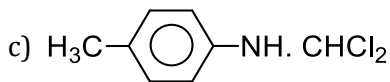
b)  $\text{NH}_3$

c)  $\text{CO}_2$

d)  $\text{H}_2$

324. The reaction of chloroform with alcoholic  $\text{KOH}$  and *p*-toluidine from





325. Acetanilide is prepared by the reaction of acetyl chloride on:

- a) Acetamide                      b) Aniline                      c) Acetaldehyde                      d) Benzene

326. The correct order of the increasing basic nature of methyl amine, ammonia and aniline is:

- a) Methylamine < aniline < ammonia  
 b) Aniline < ammonia < methylamine  
 c) Aniline < methylamine < ammonia  
 d) Ammonia < aniline < methylamine

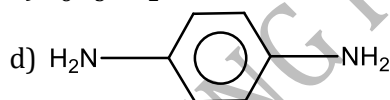
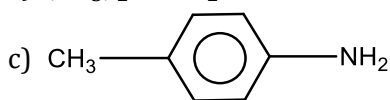
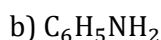
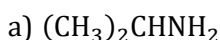
327. Aliphatic amines are ... .. basic than  $\text{NH}_3$  but aromatic amines are ... .. basic than  $\text{NH}_3$ .

- a) More, less                      b) Less, more                      c) Both (a) and (b)                      d) None of these

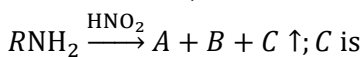
328.  $\text{CH}_3\text{CH}_2\text{Br} \xrightarrow[\Delta]{\text{aq. KOH}} \text{A} \xrightarrow[\Delta]{\text{KMnO}_4/\text{H}^+} \text{B} \xrightarrow[\Delta]{\text{NH}_3} \text{C} \xrightarrow[\text{alkali}]{\text{Br}_2} \text{D}, \text{D}'$  is

- a)  $\text{CH}_3\text{Br}$                       b)  $\text{CH}_3\text{CONH}_2$                       c)  $\text{CH}_3\text{NH}_2$                       d)  $\text{CHBr}_3$

329. Which of the following compounds will form alcohol on treatment with  $\text{NaNO}_2, \text{HCl}/\text{H}_2\text{O}$  at  $0^\circ\text{C}$  ?



330. In the reaction,

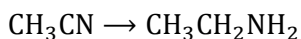


- a)  $\text{NH}_3$                       b)  $\text{N}_2$                       c)  $\text{O}_2$                       d)  $\text{CO}_2$

331. What is decreasing order of basicity of *p*-, *s*-, *t*-ethyl amines and  $\text{NH}_3$ ?

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

332. Which of the following cannot be used for following conversion?

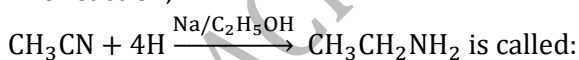


- a)  $\text{Pt}/\text{H}_2$                       b)  $\text{LiAlH}_4$                       c)  $\text{Na}/\text{C}_2\text{H}_5\text{OH}$                       d)  $\text{SnCl}_2/\text{HCl}$

333. Aqueous solution of urea is:

- a) Acidic                      b) Alkaline                      c) Almost neutral                      d) Amphoteric

334. The reaction,



- a) Hofmann's bromamide reaction  
 b) Mendius reaction  
 c) Sabatier reaction  
 d) None of the above

335. Which substance when boiled with  $\text{NaOH}$  will evolve  $\text{NH}_3$ ?

- a) Ethylamine                      b) Aniline                      c) Acetamide                      d) Acetoxime

336. Which of the following compounds is expected to be most basic?

- a) Aniline                      b) Ethylamine                      c) Hydroxylamine                      d) Methylamine

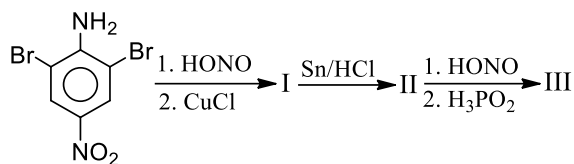
337. In pyridine, the state of hybridization of the nitrogen atom is

- a)  $sp^2$                       b)  $sp^3$                       c)  $sp$                       d) None of these

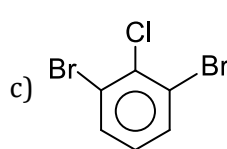
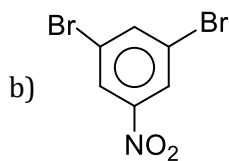
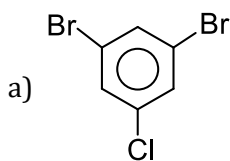
338. Acetoneoxime on catalytic hydrogenation gives:

- a) 1-propanamine                      b) Isopropylamine                      c) Ethyl methyl amine                      d)  $\text{CH}_4$  and ethanamine

339. The final product (III) obtained in the reaction sequence

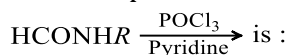


is



d) None of these

340. The main product in the reaction,



a)  $\text{RCN}$

b)  $\text{RNC}$

c)  $\text{RCNO}$

d)  $\text{RNCO}$

341. Ethyl isocyanide on hydrolysis in acidic medium generates

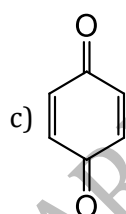
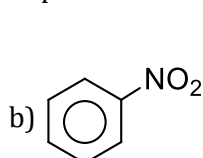
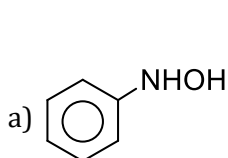
a) Ethylamine salt and methanoic acid

b) Propanoic acid and ammonium salt

c) Ethanoic acid and ammonium salt

d) Methylamine salt and ethanoic acid

342. The oxidation of aniline with per acetic acid in the presence of acetic acid by refluxing gives



d) None of these

343. The compound having the molecular formula  $\text{C}_3\text{H}_9\text{N}$  represent :

a) Trimethylamine

b) *n*-propylamine

c) Isopropylamine

d) All of these

344. Amines have:

a) Garlic odour

b) Fishy odour

c) jasmine odour

d) Bitter almonds odour

345. Which of the following compounds gives a secondary amine on reduction?

a) Nitromethane

b) Nitrobenzene

c) Methyl isocyanide

d) Methyl cyanide

346. Indicate the correct statement.

a)  $\text{C}_2\text{H}_5\text{N}^+\text{H}_3\text{OH}^-$  is acidic

b)  $\text{C}_2\text{H}_5\text{NH}_2$  is less basic than  $\text{NH}_3$

c)  $\text{C}_2\text{H}_5\text{NH}_2$  is a stronger base than  $\text{NH}_3$

d)  $\text{C}_2\text{H}_5\text{NH}_2$  forms salts with bases

347. Choose the incorrect statement.

a) Primary amines show intermolecular hydrogen bonds.

b) Tert-butylamine is primary amine.

c) Tertiary amines do not show intermolecular hydrogen bonds.

d) Isopropylamine is a secondary amine.

348. Toluene is nitrated and the resulting product is reduced with tin and hydrochloric acid. The product so obtained is diazotised and then heated with cuprous bromide. The reaction mixture so formed contains.

a) Mixture of *o*- and *p*-bromotoluenes

b) Mixture of *o*- and *p*-dibromobenzenes

c) Mixture of *o*- and *p*-bromoanilines

d) Mixture of *o*- and *m*-bromotoluenes

349. The strongest base among the following is

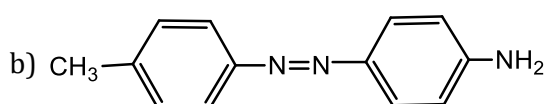
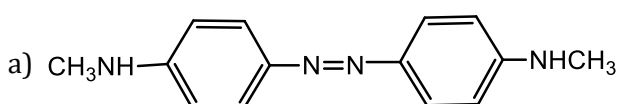
a)  $\text{C}_6\text{H}_5\text{NH}_2$

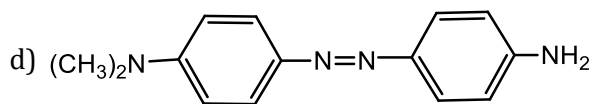
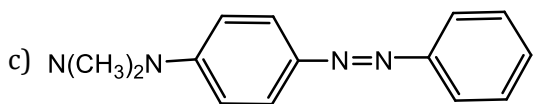
b)  $(\text{C}_6\text{H}_5)_2\text{NH}$

c)  $\text{NH}_3$

d)  $(\text{C}_2\text{H}_5)_2\text{NH}$

350. Aniline when diazotized in cold and then treated with dimethyl aniline gives a coloured product. Its structure would be





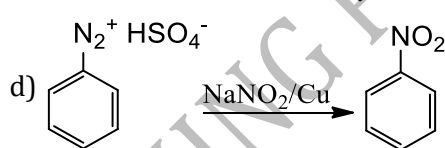
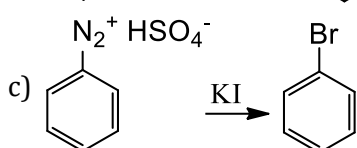
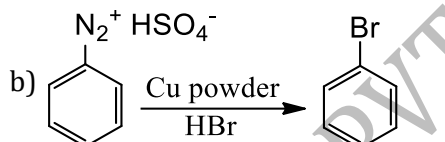
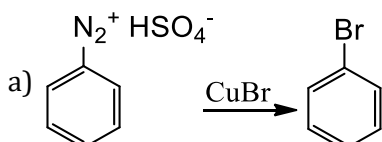
351. Treatment of nitrobenzene with acetyl chloride in the presence of anhydrous  $\text{AlCl}_3$  gives

- a) 2-nitroacetophenone  
b) 3-nitroacetophenone  
c) 4-nitroacetophenone  
d) None of these

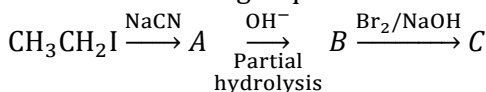
352. Urea when heated slowly, product formed is:

- a)  $\text{N}_2$   
b)  $\text{CO}_2$   
c) biuret  
d) Ammonium carbamate

353. Which of the following reactions is an example of Sandmeyer reaction?



354. Given the following sequence of reactions,



The major product 'C' is

- a)  $\text{CH}_3\text{CH}_2\text{NH}_2$   
b)  $\text{CH}_3\text{CH}_2\text{C}(\text{O})\text{NHBH}$   
c)  $\text{CH}_3\text{CH}_2\text{COONH}_4$   
d)  $\text{CH}_3\text{CH}_2\text{C}(\text{O})\text{NBr}_2$

355.  $\text{CHCl}_3$  and  $\text{KOH}$  on heating with a compound from a bad smelling product, compound is

- a)  $\text{C}_2\text{H}_5\text{CN}$   
b)  $\text{C}_2\text{H}_5\text{NC}$   
c)  $\text{C}_2\text{H}_5\text{OH}$   
d)  $\text{C}_2\text{H}_5\text{NH}_2$

356. Benzamide can be converted into benzonitrile with

- a)  $\text{H}_3\text{O}^+$   
b)  $\text{OH}^-/\text{H}_2\text{O}$   
c)  $\text{KCN}$   
d)  $\text{P}_2\text{O}_5$

357. Compare boiling point of isomeric alkyl amines.

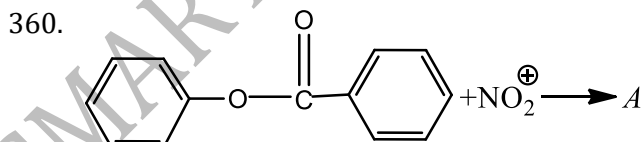
- a)  $1^\circ > 2^\circ > 3^\circ$   
b)  $1^\circ > 2^\circ < 3^\circ$   
c)  $1^\circ < 2^\circ < 3^\circ$   
d)  $1^\circ < 2^\circ > 3^\circ$

358. Hofmann's bromamide reaction is to convert

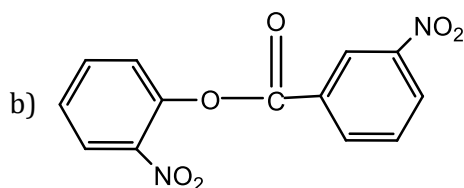
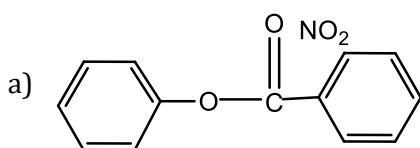
- a) Acid to alcohol  
b) Alcohol to acid  
c) Amide to amine  
d) Amine to amide

359. During coupling reaction of benzene diazonium chloride and aniline, the pH of reaction medium should be approximately

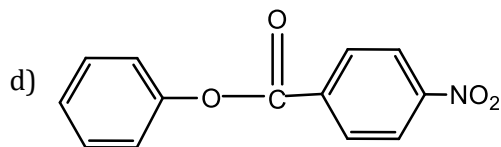
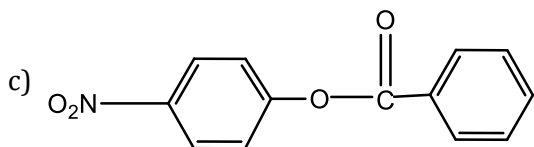
- a) 1–2  
b) 9–10  
c) 4–5  
d) 7–8



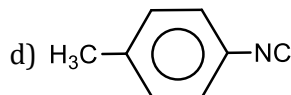
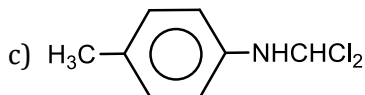
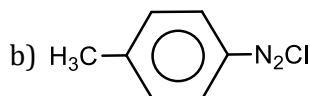
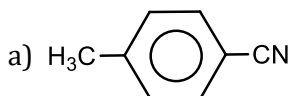
The product A is



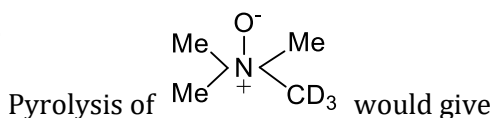




361. The reaction of chloroform with alcoholic KOH and *p*-toluidine form



362.



a) Mixture of  $\text{CH}_2 = \text{CH} - \text{CD}_3$  and  $\text{CH}_3 - \text{CH} = \text{CD}_2$

c)  $\text{Me}_2\text{N}^+ = \text{C}(\text{CD}_3)(\text{CH}_3)$

b)  $\text{CH}_3 - \text{CH} = \text{CD}_2$

d)  $\text{CH}_2 = \text{CH} - \text{CD}_3$

363. Which of the following compounds is soluble in benzene but almost insoluble in water?

a)  $\text{C}_2\text{H}_5\text{OH}$

b)  $\text{CH}_3\text{CO}_2\text{H}$

c)  $\text{CH}_3\text{CHO}$

d)  $\text{C}_6\text{H}_5\text{NO}_2$

364. The action of nitrous acid on a primary amine gives:

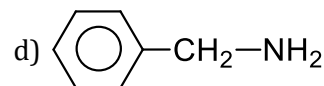
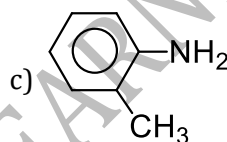
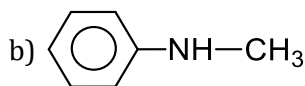
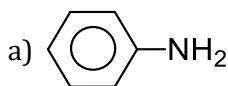
a) Nitroalkane

b) Alkyl nitrite

c) Alcohol

d) Secondary amine

365. Which of the following is the strongest base?



366. Which is not the property of ethanenitrile ( $\text{CH}_3\text{CN}$ )?

a) Undergoes acidic hydrolysis to give carboxylic acid

b) Undergoes alkaline hydrolysis to give salt of carboxylic acid

c) It tautomerises to give methyl isocyanide

d) It gives carbylamines reaction with chloroform

367. The basic character of methylamines in vapour phase is:

a)  $3^\circ > 2^\circ > 1^\circ > \text{NH}_3$

b)  $2^\circ > 3^\circ > 1^\circ > \text{NH}_3$

c)  $1^\circ > 2^\circ > 3^\circ > \text{NH}_3$

d) None of these

368. In which case formation of butane nitrile is possible?

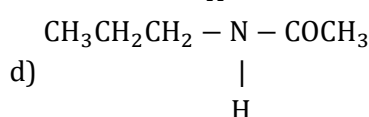
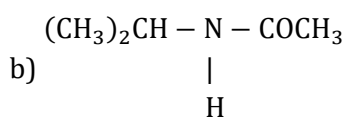
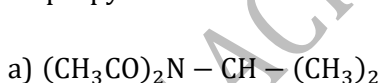
a)  $\text{C}_3\text{H}_7\text{Br} + \text{KCN}$

b)  $\text{C}_4\text{H}_9\text{Br} + \text{KCN}$

c)  $\text{C}_3\text{H}_7\text{OH} + \text{KCN}$

d)  $\text{C}_4\text{H}_9\text{OH} + \text{KCN}$

369. Isopropyl amine with excess of acetyl chloride will give



370. In the reaction of (S) 2-phenylpropamide with  $\text{NaBr}/\text{H}_2\text{O}$  to give 1-phenylethylamine

a) There is retention of configuration

b) There is inversion of configuration

c) A mixture of two products is obtained

d) There is no reaction

371. High basicity of  $\text{Me}_2\text{NH}$  relative to  $\text{Me}_3\text{N}$  is attributed to

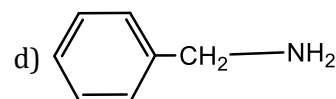
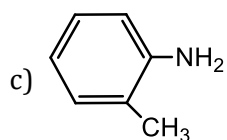
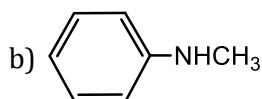
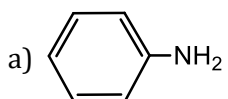
a) Effect of solvent

b) Inductive effect of Me

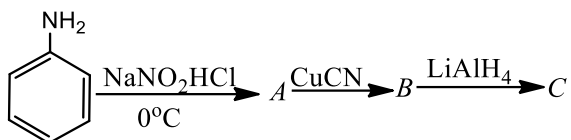
c) Shape of  $\text{Me}_2\text{NH}$

d) Shape of  $\text{Me}_3\text{N}$

372. Which of the following is the strongest base?

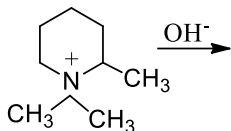


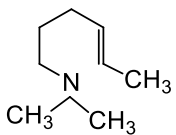
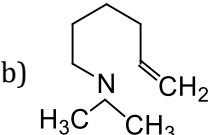
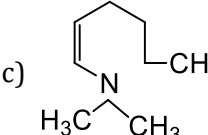
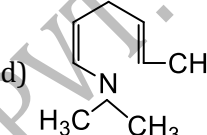
373. In the reaction sequence



The product 'C' is

- a) Benzonitrile                      b) Benzaldehyde                      c) Benzoic acid                      d) Benzyl amine
374. Which one does not liberate  $\text{NH}_3$  when undergoes hydrolysis?  
 a) Acetanilide                      b) Acetonitrile                      c) Acetamide                      d) Phenyl isocyanide
375. Identify the major product of the reaction

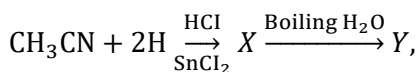


- a)                       b) 
- c)                       d) 

376. Primary nitroalkanes on hydrolysis give:

- a)  $\text{RCOOH} + \text{NH}_2\text{OH}$                       b)  $\text{RCOOH}$                       c)  $\text{NH}_2\text{OH}$                       d)  $\text{RCOR}$

377. In the reaction



The term Y is,

- a) Acetone                      b) Ethanamine                      c) Acetaldehyde                      d) Dimethyl amine
378. Which one of the following compounds forms a quaternary salt on reacting with excess methyl iodide?  
 a)  $\text{C}_2\text{H}_5\text{OCH}_3$                       b)  $(\text{CH}_3)_2\text{CHOC}_2\text{H}_5$                       c)  $\text{C}_6\text{H}_5\text{NH}_2$                       d)  $\text{C}_6\text{H}_5\text{NO}_2$

# AMINES

## CHEMISTRY

### : ANSWER KEY :

1)	c	2)	b	3)	b	4)	a	177)	a	178)	d	179)	b	180)	d
5)	b	6)	c	7)	b	8)	d	181)	d	182)	d	183)	c	184)	d
9)	d	10)	b	11)	d	12)	a	185)	c	186)	c	187)	c	188)	a
13)	b	14)	a	15)	c	16)	b	189)	a	190)	b	191)	c	192)	a
17)	b	18)	b	19)	b	20)	d	193)	c	194)	d	195)	c	196)	d
21)	c	22)	c	23)	b	24)	c	197)	a	198)	a	199)	a	200)	b
25)	c	26)	c	27)	c	28)	d	201)	d	202)	c	203)	c	204)	b
29)	d	30)	a	31)	b	32)	d	205)	d	206)	a	207)	c	208)	a
33)	b	34)	c	35)	d	36)	c	209)	d	210)	a	211)	c	212)	a
37)	b	38)	a	39)	c	40)	a	213)	a	214)	d	215)	d	216)	a
41)	d	42)	b	43)	c	44)	d	217)	c	218)	b	219)	a	220)	d
45)	b	46)	a	47)	b	48)	b	221)	a	222)	d	223)	a	224)	d
49)	d	50)	a	51)	b	52)	b	225)	d	226)	c	227)	c	228)	b
53)	d	54)	d	55)	c	56)	a	229)	b	230)	c	231)	c	232)	a
57)	b	58)	b	59)	b	60)	b	233)	a	234)	a	235)	c	236)	c
61)	b	62)	a	63)	b	64)	a	237)	b	238)	c	239)	a	240)	d
65)	b	66)	d	67)	c	68)	a	241)	c	242)	c	243)	c	244)	b
69)	a	70)	d	71)	a	72)	c	245)	d	246)	b	247)	b	248)	b
73)	c	74)	a	75)	a	76)	d	249)	a	250)	a	251)	c	252)	d
77)	b	78)	a	79)	c	80)	a	253)	b	254)	d	255)	b	256)	c
81)	c	82)	c	83)	c	84)	c	257)	c	258)	c	259)	c	260)	c
85)	b	86)	d	87)	b	88)	d	261)	b	262)	b	263)	b	264)	b
89)	c	90)	b	91)	a	92)	d	265)	a	266)	d	267)	b	268)	b
93)	c	94)	c	95)	a	96)	d	269)	b	270)	b	271)	b	272)	a
97)	b	98)	d	99)	b	100)	d	273)	b	274)	a	275)	a	276)	b
101)	b	102)	c	103)	c	104)	d	277)	c	278)	a	279)	a	280)	b
105)	a	106)	a	107)	b	108)	a	281)	a	282)	a	283)	b	284)	d
109)	c	110)	b	111)	c	112)	a	285)	a	286)	a	287)	b	288)	b
113)	c	114)	d	115)	c	116)	d	289)	a	290)	b	291)	c	292)	b
117)	c	118)	b	119)	d	120)	a	293)	c	294)	b	295)	b	296)	b
121)	b	122)	c	123)	d	124)	b	297)	b	298)	c	299)	c	300)	c
125)	a	126)	c	127)	a	128)	b	301)	b	302)	b	303)	c	304)	b
129)	d	130)	b	131)	d	132)	a	305)	b	306)	b	307)	d	308)	b
133)	a	134)	c	135)	c	136)	c	309)	c	310)	a	311)	d	312)	d
137)	c	138)	a	139)	d	140)	c	313)	c	314)	d	315)	d	316)	a
141)	a	142)	c	143)	c	144)	b	317)	a	318)	a	319)	a	320)	b
145)	b	146)	b	147)	d	148)	d	321)	a	322)	b	323)	b	324)	d
149)	d	150)	b	151)	b	152)	b	325)	b	326)	b	327)	a	328)	c
153)	c	154)	a	155)	c	156)	a	329)	a	330)	b	331)	d	332)	d
157)	b	158)	c	159)	b	160)	a	333)	c	334)	b	335)	c	336)	b
161)	b	162)	b	163)	a	164)	a	337)	a	338)	b	339)	b	340)	b
165)	c	166)	c	167)	d	168)	a	341)	a	342)	b	343)	d	344)	b
169)	b	170)	d	171)	c	172)	b	345)	c	346)	c	347)	d	348)	a
173)	a	174)	a	175)	c	176)	d	349)	d	350)	c	351)	c	352)	c

353) a	354) a	355) b	356) d	369) c	370) a	371) a	372) d
357) a	358) c	359) c	360) c	373) d	374) d	375) b	376) a
361) d	362) a	363) d	364) c	377) c	378) c		
365) d	366) d	367) a	368) a				

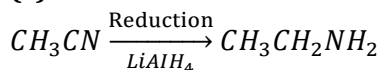
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# AMINES

## CHEMISTRY

### : HINTS AND SOLUTIONS :

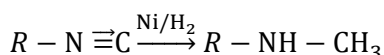
1 (c)



acetonitrile      ethanamine

3 (b)

Carbylamine (or isocyanides) give secondary amine on reduction.



carbylamine      secondary amine

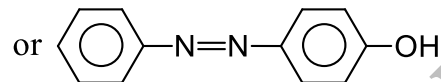
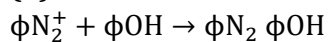
4 (a)

For detection of secondary amines Liebermann's nitroso test is used.

5 (b)

Tertiary amines, due to lack of H-atom, attached directly with N, does not react with benzene sulphonyl chloride ( $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$ ), i.e., Hinsberg's reagent.  $(\text{C}_2\text{H}_5)_3\text{N}$  is a tertiary amine, so does not react with  $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$ .

7 (b)

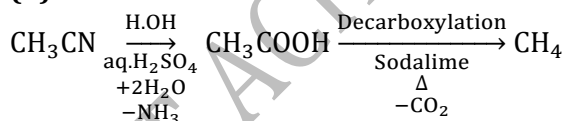


coupling product

10 (b)

—CN and —NC are different functional groups.

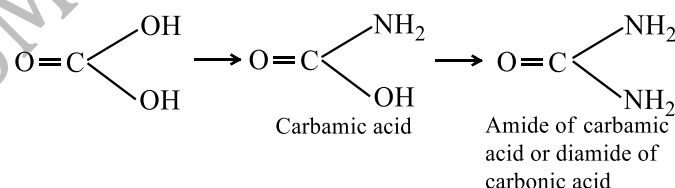
11 (d)



Ethane      ethanoic acid      methane

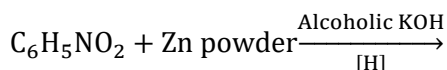
17 (b)

Urea is monoamide of carbamic acid or diamide of carbonic acid,



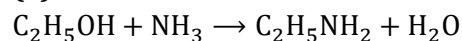
18 (b)

Aniline is not obtained as a major product by the reaction.



Nitrile      (A)

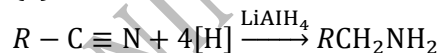
12 (a)



13 (b)

Aliphatic amines (in which amino group is attached with alkyl group) are more basic than aromatic amines (in which amino group is bonded directly with benzene nucleus). Hence,  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$  (benzyl amine), being an aliphatic amine, is the most basic among the given the compounds.

14 (a)



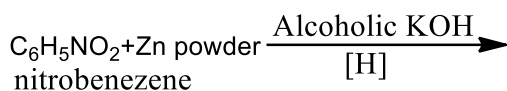
15 (c)

Electron deficient group decreases the electron density of N-atom, thus, makes its lone pair less available for donation

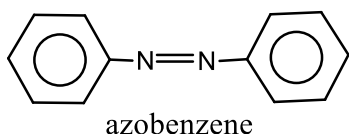
16 (b)

The order for acidic nature depends upon the ease to lose  $\text{H}^+$  ion. —COOH is resonance stabilized and thus lose  $\text{H}^+$  at the earliest. Also  $\text{NH}_3^+$  near to —COOH releases  $\text{H}^+$  more easily due to electron withdrawing nature of —COOH than  $\text{NH}_3^+$  far away from —COOH.

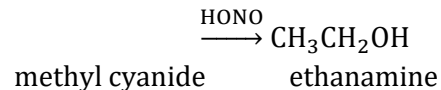
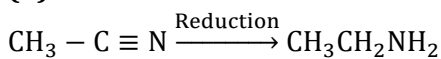
Nitrobenzene



nitrobenzene



19 (b)



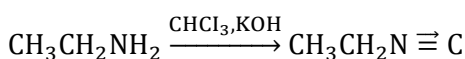
methyl cyanide

ethanamine

ethanol

1.

(B)

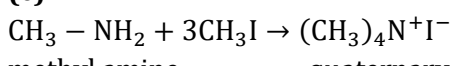


2.

Ethyl isocyanide

(C)

21 (c)



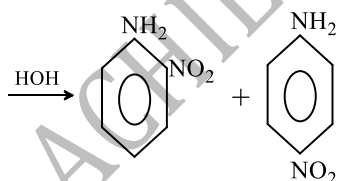
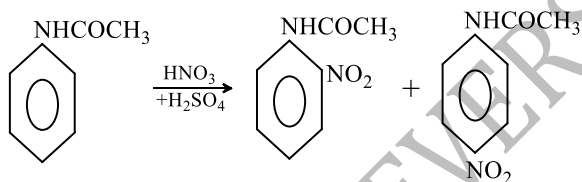
methyl amine

quaternary

ammonium salt

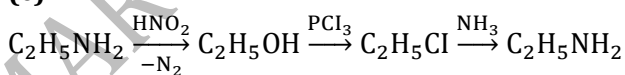
therefore, 3 moles of  $\text{CH}_3\text{I}$  (methyl iodide) are required for reaction with methyl amine.

23 (b)



( $-\text{NHCOCH}_3$  is *o*- and *p*-directing)

24 (c)



ethyl amine

ethanol

ethyl chloride

ethyl

amine

3.

(B)

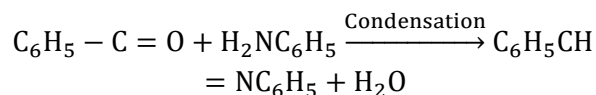
(C)

27 (c)

Reaction of aniline with benzaldehyde is condensation reaction.

H

|



Benzaldehyde

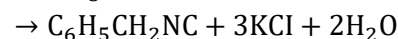
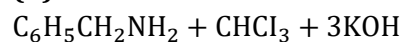
aniline

benzylidene

aniline

28

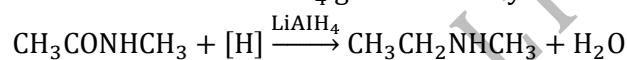
(d)



29

(d)

Secondary amides such as *N*-methylethanamide on reduction with  $\text{LiAlH}_4$  give secondary amines.



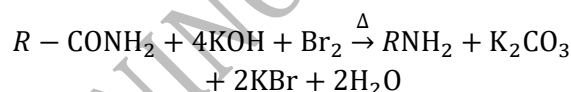
*N*-methylethanamide

2° amine

30

(a)

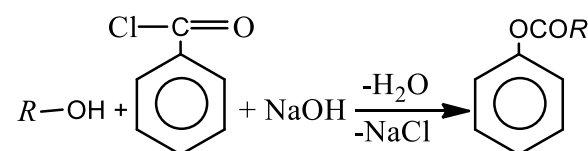
Hofmann bromamide reaction is used to prepare 1° amine from primary amides. In this method, amides are treated with bromine in presence of KOH.



32

(d)

Compounds having active hydrogen such as, phenols, alcohols, primary or secondary amines and amides show Schotten-Baumann reaction. But tertiary amines do not have active hydrogen, hence, do not undergo Schotten-Baumann reaction.



33

(b)

Due to +ve I.E. in alkylamines and resonance in  $\text{C}_6\text{H}_5\text{NH}_2$ .

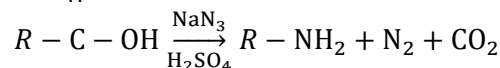
34

(c)

Schmidt reaction

O

||

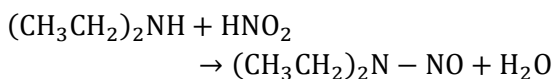


37

(b)

Benzene diazonium chloride reacts with phenol in weakly basic medium gives *p*-hydroxy azobenzene.

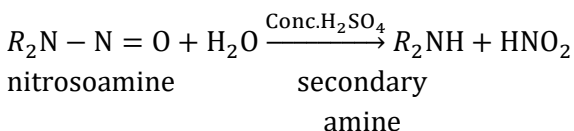




Secondary amine nitrous acid oily nitrosoamine

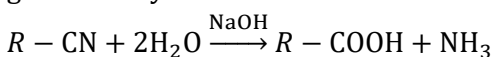
55 (c)

Nitrosoamine on heating with conc.  $\text{H}_2\text{SO}_4$  gives secondary amine. This reaction is called Liebermann nitroso reaction.

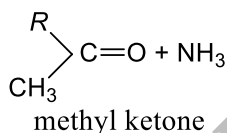
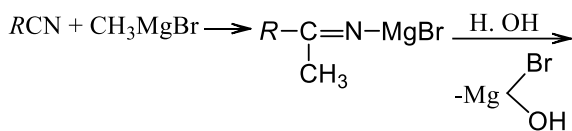
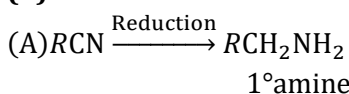


56 (a)

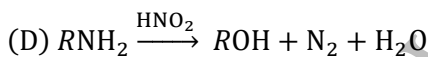
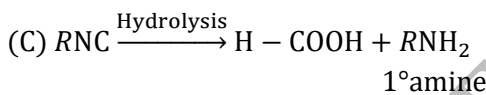
Cyanides are hydrolysed either by alkali or acid to give carboxylic acid.



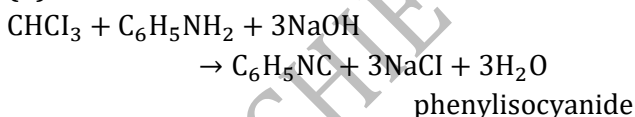
57 (b)



(B)

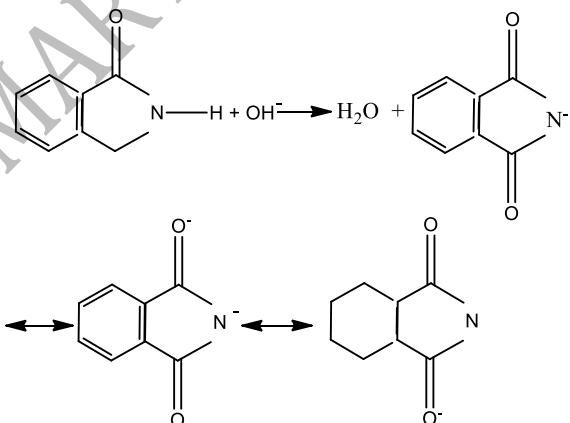


59 (b)



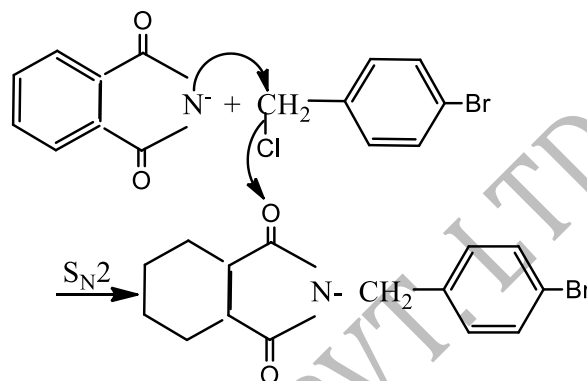
62 (a)

It is the first step of Gabriel's phthalimide synthesis. The hydrogen bonded to nitrogen is sufficiently acidic due to two  $\alpha$ -carbonyls.



The conjugate base forms above act as nucleophile in the subsequent step of reaction. As

shown above, the nucleophile exist in three resonating form, one may think of oxygen being the donor atom in the nucleophilic attack. However, nitrogen act as donor as it is better donor than oxygen.



Bromine is not substituted in the above reaction as it is in resonance with benzene ring giving partial double bond character to C - Br bond, hence difficult to break.

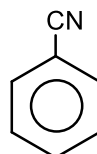


63 (b)

Only these aromatic primary amines undergo diazotisation in which  $-\text{NH}_2$  is attached to nucleus.

64 (a)

Molecular formula of benzonitrile is  $\text{C}_6\text{H}_5\text{CN}$ .

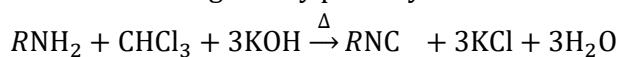


phenyl cyanide or benzonitrile

65 (b)

In carbylamines reaction, when a primary amine reacts with chloroform in presence of alc. KOH, it gives iso-cyanide which has abnoxious odour.

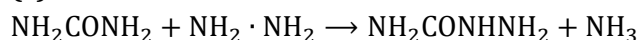
This reaction is given by primary amine



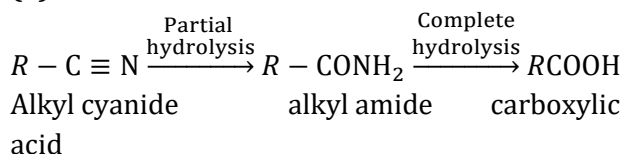
Primary (alc) alkyl

Amine iso-cyanide

67 (c)



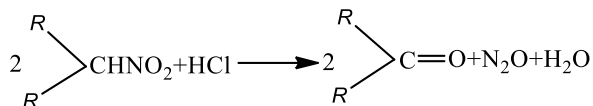
68 (a)



69 (a)



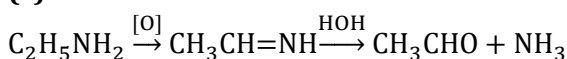
Secondary nitroalkanes can be converted into ketones by using aqueous HCl.



70 (d)

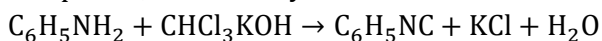
Benzyl amine is most basic because positive inductive effect (+I) increases due to presence of methylene group.

72 (c)

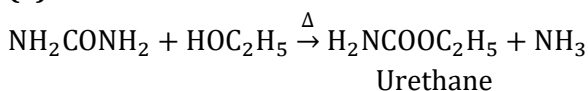


73 (c)

Carbylamine reaction is given by only primary amines (both aliphatic and aromatic). In this reaction a primary amine reacts with chloroform in basic medium, to form a very bad smelling compound, called carbylamines



75 (a)



77 (b)

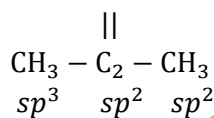
Only primary amines give positive carbylamine test

78 (a)

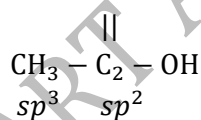
Primary amines have tendency of forming H-bonds

81 (c)

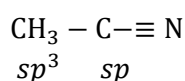
7. 0



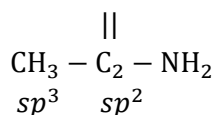
(b) 0



(c)



(d) 0



Acetonitrile does not contain  $\text{sp}^2$  hybridised

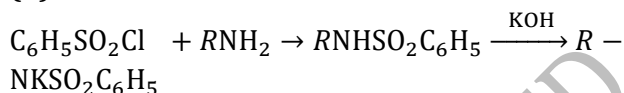
carbon.

85 (b)

Due to

+ve IE in alkyamines and resonance in  $\text{C}_6\text{H}_5\text{NH}_2$ .

86 (d)



Benzene sulphonyl

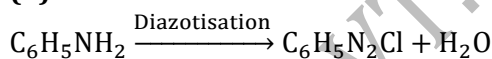
N-alkyl benzene

soluble in KOH

chloride

sulphonamide

87 (b)



89 (c)

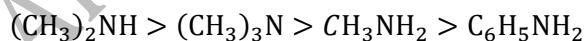
Tertiary amines do not have replaceable H-atom.

90 (b)

Urea gives biuret test. Biuret formed gives violet colour with  $\text{CuSO}_4$  in alkaline medium.

91 (a)

The order of basicity among the following amines is



92 (d)

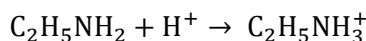
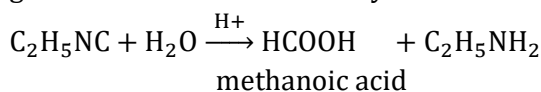
Concentration does not affect the basis strength of amines

93 (c)

Secondary amine on reaction with aq.  $\text{HNO}_2$  at low temperature produces yellow oily nitrosoamines.  $\text{CH}_3\text{CH}_2\text{NHCH}_2\text{CH}_3$  is secondary amine.

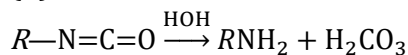
95 (a)

Ethyl isocyanide on hydrolysis in acidic medium gives methanoic acid and ethyl amine salt



Ethylamine salt

96 (d)



97 (b)

Biuret formed gives violet colour with  $\text{CuSO}_4$  in alkaline medium.

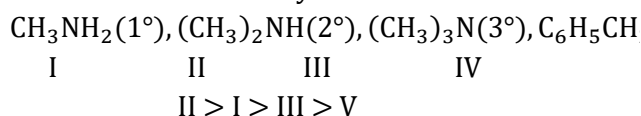
98 (d)

Benzyl amine ( $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$ ) is more basic than aniline ( $\text{C}_6\text{H}_5\text{NH}_2$ ) because N-atom of aniline is delocalized over the benzene ring. However in benzyl amine the lone pair of electrons on the N-atom is not conjugated with the benzene ring and

therefore it is not delocalized. Hence, the lone pair of electrons on the N-atom in benzyl amine is more readily available for protonation than that on the N-atom of aniline. Thus, the benzyl amine is a stronger base than aniline.

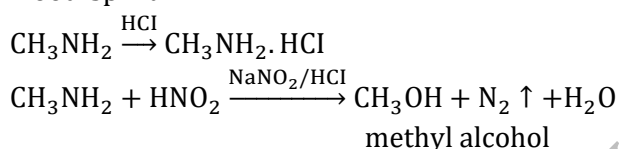
99 (b)

Basicity of amines increases with increasing +I effect of alkyl group. 3° amine has greater +I effect than 2° and 1° amines but less basic than these, due to steric hindrance of bulky groups. Moreover, benzyl amine is a weaker base than aliphatic amines. Hence, the following compounds has the order of basicity.



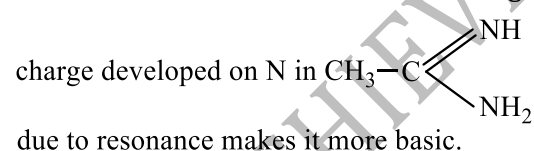
100 (d)

It is methyl amine which, being basic dissolves in dilute HCl. It with NaNO<sub>2</sub> evolves nitrogen gas leaving behind methyl alcohol which has smell of wood-spirit.



101 (b)

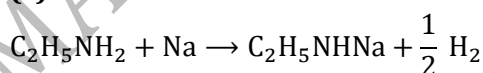
2° amines are more basic than 1° amines due to +ve IE of -CH<sub>3</sub> gp. In amide the resonance give rise to less availability to electron pair for coordination and thus less basic. The negative



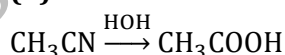
102 (c)

Availability of lone pair on N-atom (Lewis concept),  
 $\text{RNH}_2 + \text{H}_2\text{O} \rightarrow \text{RNH}_3^+ + \text{OH}^-$  (Bronsted concept proton acceptor).

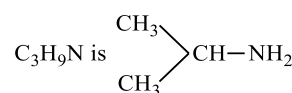
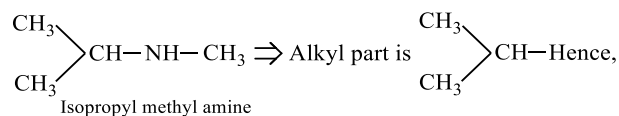
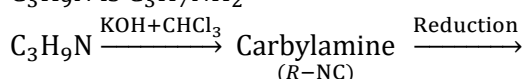
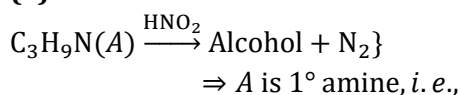
103 (c)



104 (d)

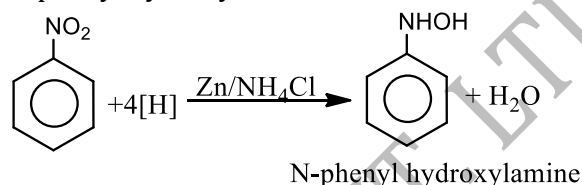


105 (a)



109 (c)

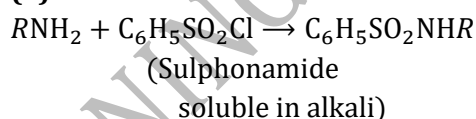
Reduction of nitrobenzene by Zn and NH<sub>4</sub>Cl gives N-phenyl hydroxylamine.



111 (c)

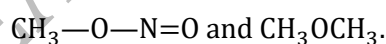
Carbylamine reaction is used to prepare isocyanides.

112 (a)



114 (d)

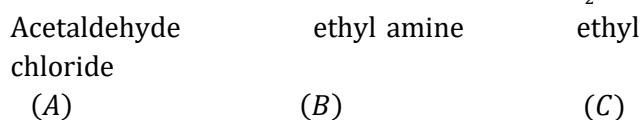
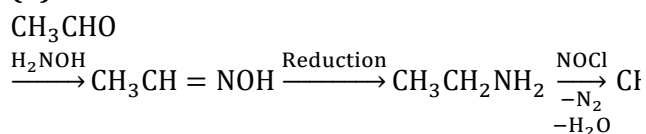
All primary (aliphatic) amines give alcohol with H which forms



117 (c)

Roullé first isolated urea (in 1773) from urine and named it as urea.

119 (d)



120 (a)

$\text{R}-\text{C} \equiv \text{N}$   
 ∴ Alkyl group is attached to carbon.

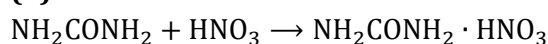
122 (c)

p-amine forms alcohol; s-amine forms only nitrosoamine.

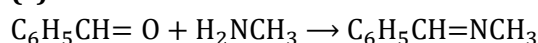
123 (d)

Nitrene is not the intermediate of Gabriel's phthalimide reaction

124 (b)



126 (c)

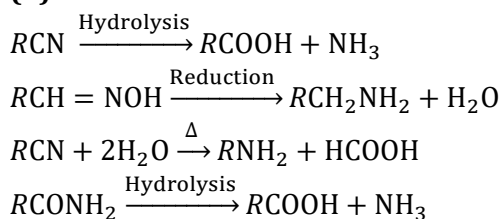


128 (b)

Ethyl bromide reacts with KCN to give ethyl cyanide.

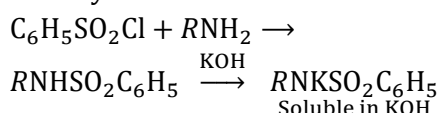


152 (b)



154 (a)

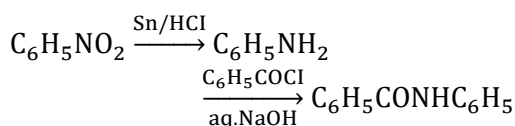
Hinsberg reagent  $\text{C}_6\text{H}_5\text{CO}_2\text{Cl}$  reacts with primary amines and gives alkali soluble benzene sulphonamide; with secondary amine it gives alkali insoluble benzene sulphonamide, with tertiary amines it does not react.



156 (a)

Due to  $sp^3$ -hybridisation and lone pair of electron (like  $\text{NH}_3$ )

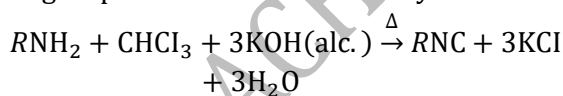
157 (b)



Nitrobenzene      aniline      benzanilide

160 (a)

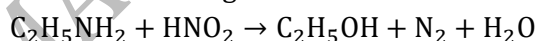
Carbylamine reaction is given by aliphatic and aromatic primary amine hence, it can be used for the distinguish of primary amine with secondary and tertiary amine. In this reaction, a primary amine reacts with chloroform and alcoholic KOH to give poisonous substance isocyanide.



Primary amine      alkyl isocyanide

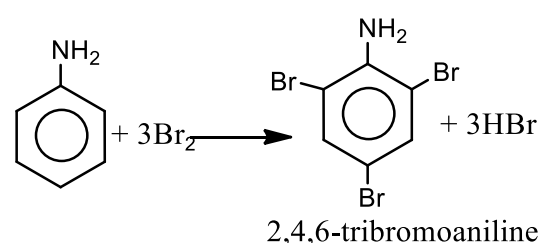
161 (b)

Ethyl amine reacts with nitrous acid to give ethyl alcohol and nitrogen.



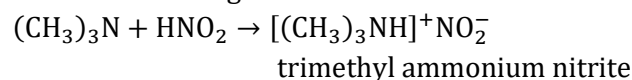
162 (b)

Aniline reacts with  $\text{Br}_2$  to give 2, 4, 6-tribromoaniline not bromoaniline as



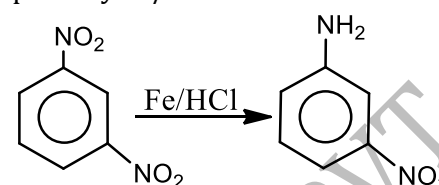
163 (a)

Trimethyl amine is a tertiary amine. It dissolves in cold nitrous acid to form salts which decompose on warming to nitrosoamine and alcohol. It will not liberate nitrogen.



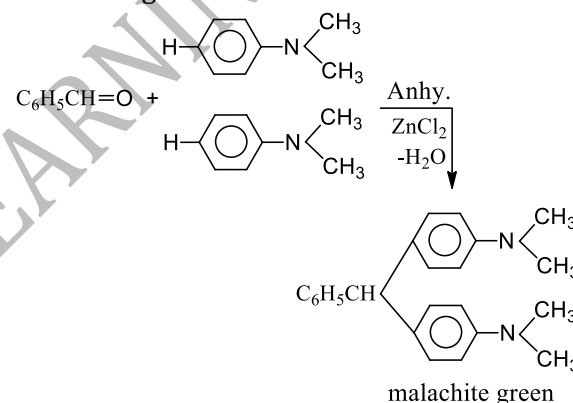
167 (d)

Reduction of  $\text{NO}_2$  group to  $\text{NH}_2$  group is taking place by  $\text{Fe}/\text{HCl}$ .

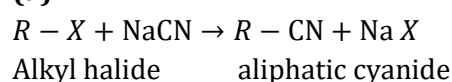


172 (b)

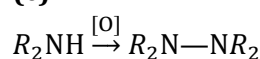
Benzaldehyde condenses with N, N-dimethylaniline in presence of anhydrous  $\text{ZnCl}_2$  to give malachite green



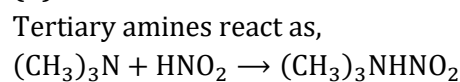
174 (a)



175 (c)



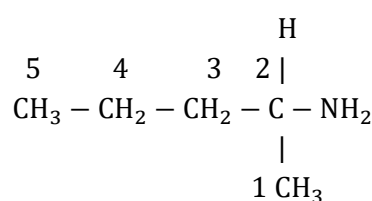
176 (d)



178 (d)

$\text{HNO}_2$  reacts to give an alcohol means the compound is primary amine.

$\text{C}_5\text{H}_{13}\text{N}$  means  $\text{C}_5\text{H}_{11}\text{NH}_2$  (primary amine)  
Optically active alcohol means  $\text{C}_5\text{H}_{11}$  segment contains a chiral carbon.

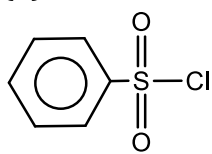


Pentan-2-amine

179 (b)

$\text{CH}_3\text{CH}_2 - \text{O} - \text{N} = \text{O}$  is a nitrite derivative, hence it is not a nitro derivative.

180 (d)



or  $\text{C}_6\text{H}_5\text{SO}_2\text{Cl}$  is called Hinsberg

reagent.

It is used for the distinction of  $1^\circ$ ,  $2^\circ$ ,  $3^\circ$  amine.

181 (d)

Presence of electron withdrawing group like  $-\text{CN}$ ,  $-\text{CHO}$ ,  $-\text{NO}_2$  etc decreases the electron density over N-atom of amines, and thus decreases their basic character as lone pair is less available for donation

184 (d)

It is not used in purification of water.

185 (c)

In tertiary amines, no H-atom is attached directly to the more electronegative N-atom. Hence, it has no tendency to form H-bond

186 (c)

Methylaminomethane is trivial name of *N*-methyl methanamine  $(\text{CH}_3)_2\text{NH}$ .

187 (c)

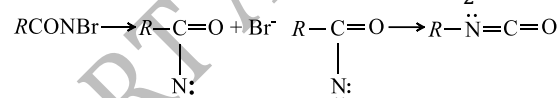
Both gives alkane (RH) with Grignard reagents  $\text{RMgX}$  due to the presence of acidic hydrogen (N—H)

190 (b)

Hofmann's method is used to separate primary, secondary and tertiary amines. The compound used is diethyl oxalate for this purpose.

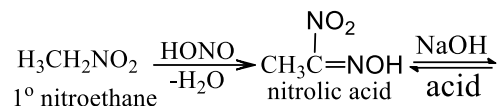
191 (c)

The reaction is believed to follow the mechanism.



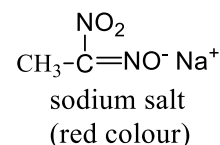
192 (a)

Primary nitro alkanes when treated with nitrous acid from nitrolic acid which when dissolve in alkali gives, salt of nitrolic acid which is red in colour. In excess of acid, the salt dissociated, thus colour disappears while in excess of alkali the red colour reappears

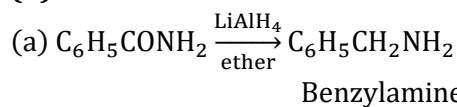


$1^\circ$  nitroethane

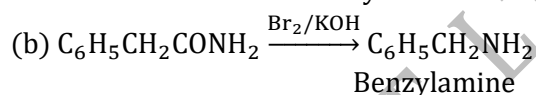
nitrolic acid



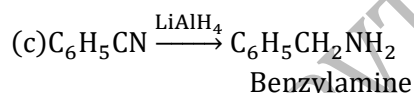
194 (d)



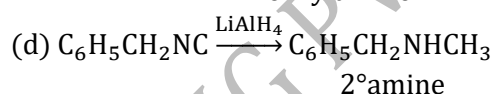
Benzylamine



Benzylamine

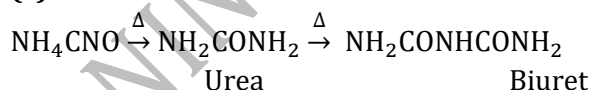


Benzylamine



$2^\circ$  amine

195 (c)



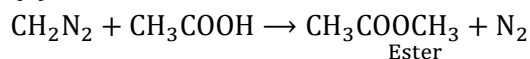
Urea

Biuret

196 (d)

The amines are basic in nature due to presence of lone pair of electron on nitrogen. The  $2^\circ$  amines are basic among  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  amines because of steric effect and hydration effect

197 (a)



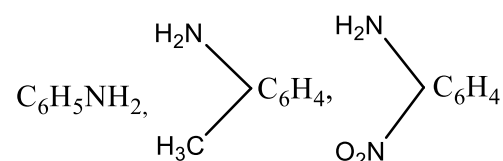
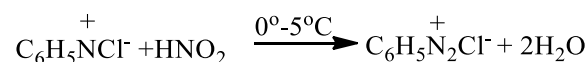
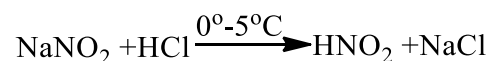
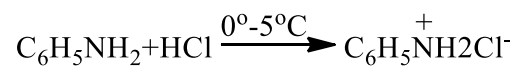
Ester

198 (a)

Follow text.

200 (b)

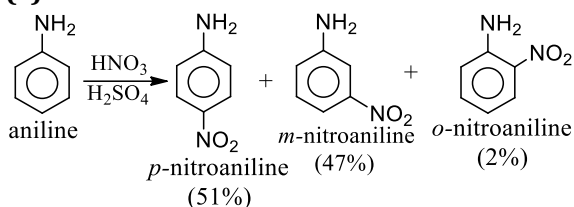
Only  $1^\circ$  aromatic amine (primary aromatic amine) from diazonium salts at low temperature ( $0^\circ - 5^\circ\text{C}$ ). A reaction in which  $-\text{NH}_2$  group is converted into diazo group ( $-\text{N}^+ \equiv \text{N}$ ) is called diazotization. Diazotized salts are stable in cold aqueous solution.



Amines, so undergo diazotization but

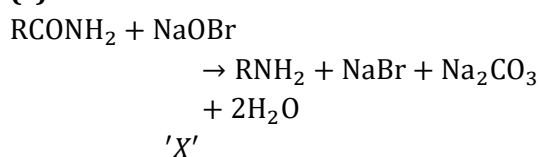
$\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$  (aliphatic amine) will not undergo diazotisation.

202 (c)



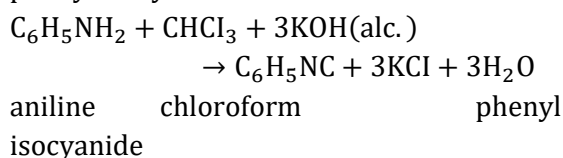
Nitration of aniline also gives *m*-nitro aniline in strong acidic medium because in strong acidic condition protonation of  $-\text{NH}_2$  group gives anilinium ion ( $+\text{NH}_3$ ) which is deactivating in nature and of *m*-directive nature

203 (c)



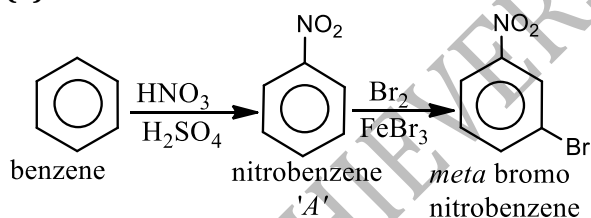
204 (b)

Action of alcoholic caustic potash on chloroform and aniline forms a bad smelling compound phenyl isocyanide.



This reaction is called carbylamine reaction and it is actually the test of primary amines.

206 (a)



$-\text{NO}_2$  is a *meta* directing group. As it is also a deactivating group, so no chance of introduction of second  $-\text{Br}$  atom.

207 (c)



210 (a)

Isocyanides (carbylamines) are foul odour compounds.



∴ As foul odour

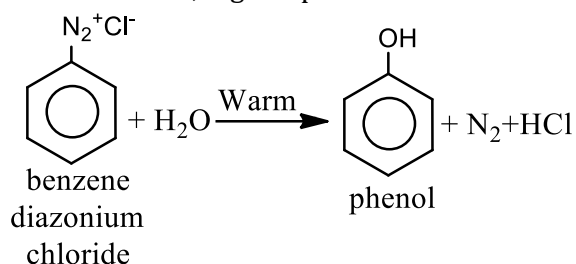
213 (a)

This is carbylamine reaction.

214 (d)

When aqueous solution of benzene diazonium

chloride boiled, it gives phenol.

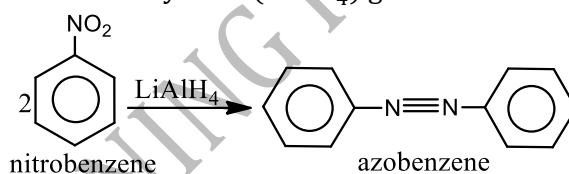


215 (d)

Electron withdrawing groups result in decreased basicity while electron releasing groups increases the basicity. Thus, the order of basic character is  $D > A > B > C$

217 (c)

Nitrobenzene on reduction with lithium aluminium hydride ( $\text{LiAlH}_4$ ) gives azobenzene.

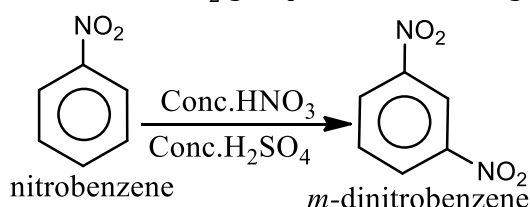


218 (b)

Secondary and tertiary amines fail to undergo the carbylamine test because they react with alcoholic  $\text{KOH}$ .

219 (a)

Nitrobenzene on nitration gives *m*-dinitro benzene as  $-\text{NO}_2$  group is *meta*-directing.



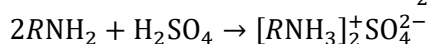
In this reaction the attacking reagent is  $\text{NO}_2^+$ .

220 (d)

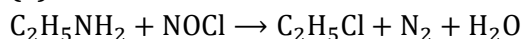
Bases react with acid to form salt.

∴ Amines are basic in nature.

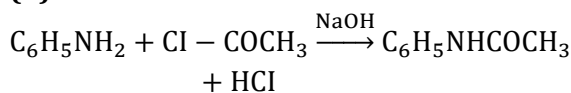
∴ It forms salt on reaction with  $\text{H}_2\text{SO}_4$



221 (a)



222 (d)



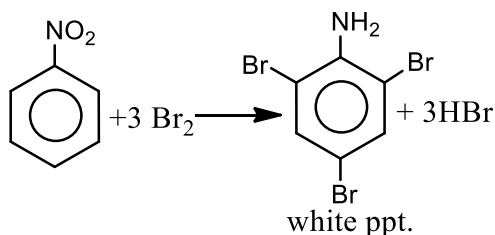
aniline                  acetyl chloride                  acetanilide

223 (a)

On direct nitration of aniline, lone pair of electrons present at nitrogen atom will accept proton from the nitrating mixture to give anilinium ion which is *meta* directing.

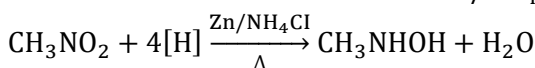


2, 4, 6 tribromoaniline.



246 (b)

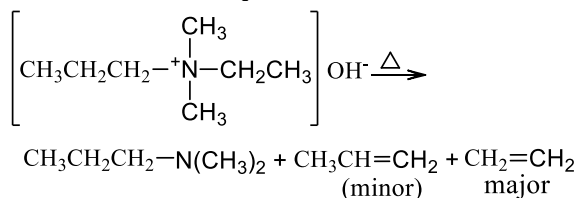
Nitromethane forms methyl hydroxylamine on reduction in neutral medium with Zn/NH<sub>4</sub>Cl.



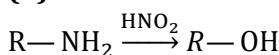
Nitromethane                      N-methyl hydroxyl  
amine

251 (c)

In Hofmann elimination reaction, less substituted alkene is the main product



253 (b)



254 (d)

C<sub>6</sub>H<sub>5</sub>COCl has no reaction with carboxylic acids.

257 (c)

Basic nature of an amine depends upon availability of lone pair on nitrogen atom. If lone pair is easily available the compound would be more basic.

Due to +I effect of methyl group, methyl amine is more basic than ammonia and dimethyl amine is more basic than methyl amine. While aniline is a weaker base than ammonia due to delocalization of lone pair of nitrogen atom at different position.

258 (c)

Presence of methyl group increases the electron density on nitrogen. So, it increases the basicity. Aniline is a weaker base than the primary aliphatic amines and this may be explained by resonance. The lone pair of N is involved in resonance, thus not available for donation. That's why the basic strength of aryl amines (aniline) is the lowest.

260 (c)

In aqueous solution, the basicity order is dimethyl amine > methyl amine > trimethyl amine > aniline

2°

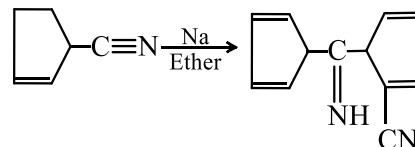
1°

3°

261 (b)

The name of isocyanides is carbylamine, and when it is attached with an alkyl group, the compound is called alkyl carbylamine, *i.e.*, RNC.

264 (b)

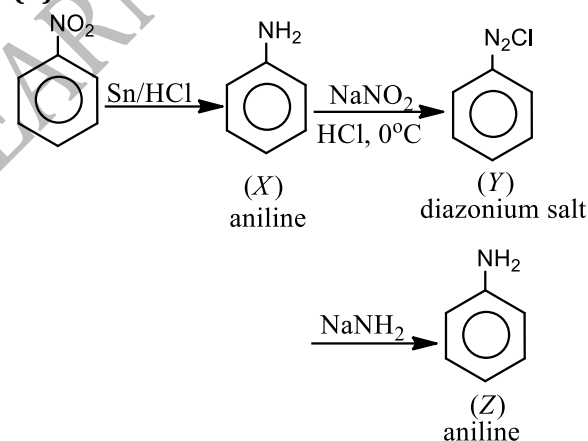


This is Thorpe nitrile condensation involving only α-H-atom of nitrile due to the strong attraction nature of CN group.

265 (a)

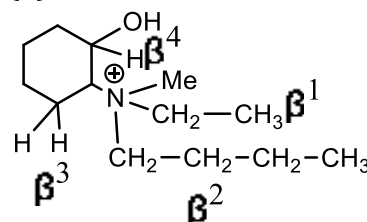
**Gabriel's synthesis**: Phthalimide is reacted with KOH to form potassium phthalimide. The potassium salt is treated with an alkyl halide. The product N-alkyl phthalimide is put to hydrolyse with hydrochloric acid, then primary amine is formed.

266 (d)



∴ Z is aniline

267 (b)

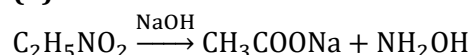


There are four β-hydrogens in this quaternary ammonium salt.

On heating the quaternary ammonium salt gives Hofmann elimination (abstraction of the most acidic hydrogen which is β<sup>1</sup>).

Hence, the major product is CH<sub>2</sub>=CH<sub>2</sub> (least substituted alkene).

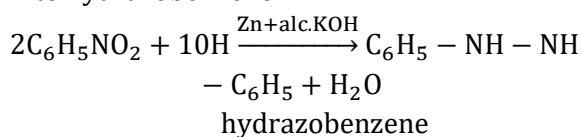
268 (b)



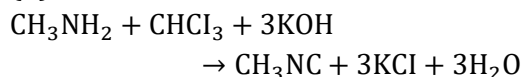


269 (b)

Nitrobenzene is reduced by Zn and alcoholic KOH into hydrazobenzene.



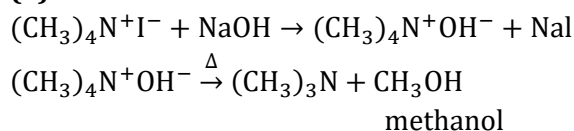
270 (b)



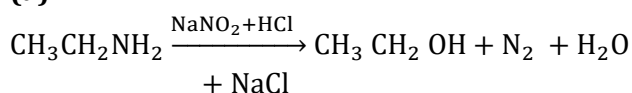
$\text{CH}_3\text{NC}$  or  $\text{CH}_3 - \text{N}^+ \equiv \text{C}^-$  methyl isocyanide or methyl carbylamine.

This reaction is an example of carbylamine reaction and it is used for the distinction of *p*-amines from *s*- and *t*-amines or identification of *p*-amino group.

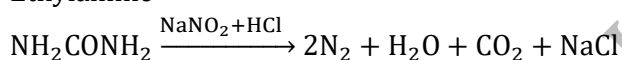
274 (a)



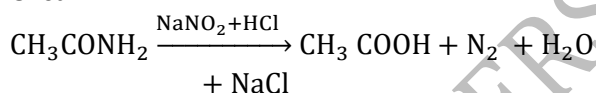
275 (a)



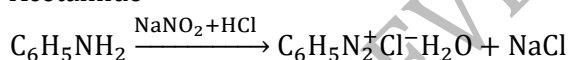
Ethylamine



Urea

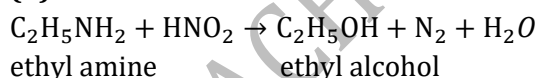


Acetamide

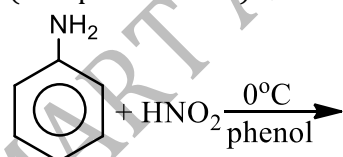


Aniline

276 (b)



(1° aliphatic amine)



aniline

1° aromatic amine

∴ Dye test is used to distinguish between

1° aliphatic and

1° aromatic amine

277 (c)

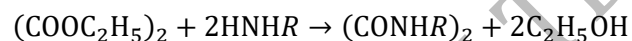
Presence of  $\alpha$ -H atom is the main condition for exhibiting tautomerism.

The reactant taken in reaction (C) does not contain any  $\alpha$ -H atom, thus the product (Y) will

also show the absence of  $\alpha$ -H atom, Hence, Y will show tautomerism

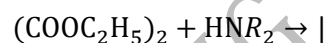
278 (a)

8. In Hofmann method, a mixture of primary, secondary and tertiary amines is treated with diethyloxalate, when primary amine forms solid oxamide, secondary amine forms a liquid oxamic ester whereas tertiary amine remains unaffected.



Diethyl oxalate    1° amine    solid

$\text{CONR}_2$



$\text{COOC}_2\text{H}_5 + \text{C}_2\text{H}_5\text{OH}$

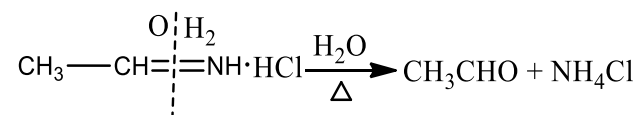
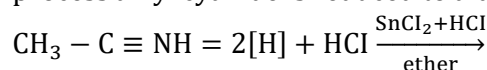
2° amine    liquid



3° amine

279 (a)

An alkyl cyanide is dissolved in ether or better in ethyl formate or ethyl acetate, and reduced with  $\text{SnCl}_2$  and  $\text{HCl}$  and then steam distilled. The whole process is called Stephen reaction. In this process alkyl cyanide is reduced to aldehyde.



There is no analogous method for the preparation of ketones.

282 (a)

Azoxybenzene is the main product when reducing agent used is  $\text{Na}_3\text{AsO}_3/\text{NaOH}$

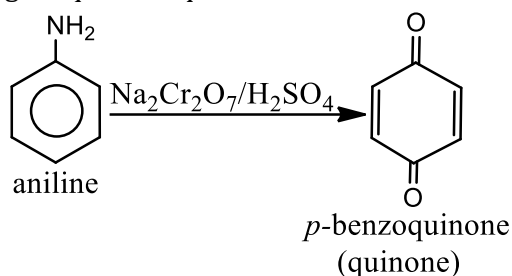
283 (b)

Negative charge developed on N in the resonance hybrid makes it more basic as it loses electron pair readily. Also 2° amine is more basic than 1°

amine due to +ve *IE* of alkyl group. In amide the lone pair remains less available due to delocalisation in resonance.

284 (d)

Aniline on oxidation with  $\text{Na}_2\text{Cr}_2\text{O}_7$  and  $\text{H}_2\text{SO}_4$  gives *p*-benzoquinone.

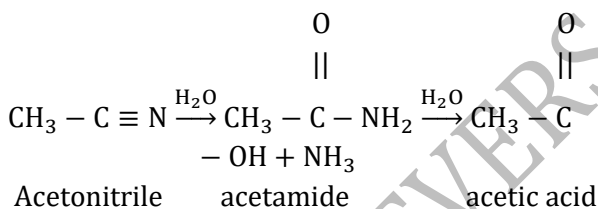


285 (a)

As the molecular mass increase, boiling point increases. In case of isometric amines, however, as the number of H-atoms attached directly to N-atom decreases, boiling point decreases because tendency to form H-bonds decreases. Hence, the order of boiling points of given amines is  $\text{CH}_3\text{NH}_2 < (\text{CH}_3)_3\text{N} < \text{CH}_3\text{CH}_2\text{N}(\text{NH}_3) < \text{CH}_3\text{CH}_2\text{CH}_2\text{NH}_2$

288 (b)

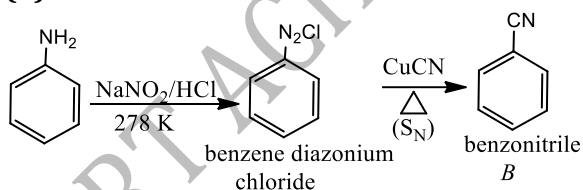
Acetonitriles on hydrolysis produce carboxylic acids with the evolution of ammonia.



289 (a)

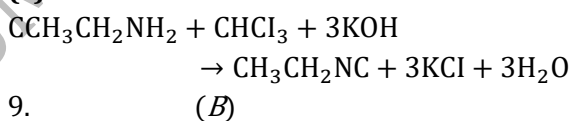
$\text{N} \equiv \text{C} - \text{CH} = \text{CH} - \text{C} \equiv \text{N}$ ; It has five  $\pi$ -bonds.

292 (b)



Formation of *A* is by diazotization and formation of *B* from *A* is by  $\text{S}_\text{N}$  reaction.

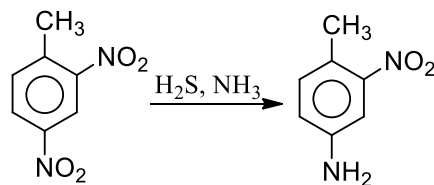
293 (c)



This reaction is known as carbylamine reaction

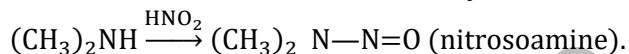
294 (b)

By using  $\text{H}_2\text{S}$ ,  $\text{NH}_3$  as reagent, selective reduction takes place



296 (b)

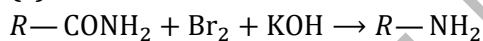
A characteristic reaction of secondary amines.



299 (c)

EDTA is ethylenediamine-tetra acetic acid.

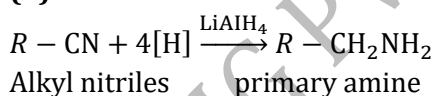
300 (c)



301 (b)

$\text{C}_3\text{H}_8\text{O}$  is alcohol and  $\text{C}_3\text{H}_6\text{O}_2$  is acid. Thus,  $\text{C}_3\text{H}_9\text{N}$  is

302 (b)



303 (c)

General formula for any amine is  $\text{C}_n\text{H}_{2n+3}\text{N}$ ; also note that for primary amine, it is  $\text{C}_n\text{H}_{2n+1}\text{NH}_2$ ; for secondary amine, it is  $\text{C}_n\text{H}_{2n+2}\text{NH}$  and for tertiary amine, it is  $\text{C}_n\text{H}_{2n+3}\text{N}$ .

304 (b)

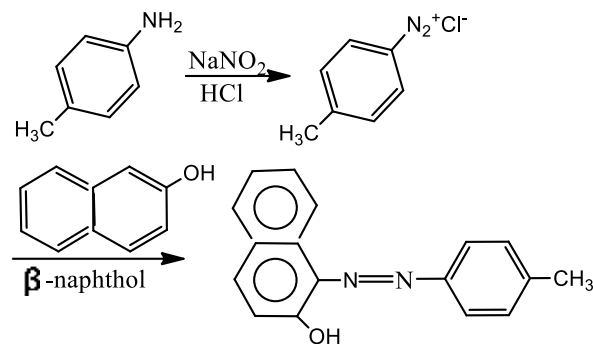
Biuret test is given by compounds having  $-\text{CONH}_2$  gp.

305 (b)

$\text{CH}_3\text{CH}_2 - \text{O} - \text{N} = \text{O}$  is a nitrite derivative, hence, it is not a nitro derivative

309 (c)

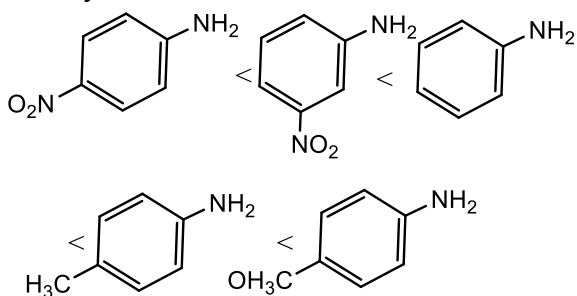
As we know, benzenediazonium salt forms brilliant coloured dye with  $\beta$ -naphthol, the compound under consideration must be *p*-toluidine (c) as it is a primary aromatic amine. Primary aromatic amine, on treatment with  $\text{NaNO}_2$  in dil.  $\text{HCl}$  forms the corresponding diazonium chloride salt.



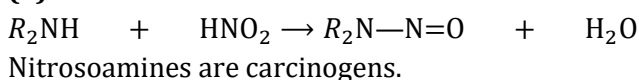
310 (a)

$-\text{OCH}_3$  is strongest electron releasing group (+*M* effect) which opposes most the dispersion of lone pair of electron of nitrogen into the ring. Thus,  $-\text{OCH}_3$  being at *para* position imparts

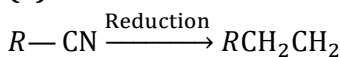
highest basicity.  $\text{NO}_2$  being at *meta* position stabilises the electron pair of nitrogen only by  $-I$  effect. While  $\text{NO}_2$  being present at *para* position due to  $-M$  effect and  $-I$  effect stabilizes the lone pair of electron of nitrogen, most and impart least basicity.



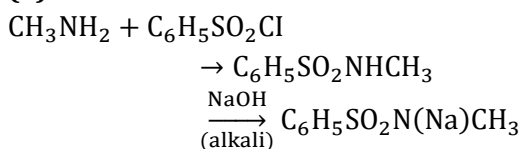
317 (a)



318 (a)



319 (a)

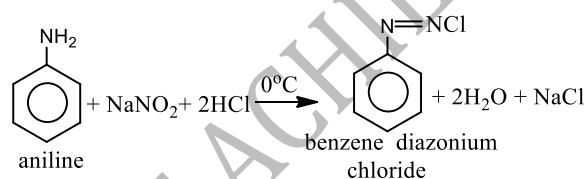


1° amine    Hinsberg's    N-methyl benzene  
soluble sodium salt

Reagent    sulphonamide

320 (b)

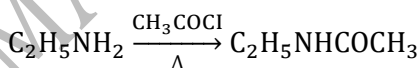
It gives diazonium salt.



It is known as diazotization reaction.

321 (a)

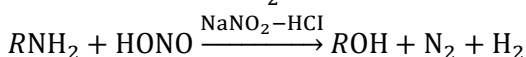
Ethyl amine, on acetylation, gives N-ethyl acetamide.



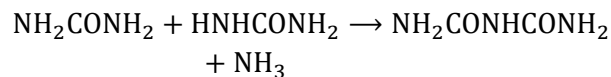
N-ethyl acetamide

322 (b)

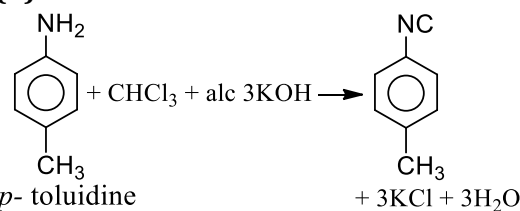
1° aliphatic amines on reduction with  $\text{HNO}_2$  form alcohol and evolve  $\text{N}_2$ .



323 (b)



324 (d)



it is an example of carbylamine's reaction

325 (b)



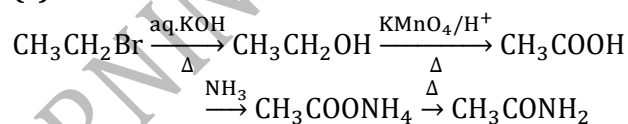
326 (b)

Due to +ve *IE* in alkylamines and resonance in  $\text{C}_6\text{H}_5\text{NH}_2$ .

327 (a)

Due to +ve *IE* in alkylamines and resonance in  $\text{C}_6\text{H}_5\text{NH}_2$ .

328 (c)



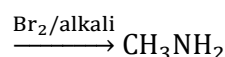
10.

Acetic acid

acetamide

(B)

(C)

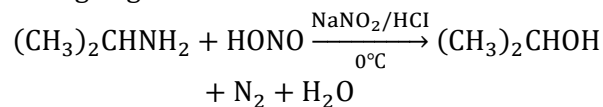


Methyl amine

(D)

329 (a)

Aliphatic primary amines on treatment with  $\text{NaNO}_2/\text{HCl}$  gives alcohols with evolution of nitrogen gas.



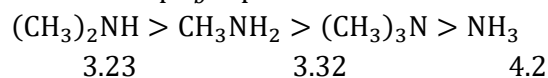
330 (b)



11. (B) (C)

331 (d)

The abnormal trend of 3° amines is explained in terms of steric effect. Note basic order of amines on the basis of  $\text{p}K_b$  reported in Finar



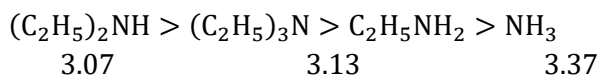
3.23

3.32

4.2

4.73

$\text{p}K_b$



4.73

 $pK_b$ 

332 (d)

The mixture of  $\text{SnCl}_2 + \text{HCl}$ , reduces,  $-\text{CN}$  group partially

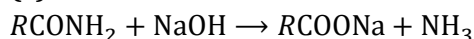
333 (c)

The aqueous solution of urea is neutral in nature but urea behaves as a weak monoacid-base and forms salts with strong acids, e.g.,  
 $\text{NH}_2\text{CONH}_2 + \text{HNO}_3 \rightarrow \text{NH}_2\text{CONH}_2 \cdot \text{HNO}_3$   
 Urea nitrate

334 (b)

The conversion of  $-\text{CN}$  to  $-\text{CH}_2\text{NH}_2$  by catalytic reduction is called Mendius reaction.

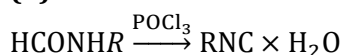
335 (c)



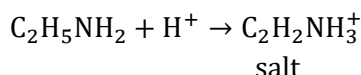
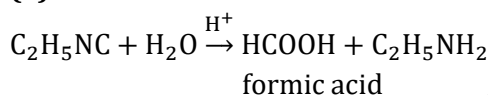
336 (b)

Due to +ve *IE* of alkyl gp., N-atom of amines acquires partial -ve charge and thus, electron pair is easily donated.

340 (b)

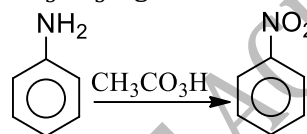


341 (a)



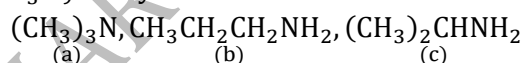
342 (b)

Aniline on oxidation with per acetic acid,  $\text{CH}_3\text{CO}_3\text{H}$  gives nitrobenzene



343 (d)

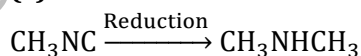
$\text{C}_3\text{H}_9\text{N}$  may have the structures as:



344 (b)

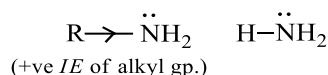
Amines possess fishy smell.

345 (c)



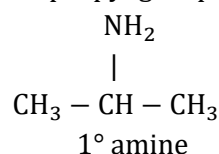
346 (c)

$\text{C}_2\text{H}_5\text{NH}_2$  is stronger base than  $\text{NH}_3$ . The presence of alkyl group on N-atom intensifies -ve charge on N-atom and thus, electron pair is donated more readily.



347 (d)

Isopropyl amine is a primary amine because one hydrogen atom of ammonia is replaced by isopropyl group.

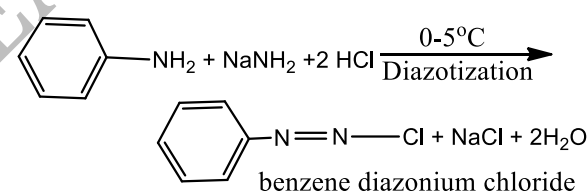


349 (d)

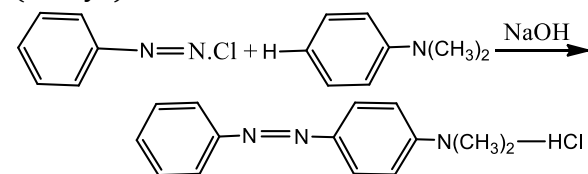
$(\text{C}_2\text{H}_5)_2\ddot{\text{N}}\text{H}$  ( $2^\circ$  amine) is strongest base. Basic nature of amines due to presence of lone pair of electron on nitrogen atom which is available for the bond formation with Lewis acid. Due to the +*I* effect  $2^\circ$  amine is better base than  $1^\circ$  amine and  $\text{NH}_3$ . In case of aromatic amines the lone pair on nitrogen atom involved in resonance, therefore, not available for bond formation, so aromatic amines are less basic.

350 (c)

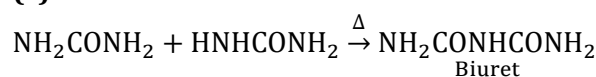
Aniline on diazotization in cold (at  $0^\circ$  to  $5^\circ\text{C}$ ) gives benzene diazonium chloride.



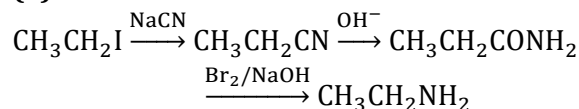
This benzene diazonium chloride on coupling reaction with dimethyl aniline gives a coloured product *i.e.*, *p*-(*N,N* dimethyl)amino azobenzene (azodye)



352 (c)

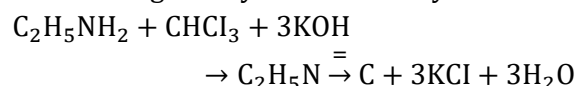


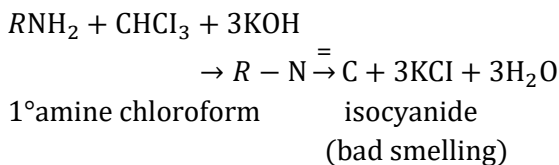
354 (a)



355 (b)

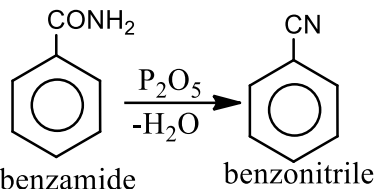
This is carbylamine reaction which is used to distinguish  $1^\circ$  amines from other amines. The reaction is given by  $1^\circ$  amines only.





356 (d)

With  $\text{P}_2\text{O}_5$  benzamide loses a water molecule and gives benzonitrile.

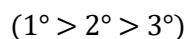


Here,  $\text{P}_2\text{O}_5$  is a dehydrating agent.

357 (a)

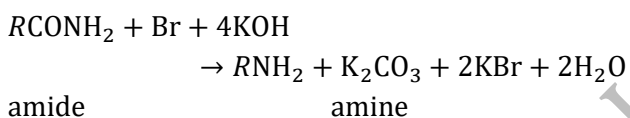
The order of boiling points of the isomeric amines is as follows :

Primary amines > secondary amines > tertiary amines

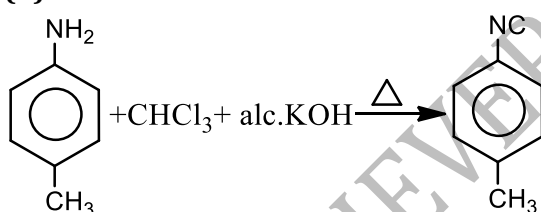


358 (c)

Hofmann's bromamide reaction is used to convert amide to amine.



361 (d)



363 (d)

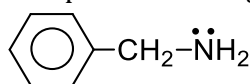
Nitrobenzene is insoluble in water but soluble in benzene alcohol etc.

364 (c)

$\text{R}-\text{NH}_2 + \text{HNO}_2 \rightarrow \text{ROH} + \text{N}_2 + \text{H}_2\text{O}$ ; But note that  $\text{CH}_3\text{NH}_2$  gives  $\text{CH}_3\text{ONO}$  or  $\text{CH}_3\text{OCH}_3$  on treating with  $\text{HNO}_2$ .

365 (d)

Benzyl amine is the strongest base among the given compounds because lone of  $\ddot{\text{N}}$  are not taking part in conjugation whereas in other compounds lone pairs are taking part in conjugation

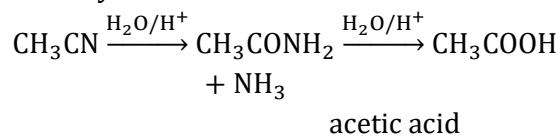


366 (d)

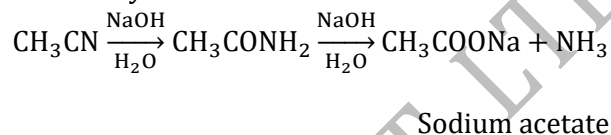
Carbylamine reaction is given by aliphatic and aromatic primary amine.

$\text{CH}_3\text{CN}$  does not give carbylamine reaction with chloroform because it is not an amine.

$\text{CH}_3\text{CN}$  undergoes acidic hydrolysis to give carboxylic acid.



$\text{CH}_3\text{CN}$  undergoes alkaline hydrolysis to give salt of carboxylic acids.



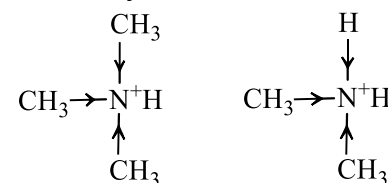
$\text{CH}_3\text{CN}$  tautomerises to give methyl isocyanide.



367 (a)

In vapour phase the basic character of methylamines is  $3^\circ > 2^\circ > 1^\circ > \text{NH}_3$ .

This is due to less acidic character in conjugate acid of amines because of +ve *IE* of methyl group which disperses +ve charge on N-atom more effectively in  $3^\circ$  ion.

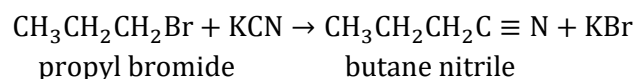


+ve charge on N is more dispersed and thus, more stable.

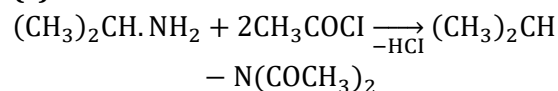
In case of solution phase steric hindrance or solvation effect play role to give the basic order  $2^\circ > 1^\circ > 3^\circ > \text{NH}_3$ .

368 (a)

When propyl bromide is reacted with KCN, butanenitrile is formed.



369 (c)



*iso*-propyl amine (*ter*-amine) (*pri* amine)

370 (a)

Hofmann bromamide degradation takes place with complete retention of stereochemical configuration in the migrating alkyl group

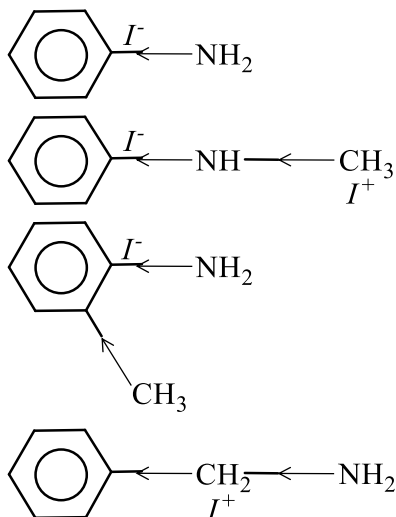
371 (a)

Electrons donors are bases. Greater the stabilisation of cation formed by loss of electron more will be basicity of amine.

2° amine is more basic than 3° amine because 2° amine is stabilized by hydrogen bonding with solvent molecule.

372 (d)

CH<sub>3</sub> – (an electron releasing (+I) group) increases electron density at N-atom hence, basic nature is increased.



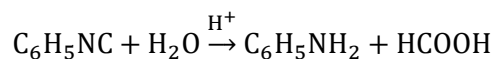
C<sub>6</sub>H<sub>5</sub> decreases electron density at N-atom thus basic nature is decreased. (Lone-pair on N in aniline compounds is delocalised along with π-electrons in benzene).

Thus, (d) is the strongest base.

374 (d)

Isocyanide on hydrolysis forms primary amine

not ammonia.



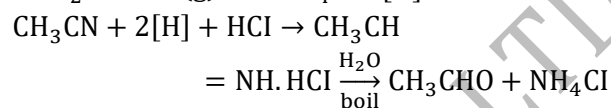
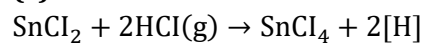
375 (b)

Less substituted alkene is the main product

376 (a)



377 (c)

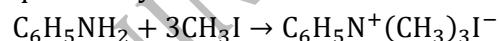


(X) (Y)

(X) is acetaldimine hydrochloride and (Y) is acetaldehyde.

378 (c)

Amines react with alkyl halide (excess) to give quaternary ammonium salt.



# AMINES

## CHEMISTRY

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### Assertion - Reasoning Type

This section contain(s) 0 questions numbered 1 to 0. Each question contains STATEMENT 1 (Assertion) and STATEMENT 2 (Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

- a) Statement 1 is True, Statement 2 is True; Statement 2 **is** correct explanation for Statement 1
- b) Statement 1 is True, Statement 2 is True; Statement 2 **is not** correct explanation for Statement 1
- c) Statement 1 is True, Statement 2 is False
- d) Statement 1 is False, Statement 2 is True

1

**Statement 1:** Hofmann degradation and Curtius degradation methods are used to prepare 1° amines

**Statement 2:** Both involve intermolecular alkyl shift

2

**Statement 1:** Stable diazonium salt is formed when primary amines react with nitrous acid

**Statement 2:**  $\text{Cl}^-$  is the leaving group

3

**Statement 1:** In strongly acidic solutions, aniline becomes more reactive towards electrophilic reagents

**Statement 2:** The amino group being completely protonated in strongly acidic solution, the lone pair of electrons on the nitrogen is no longer available for resonance

4

**Statement 1:** Tertiary amine is less basic than secondary amine in aqueous solution

**Statement 2:** Overcrowding due to  $I^+$  effect of three alkyl groups increases strain

5

**Statement 1:** Carbylamine reaction involves chemical reaction between 1° amine and chloroform in basic medium

**Statement 2:** In carbylamine reaction,  $-\text{NH}_2$  group changes into  $-\text{NC}$  group

# AMINES

## CHEMISTRY

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### : ANSWER KEY :

- |    |   |    |   |    |   |    |   |
|----|---|----|---|----|---|----|---|
| 1) | a | 2) | d | 3) | d | 4) | a |
| 5) | a |    |   |    |   |    |   |

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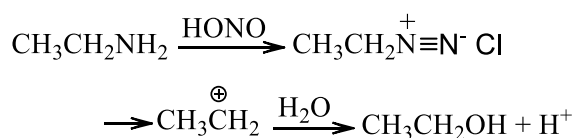
# AMINES

## CHEMISTRY

### : HINTS AND SOLUTIONS :

1 **(a)**  
Hofmann bromamide degradation and Curtius degradation both involve the intramolecular alkyl shift and, thus result in the formation of 1° amines

2 **(d)**  
When primary amines (aliphatic) react with  $\text{HNO}_2$ , unstable diazonium salt is obtained which readily dissociate to give a carbocation,  $\text{N}_2$  and  $\text{Cl}^-$  (the leaving group). The carbocation upon hydrolysis gives alcohol

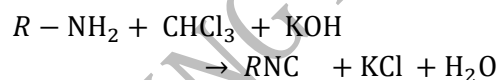


3 **(d)**  
Since aniline gets protonated in strongly acidic medium, the lone pair of electrons are not available to produce mesomeric or electrometric effect. Thus, aniline becomes less reactive

4 **(a)**  
Alkyl group is +I showing group. In general, it increases the electron density over nitrogen, thus increase the availability of lone pair for donation. But in case of tertiary amines, in aqueous solution, the over crowing of three bulkier alkyl group result in increased strain, which decreases the availability of lone pairs for donation and thus

result in decreased basicity. Hence, in aqueous solution, 3° amines are less basic as compared to 2° amine

5 **(a)**  
When primary amine is treated with chloroform and alkali, a very bad smelling compound, called isocyanide or carbylamine is obtained. On the basis of the name of the product, the reaction is called carbylamines reaction



1° amine    chloroform    alkali    isocyanide  
or carbylamine

# AMINES

## CHEMISTRY

### Matrix-Match Type

This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

1. Match the following

Column-I	Column-II
(A) $(\text{CH}_3)_3\text{C} - \text{OH} + \text{HCN} \xrightarrow{\text{H}^+} (\text{CH}_3)_3\text{C} - \text{NH}_2$	(1) Grignard
(B) $\text{CH}_3\text{CONH}_2 + \text{Br}_2 + \text{KOH} \rightarrow \text{RNH}_2$	(2) Mendius
(C) $\text{CH}_3\text{CN} + 4\text{H} \xrightarrow[\text{alc.}]{\text{Na}} \text{CH}_3\text{CH}_2\text{NH}_2$	(3) Hofmann bromamide
(D) $\text{CH}_3\text{MgBr} + \text{ClNH}_2 \rightarrow \text{CH}_3\text{NH}_2$	(4) Ritter

**CODES :**

	A	B	C	D
a)	1	2	3	4
b)	4	3	2	1
c)	2	3	4	1
d)	4	2	3	1

2. Aromatic diazonium group can be replaced by various groups/atoms. In this context, match list I with list II and select the correct answer using the codes given below the lists

Column-I	Column-II
(A) $\text{H}_3\text{PO}_2$	(1) Hydrogen
(B) Sandmeyer reaction	(2) Hydroxyl group
(C) Boiling with water	(3) Aryl group
(D) Gomberg reaction	(4) Chlorine

**CODES :**

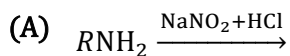
	A	B	C	D
a)	4	3	2	1
b)	1	4	2	3
c)	1	2	3	4

d) 2 3 4 1

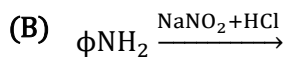
3.

Column-I

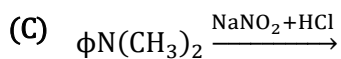
Column-II



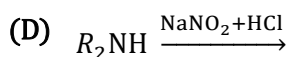
(1)  $R_2NNO$

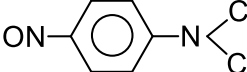


(2)  $ROH + N_2$



(3)  $\phi NNCl$



(4) 

CODES :

	A	B	C	D
a)	2	3	4	1
b)	1	3	4	2
c)	2	4	3	1
d)	1	2	3	4

4. Match the following

Column-I

Column-II

(A) Aniline

(1) Sulpha drug

(B) TNT

(2) Solvent in Friedel-Craft

(C) Sulphanilamide

(3) Explosive

(D) Nitrobenzene

(4) Used in azo dyes

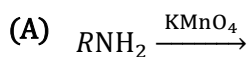
CODES :

	A	B	C	D
a)	1	2	3	4
b)	4	3	2	1
c)	2	3	4	1
d)	4	3	1	2

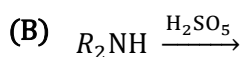
5. Match the list

Column-I

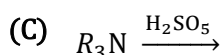
Column-II



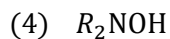
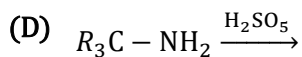
(1)  $R_3N \rightarrow O$



(2)  $R_3CNO_2$



(3)  $R_3CNO$



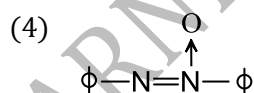
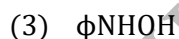
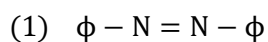
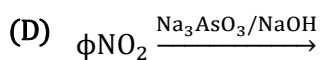
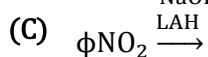
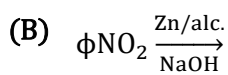
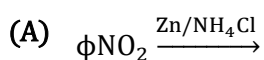
CODES:

	A	B	C	D
a)	3	1	4	2
b)	2	3	4	1
c)	3	2	1	4
d)	1	2	3	4

6.

Column-I

Column-II



CODES:

	A	B	C	D
a)	1	2	3	4
b)	2	3	1	4
c)	2	3	1	4
d)	2	4	3	1

# AMINES

## CHEMISTRY

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### : ANSWER KEY :

- 1) b    2) b    3) a    4) d  
5) a    6) c
- 

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