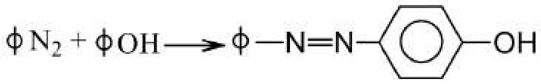
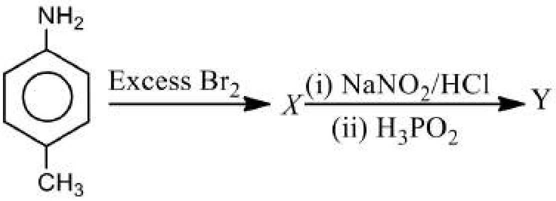
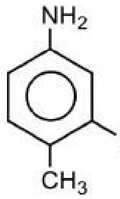
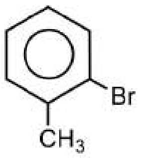
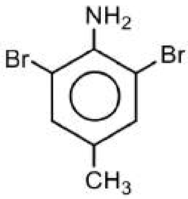
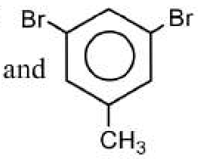
AMINES

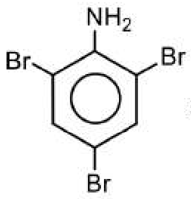
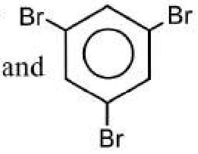
1. Acetonitrile on reduction gives
   a) Propanamine b) Methanamine c) Ethanamine d) None of these
2. Hofmann's rearrangement during the conversion of an amide to amine involves……… rearrangemet.
   a) Intermolecular b) Intramolecular. c) Both (a) and (b) d) None of these
3. The reduction of which of the following compound would yield secondary amine?
   a) Alkyl nitrile b) Carbylamine
   c) Primary amine d) Secondary nitro compound
4. Which of the test is used for detection of secondary amines ?
   a) Liebermann's nitroso test b) Lucas test
   c) Tollen's test d) Carbylamine reaction
5. From the following compounds which does not react with $C_6H_5SO_2Cl$?
   a) $C_2H_5.NH_2$ b) $CH_3.NH_2$
   c) $(CH_3)_2NH$ d) $(C_2H_5)_3N$
6. Which of the following statements is not correct?
   a) Alkyl isocyasnides have bad odours while alkyl cyanides have pleasant odours
   b) Alkyl cyanides are not as poisonous as KCN
   c) Alkyl cyanides have lower boiling points than the corresponding alkyl isocyanides
   d) Acetonitrile is soluble in water but methylcarbylamine is not
7. Which of the following reaction will not occur?
   a) $\phi N_2^+ + CuBr \xrightarrow{HBr} \phi - Br$
   b) 
   c) $\phi N_2^+ \xrightarrow[HOH]{H_3PO_2} \phi H$
   d) $\phi N_2^+ + I^- \rightarrow \phi - I$
8. Which of the following is not characteristic of amines?
   a) They smell like ammonia
   b) They are inflammable in air
   c) They show the property of hydrogen bonding
   d) They are amphoteric in nature
9. In the following reaction sequence predict the compound *X* and *Y*.

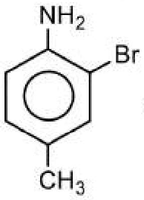
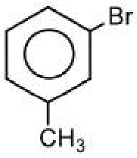


The compound *X* and *Y* are

a)  and 

b)  and 

c)  and 

d)  and 

10. The type of isomerism shown by C_6H_5CN and C_6H_5NC is:
a) Position
b) Functional
c) Enantiomerism
d) Tautomerism

11. Identify *A* and *B* in the reaction given below.

$$\text{Ethane nitrile} \xrightarrow[\substack{aq.H_2SO_4 \\ +2H_2O \\ -NH_3}]{\text{Hydrolysis}} A \xrightarrow[\substack{\text{Sodalime} \\ \Delta \\ -CO_2}]{\text{Decarboxylation}} B$$

a) Acetic acid, methanol
b) Acetone, methane
c) Ethanoic acid, ethane
d) Ethanoic acid, methane

12. When ethanol is mixed with ammonia and passed over catalyst, the compound formed is:
a) $C_2H_5NH_2$
b) C_2H_4
c) $C_2H_5OC_2H_5$
d) CH_3OCH_3

13. Which of the following is strongest base?
a) $C_6H_5NH_2$
b) $p-NO_2-C_6H_4NH_2$
c) $m-NO_2-C_6H_4NH_2$
d) $C_6H_5CH_2CH_2$

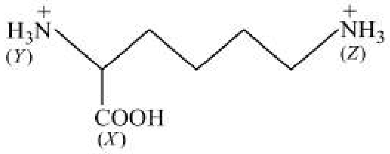
14. In the reaction

$$R-C\equiv N+4(H)\xrightarrow{X}RCH_2NH_2$$

X can be
a) $LiAlH_4$
b) H_2SO_4
c) Ni
d) 2KBr

15. Increasing order of basicity of $CH_3CH_2CH_2NH_2$ $H_2C=CHCH_2NH_2$ and $HC\equiv CCH_2NH_2$ is
a) $CH_3CH_2CH_2NH_2 < HC\equiv CCH_2NH_2 < H_2C=CHCH_2NH_2$
b) $CH_3CH_2CH_2NH_2 < H_2C=CHCH_2NH_2 < CH\equiv CCH_2NH_2$
c) $HC\equiv CCH_2NH_2 < H_2C=CHCH_2NH_2 < CH_3CH_2CH_2NH_2$
d) $CH\equiv CCH_2NH_2 < CH_3CH_2CH_2NH_2 < H_2C=CHCH_2NH_2$

16. In the compound given below,



the correct order of acidic nature of the positions (*X*), (*Y*) and (*Z*) is:
a) $Z>X>Y$
b) $X>Y>Z$
c) $X>Z>Y$
d) $Y>X>Z$

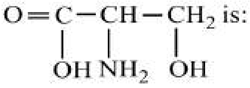
17. Which of the following is carbamide?
a) CH_3CONH_2
b) NH_2CONH_2
c) $CH_2(NH_2)CONH_2$
d) $CO(OH)NH_2$

18. Aniline is not the major product in one of the following reactions. Identify that reaction.
a) $C_6H_5OH+NH_3\xrightarrow[300^\circ C]{ZnCl_2}$
b) $C_6H_5NO_2+\text{Zn powder}\xrightarrow{\text{Alcoholic KOH}}$
c) $C_6H_5Ci+NH_3\xrightarrow[Cu_2O]{200^\circ C}$ High pressure
d) $C_6H_5NO_2+6(H)\xrightarrow[HCl]{Fe+H_2O}$

19. An organic compound '*A*' having molecular formula C_2H_3N on reduction gave another compound *B*, upon treatment with nitrous acid '*B*' gave ethyl alcohol. On warming with chloroform and alcoholic KOH, it formed an offensive smelling compound '*C*'. The compound '*C*' is

a) $CH_3CH_2NH_2$ b) $CH_3CH_2N \equiv C$ c) $CH_3C \equiv N$ d) $CH_3CH_2.OH$

20. The IUPAC name of the compound having formula,



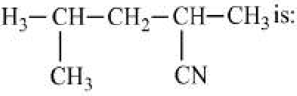
$O=\underset{OH}{C}-\underset{NH_2}{CH}-\underset{OH}{CH_2}$ is:

a) 3-aminohydroxy propionic acid
b) 2-amino-propan-3-oic acid
c) Amino hydroxy propanoic acid
d) 2-amino-3-hydroxy propanoic acid

21. Methyl amine reacts with methyl iodide. For completion of reaction, how many moles of methyl iodide are required ?

a) 1 b) 2 c) 3 d) 4

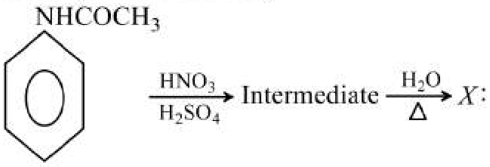
22. The IUPAC name of

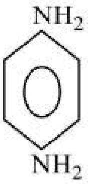


$CH_3-\underset{CH_3}{CH}-CH_2-\underset{CN}{CH}-CH_3$ is:

a) 2-cyano-3-methyl hexane
b) 2-dimethyl-4-cyanopentane
c) 2,4-dimethyl pentane nitrile
d) 2-cyano-3-methyl hexane

23. Identify *X* in the series,



a)


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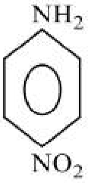

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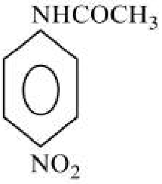

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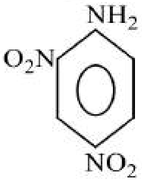


24. $C_2H_5NH_2 \xrightarrow{HNO_2} A \xrightarrow{PCl_3} B \xrightarrow{NH_3} C.$

Recognize the compound C from the following

a) Propanenitrile b) Methylamine c) Ethylamine d) Acetamide

25. Dichlorocarbene does not form as an intermediate in this reaction
a) phenol + $CHCl_3$ + 4KOH b) Ethyl amine +$CHCl_3$ + KOH
c) Phenol+CCl_4 + 4KOH d) $CHCl_3$ + KOH

26. Which of the following methods neither means for the synthesis nor for separation of amines?
a) Hinsberg's method b) Hofmann's method c) Wurtz reaction d) Curtius method

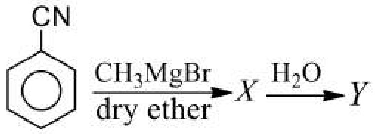
27. Reaction of aniline with benzaldehyde is
a) Substitution b) Addition c) Condensation d) Polymerisation

28. On heating benzyl amine with chloroform and ethanolic KOH, product obtained is
a) Benzyl alcohol b) Benzaldehyde c) Benzonitrile d) Benzyl isocyanide

29. Choose the amide which on reduction with $LiAlH_4$ yields a secondary amine
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

31.



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

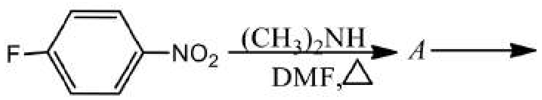
34. The reaction,
$$RCOOH \xrightarrow{NaN_3/conc.H_2SO_4} RNH_2 + N_2 + CO_2$$
is known as
a) Curtius reaction b) Lossen reaction c) Schmidt reaction d) Hofmann reaction

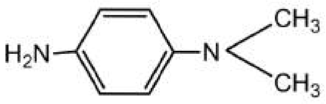
35. Which of the following compounds on treatment first with $NaNO_2$/HCl and then coupled with phenol produces *p*-hydroxyazobenzene ?
a) Nitrobenzene b) Azobenzene c) Phenol d) Aniline

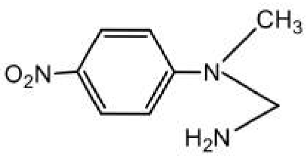
36. A compound which on reaction with aqueous nitrous acid gives an oily nitrosoamine is:
a) Methylamine b) Ethylamine c) Diethylamine d) Triethylamine

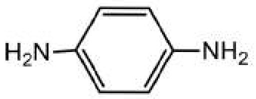
37. Benzene diazonium chloride on reaction with phenol in weakly basic medium gives
a) Diphenyl ether b) *p*-hydroxy azobenzene c) Chlorobenzene d) Benzene

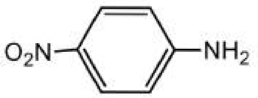
38.



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. $(CH_3)_3N \xrightarrow[\text{(ii)}H_2O,\Delta]{\text{(i)}BrCN} [X]$, 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 soluable 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

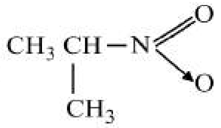
(A) $RCN \xrightarrow{\text{Reduction}}$ (B) $RCN \xrightarrow[\text{(II)}H_2O]{\text{(I)}CH_3MgBr}$

(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?

a) $C_6H_5NO_2$ b) CH_3CH_2ONO c)



d) $C_6H_4(OH)NO_2$

59. $CHCl_3 + C_6H_5NH_2 + 3NaOH \rightarrow A + 3B + 3C$

In the above reaction, the product '*A*' is

a) Chlorobenzene b) Phenyl isocyanide c) Phenyl cyanide d) Phenyl chloride

60. Carbonyl chloride reacts with ammonia to form:

a) CO_2 b) NH_2CONH_2 c) CH_3COONH_4 d) CH_3CONH_2

61. Which of the following statements are correct?

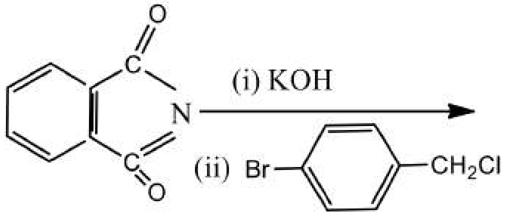
a) Aniline is a stronger base ethyl amine

b) Aniline is a stronger base than *p*-methoxyaniline

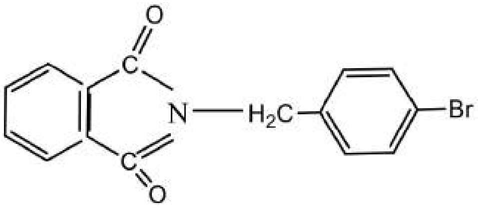
c) Aniline must be acetylated before nitration with an acid mixture

d) Aniline is soluble in an ammonium hydroxide solution

62. The major product of the following reaction is



a)



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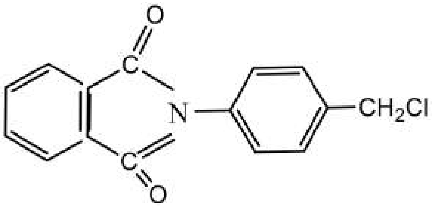

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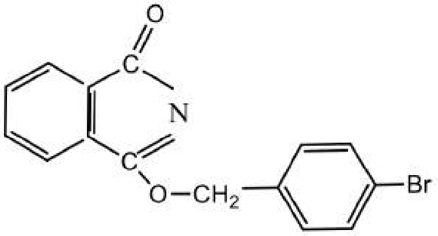

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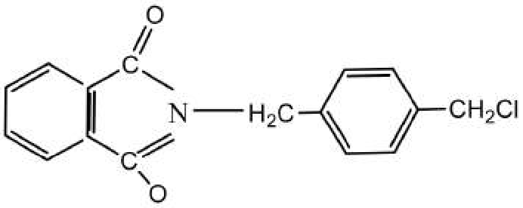


63. Diazotisation can be carried out by the action of $NaNO_2$ and dilute HCl at ice cold temperature on:

a) Aromatic secondary amine

b) Aromatic primary amine

c) Aromatic nitro compound

d) Aromatic amine

64. The molecular formula of benzonitrile is

a) C_6H_5CN b) C_6H_5NC c) C_6H_5CNO d) C_6H_5NCO

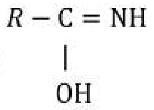
65. Which of the following reactions is given by only primary amines?

a) Reaction with HONO b) Reaction with chloroform and alcoholic KOH

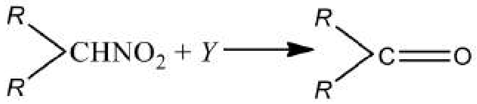
c) Reaction with acetyl chloride
d) Reaction with Grignard reagent

66. The diamide of carbonic acid is:
a) Acetamide
b) Formamide
c) Benzamide
d) Urea

67. Urea reacts with hydrazine to form:
a) Nitrogen
b) Phenyl hydrazine
c) Semicarbazide
d) Urethane

68. Final product of hydrolysed alkyl cyanide is
a) $RCOOH$
b) $RCONH_2$
c) 
$R-C(OH)=NH$
d) $R-C\equiv\overset{\oplus}{N}H$

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



a) Aqueous HCl
b) Aqueous NaOH
c) $KMnO_4$
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 $KMnO_4$ 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) $(CH_3CH_2)_2NH$
b) $(CH_3)_2NH$
c) $C_6H_5NH_2$
d) $(CH_3)_3N$

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 carbylamines 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) CH_3NH_2
b) $(CH_3)_2NH$
c) $(CH_3)_3N$
d) None of these

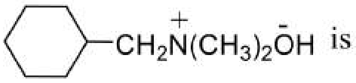
79. Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound of water during the reaction is continuously removed. The compound formed is generally known as
a) An amine
b) An imine
c) An enamine
d) A Schiff's base

80. Benzene diazonium chloride on treatment with hypo phosphorous acid and water in presence of Cu^+ catalyst produce
a) Benzene
b) Toluene
c) Aniline
d) Chlorobenzene

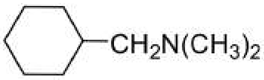
81. Which one of the following does not have sp^2 hybridised carbon?

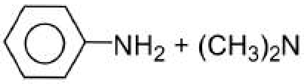
a) Acetone b) Acetic acid c) Acetonitrile d) Acetamide

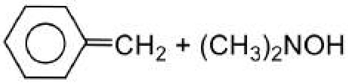
82. The product of Hofmann elimination of

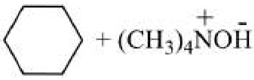


is

a) 

b) 

c) 

d) 

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

a) Benzene $\xrightarrow{Br_2/FeBr_3/heat}$

Nitrobenzene

b) Aniline $\xrightarrow{Br_2,H_2O}[\ ]\xrightarrow[2.CuBr]{1.HONO}$

Bromobenzene

c) $\xrightarrow[H_2SO_4,\Delta]{\text{Fuming } HNO_3}[\ ]\xrightarrow[C_2H_5OH,heat]{Fe/HCl}[\ ]\xrightarrow[2.CuBr]{1.HONO}$

d) $\xrightarrow[H_2SO_4]{HNO_3}[\ ]\xrightarrow[C_2H_5OH,heat]{Fe/HCl}[\ ]\xrightarrow[2.CuBr]{1.HONO}$

84. Aniline is reacted with Br_2 water and the resulting product is treated with an aqueous solution of sodium nitrite in the presence of diluteHCl. 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- tribromofluoro benzene

d) 1, 3, 5- tribromobenzene

85. Which of the following statements is correct?

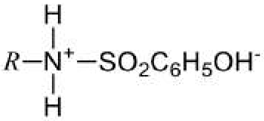
a) Aniline is stronger base than ammonia

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. RNH_2 reacts with $C_6H_5SO_2Cl$ in aqueous KOH to give a clear solution. On acidification a precipitate is obtained which is due to the formation of

a) 

$R-\overset{H}{\underset{H}{N^+}}-SO_2C_6H_5OH^-$

b) $R-N^-SO_2C_6H_5K^+$

c) $C_6H_5SO_2NH_2$

d) $R-NH-SO_2-C_6H_5$

87. When $NaNO_2$ and dilute HCl were added to an amine at 0°C, a colourless gas was evoloved and an ionic compound is formed. The amine is:

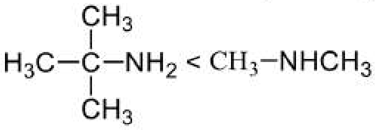
a) An primary amine

b) An aromatic primary amine

c) Any amine

d) None of the above

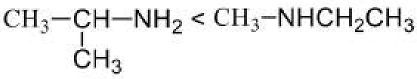
88. Choose the incorrect comparision(s)

a) 

$H_3C-\overset{CH_3}{\underset{CH_3}{C}}-NH_2 < CH_3-NHCH_3$

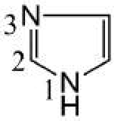
(basicity in aqueous medium)

b) $CH_3CH_2CH_2NH_2 > (CH_3)_3N$
(basicity in aqueous medium)

c) 

$CH_3-\underset{CH_3}{CH}-NH_2 < CH_3-NHCH_2CH_3$

(basicity in the gaseous state)

d) 

N(1) >N(3) (basicity in aqueous medium)

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

a) RNH_2 b) R_2NH c) R_3N 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 $(A) C_6H_5NH_2, (B) CH_3NH_2, (C)$ $(CH_3)_2NH, (D) (CH_3)_3N$, 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 $-OCH_3$ and $-CH_3$ increases the basic strength of amines
c) The presence of groups like $-NO_2, -CN$ 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) CH_3NH_2 b) $CH_3CH_2NH_2$ c) $CH_3CH_2NHCH_2CH_3$ d) $(CH_3CH_2)_3N$

94. RMgX on reacting with cyanogen chloride gives:
a) R—NC b) R—Cl c) R—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

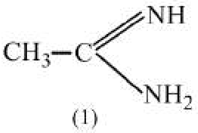
97. Urea when heated a white residue is formed. Its alkaline solution when treated with few drops of $CuSO_4$ solution gives:
a) Red colour b) Violet colour c) Green colour d) Yellow colour

98. Which one of the following is most basic?
a) FCH_2NH_2 b) $FCH_2CH_2NH_2$ c) $C_6H_5NH_2$ d) $C_6H_5CH_2NH_2$

99. The basicity of compounds I, II, III and IV
$\underset{\text{I}}{CH_3NH_2}, \underset{\text{II}}{(CH_3)_2NH}, \underset{\text{III}}{(CH_3)_3N}, \underset{\text{IV}}{C_6H_5CH_2NH_2}$
varies in the order
a) I > II > III > IV b) II > I > III > IV c) III > I > II > IV d) IV > I > II > III

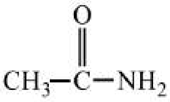
100. A gaseous carbon compound is soluable in dilute HCl. The solution on treating with $NaNO_2$ gives off nitrogen leaving behind a solution which smells of wood spirit. The carbon compound is
a) HCHO b) CO c) $C_2H_5NH_2$ d) CH_3NH_2

101. The correct order of basic nature of the following compounds is:


(1)

$CH_3CH_2NH_2$
(2)

$(CH_3)_2NH$
(3)


$CH_3-\overset{\overset{\large O}{\|}}{C}-NH_2$
(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) It terms of Lewis and Lowry Bronsted concept
d) Only in Lewis concept

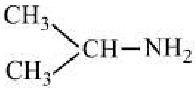
103. Gas evolved during the reaction of sodium metal on ethyl amine is:

a) N_2 b) C_2H_2 c) H_2 d) CO_2

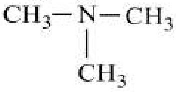
104. When methyl cyanide is hydrolysed in presence of alkali, the product is:

a) Acetamide b) Methane c) $CO_2 + H_2O$ d) Acetic acid

105. An organic compound (C_3H_9N) (*A*), when treated with nitrous acid, gave an alcohol and N_2 gas was evolved. (*A*) on warming with $CHCl_3$ and caustic potash gave (*C*) which on reduction gave isopropylmethylamine. Predict the structure of (*A*).

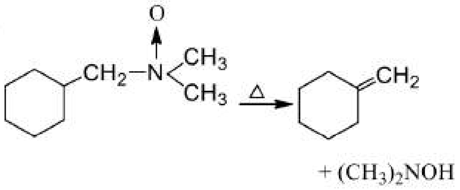
a) 
$(CH_3)_2CH-NH_2$

b) $CH_3CH_2-NH-CH_3$

c) 
$CH_3-N(CH_3)-CH_3$

d) $CH_3CH_2CH_2-NH_2$

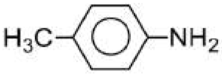
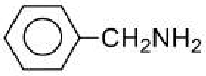
106.



This reaction is called

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

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

 and 

a) $C_6H_5SO_2Cl$ and OH^- in H_2O b) HONO, then β-naphthol
c) Dilute HCl d) $AgNO_3$ in H_2O

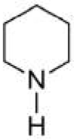
108. Alkanamide , which on Hofmann's reaction gives 1-phenylethylamine, is:

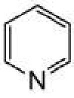
a) 2-phenylpropanamide
b) 3-phenylpropanamide
c) 2-phenylethanamide
d) *N*-phenylethanamide

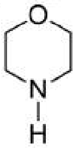
109. Reduction of nitrobenzene in the presence of Zn/NH_4Cl gives

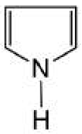
a) Azobenzene b) Hydrazobenzene
c) N-phenyl hydroxylamine d) Aniline

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


(I)


(II)


(III)


(IV)

a) IV>I>III>II b) III>I>IV>II c) II>I>III>IV d) I>III>II>IV

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

a) $CH_3CH_2I + NaCN \xrightarrow{C_2H_5OH/H_2O}$ b) $CH_3CH_2I + KCN \xrightarrow[\Delta]{\text{Alcohol}}$

c) $CH_3CH_2NH_2 + CHCL_3 + KOH \xrightarrow[\Delta]{\text{Alcohol}}$ d) None of the above

112. An amine reacts with $C_6H_5SO_2Cl$ and the product is soluble in alkali, amine is:
a) 1° b) 2° c) 3° d) All of these

113. Carbylamine reaction tubes are not thrown into sink, to avoid bad odour, but are treated with conc. HCl to give:
a) $RCOOH + NH_3$ b) RNH_2 c) $RNH_2 + HCOOH$ d) $RCOOH + N_2$

114. The product obtained when methylamine is treated with nitrous acid is:
a) CH_3OH b) $CH_3—ONO$ c) CH_3OCH_3 d) Both (b) and (c)

115. Correct order of basic nature of $CH_3NH_2(A)$, $CH_3CN(B)$ and $CH_3N = CHCH_3(C)$ 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) $C_6H_5NO_2 + Zn/KOH$ b) $C_6H_5NO_2 + Zn/NH_4Cl$
c) $C_6H_5NO_2 + LiAlH_4$ d) $C_6H_5NO_2 + Zn/HCl$

117. The name urea given by:
a) Wöhler b) Berzelius c) Roulle d) Lemery

118. Which of the following enzymes can hydrolyse urea into CO_2 and NH_3?
a) Amylase b) Urease c) Lipase d) Zymase

119. $A \xrightarrow{H_2NOH} B \xrightarrow{\text{Reduction}} C \xrightarrow{NOCl} CH_3CH_2Cl$
In the above sequence A and C are
a) Methanal, methyl amine b) Acetone, ethaneamine
c) Ethanal, diamethyl amine d) Acetaldehyde, ethyl amine

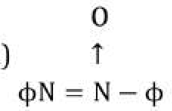
120. In alkyl cyanide alkyl group attached with
a) C of CN group b) N of CN group
c) Either C or N of CN group d) Both C and N of CN group

121. Amine oxide, when heated froms alkene. The reaction is known as
a) Curtius b) Cope elimination
c) Mannich reaction d) Hofmann elimination

122. p – amine and s – amine are distinguished by:
a) Br_2/KOH b) HClO c) HNO_2 d) NH_3

123. In which reaction, nitrene is not the intermediate?
a) Schmidt b) Curtius
c) Hofmann bromamide d) Gabriel's phthalimide

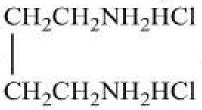
124. Urea reacts with HNO_3 to give:
a) Urea nitrite b) Urea nitrate c) H_2CO_3 d) None of these

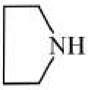
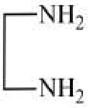
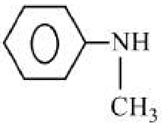
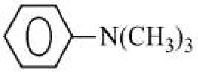
125. In reduction of nitrobenzene, which of the following is the intermediate?
a) ϕNO b) $\phi NHNH\phi$ c) $\phi N = N - \phi$ d) 
$\phi N \overset{\overset{O}{\uparrow}}{=} N - \phi$

126. Benzaldehyde reacts with methyl amine to give:
a) $C_6H_5NH_2$ b) $C_6H_5CH_2NH_2$ c) $C_6H_5CH= NCH_3$ d) $C_6H_5CONH_2$

127. The compound that will react most readily with NaOH to form methanol is
a) $(CH_3)_4N^+I^-$ b) CH_3OCH_3 c) $(CH_3)S^+I^-$ d) $(CH_3)_3CCl$

128. KCN reacts readily to give a cyanide
a) Ethyl alcohol b) Ethyl bromide c) Bromobenzene d) chlorobenzene

129. In the reaction,  $\xrightarrow{\Delta}$ Product:
$\begin{array}{l} CH_2CH_2NH_2HCl \\ | \\ CH_2CH_2NH_2HCl \end{array}$
The product is:

a) 
b) 
c) 
d) 

130. $C_6H_5NO_2 \xrightarrow{Sn/HCl} C_6H_5X$

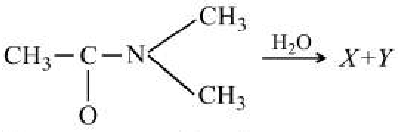
'X' is identified as

a) NO b) $-NH_2$ c) NHOH d) None of these

131. When methyl iodide is treated with ammonia, the product obtained is:

a) Methylamine b) Dimethylamine c) Trimethylamine d) All of these

132. X and y in the given reaction are:



a) $CH_3COOH + (CH_3)_2NH$

b) $CH_3CONH_2 + CH_3OH$

c) $CH_3CHO + (CH_3)_2NH$

d) $CH_3COCH_3 + CH_3NH_2$

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) C_6H_5COOH b) $C_6H_5N = NCl$

c) $C_6H_5 - CH = N - CH_3$ d) $C_6H_5NH_2$

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 $NaNO_2$ and dil. 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) NaOH b) CH_3COCl c) $NaNO_2 + HCl$ d) H_2SO_4

138. The compound obtained by heating a mixture of 1° amine and chloroform with ethanolic potassium hydroxide is

a) An alkyl isocyanide b) An alkyl isothiocyanate

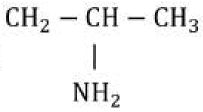
c) An amide d) An amide and nitro compound

139. $CH_3CONH_2 + NaOH \longrightarrow CH_3COONa + A$

Urea is obtained if product 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) CH_3NH_2 b) 
$\underset{NH_2}{\overset{CH_2 - CH - CH_3}{|}}$ c) $(CH_3)_2NH$ d) $(CH_3)_3C - NH_2$

141. Which one of the following compound when heated with KOH and primary amines gives carbylamine test?

a) $CHCl_3$ b) CH_3Cl c) CCl_4 d) CH_3NC

142. The hydrochlorides of amines form double salt with:

a) $PtCl_4$ b) $AuCl_3$ c) Both (a) and (b) d) None of these

143. In the following reactions, reactants A, B and C are:

$Cl_2H_5NH_2 + A \longrightarrow C_2H_5N = CH - C_6H_5 + H_2O$

Urea $+B \longrightarrow H_2N - NHCONH_2 + NH_3$

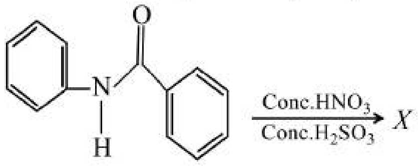
$CH_2H_5NH_2 + C \longrightarrow C_2H_5Cl + H_2O + N_2$

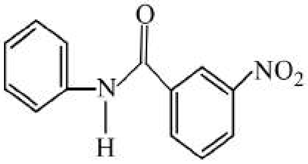
a) $CH_3CHO, NH_2 - NH_2$ and PCl_5 b) $C_6H_5CHO, NH_2 - NH_2$ and $SOCl_2$
c) $C_6H_5CHO, NH_2 - NH_2$ and $NOCl$ d) $CH_3CHO, NH_2 - NH_2$ and PCl_3

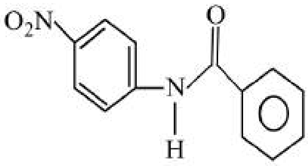
144. Nitroparaffins on reduction give:
a) Amides b) Alkylamines c) Ammonium salts d) Acetanilides

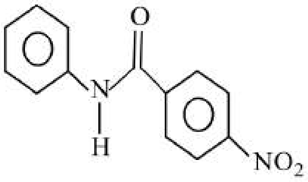
145. Aniline is prepared in presence of Fe/HCl from
a) Benzene b) Nitrobenzene c) Dinitrobenzene d) None of these

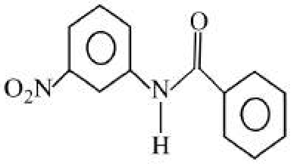
146. In the following reaction, the product X is:



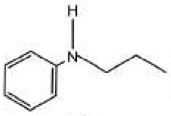
a)


b)


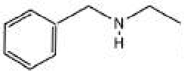
c)


d)


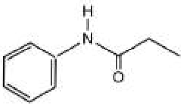
147. Which one of the following compound is most basic?



(A)



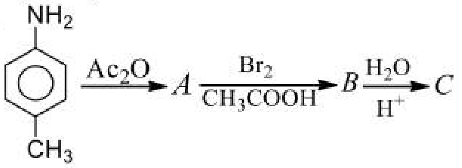
(B)



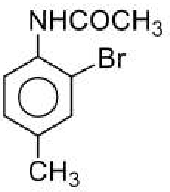
(C)

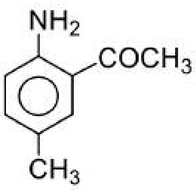
a) (A) b) (B) c) (C) d) All are equally basic

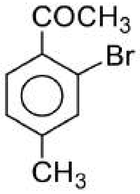
148. $C_6H_5NH_2 \xrightarrow[180°C]{H_2SO_4} H_2NC_6H_4(SO_3H)$
(para)
The true statement about the product is
a) It does not exist as Zwitter ion
b) $-NH_2$ displays a powerful basic character
c) It does not act as inner salt
d) $-SO_3$ dimminishes the basic character of $-NH_2$

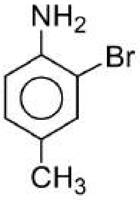
149.


The final product 'C' in the above reaction is

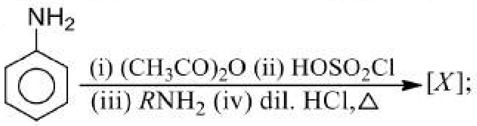
a) 

b) 

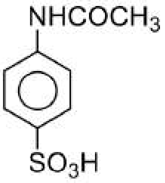
c) 

d) 

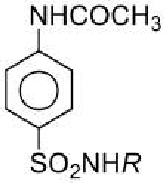
150. Which of the following compound reacts with chloroform and a base to form phenyl isocyanide?
a) Phenol b) Aniline c) Benzene d) Nitrobenzene

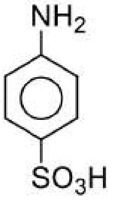
151. 

here X is

a) 

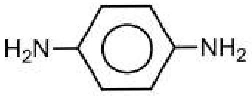
b) 

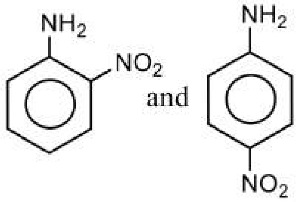
c) 

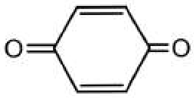
d) 

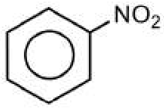
152. Amine is not formed in the reaction
(A) Hydrolysis of RCN
(B) Reduction of $RCH = NOH$
(C) Hydrolysis of RNC
(D) Hydrolysis of $RCONH_2$
The correct answer is
a) A, B, D b) A, D c) B, C d) A, B, C

153. Aniline reacts with conc. HNO_3 to give

a) 

b) 

c) 

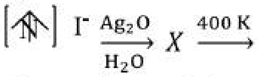
d) 

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 ?
a) $C_6H_5N_2^+Cl^- + Cu_2Cl_2 \rightarrow C_6H_5Cl$ b) $C_6H_5N_2^+Cl^- + HBF_4 \xrightarrow{\text{Heat}} C_6H_5F$
c) $C_6H_5N_2^+Cl^- + H_3PO_2 \rightarrow C_6H_5PO_4$ d) $C_6H_5N_2^+Cl^- + SnCl_2/HCl \rightarrow C_6H_5NHNH_2$

156. The geometry of ethylamine is:
a) Pyramidal b) Tetrahedral c) Triangular d) Square planar

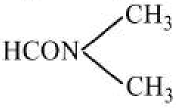
157. Consider the following reaction,
$C_6H_5NO_2 \xrightarrow{Sn/HCl} X \xrightarrow{C_6H_5COCl} Y + HCl$
What is Y?
a) Acetanilide b) Benzanilide c) Azobenzene d) Hydrazobenzene

158. 

The products of above sequence of reactions are
a) $CH_2 = CH_2$ and $(CH_3)_2CHCN$ b) CH_3CH_2CN and $C_2H_5NH_2$
c) $CH_2 = CH_2$ and $(CH_3)_3N$ d) $(CH_3)_2 C = CH_2$ and NH_3

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

a) Alkyl

b) 
$HCON(CH_3)_2$

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

a) C_2H_5OH
b) C_2H_5OH, N_2, H_2O
c) $C_2H_5N_2^+Cl^-$
d) C_2H_5NHOH, NH_3

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

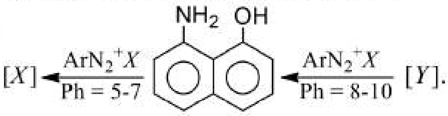
164. Which of the following reagents will convert nitromethane into methylamine?

a) Zn/HCl
b) Zn/NaOH
c) Zn/C_2H_5OH
d) Ni/H_2

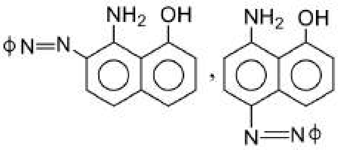
165. Tertiary nitroalkane cannot tautomerise because

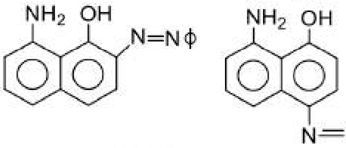
a) Their tautomeric forms are highly unstable
b) They do not contain any multiple bond
c) They do not have labile H-atom
d) They are not basic in nature

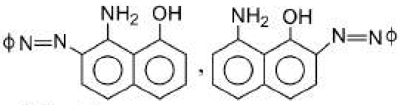
166.

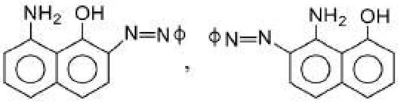


[X] and [Y]are

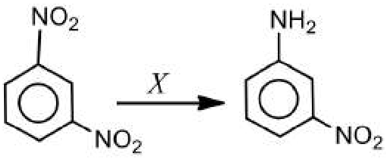
a) 

b) 

c) 

d) 

167. In the reaction



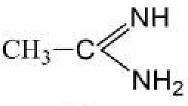
X is

a) SiC
b) H_2SO_4
c) $KMnO_4$
d) Fe/HCl

168. A compound *A* when reacted with PCl_5 and then with ammonia gave *B*. *B* when treated with bromine and caustic potash produced *C*. *C* on treatment with $NaNO_2$ 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

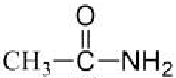
169. The correct order of basicities of the following compound is



(1)

$CH_3CH_2NH_2$
(2)

$(CH_3)_2NH$
(3)



$CH_3-\overset{O}{\overset{\|}{C}}-NH_2$

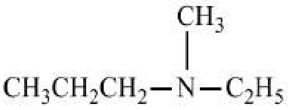
(4)

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_3NH_2

b) CH_3NHCH_3

c) 

$CH_3CH_2CH_2-\overset{CH_3}{\overset{|}{N}}-C_2H_5$

d) Sec. butylamine

171. $CH_3CH_2NH_2$ contains a basic NH_2 group, but CH_3CONH_2 does not, because:

a) Acetamide is amphoteric in character

b) In $CH_3CH_2NH_2$ the electron pair on N-atom is delocalised by resonance

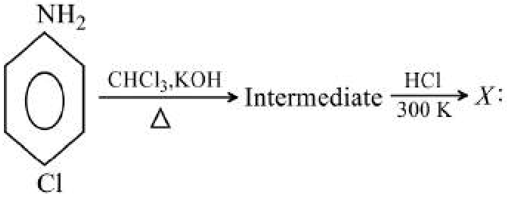
c) In $CH_3CH_2NH_2$ there is no resonance, while in acetamide the lone pair of electron on N-atom is delocalised and therefore less available for protonation

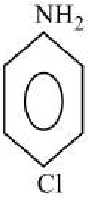
d) None of the above

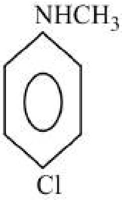
172. Benzaldehyde condenses with N, N-diamethylaniline in presence of anhydrous $ZnCl_2$ to give

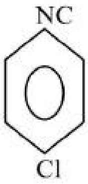
a) Azo dye b) Malachite green c) Michler's ketone d) Buffer yellow

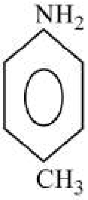
173. Identify *X* in the reaction,



a) 

b) 

c) 

d) 

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

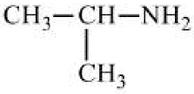
a) Sodium cyanide b) Sodium isocyanide c) Sodium isocyanate d) Cyanamide

175. Diethylamine on oxidation with $KMnO_4$ gives:

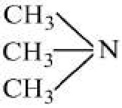
a) Ethanal b) Propanone c) Tetraethyl hydrazine d) None of these

176. Which one of the following amines will not react with HNO_2 acid to give nitrogen?

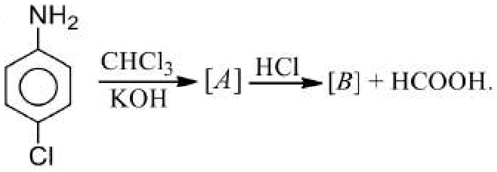
a) CH_3NH_2 b) $CH_3CH_2NH_2$

c) 

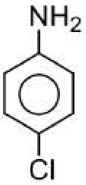
$CH_3-\underset{CH_3}{\underset{|}{CH}}-NH_2$

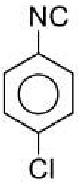
d) 

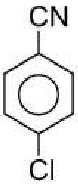
$(CH_3)_3N$

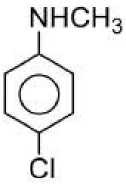
177. 

What is [*B*]?

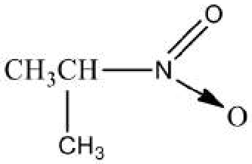
a) 

b) 

c) 

d) 

178. $C_5H_{13}N$ reacts with 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?
a) $C_6H_5NO_2$
b) CH_3CH_2ONO
c) 

d) $C_6H_5(OH)NO_2$

180. Hinsberg's reagent is
a) C_6H_5COCl
b) CH_3COCl
c) $C_6H_5CH_2Cl$
d) $C_6H_5SO_2Cl$

181. Among the following the weakest base is
a) $C_6H_5CH_2NH_2$
b) $C_6H_5CH_2NHCH_3$
c) $O_2NCH_2NH_2$
d) CH_3NHCHO

182. A secondary amine is:
a) A compound with two —NH_2 groups
b) A compound with 2 carbon atoms and a —NH_2 group
c) A compound with a —NH_2group on the carbon atom in number 2 position
d) 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
a) Azobenzene
b) Benzene
c) Benzyl alcohol
d) Phenol

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:
a) $(CH_3)_2CHNH_2$
b) $(CH_3)_3N$
c) $(CH_3)_2NH$
d) CH_3NH_2

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?
a) Br_2, KOH, H_2O
b) KOH, Br_2, H_2O
c) H_2O, KOH, Br_2
d) KOH, H_2O, Br_2

189. Primary, secondary and tertiary nitroalkanes can be identified by the action of:
a) $HNO_2 + NaOH(aq.)$
b) $CHCl_3 + NaOH(aq.)$
c) $CHCl_3 + KOH(\text{alc.})$
d) None of these

190. Primary, secondary and tertiary amines may be separated by using:
a) Ethanoyl chloride
b) Diethyl oxalate
c) Thionyl chloride
d) None of these

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

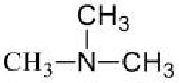
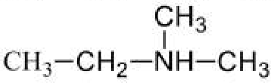
a) Br^-
b) Br_2
c) OBr^-
d) OBr_2

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 is
a) $CH_3CH_2NO_2$ b) $(CH_3)_2CHNO_2$ c) $(CH_3)_3CNO_2$ d) All of these

193. Isopropylamine $\xrightarrow{KMnO_4} X \xrightarrow{H_3O^+} Y$. In the above sequence X and Y are respectively
a) Acetaldimine, ethanal b) Ethanal, ketimine
c) Ketimine, acetone d) Acetone, propan-2-ol

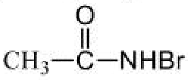
194. Benzyl amine cannot be prepared by
a) $C_6H_5CONH_2 \xrightarrow[ether]{LiAlH_4}$ b) $C_6H_5CH_2CONH_2 + Br_2 + KOH \rightarrow$
c) $C_6H_5CN \xrightarrow{LiAlH_4}$ d) $C_6H_5CH_2NC \xrightarrow{LiAlH_4}$

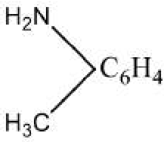
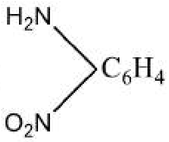
195. When $(NH_4)_2SO_4 + KCNO$ are heated, we get:
a) Nitrogen
b) Carbon dioxide
c) Biuret
d) Ammonium carbonate

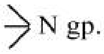
196. Which of the following is most basic in aqueous medium?
a) $CH_3CH_2CH_2CH_2NH_2$ b) $CH_3 - CH_2 - CH_2 - NH_2$
c) 
$CH_3-N(CH_3)-CH_3$
d) 
$CH_3-CH_2-NH(CH_3)-CH_3$

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) 
$CH_3-\overset{O}{\overset{\|}{C}}-NHBr$
B) $CH_3 - N = C = O$
(C)CH_3NHBr (D) CH_3CONBr_2
The correct answer is
a) A, B b) A, C c) C, D d) B, D

200. Which will not go for diazotization?
a) $C_6H_5NH_2$ b) $C_6H_5CH_2NH_2$
c) 
d) 

201. Amine may contain:
a) $—NH_2gp$
b) 
c) 
d) All of these

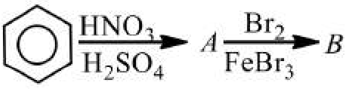
202. Nitration of aniline also gives m-nitro aniline in strong acidic medium because
a) In electrophilic substitution reaction amino group is *meta* directive
b) Inspite of substituents nitro group always goes to m-position

c) In strong acidic medium aniline aniline present as anilinium ion d) None of the above

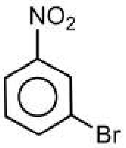
203. In the reaction $RCONH_2 + X \rightarrow RNH_2$, the regent X is
a) Soda lime b) PCl_5 c) NaOBr d) All of these

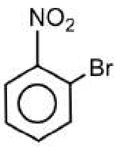
204. The bad smelling substance formed by the action of alcoholic caustic potash on chloroform and aniline is
a) Nitrobenzene b) Phenyl isocyanide c) Phenyl cyanide d) Phenyl isocyanate

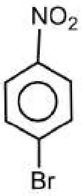
205. How may primary amines are possible for the formula $C_4H_{11}N$?
a) 1 b) 2 c) 3 d) 4

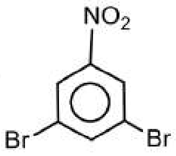
206. 

The compound B is

a) 

b) 

c) 

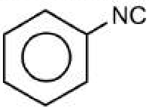
d) 

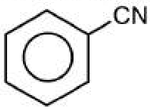
207. $R-N\underset{\rightarrow}{\equiv}C+HgO \longrightarrow A+Hg_2O$; What is A?
a) RNH_2 b) $RCONH_2$ c) R—NCO d) RCOOH

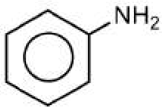
208. Which of the following on reduction with $LiAlH_4$ gives a secondary amine?
a) CH_3NC b) CH_3CONH_2 c) CH_3CN d) CH_3NO_2

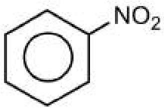
209. Aniline on treatment with $NaNO_2$ in HCl at 0°C followed by treatment with alkaline β —naphthol gives
a) A violet solution b) A red solution
c) A green solution d) A blue precipitate

210. The compound with foul odour among the following is

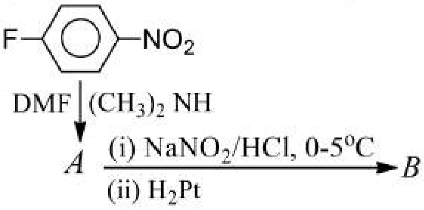
a) 

b) 

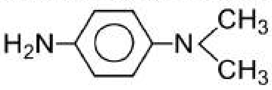
c) 

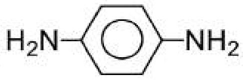
d) 

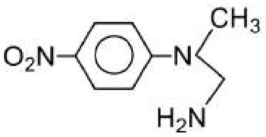
211. Aniline first reacts with acetyl chloride producing compound 'A'. 'A' reacts with nitric acid/sulphuric acid mixture and produces compound 'B', which hydrolyses to compound 'C'. What is the identify of 'C' ?
a) Acetanilide b) *p*-nitroacetanilide c) *p*-nitroaniline d) Aniline

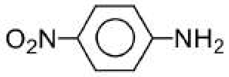
212. 

In the above sequence B is

a) 

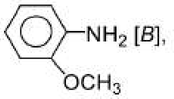
b) 

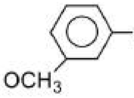
c) 

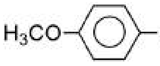
d) 

213. The product A and B in the reaction are:
$C_2H_5NH_2 + CHCl_3 + 3KOH \longrightarrow A + B + 3H_2O$
a) $C_2H_5NC + 3KCl$ b) $C_2H_5CN + 3KCl$ c) $C_2H_5CONH_2 + 3KCl$ d) $C_2H_5NC + K_2CO_3$

214. When aqueous solution of benzene diazonium chloride is boiled, the product formed is
a) $C_6H_5CH_2OH$ b) $C_6H_6 + N_2$ c) C_6H_5COOH d) C_6H_5OH

215. Correct order of basicity of ϕNH_2 [A],


[B],


[C]


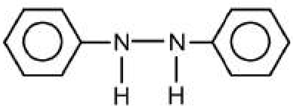
[D] is

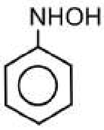
a) $A > B > C > D$ b) $D > C > A > B$ c) $B > D > C > A$ d) $D > A > B > C$

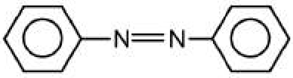
216. Tertiary amine is obtained in the reaction

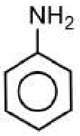
a) Aniline $\xrightarrow{CH_3I}\xrightarrow{CH_3I}$ b) Aniline $\xrightarrow{CH_3I}$ c) Nitrobenzene $\xrightarrow{Sn/HCl}$ d) None of these

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

a)


b)


c)


d)


218. Why do 2° and 3° amines fail to undergo the carbylamines test?

a) They combine with chloroform to give a stable compound

b) They react with alcoholic KOH

c) They nitrogen atom of the amine group does not have the required number of hydrogen atoms

d) All the given reasons are correct

219. Nitrogen of nitrobenzene at 125°C with mixed acids gives

a) *meta*-dinitrobenzene b) *ortho*-dinitrobenzene

c) *para*-dinitrobenzene d) 1, 3, 5-trinitrobenzene

220. Complete the following reaction

$RNH_2 + H_2SO_4 \rightarrow$

a) $[RNH_3]^+HSO_4^-$ b) $[RNH_3]_2^+SO_4^{2-}$ c) $RNH_2.H_2SO_4$ d) No reaction

221. Ethylamine reacts with nitrosyl chloride (NOCl)to form:

a) Ethyl chloride b) Ethyl alcohol c) Ethyl nitrite d) Nitroethane

222. Reduction of aniline with acetyl chloride in presence of NaOH produce

a) Aniline hydrochloride b) Acetanilide c) *p*-choloroaniline d) 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

a) In nitration mixture, *ortho, para*-activity of NH_2 group is completely lost

b) $-NH_2$ because $-NH_3^+$, which is m-directing

c) $-NH_2$ becomes $-NH^+SO_4^-$, which is *m*-directing

d) $-NH_2$ becomes $-NH^-NO_2^+$, which is *m*-directing

224. *p*-chloro aniline and anilinium hydrogen chloride can be distinguished by

a) Sandmeyer reaction b) Carbylamines reaction

c) Hinsberg's reaction d) $AgNO_3$

225. Nitrobenzene on reduction with Al—Hg and water gives:

a) Azobenzene

b) Aniline

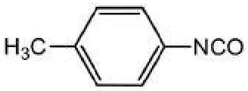
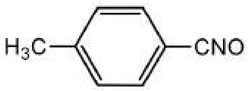
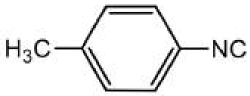
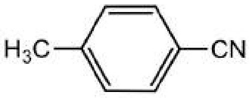
c) Azoxy benzene

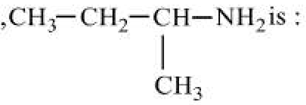
d) phenylhydroxylamine

226. Which of the following is most basic in nature?

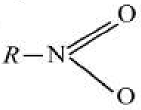
a) NH_3 b) CH_3NH_2 c) $(CH_3)_2NH$ d) $C_6H_5N(CH_3)_2$

227. The reaction of $CHCl_3$ and alcoholic KOH with *p*-toluidine gives

a) 
b) 
c) 
d) 

228. The IUPAC name of,  $CH_3-CH_2-\underset{|\atop CH_3}{CH}-NH_2$ is :

a) 1-methyl-amino propane
b) 2-aminobutane
c) 2-methyl-2-aminopropane
d) None of the above

229.  and — $R-O-N=O$ are....isomers.

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 HNO_3 and concentrated H_2SO_4
b) A mixture of concentrated 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) $CH_3CH_2CH_2CN$
b) $(CH_3)_2CHCN$
c) $CH_3CH_2CH_2NC$
d) $(CH_3)_2CHNC$

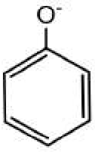
232. *n*-butylamine (I), diethylamine (II) and N, N-dimethylethylamine (III) have the same molar mass. The increasing order of their boiling point is

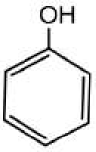
a) III < II < I
b) I < II < III
c) II < III < I
d) II < I < III

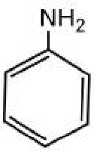
233. Aniline reacts with acetaldehyde to form

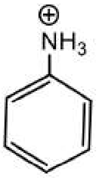
a) Schiff's base
b) Carbylamine
c) Immine
d) None of these

234. Coupling of diazonium salts of following takes place in the order


I


II


III


IV

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) $R—NH_2$
b) R_3N
c) $[R_4N]^+X^-$
d) NH_4X

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

$$C_2H_5NH_2 \xrightarrow{HNO_2} A \xrightarrow{PCl_5} B \xrightarrow{NH_3} C$$

a) Ethyl cynide
b) Ethyl amine
c) Methyl amine
d) Acetamide

238. In hypobromite reaction of amide, carbonyl carbon atom is lost as:

a) CO
b) CO_2
c) CO_3^{2-}
d) None of these

239. Identify the product Z in the following reaction scheme

$C_6H_5NH_2 \xrightarrow{Ac_2O} X \xrightarrow{Br_2/CCl_4} Y \xrightarrow{HOH} Z$

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 NH_2 group
b) Ethylamine and aniline both dissolve HCl
c) Ethylamine and aniline both react with $CHCl_3$ and KOH to form unpleasant smell
d) Ethylamine and aniline both react with $NaNO_2 + HCl$ to give hydroxyl compounds in cold

241. The reduction of CH_3CN to $CH_3CH_2NH_2$ 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) $C_6H_5Cl \xrightarrow{\text{alc.KOH}}$
d) $C_6H_5NH_2 \xrightarrow[\text{2.CuCN}]{\text{1.NaNO}_2\text{/HCl}}$

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/HCI
b) Zn/NH_4CI
c) Zn/NaOH
d) Sn/HCI

247. Identify the product in the following sequence 3, 4, 5-tribromoaniline

$\xrightarrow[\text{(ii)}H_3PO_2]{\text{(i)Diazotization}} ?$

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 mustrard oil reaction
d) Hofmann's bromamide reaction

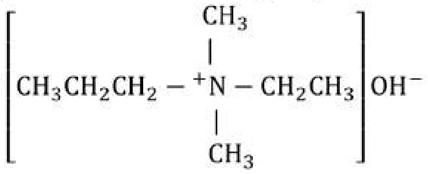
249. m-fluoronitrobenzene is best synthesized by using the reaction

a) Nitrobenzene $\xrightarrow[H_2SO_4\text{,heat}]{\text{Fuming }HNO_3} [\,] \xrightarrow{NH_3/H_2S} [\,] \xrightarrow[\text{2.HBF}_4,\Delta]{\text{1.HONO}}$
b) Aniline $\xrightarrow[\text{heat}]{F_2}$
c) Fluorobenzene $\xrightarrow[H_2SO_4\text{,heat}]{HNO_3}$
d) m-$C_6H_4(NH_2)_2 \xrightarrow[\text{2.CuNO}_2\text{,3.HBF}_4]{\text{1.HONO}}$

250. Allyl isocyanide contains ....and......bonds.

a) 9σ , 3π
b) 9σ , 9π
c) 3σ , 4π
d) 5σ , 7π

251.

When 

$$\left[\mathrm{CH_3CH_2CH_2}-\overset{\overset{\mathrm{CH_3}}{|}}{\underset{\underset{\mathrm{CH_3}}{|}}{{}^+\mathrm{N}}}-\mathrm{CH_2CH_3}\right]\mathrm{OH^-}$$

Is heated, then

a) Propene is the major product
b) Ethane and $C_3H_7N(CH_3)_2$ 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, $X \xrightarrow{\text{Bromination}} Y \xrightarrow[+HCl]{NaNO_2} Z \xrightarrow[C_2H_5OH]{\text{Boiling}}$ 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 b) Presence of a chiral N- atom
c) Presence of lone pair on N-atom d) Rapid flipping of one from into another

256. $>C=O$ compounds reacts with NH_3 or amines followed by H_2/Ni. The reaction is called

a) Mendius reaction b) Hofmann bromamide
c) Reductive amination d) Gabriel's phthalimide

257. Decreasing order of basic nature in aqueous solutions

a) $C_6H_5NH_2 > NH_3 > CH_3NH_2 > (CH_3)_2NH$ b) $NH_3 > C_6H_5NH_2 > CH_3NH_2 > (CH_3)_2NH$
c) $(CH_3)_2NH > CH_3NH_2 > NH_3 > C_6H_5NH_2$ d) $CH_3NH_2 > (CH_3)_2NH > NH_3 > C_6H_5NH_2$

258. Comparing basic strength of NH_3, CH_3NH_2 and $C_6H_5NH_2$ it may be concluded that

a) Basic strength remains unaffected b) Basic strength of alkyl amines is lowest
c) Basic strength of aryl amines is lowest d) Basic strength of NH_3 is highest

259. Decreasing order of basicity of the three isomers of methoxyaniline is

a) $p\text{-}CH_3OC_6H_4NH_2 > o-CH_3OC_6H_4NH_2 > m-CH_3OC_6H_4NH_2$
b) $p\text{-}CH_3OC_6H_4NH_2 > m-CH_3OC_6H_4NH_2 > o-CH_3OC_6H_4NH_2$
c) $o\text{-}CH_3OC_6H_4NH_2 > p-CH_3OC_6H_4NH_2 > m-CH_3OC_6H_4NH_2$
d) $o\text{-}CH_3OC_6H_4NH_2 > m-CH_3OC_6H_4NH_2 > p-CH_3OC_6H_4NH_2$

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) $R.CN$ b) $R.NC$ c) $Ar.CN$ d) $Ar.NC$

262. The product D in the following sequence of reactions is,

$CH_3COOH \xrightarrow{NH_3} A \xrightarrow{\text{Heat}} B \xrightarrow{P_2O_5} C \xrightarrow{Na+C_2H_5OH} D$:

a) Ester b) Amine c) Acid d) Alcohol

263. $C_6H_5NH_2 \xrightarrow[HCl]{NaNO_2} X \xrightarrow{Cu_2(CN)_2} Y \xrightarrow{H_2O/H^+} Z$

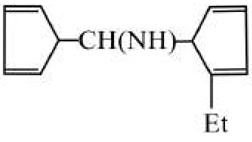
Z is identified as

a) $C_6H_5-NH-CH_3$ b) C_6H_5-COOH c) $C_6H_5-CH_2-NH_2$ d) $C_6H_5-CH_2COOH$

264. The product $[A]$ formed in the reaction;

$2C_5H_5-CN \xrightarrow[Et_2O]{Na} [A]$ is:

a)



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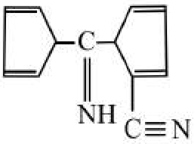
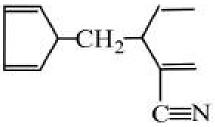
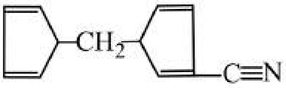


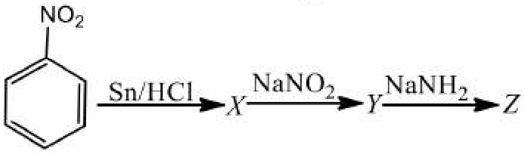
c) 

d) 

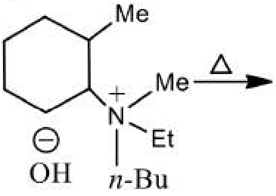
265. Gabriel's sunthesis is used frequently for the preparation of which of the following?

a) Primary amines b) Primary alcohols c) Tertiary amines d) Tertiary alcohols

266. What is 'Z'in the following reaction ?



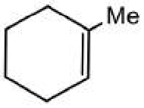
a) Benzoic acid b) Cyanobenzoic acid c) Benzamide d) Aniline

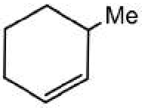
267. 

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

a) 

b) $CH_2 = CH_2$

c) 

d) 

268. Nitroalkane is acidic only towards :

a) Na_2CO_3 b) NaOH c) Alcohol d) Liquid NH_3

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

a) $C_6H_5 - NH_2$ b) $C_6H_5 - NH - NH - C_6H_5$

c) $C_6H_5 - N - N - C_6H_5$ d) $C_6H_5 - NH - CO - C_6H_5$

270. $CH_3NH_2 + CHCl_3 + KOH \rightarrow$nitrogen containing compound $+ KCl + H_2O$. Nitrogen containing compound is

a) $CH_3 - C \equiv N$ b) $CH_3 - NH - CH_3$ c) $CH_3 - \overset{-}{N} \equiv \overset{+}{C}$ d) $CH_3\ \overset{+}{N} \equiv C$

271. $$Y \underset{Z}{\overset{\text{Reduction}}{\rightleftharpoons}} [R_2C{=}NH] \xrightarrow{H_3O^+} X$$

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

a) Aldehyde, ketone, NH_3 b) Ketone, 1° amine, $KMnO_4$

c) Ketone, 2° amine, $KMnO_4$ d) Ketimine, 1° amine, H_2SO_5

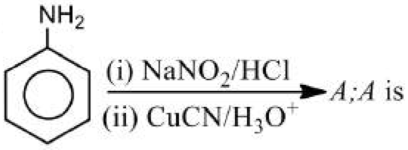
272. Aniline is weaker base than ethylamine because:

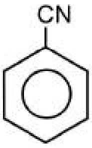
a) Lone pair of electrons of N-atom is not freely available for coordination with a proton due to resonance than in ethylamine

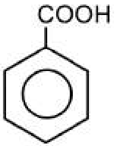
b) Its b. p. is higher than that of ethylamine

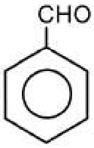
c) It does not produce sufficient concentration of OH^- ions in solution

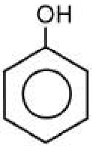
d) It is insoluble in water while ethylamine is soluble in water

273. 

a) 

b) 

c) 

d) 

274. The compound will react most readily with NaOH to form methanol is

a) $(CH_3)_4N^+I^-$
b) CH_3OCH_3
c) $(CH_3)_3S^+I^-$
d) $(CH_3)_3CI$

275. N_2 gas is liberated when $[HCl + NaNO_2]$ reacts with the following compounds

(A)$CH_3CH_2NH_2$ (B) Urea
(C)CH_3CONH_2 (D)$C_6H_5NH_2$

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

a) Ethyl amine and acetamide
b) Ethyl amine and aniline
c) Urea and acetamide
d) Methyl amine and ethyl amine

277. (A)$C_2H_5NH_2 \xrightarrow[\text{(ii)}AgNO_2]{\text{(i)}NOCl} [W]$

(B)$(CH_3)_2CHNH_2 \xrightarrow[\text{(ii)}AgNO_2]{\text{(i)}NOCl} [X]$

(C)$(CH_3)_3\,CNH_2 \xrightarrow[\text{(ii)}AgNO_2]{\text{(i)}NOCl} [Y]$

(D)$CH_3CH(NH_2)C_2H_5 \xrightarrow[\text{(ii)}AgNO_2]{\text{(i)}NOCl} [Z]$

Which product will not show tautomerism?

a) W
b) X
c) Y
d) Z

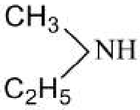
278. Name of method use to separate primary, secondary and tertiary amines is

a) Hofmann method
b) Lucas method
c) Victor Meyer method
d) Kolbe method

279. Alkyl cyanides undergo Stephen reduction to produce

a) Aldehyde
b) Secondary amine
c) Primary amine
d) amide

280. A compound of molecular formula C_3H_9N when reacts with benzene sulphonyl chloride gives a product soluble in dilute NaOH solution. The compound should be

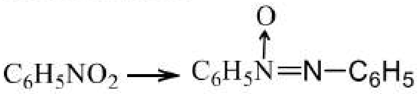
a) $(CH_3)_3N$
b) $(CH_3)_2CH-NH_2$
c) 

d) All of these

281. Benzenediazonium chloride on reaction with phenol in weakly basic medium gives

a) Diphenyl ether
b) *p*-hydroxyazobenzene
c) Chlorobenzene
d) benzene

282. The conversion

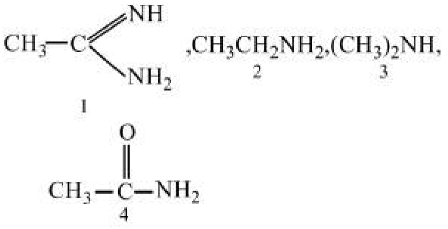


$$C_6H_5NO_2 \longrightarrow C_6H_5\overset{\overset{O}{\uparrow}}{N}=N-C_6H_5$$

Can be brought about by reduction with

a) $Na_3AsO_3/NaOH$
b) Glucose/HCl
c) Zn/NaOH
d) $LiAlH_4$/ether

283. The correct order of basicities of the following compounds is:



$CH_3-C(=NH)NH_2$ (1), $CH_3CH_2NH_2$ (2), $(CH_3)_2NH$ (3), $CH_3-C(=O)-NH_2$ (4)

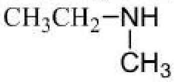
a) 2 > 1 > 3 > 4
b) 1 > 3 > 2 > 4
c) 3 > 1 > 2 > 4
d) 1 > 2 > 3 > 4

284. Aniline on oxidation with $Na_2Cr_2O_7$ and H_2SO_4 gives

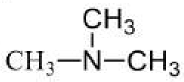
a) Benzoic acid b) *m*-amino benzoic acid c) Schiff's base d) *p*-bezoquinone

285. Which among the following has the highest boiling point?

a) $CH_3CH_2CH_2NH_2$

b) 

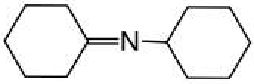
$CH_3CH_2-NH(CH_3)$

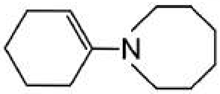
c) 

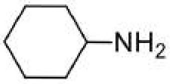
$CH_3-N(CH_3)-CH_3$

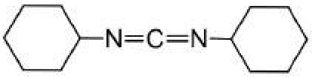
d) CH_3NH_2

286. Which of the following is an enamine?

a) 

b) 

c) 

d) 

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 π-bonds in the formula given below, NC—CH=CH—CN are:

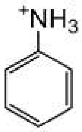
a) 5 b) 4 c) 3 d) 2

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

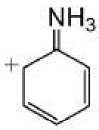
Both X and Y on reduction with Sn/HCl give$Z$. Which of the following does not represent X, Y or Z?

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



(I)



(II)

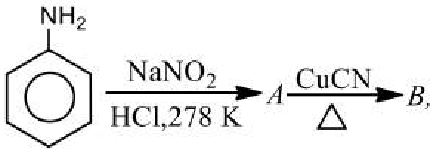
a) II is not acceptable as canonical structure because carbonium ions are less stable than ammonium ions

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,

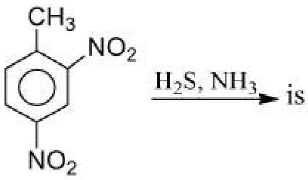
$CH_3CH_2NH_2 + CHCl_3 + 3KOH \rightarrow (A) + (B) + 3H_2O$

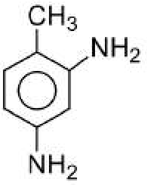
The compounds (A) and (B) are respectively

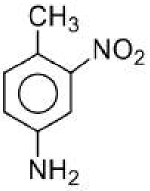
a) $CH_3CH_2CONH_2$ and 3KCl b) C_2H_5NC and K_2CO_3

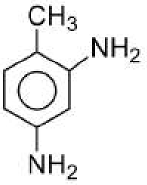
c) C_2H_5NC and 3KCl d) C_2H_5CN and 3KCl

294. The product obtained in the reduction



a) 

b) 

c) 

d) The compound is not reduced

295. In the reaction between CH_3NC and HgO, the product obtained is

a) Methyl isothiocyanate
b) Methyl isocyanate
c) Methyl amine
d) Methyl cyanide

296. The compound which on reaction with cold HNO_2 gives only nitrosoamine is:

a) CH_3NH_2
b) $(CH_3)_2NH$
c) $(CH_3)_3N$
d) $(C_2H_5)_3N$

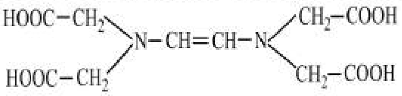
297. Which of the following is involved in Sandmeyer's reaction?

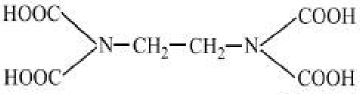
a) Ferrous salt
b) Diazonium salt
c) Ammonium salt
d) Cupraammonium salt

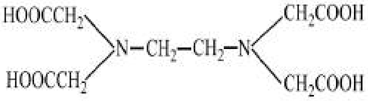
298. During diazotization of benzenamine with sodium nitrite and hydrochloric acid, the excess of hydrochloric acid is used primarily to

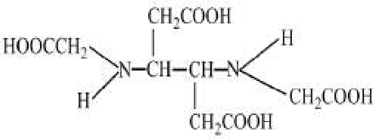
a) Check the hydrolysis of $\phi - OH$
b) Ensure a stoichiometric amount of nitrous acid
c) Check the concentration of free aniline
d) Neutralize any base formed during reaction

299. The correct structure of ethylenediamine-tetra acetic acid (EDTA) is :

a) 

b) 

c) 

d) 

300. Hofmann's hypobromite reaction affords a method of:

a) Preparing a tertiary amine

b) Preparing a mixture of amines
c) Stepping down a series
d) Stepping up a series

301. Identify X in the sequence,

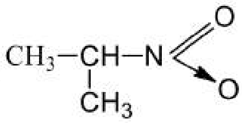
$$X \xrightarrow{HNO_2} C_3H_8O \xrightarrow[H_2SO_4]{} C_3H_6O_2 :$$

a) $CH_3—NH—CH_2—CH_3$
b) $CH_3—CH_2—CH_2—NH_2$
c) $(CH_3)_3N$
d) None of the above

302. Reduction of alkyl nitriles, produces
a) Secondary amine
b) Primary amine
c) Tertiary amine
d) amide

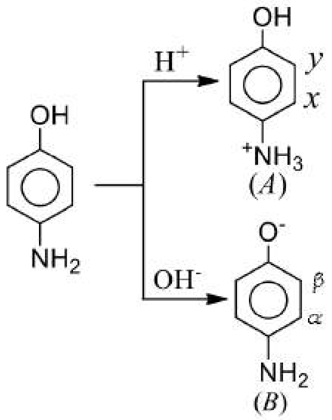
303. General formula of an amine is:
a) $C_nH_{2n+1}N$
b) $C_nH_{2n+2}N$
c) $C_nH_{2n+3}N$
d) $C_nH_{2n}N$

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?
a) $C_6H_5NO_2$
b) CH_3CH_2ONO
c)


d) $C_6H_4(OH)NO_2$

306. Consider p-aminophenol

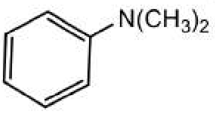


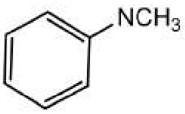
Which positions are activated for coupling reaction in acidic and basic media respectively?
a) x in A and β in B
b) x in A and α in B
c) y in A and α in B
d) y in A and β in B

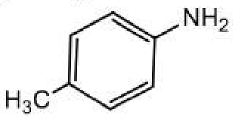
307. Diethyl carbonate on heating with ammonia gives:
a) $C_2H_5NH_2$
b) $(C_2H_5)_3N$
c) $(C_2H_5)_2NH$
d) Urea

308. A primary amine hated 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. HCI followed by addition to an alkaline solution of β −naphthol is

a)


b)


c)


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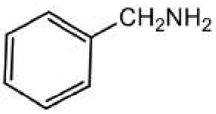
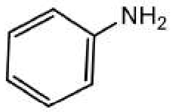
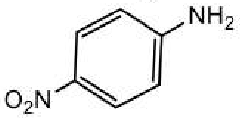
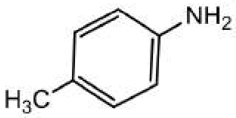
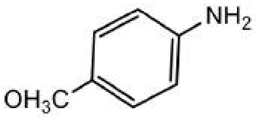
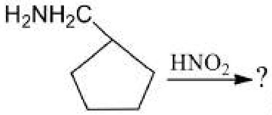


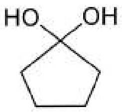
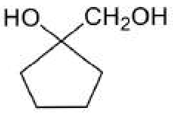
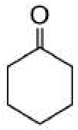
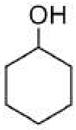
310. The correct order of increasing basic nature of the following bases is

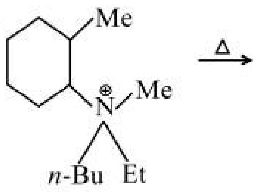






a) II < V < I < III < IV b) V < II < I < III < IV c) II < V < I < IV < III d) V < II < I < IV < III

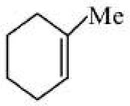
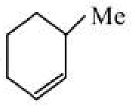
311. 

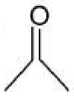
Product is

a) 
b) 
c) 
d) 

312. 

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

a) 
b) $CH_2{=}CH_2$
c) 
d) 

313.  $\xrightarrow{NH_2OH} X \xrightarrow{LiAlH_4} Y$. In the above sequence Y is

a) Tertiary amine b) Secondary amine c) Primary amine d) 2-nitropropane

314. In the following reaction, X is

$$X \xrightarrow{\text{Bromination}} Y \xrightarrow[+HCl]{NaNO_2} Z \xrightarrow[C_2H_5OH]{\text{Boiling}} \text{Tribromo benzene}$$

a) Benzoic acid b) Salicyclic acid c) Phenol d) Aniline

315. Ketones and 1° amines react to form:

a) Amides b) Oximes c) Urea d) Anils

316. Gabriels 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) $R_2NH + HNO_2$ b) $R_3N + HNO_2$ c) $RNH_2 + HNO_2$ d) None of these

318. Mendius method of preparation of amines consists of:

a) Catalytic reduction of alkyl cyanides
b) Reduction of amide with $LiAlH_4$
c) Reduction of nitroparaffin with Sn + HCl
d) Reduction of oximes with $Na + C_2H_5OH$

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

a) CH_3NH_2 b) $(CH_3)_3N$ c) $(C_2H_5)_2NH$ d) $C_6H_5NHC_6H_5$

320. When aniline is treated with sodium nitrite and hydrochloric acid at 0°C, it gives

a) Phenol and N_2 b) Diazonium salt

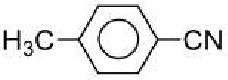
c) Hydrazo compound d) No reaction takes place

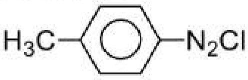
321. Ethyl amine on acetylation gives
a) N-ethyl acetamide b) Acetamide c) Methyl acetamide d) None of these

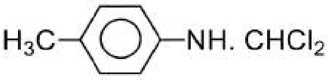
322. Primary amine (RNH_2) reacts with nitrous acid to give
a) $RNH_3^+NO_2$ b) ROH c) ROR d) None of these

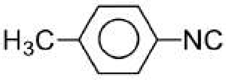
323. On heating urea, a gas evolves along with formation of biuret. Identify the gas.
a) CO b) NH_3 c) CO_2 d) H_2

324. The reaction of chloroform with alcoholic KOH and *p*-toluidine from

a) 

b) 

c) 

d) 

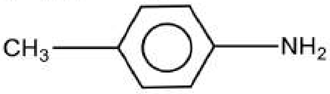
325. Acetanilide is prepared by the reaction of acetyl chloride on:
a) Acetamide b) Aniline c) Acetaldehyde d) Benzene

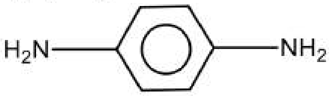
326. The correct order of the increasing basic nature of methyl amine, ammonia and aniline is:
a) Methylamine < aniline < ammonia
b) Aniline < ammonia < methylamine
c) Aniline < methylamine < ammonia
d) Ammonia < aniline < methylamine

327. Aliphatic amines are … … basic than NH_3 but aromatic amines are … … basic than NH_3.
a) More, less b) Less, more c) Both (a) and (b) d) None of these

328. $CH_3CH_2Br \xrightarrow[\Delta]{aq.KOH} A \xrightarrow[\Delta]{KMnO_4/H^+} B \xrightarrow[\Delta]{NH_3} C \xrightarrow[alkali]{Br_2} D$, '*D*' is
a) CH_3Br b) CH_3CONH_2 c) CH_3NH_2 d) $CHBr_3$

329. Which of the following compounds will form alcohol on treatment with $NaNO_2, HCl/H_2O$ at 0°C ?
a) $(CH_3)_2CHNH_2$ b) $C_6H_5NH_2$

c) 

d) 

330. In the reaction,
$RNH_2 \xrightarrow{HNO_2} A + B + C \uparrow; C$ is
a) NH_3 b) N_2 c) O_2 d) CO_2

331. What is decreasing order of basicity of *p*- , *s*- , *t*- ethyl amines and NH_3?
a) $NH_3 > C_2H_5NH_2 > (C_2H_5)_2NH > (C_2H_5)_3N$
b) $(C_2H_5)_3N > (C_2H_5)_2NH > C_2H_5NH_2 > NH_3$
c) $(C_2H_5)_2NH > C_2H_5NH_2 > NH_3 > (C_2H_5)_3N/'$
d) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

332. Which of the following cannot be used for following conversion?
$CH_3CN \longrightarrow CH_3CH_2NH_2$
a) Pt/H_2 b) $LiAlH_4$ c) Na/C_2H_5OH d) $SnCl_2/HCl$

333. Aqueous solution of urea is:
a) Acidic b) Alkaline c) Almost neutral d) Amphoteric

334. The reaction,
$CH_3CN + 4H \xrightarrow{Na/C_2H_5OH} CH_3CH_2NH_2$ is called:
a) Hofmann's bromamide reaction
b) Mendius reaction
c) Sabatier reaction
d) None of the above

335. Which substance when boiled with NaOH will evolve 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

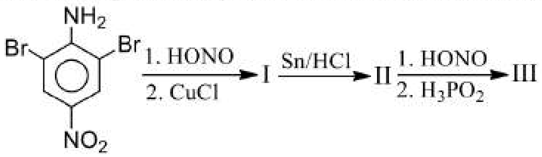
337. In pyridine, the state of hybridization of the nitrogen atom is

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

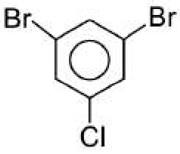
338. Acetoneoxime on catalytic hydrogenation gives:

a) 1-propanamine b) Isopropylamine c) Ethyl methyl amine d) CH4 and ethanamine

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



is

a)


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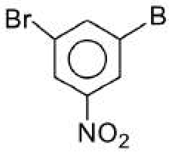

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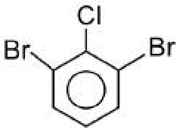


d) None of these

340. The main product in the reaction,

$$\text{HCONH}R \xrightarrow[\text{Pyridine}]{\text{POCl}_3} \text{ is :}$$

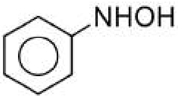
a) RCN b) RNC c) $RCNO$ d) $RNCO$

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

a)


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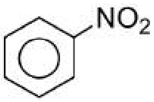

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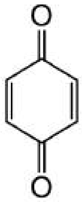


d) None of these

343. The compound having the molecular formula C_3H_9N 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) $C_2H_5N^+H_3OH^-$ is acidic

b) $C_2H_5NH_2$ is less basic than NH_3

c) $C_2H_5NH_2$ is a stronger base than NH_3

d) $C_2H_5NH_2$ 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.

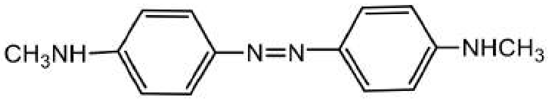
d) Isopropylamine is a secondary amine.

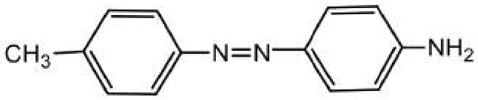
348. Toluene is nitrated and the resulting product is reduced with tin and hydrochloric acid. The product so obtained is diazotised and then heated with cuprous bromide. The reaction mixture so formed contains.

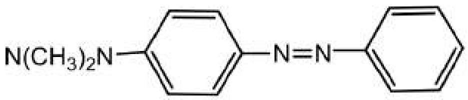
a) Mixture of *o*-and *p*-bromotoluenes
b) Mixture of *o*-and *p*-dibromobenzenes
c) Mixture of *o*-and *p*-bromoanilines
d) Mixture of *o*-and *m*-bromotoluenes

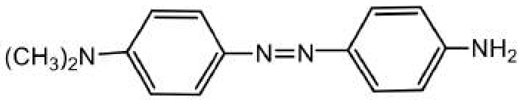
349. The strongest base among the following is
a) $C_6H_5NH_2$
b) $(C_6H_5)_2NH$
c) NH_3
d) $(C_2H_5)_2NH$

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

a) 

b) 

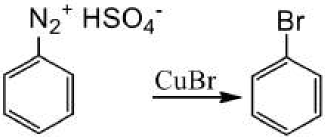
c) 

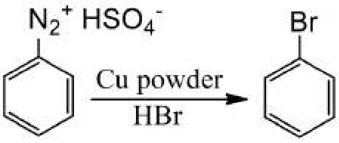
d) 

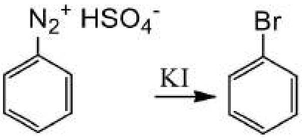
351. Treatment of nitrobenzene with acetyl chloride in the presence of anhydrous $AlCl_3$ gives
a) 2-nitroacetophenone
b) 3-nitroacetophenone
c) 4-nitroacetophenone
d) None of these

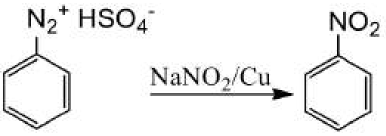
352. Urea when heated slowly, product formed is:
a) N_2
b) CO_2
c) biuret
d) Ammonium carbamate

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

a) 

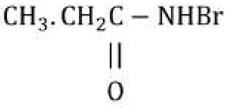
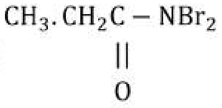
b) 

c) 

d) 

354. Given the following sequence of reactions,

$$CH_3CH_2I \xrightarrow{NaCN} A \xrightarrow[\text{Partial hydrolysis}]{OH^-} B \xrightarrow{Br_2/NaOH} C$$

The major product '*C*' is
a) $CH_3CH_2NH_2$
b) 
$CH_3.CH_2\underset{\underset{O}{||}}{C}-NHBr$
c) $CH_3.CH_2-COONH_4$
d) 
$CH_3.CH_2\underset{\underset{O}{||}}{C}-NBr_2$

355. $CHCl_3$ and KOH on heating with a compound from a bad smelling product, compound is
a) C_2H_5CN
b) C_2H_5NC
c) C_2H_5OH
d) $C_2H_5NH_2$

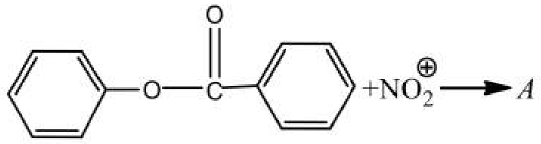
356. Benzamide can be converted into benzonitrile with
a) H_3O^+
b) OH^-/H_2O
c) KCN
d) P_2O_5

357. Compare boiling point of isomeric alkyl amines.
a) $1° > 2° > 3°$
b) $1° > 2° < 3°$
c) $1° < 2° < 3°$
d) $1° < 2° > 3°$

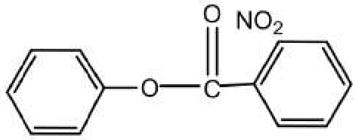
358. Hofmann's bromamide reaction is to convert
a) Acid to alcohol
b) Alcohol to acid
c) Amide to amine
d) Amine to amide

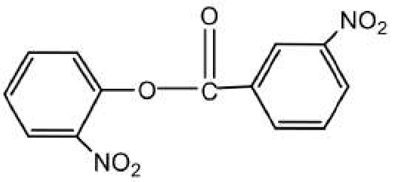
359. During coupling reaction of benzene diazonium chloride and aniline, the pH of reaction medium should be approximately
a) 1–2
b) 9–10
c) 4–5
d) 7–8

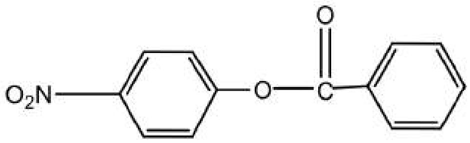
360.

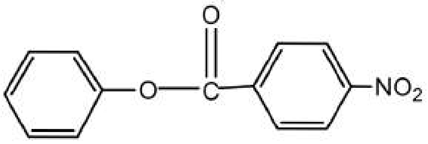


The product A is

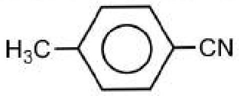
a) 

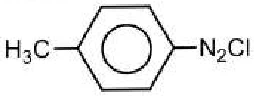
b) 

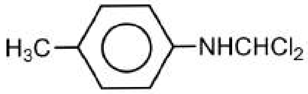
c) 

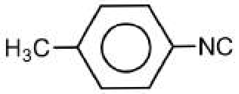
d) 

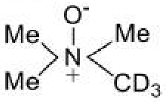
361. The reaction of chloroform with alcoholic KOH and *p*-toluidine form

a) 

b) 

c) 

d) 

362. Pyrolysis of  would give

a) Mixture of $CH_2 = CH - CD_3$ and $CH_3 - CH = CD_2$
b) $CH_3 - CH = CD_2$
c) $Me_2N^+ = C(CD_3)(CH_3)$
d) $CH_2 = CH - CD_3$

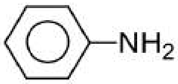
363. Which of the following compounds is soluble in benzene but almost insoluble in water?

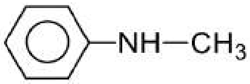
a) C_2H_5OH
b) CH_3CO_2H
c) CH_3CHO
d) $C_6H_5NO_2$

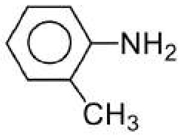
364. The action of nitrous acid on a primary amine gives:

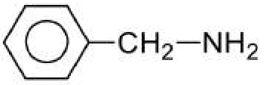
a) Nitroalkane
b) Alkyl nitrite
c) Alcohol
d) Secondary amine

365. Which of the following is the strongest base?

a) 

b) 

c) 

d) 

366. Which is not the property of ethanenitrile (CH_3CN)?

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:

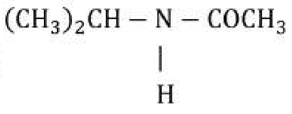
a) 3°>2°>1°>NH_3
b) 2°>3°>1°>NH_3
c) 1°>2°>3°>NH_3
d) None of these

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

a) $C_3H_7Br + KCN$
b) $C_4H_9Br + KCN$
c) $C_3H_7OH + KCN$
d) $C_4H_9OH + KCN$

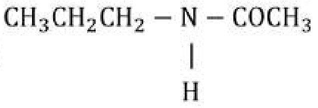
369. Isopropyl amine with excess of acetyl chloride will give

a) $(CH_3CO)_2N - CH - (CH_3)_2$

b) 

$(CH_3)_2CH - \underset{\substack{| \\ H}}{N} - COCH_3$

c) $(CH_3)_2CHN(COCH_3)_2$

d) 

$CH_3CH_2CH_2 - \underset{\substack{| \\ H}}{N} - COCH_3$

370. In the reaction of (*S*) 2-phenylpropamide with NaBr/H_2O to give 1-phenylethylamine

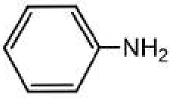
a) There is retention of configuration b) There is inversion of configuration

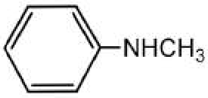
c) A mixture of two products is obtained d) There is no reaction

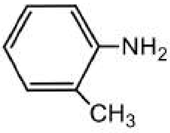
371. High basicity of Me_2NH relative to Me_3N is attributed to

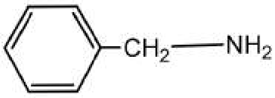
a) Effect f solvent b) Inductive effect of Me c) Shape of Me_2NH d) Shape of Me_3N

372. Which of the following is the strongest base?

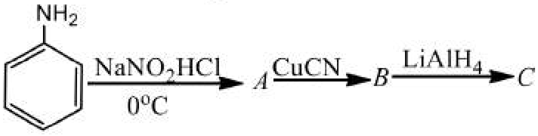
a) 

b) 

c) 

d) 

373. In the reaction sequence



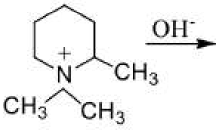
The product '*C*' is

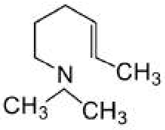
a) Benzonitrile b) Benzaldehyde c) Benzoic acid d) Benzyl amine

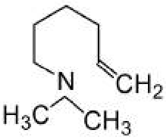
374. Which one does not liberate NH_3 when undergoes hydrolysis?

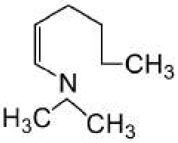
a) Acetanilide b) Acetonitrile c) Acetamide d) Phenyl isocyanide

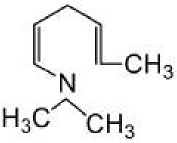
375. Identify the major product of the reaction



a) 

b) 

c) 

d) 

376. Primary nitroalkanes on hydrolysis give:

a) $RCOOH + NH_2OH$ b) $RCOOH$ c) NH_2OH d) $RCOR$

377. In the reaction

$$CH_3CN + 2H \underset{SnCl_2}{\overset{HCl}{\longrightarrow}} X \xrightarrow{\text{Boiling } H_2O} Y,$$

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) $C_2H_5OCH_3$ b) $(CH_3)_2CHOC_2H_5$ c) $C_6H_5NH_2$ d) $C_6H_5NO_2$

AMINES

: ANSWER KEY :

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

321)	a	322)	b	323)	b	324)	d	353)	a	354)	a	355)	b	356)	d
325)	b	326)	b	327)	a	328)	c	357)	a	358)	c	359)	c	360)	c
329)	a	330)	b	331)	d	332)	d	361)	d	362)	a	363)	d	364)	c
333)	c	334)	b	335)	c	336)	b	365)	d	366)	d	367)	a	368)	a
337)	a	338)	b	339)	b	340)	b	369)	c	370)	a	371)	a	372)	d
341)	a	342)	b	343)	d	344)	b	373)	d	374)	d	375)	b	376)	a
345)	c	346)	c	347)	d	348)	a	377)	c	378)	c				
349)	d	350)	c	351)	c	352)	c								

AMINES

: HINTS AND SOLUTIONS :

1 **(c)**

$CH_3CN \xrightarrow[LiAlH_4]{\text{Reduction}} CH_3CH_2NH_2$

acetonitrile ethanamine

3 **(b)**

Carbylamine (or isocyanides) give secondary amine on reduction.

$R-\mathrm{N}\equiv\mathrm{C} \xrightarrow{\mathrm{Ni/H_2}} R-\mathrm{NH}-\mathrm{CH_3}$

carbylamine secondary amine

4 **(a)**

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

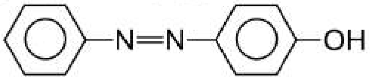
5 **(b)**

Tertiary amines, due to lack of H-atom, attached directly with N, does not react with benzene sulphonyl chloride ($C_6H_5SO_2Cl$), i.e., Hinsberg's reagent. $(C_2H_5)_3N$ is a tertiary amine, so does not react with $C_6H_5SO_2Cl$.

7 **(b)**

$\phi N_2^+ + \phi OH \rightarrow \phi N_2\ \phi OH$

or



coupling product

10 **(b)**

—CN and —NC are different functional groups.

11 **(d)**

$CH_3CN \xrightarrow[\substack{\text{aq.}H_2SO_4\\ +2H_2O\\ -NH_3}]{\text{H.OH}} CH_3COOH \xrightarrow[\substack{\text{Sodalime}\\ \Delta\\ -CO_2}]{\text{Decarboxylation}} CH_4$

Ethane ethanoic acid methane

Nitrile (*A*)

12 **(a)**

$C_2H_5OH + NH_3 \longrightarrow C_2H_5NH_2 + H_2O$

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, $C_6H_5CH_2NH_2$ (benzyl amine), being an aliphatic amine, is the most basic among the given the compounds.

14 **(a)**

$R-C\equiv N + 4[H] \xrightarrow{LiAlH_4} RCH_2NH_2$

15 **(c)**

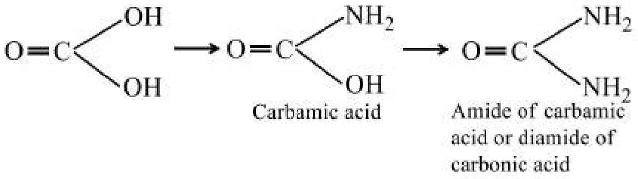
Electron deficient group decreases the electron density of N-atom, thus, makes its lone pair less available for donation

16 **(b)**

The order for acidic nature depends upon the ease to lose H^+ ion. —COOH is resonance stabilized and thus lose H^+ at the earliest. Also NH_3^+ near to —COOH releases H^+ more easily due to electron withdrawing nature of —COOH than NH_3^+ far away from —COOH.

17 **(b)**

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



18 **(b)**

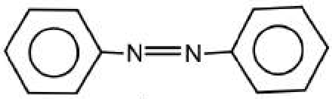
Aniline is not obtained as a major product by the reaction.

$C_6H_5NO_2 + \text{Zn powder} \xrightarrow[\text{[H]}]{\text{Alcoholic KOH}}$

Nitrobenezene

$C_6H_5NO_2\text{+Zn powder} \xrightarrow[\text{[H]}]{\text{Alcoholic KOH}}$

nitrobenezene



azobenzene

19 **(b)**

$CH_3 - C \equiv N \xrightarrow{\text{Reduction}} CH_3CH_2NH_2$

$\xrightarrow{\text{HONO}} CH_3CH_2OH$

methyl cyanide ethanamine ethanol

1. *(B)*

$CH_3CH_2NH_2 \xrightarrow{\text{CHCl}_3\text{,KOH}} CH_3CH_2N \rightleftarrows C$

2. Ethyl isocyanide

(C)

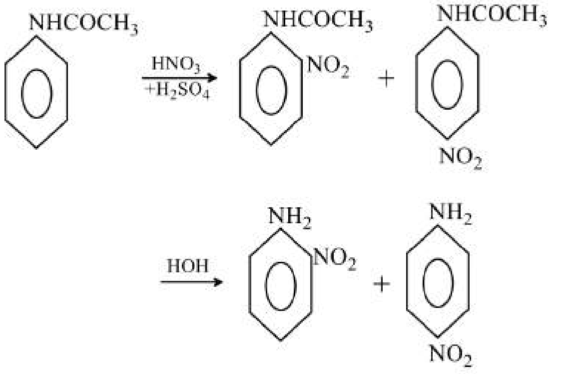
21 **(c)**

$CH_3 - NH_2 + 3CH_3I \rightarrow (CH_3)_4N^+I^-$

methyl amine quaternary ammonium salt

therefore, 3 moles of CH_3I (methyl iodide) are required for reaction with methyl amine.

23 **(b)**



(−$NHCOCH_3$ is *o*- and *p*-directing)

24 **(c)**

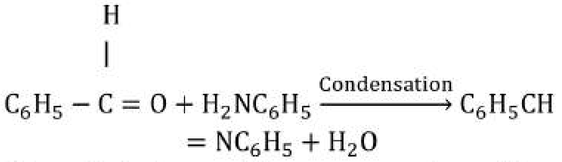
$C_2H_5NH_2 \xrightarrow[-N_2]{HNO_2} C_2H_5OH \xrightarrow{PCl_3} C_2H_5Cl \xrightarrow{NH_3} C_2H_5NH_2$

ethyl amine ethanol ethyl chloride ethyl amine

3. *(B)* *(C)*

27 **(c)**

Reaction of aniline with benzaldehyde is condensation reaction.



$$C_6H_5 - \overset{\overset{\displaystyle H}{|}}{C} = O + H_2NC_6H_5 \xrightarrow{\text{Condensation}} C_6H_5CH = NC_6H_5 + H_2O$$

Benzaldehyde aniline benzylidene aniline

28 **(d)**

$C_6H_5CH_2NH_2 + CHCl_3 + 3KOH$
$\rightarrow C_6H_5CH_2NC + 3KCl + 2H_2O$

29 **(d)**

Secondary amides such as N-methylethanamide on reduction with $LiAlH_4$ give secondary amines.

$CH_3CONHCH_3 + [H] \xrightarrow{LiAlH_4} CH_3CH_2NHCH_3 + H_2O$

N-methylethanamide 2°amine

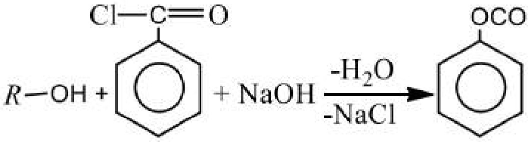
30 **(a)**

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

$R - CONH_2 + 4KOH + Br_2 \xrightarrow{\Delta} RNH_2 + K_2CO_3$
$+ 2KBr + 2H_2O$

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.

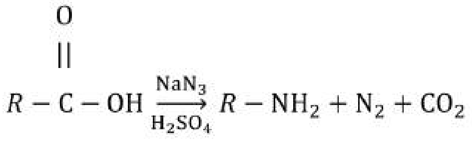


33 **(b)**

Due to +ve *IE* in alkylamines and resonance in $C_6H_5NH_2$.

34 **(c)**

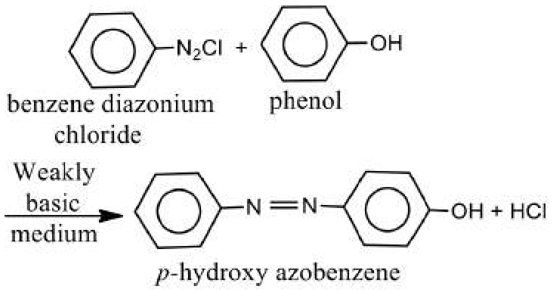
Schmidt reaction



$$R - \overset{\overset{\displaystyle O}{||}}{C} - OH \xrightarrow[H_2SO_4]{NaN_3} R - NH_2 + N_2 + CO_2$$

37 **(b)**

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



40 **(a)**

$$RCONH_2 \xrightarrow{P_2O_5} RCN + H_2O$$

41 **(d)**

Basicity of amines depends upon the availability of lone pair of electrons of nitrogen for donation. Electron releasing group increases the electron density over nitrogen, thus increases the basic character. 3° methyl amine although contains three electron realeasing groups but is least basic because of steric hindrance. Hence, the order of basic character is

$$(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$$

42 **(b)**

Methyl cyanide gives acetic acid on hydrolysis.

$$CH_3CN \xrightarrow{H_2O/H^+} CH_3 - \overset{\overset{O}{\|}}{C} - NH_2 \xrightarrow{H_2O/H^+} CH_3COOH + NH_3$$

43 **(c)**

$$R{-}O{-}N{=}O \xrightarrow{4[H]} R{-}OH + NH_2OH$$

44 **(d)**

C_3H_9N represent following structures

$CH_3CH_2CH_2NH_2$

Propanamine

(1°amine)

$$CH_3CH_2 - \overset{\overset{H}{|}}{N} - CH_3$$

N-methyl ethanamine

(2°amine)

$$CH_3 - \overset{\overset{CH_3}{|}}{N} - CH_3$$

N,N-dimethyl methanamine

(3°amine)

45 **(b)**

H-atom of C_6H_6 ring is replaced by S_E reactions

46 **(a)**

Presence of—OCH_3 gp. on aniline makes it more basic than the presence of —NO_2, —Cl or —CH_3 gp.

48 **(b)**

Electron withdrawing groups (*e.g.*, benzyl) because the basicity of amines. Electron donating groups (*e.g.*, alkyl) increase the acidity of amines.

∴ The correct order of basicity of amines is

$$C_2H_5NH_2 > CH_3NH_2 > NH_3 > C_6H_5NH_2$$

49 **(d)**

CH_3NH_3Cl is acidic in nature.

50 **(a)**

$$CH_3CH{=}NOH \xrightarrow{P_2O_5} CH_3CN + H_2O$$

51 **(b)**

Dimethyl oxalate is used for distinguishing primary, secondary and tertiary amines (Hofmann's method).

4. The primary (1°) amine forms the corresponding substituted oxamide which is usually a crystalline solid.

$$\begin{array}{l} COOC_2H_5 \\ | \\ COOC_2H_5 \end{array} + \begin{array}{l} H - NHR \\ \\ H - NHR \end{array} \rightarrow \begin{array}{l} CONHR \\ | \\ CONHR \end{array} + 2C_2H_5OH$$

5. The secondary amine forms a diethyl oxamic ester which is generally a liquid.

$$\begin{array}{l} COOC_2H_5 \\ | \\ COOC_2H_5 \end{array} + NHR_2 \rightarrow \begin{array}{l} CONR_2 \\ | \\ COOC_2H_5 \end{array} + C_2H_5OH$$

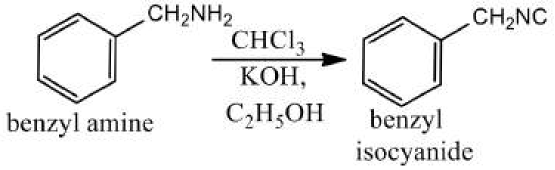
6. The tertiary amine under these conditions does not react at all since it does not contain a replaceable hydrogen atom.

52 **(b)**

Nitro group goes always to meta position, in aromatic compounds, irrespective to the substituents.

53 **(d)**

It is carbylamine reaction,



54 **(d)**

Secondary amines give oily nitrosoamine with nitrous acid

$(CH_3CH_2)_2NH + HNO_2$

$\rightarrow (CH_3CH_2)_2N - NO + H_2O$

Secondary amine nitrous acid oily nitrosoamine

55 **(c)**

Nitrosoamine on heating with conc.H_2SO_4 gives secondary amine. This reaction is called Liebermann nitroso reaction.

$$R_2N - N = O + H_2O \xrightarrow{\text{Conc.}H_2SO_4} R_2NH + HNO_2$$

nitrosoamine secondary amine

56 **(a)**

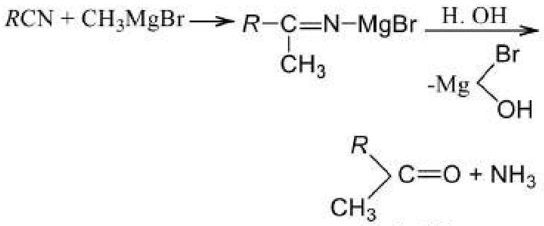
Cyanides are hydrolysed either by alkali or acid to give carboxylic acid.

$$R - CN + 2H_2O \xrightarrow{\text{NaOH}} R - COOH + NH_3$$

57 **(b)**

$$(A) RCN \xrightarrow{\text{Reduction}} RCH_2NH_2$$

1°amine



$$RCN + CH_3MgBr \longrightarrow R-\underset{CH_3}{\underset{|}{C}}=N-MgBr \xrightarrow[-Mg(Br)(OH)]{H.\ OH} \begin{matrix} R \\ CH_3 \end{matrix}\!\!>C=O + NH_3$$

methyl ketone

(B)

$$(C)\ RNC \xrightarrow{\text{Hydrolysis}} H - COOH + RNH_2$$

1°amine

$$(D)\ RNH_2 \xrightarrow{HNO_2} ROH + N_2 + H_2O$$

59 **(b)**

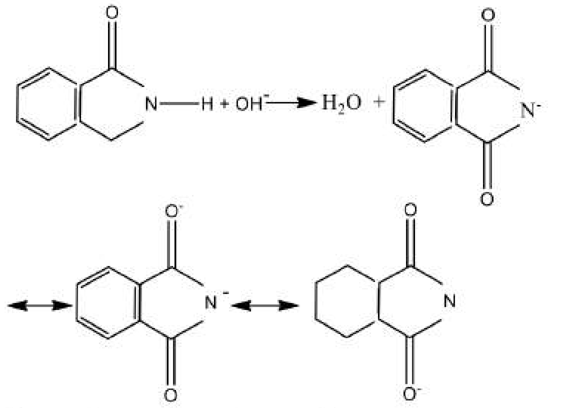
$CHCl_3 + C_6H_5NH_2 + 3NaOH$

$\rightarrow C_6H_5NC + 3NaCl + 3H_2O$

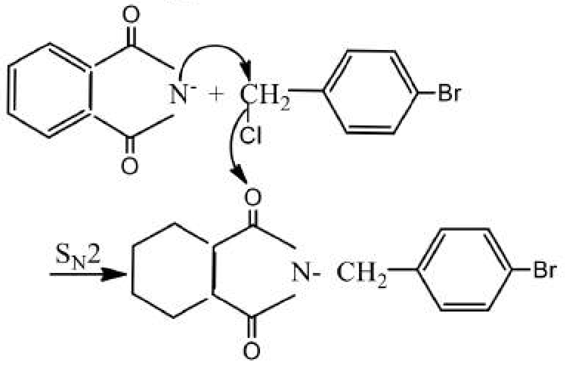
phenylisocyanide

62 **(a)**

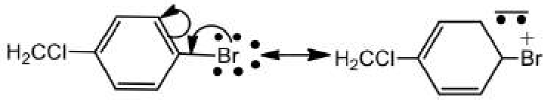
It is the first step of Gabriel's phthalimide synthesis. The hydrogen bonded to nitrogen is sufficiently acidic due to two α-carbonyls.



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 bo0nd character to C − Br bond, hence difficult to break.

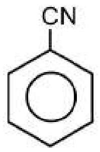


63 **(b)**

Only these aromatic primary amines undergo diazotisation in which —NH_2 is attached to nucleus.

64 **(a)**

Molecular formula of benzonitrile is C_6H_5CN.



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 abonxious odour.
This reaction is given by primary amine

$RNH_2 + CHCl_3 + 3KOH \xrightarrow{\Delta} RNC \quad + 3KCl + 3H_2O$

Primary (alc) alkyl
Amine *iso*-cyanide

67 **(c)**

$NH_2CONH_2 + NH_2 \cdot NH_2 \longrightarrow NH_2CONHNH_2 + NH_3$

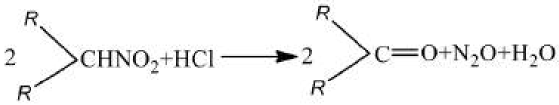
68 **(a)**

$R - C \equiv N \xrightarrow[\text{hydrolysis}]{\text{Partial}} R - CONH_2 \xrightarrow[\text{hydrolysis}]{\text{Complete}} RCOOH$

Alkyl cyanide alkyl amide carboxylic acid

69 **(a)**

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



70 **(d)**

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

72 **(c)**

$C_2H_5NH_2 \xrightarrow{[O]} CH_3CH{=}NH \xrightarrow{HOH} CH_3CHO + NH_3$

73 **(c)**

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

$C_6H_5NH_2 + CHCl_3KOH \rightarrow C_6H_5NC + KCl + H_2O$

75 **(a)**

$NH_2CONH_2 + HOC_2H_5 \xrightarrow{\Delta} H_2NCOOC_2H_5 + NH_3$

Urethane

77 **(b)**

Only primary amines give positive carbylamine test

78 **(a)**

Primary amines have tendency of forming H-bonds

81 **(c)**

7. O

||

$CH_3 - C_2 - CH_3$
$sp^3 \quad sp^2 \quad sp^2$

(b) O

||

$CH_3 - C_2 - OH$
$sp^3 \quad sp^2$

(c)

$CH_3 - C{-}{\equiv} N$
$sp^3 \quad sp$

(d) O

||

$CH_3 - C_2 - NH_2$
$sp^3 \quad sp^2$

Acetonitrile does not contain sp^2 hybridised carbon.

85 **(b)**

Due to

$+$ ve *IE* in alkyamines and resonance in $C_6H_5NH_2$.

86 **(d)**

$C_6H_5SO_2Cl \quad + RNH_2 \rightarrow RNHSO_2C_6H_5 \xrightarrow{KOH} R - NKSO_2C_6H_5$

Benzene sulphyonyl N-alkyl benzene
soluble in KOH
chloride sulphonamide

87 **(b)**

$C_6H_5NH_2 \xrightarrow{\text{Diazotisation}} C_6H_5N_2Cl + H_2O$

89 **(c)**

Tertiary amines do not have replaceable H-atom.

90 **(b)**

Urea gives biuret test. Biuret formed gives violet colour with $CuSO_4$ in alkaline medium.

91 **(a)**

The order of basicity among the following amines is

$(CH_3)_2NH > (CH_3)_3N > CH_3NH_2 > C_6H_5NH_2$

92 **(d)**

Concentration does not affect the basis strength of amines

93 **(c)**

Secondary amine on reaction with aq. HNO_2 at low temperature produces yellow oily nitrosoamines. $CH_3CH_2NHCH_2CH_3$ is secondary amine.

95 **(a)**

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

$C_2H_5NC + H_2O \xrightarrow{H+} HCOOH \quad + C_2H_5NH_2$

methanoic acid

$C_2H_5NH_2 + H^+ \rightarrow C_2H_5NH_3^+$
Ethylamine salt

96 **(d)**

$R{-}N{=}C{=}O \xrightarrow{HOH} RNH_2 + H_2CO_3$

97 **(b)**

Biuret formed gives violet colour with $CuSO_4$ in alkaline medium.

98 **(d)**

Benzyl amine ($C_6H_5CH_2NH_2$) is more basic than aniline ($C_6H_5NH_2$) 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.

$\underset{I}{CH_3NH_2(1°)}, \underset{II}{(CH_3)_2NH(2°)}, \underset{III}{(CH_3)_3N(3°)}, \underset{IV}{C_6H_5CH}$

$II > I > III > V$

100 **(d)**

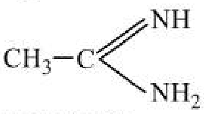
It is methyl amine which, being basic dissolves in dilute HCl. It with $NaNO_2$ evolves nitrogen gas leaving behind methyl alcohol which has smell of wood-spirit.

$CH_3NH_2 \xrightarrow{HCl} CH_3NH_2.HCl$

$CH_3NH_2 + HNO_2 \xrightarrow{NaNO_2/HCl} \underset{\text{methyl alcohol}}{CH_3OH} + N_2\uparrow + H_2O$

101 **(b)**

2° amines are more basic than 1° amines due to +ve *IE* of $-CH_3$ gp. In amide the resonance give rise to less availability to electron pair for coordination and thus less basic. The negative



charge developed on N in $CH_3{-}C\genfrac{}{}{0pt}{}{\diagup\!\!\!\!\diagup NH}{\diagdown NH_2}$

due to resonance makes it more basic.

102 **(c)**

Availability of lone pair on N-atom (Lewis concept),

$RNH_2 + H_2O \longrightarrow RNH_3^+ + OH^-$ (Bronsted concept proton acceptor).

103 **(c)**

$C_2H_5NH_2 + Na \longrightarrow C_2H_5NHNa + \frac{1}{2}H_2$

104 **(d)**

$CH_3CN \xrightarrow{HOH} CH_3COOH$

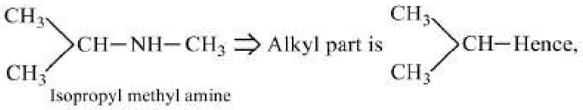
105 **(a)**

$C_3H_9N(A) \xrightarrow{HNO_2} \text{Alcohol} + N_2\}$

$\Rightarrow A$ is 1° amine, *i.e.*,

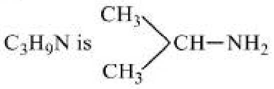
C_3H_9N is $C_3H_7NH_2$

$C_3H_9N \xrightarrow{KOH+CHCl_3} \underset{(R-NC)}{\text{Carbylamine}} \xrightarrow{\text{Reduction}}$



$\genfrac{}{}{0pt}{}{CH_3}{CH_3}\!\!>CH-NH-CH_3 \Rightarrow$ Alkyl part is $\genfrac{}{}{0pt}{}{CH_3}{CH_3}\!\!>CH-$ Hence,

Isopropyl methyl amine



C_3H_9N is $\genfrac{}{}{0pt}{}{CH_3}{CH_3}\!\!>CH-NH_2$

109 **(c)**

Reduction of nitrobenzene by Zn and NH_4Cl gives N-phenyl hydroxylamine.

N-phenyl hydroxylamine

111 **(c)**

Carbylamine reaction is used to prepare *iso*cyanides.

112 **(a)**

$RNH_2 + C_6H_5SO_2Cl \longrightarrow C_6H_5SO_2NHR$
(Sulphonamide
soluble in alkali)

114 **(d)**

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

$CH_3{-}O{-}N{=}O$ and CH_3OCH_3.

117 **(c)**

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

119 **(d)**

CH_3CHO

$\xrightarrow{H_2NOH} CH_3CH = NOH \xrightarrow{\text{Reduction}} CH_3CH_2NH_2 \xrightarrow[-N_2,\ -H_2O]{NOCl} Cl$

Acetaldehyde (*A*) ethyl amine (*B*) ethyl chloride (*C*)

120 **(a)**

$R - C \equiv N$

∴ 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)**

$NH_2CONH_2 + HNO_3 \longrightarrow NH_2CONH_2 \cdot HNO_3$

126 **(c)**

$C_6H_5CH{=}O + H_2NCH_3 \longrightarrow C_6H_5CH{=}NCH_3$

128 **(b)**

Ethyl bromide reacts with KCN to give ethyl cyanide.

$C_2H_5Br + KCN(alc.) \rightarrow C_2H_5CN + KBr$

Ethyl bromide ethyl cyanide

130 **(b)**

$$C_6H_5NO_2 \xrightarrow[\text{[H]}]{\text{Sn/HCl}} C_6H_5NH_2$$

Nitrobenzene Aniline

Nitrobenzene in reduction with Sn and HCl produce aniline. Hence, 'X' is identified as $-NH_2$ group.

131 **(d)**

$$CH_3I + NH_3 \longrightarrow CH_3NH_2 \xrightarrow{CH_3I} (CH_3)_2NH \xrightarrow{CH_3I} (CH_3)_3N \xrightarrow{CH_3I} (CH_3)_4N^+I^-$$

137 **(c)**

$$C_2H_5NH_2 \xrightarrow{HNO_2} C_2H_5OH + N_2\uparrow + H_2O$$

138 **(a)**

Primary amines on heating with chloroform and ethanolic KOH, give alkyl isocyanide. This reaction is called carbylamine reaction.

$$R-NH_2 + CHCl_3 + 3KOH \xrightarrow{\Delta} R-NC + 3KCl + 3H_2O$$

1°amine alcohol alkyl isocyanide

139 **(d)**

$CH_3CONH_2 + NaOH \longrightarrow CH_3COONa + NH_3$

(A)

$(C_2H_5)_2CO_3 + 2NH_3 \rightarrow NH_2CONH_2 + 2C_2H_5OH$

ethyl carbonate urea

$NH_2COOC_2H_5 + NH_3 \rightarrow NH_2CONH_2 + 2C_2H_5OH$

Ethyl urethane urea

$COCl_2 + 2NH_3 \rightarrow NH_2CONH_2 + 2HCl$

phosgene urea

140 **(c)**

Tertiary amine can be directly oxidised to corresponding nitro compound by $KMnO_4$.

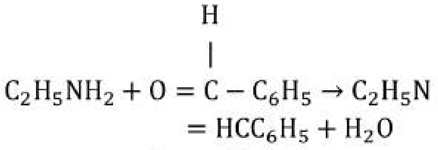
141 **(a)**

$$R-NH_2 + CHCl_3 + 3KOH \longrightarrow 3KCl + 3H_2O + \underset{\text{Offensive smell}}{RNC}$$

142 **(c)**

$2RNH_2 + 2HCl + PtCl_4 \longrightarrow (RNH_3)_2PtCl_6; RNH_3AuCl_4$

143 **(c)**



$$C_2H_5NH_2 + O=\overset{\overset{\large H}{|}}{C}-C_6H_5 \rightarrow C_2H_5N=HCC_6H_5 + H_2O$$

Benzaldehyde

(A)

$$NH_2CO\boxed{NH_2 + H}NH{\cdot}NH_2 \longrightarrow NH_2CONHNH_2 + NH_3$$

urea hydrazine

(B)

$C_2H_5NH_2 + NOCl \rightarrow C_2H_5Cl + H_2O + N_2$

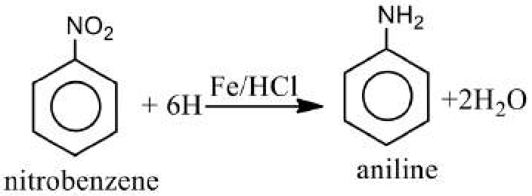
(C)

144 **(b)**

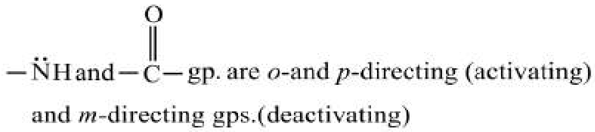
$$R-NO_2 \xrightarrow{\text{Sn/HCl}} R-NH_2$$

145 **(b)**

Aniline is prepared by the reduction of nitrobenzene in acidic medium.



146 **(b)**



$$-\ddot{N}H \text{ and } -\overset{\overset{O}{\|}}{C}- \text{gp. are } o\text{-and } p\text{-directing (activating) and } m\text{-directing gps.(deactivating)}$$

respectively. In such case o-(minor) and p-isomers (major) predominates.

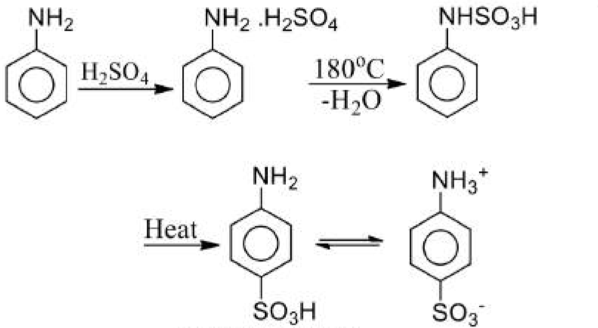
147 **(d)**

Electron donors are bases. In the given choices structure which does not involve resonance will have electron easily available for donation, hence most basic.

∴ Only in choice (b) electrons are not in conjugation with double bond of adjacent atom.

∴ Compound in choice (b) is most basic.

148 **(d)**


sulphanilic acid

Sulphanilic acid exists as a dipolar ion which has acidic and basic groups in the same molecule. Such ions are called Zwitter ions or inner salts

150 **(b)**

$$C_2H_5NH_2 + CHCl_3 + 3KOH \rightarrow C_6H_5NC + 3KCl + 3H_2O$$

Aniline chloroform phenyl isocyanide

Thus in this reaction phenyl isocyanide is produced. This is called carbylamine reaction.

152 **(b)**

$$RCN \xrightarrow{\text{Hydrolysis}} RCOOH + NH_3$$

$$RCH = NOH \xrightarrow{\text{Reduction}} RCH_2NH_2 + H_2O$$

$$RCN + 2H_2O \xrightarrow{\Delta} RNH_2 + HCOOH$$

$$RCONH_2 \xrightarrow{\text{Hydrolysis}} RCOOH + NH_3$$

154 **(a)**

Hinsberg reagent $C_6H_5CO_2Cl$ 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.

$$C_6H_5SO_2Cl + RNH_2 \longrightarrow$$

$$RNHSO_2C_6H_5 \xrightarrow{KOH} \underset{\text{Soluble in KOH}}{RNKSO_2C_6H_5}$$

156 **(a)**

Due to sp^3-hybridisation and lone pair of electron (like NH_3)

157 **(b)**

$$C_6H_5NO_2 \xrightarrow{Sn/HCl} C_6H_5NH_2 \xrightarrow[\text{aq.NaOH}]{C_6H_5COCl} C_6H_5CONHC_6H_5$$

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.

$$RNH_2 + CHCl_3 + 3KOH(alc.) \xrightarrow{\Delta} RNC + 3KCl + 3H_2O$$

Primary amine alkyl isocyanide

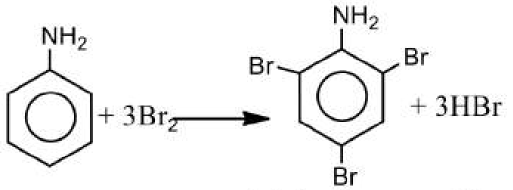
161 **(b)**

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

$$C_2H_5NH_2 + HNO_2 \rightarrow C_2H_5OH + N_2 + H_2O$$

162 **(b)**

Aniline reacts with Br_2 to give 2, 4, 6-tribromoaniline not bromoaniline as


2,4,6-tribromoaniline

163 **(a)**

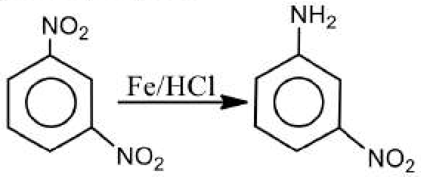
Trimethyl amine is a tertiary amine. It dissolve in cold nitrous acid to form salts which decompose on warming to nitrosoamine and alcohol. It will not liberate nitrogen.

$$(CH_3)_3N + HNO_2 \rightarrow [(CH_3)_3NH]^+NO_2^-$$

trimethyl ammonium nitrite

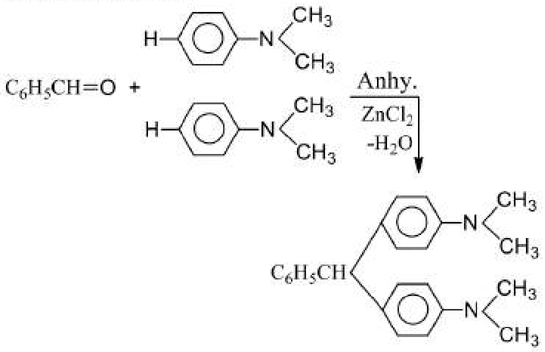
167 **(d)**

Reduction of NO_2 group to NH_2group is taking place by Fe/HCl.



172 **(b)**

Benzaldehyde condenses with N, N-diamethyl aniline in presence of anhydrous $ZnCl_2$ to give malachite green


malachite green

174 **(a)**

$$R - X + NaCN \rightarrow R - CN + Na\,X$$

Alkyl halide aliphatic cyanide

175 **(c)**

$R_2NH \xrightarrow{[O]} R_2N—NR_2$

176 **(d)**

Tertiary amines react as,

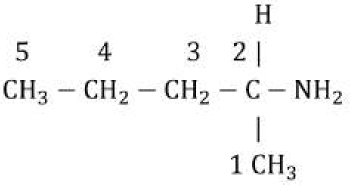
$(CH_3)_3N + HNO_2 \longrightarrow (CH_3)_3NHNO_2$

178 **(d)**

HNO_2 reacts to give an alcohol means the compound is primary amine.

$C_5H_{13}N$ means $C_5H_{11}NH_2$(primary amine)

Optically active alcohol means C_5H_{11} segment contain a chiral carbon.



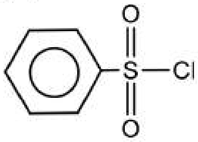
$$\overset{5}{CH_3} - \overset{4}{CH_2} - \overset{3}{CH_2} - \overset{2}{\underset{\underset{1\,CH_3}{|}}{\overset{\overset{H}{|}}{C}}} - NH_2$$

Pentan-2-amine

179 **(b)**

$CH_3CH_2 - O - N = O$ is a nitrite derivative, hence it is not a nitro derivative.

180 **(d)**



or $C_6H_5SO_2Cl$ is called Hinsberg reagent.

It is used for the distinction of 1°, 2°, 3° amine.

181 **(d)**

Presence of electron withdrawing group like $-CN, -CHO, -NO_2$ 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 $(CH_3)_2NH$.

187 **(c)**

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

190 **(b)**

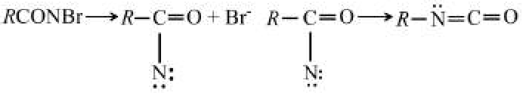
Hofmann's method is used to separate primary, secondary and tertiary amines. The compound used is diethyl oxalate for this purpose.

191 **(c)**

The reaction is believed to follow the mechanism.

$R—CONH_2 + OBr^- \longrightarrow RCONHBr + OH^-$

$RCONHBr + OH^- \longrightarrow RCONBr + H_2O$

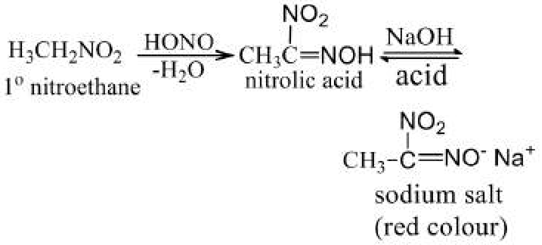


$$RCONBr \longrightarrow \underset{\underset{\ddot{N}:}{|}}{R-C=O} + Br^- \quad \underset{\underset{\ddot{N}:}{|}}{R-C=O} \longrightarrow R-\ddot{N}=C=O$$

$R—N=C=O + 2OH^- \longrightarrow RNH_2 + CO_3^{2-}$

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



$$\underset{1^\circ\text{ nitroethane}}{H_3CH_2NO_2} \xrightarrow[-H_2O]{HONO} \underset{\text{nitrolic acid}}{CH_3\overset{\overset{NO_2}{|}}{C}=NOH} \underset{\text{acid}}{\overset{\text{NaOH}}{\rightleftharpoons}} \underset{\substack{\text{sodium salt}\\\text{(red colour)}}}{CH_3-\overset{\overset{NO_2}{|}}{C}=NO^- Na^+}$$

194 **(d)**

(a) $C_6H_5CONH_2 \xrightarrow[\text{ether}]{LiAlH_4} \underset{\text{Benzylamine}}{C_6H_5CH_2NH_2}$

(b) $C_6H_5CH_2CONH_2 \xrightarrow{Br_2/KOH} \underset{\text{Benzylamine}}{C_6H_5CH_2NH_2}$

(c) $C_6H_5CN \xrightarrow{LiAlH_4} \underset{\text{Benzylamine}}{C_6H_5CH_2NH_2}$

(d) $C_6H_5CH_2NC \xrightarrow{LiAlH_4} \underset{2^\circ\text{amine}}{C_6H_5CH_2NHCH_3}$

195 **(c)**

$NH_4CNO \xrightarrow{\Delta} \underset{\text{Urea}}{NH_2CONH_2} \xrightarrow{\Delta} \underset{\text{Biuret}}{NH_2CONHCONH_2}$

196 **(d)**

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

197 **(a)**

$CH_2N_2 + CH_3COOH \longrightarrow \underset{\text{Ester}}{CH_3COOCH_3} + N_2$

198 **(a)**

Follow text.

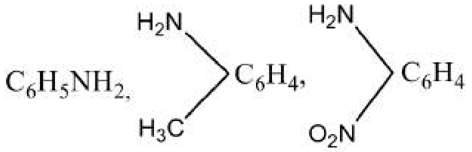
200 **(b)**

Only 1° aromatic amine (primary aromatic amine) from diazonium salts at low temperature (0° − 5°C). A reaction in which $-NH_2$ group is converted into diazo group $(-N^+ \equiv N)$ is called diazotization. Diazotized salts are stable in cold aqueous solution.

$$C_6H_5NH_2 + HCl \xrightarrow{0^o\text{-}5^oC} C_6H_5\overset{+}{N}H2Cl^-$$

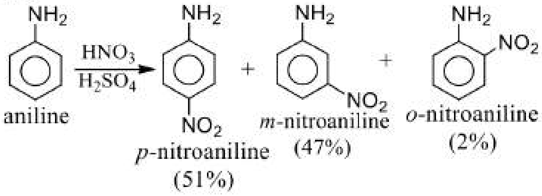
$$NaNO_2 + HCl \xrightarrow{0^o\text{-}5^oC} HNO_2 + NaCl$$

$$C_6H_5\overset{+}{N}Cl^- + HNO_2 \xrightarrow{0^o\text{-}5^oC} C_6H_5\overset{+}{N}_2Cl^- + 2H_2O$$



Amines, so undergo diazotization but $C_6H_5CH_2NH_2$ (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 $-NH_2$ group gives anilinum ion ($+NH_3$) which is deactivating in nature and of *m*-directive nature

203 **(c)**

$RCONH_2 + NaOBr$
$\rightarrow RNH_2 + NaBr + Na_2CO_3$
$+ 2H_2O$
$'X'$

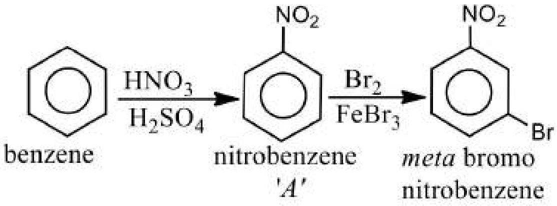
204 **(b)**

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

$C_6H_5NH_2 + CHCl_3 + 3KOH(alc.)$
$\rightarrow C_6H_5NC + 3KCl + 3H_2O$
aniline chloroform phenyl isocyanide

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

206 **(a)**



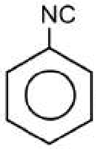
$-NO_2$ is a *meta* directing group. As it is also a deactivating group, so no chance of introduction of second – Br atom.

207 **(c)**

$R\text{—}NC + 2HgO \rightarrow RNCO + Hg_2O$

210 **(a)**

Isocyanides (carbylamines) are foul odour compounds.



(benzene isocyanide)

∴

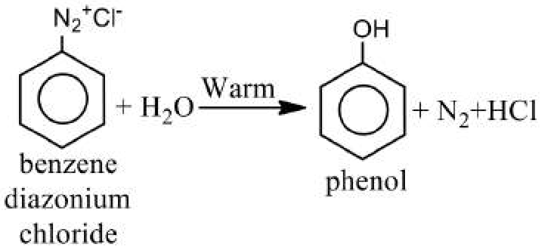
As foul odour

213 **(a)**

This is carbylamine reaction.

214 **(d)**

When aqueous solution of benzene diazonium chloride boiled, it gives phenol.

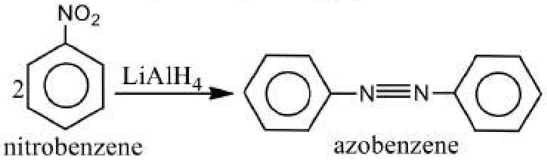


215 **(d)**

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 ($LiAlH_4$) gives azobenzene.

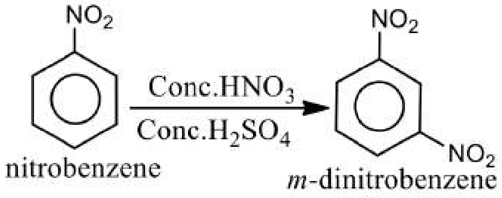


218 **(b)**

Secondary and tertiary amines fail to undergo the carbylamine test because they react with alcoholic KOH.

219 **(a)**

Nitrobenzene on nitration gives *m*-dinitro benzene as – NO_2 group is meta-directing.



In this reaction the attacking reagent is NO_2^+.

220 **(d)**

Bases react with acid to form salt.

∴ Amines are basic in nature.

∴It forms salt on reaction with H_2SO_4

$2RNH_2 + H_2SO_4 \rightarrow [RNH_3]_2^+SO_4^{2-}$

221 **(a)**

$C_2H_5NH_2 + NOCl \longrightarrow C_2H_5Cl + N_2 + H_2O$

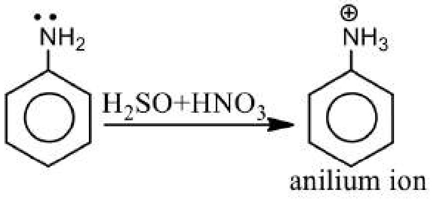
222 **(d)**

$C_6H_5NH_2 + Cl - COCH_3 \xrightarrow{NaOH} C_6H_5NHCOCH_3 + HCl$

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 anilium ion which is *meta* directing.



224 **(d)**

Anilinium hydrogen chloride ($C_6H_5NH_2.HCl$) gives white precipitate. With $AgNO_3$ solution as it gives Cl^- ion, *p*-chloro aniline has Cl atom attached directly to the nucleus, hence cannot be ionised.

226 **(c)**

The basic character of amines depends upon the capacity nitrogen atom to donate an electron pair. More the ability of nitrogen atom to donate electron pair, more will be the basic character. In presence of electron releasing groups (+I showing group, $-CH_3$) the basic character of amines increases due to more availability of electrons on nitrogen atom.

Tertiary amines are least basic due to steric hindrance caused by three bulky alkyl groups.

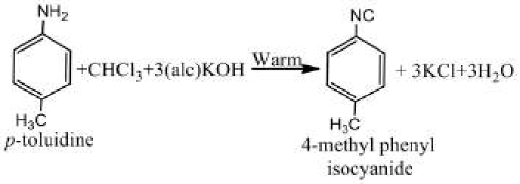
∴The order of basic character is

$NH(CH_3)_2 > CH_3NH_2 > N(CH_3)_3 > NH_3$

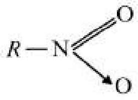
227 **(c)**

Aliphatic and aromatic primary amines on warming with $CHCl_3$ and alcoholic KOH form isocyanide or carbylamine which has very unpleasant smell. This reaction is known as carbylamine reaction.

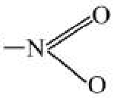
Since *p*-toluidine contains an aromatic primary amine group, it undergoes similar reaction and give 4-methyl phenyl isocyanide.



229 **(b)**



is nitroalkane having



f. gp.

R—O— N=O is alkylnitrite having —O—N=O f. gp. ; f. gps are different.

231 **(c)**

Primary amines react with alc alkali and chloroform to give an offensive odour compound *i.e.,* isocyanide. This reaction is called carbylamine reaction.

$CH_3CH_2CH_2NH_2 + CHCl_3 + 3KOH$

$\rightarrow CH_3CH_2CH_2NC + 3KCl + 3H_2O$

n-propyl amine (alco.) propyl isocyanide

232 **(a)**

Intermolecular H-bonding is more in primary amines than in secondary amines as there are two H-atom available for H-bonding. Tertiary amines do not have intermolecular H-bonding due to absence of H-atom available for H-bonding.

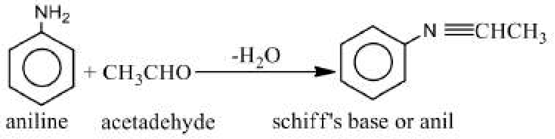
Therefore, the order of boiling points of the given amines is as fallows

$nC_4H_9NH_2 > (C_2H_5)_2NH > C_2H_5N(CH_3)_2$

b.p. 350.8 K b.p. 329.3 K b.p. 310.5 K

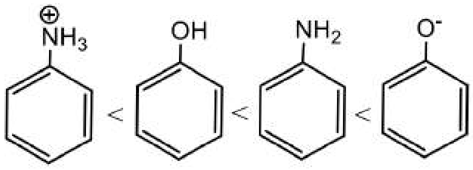
233 **(a)**

Aniline or any 1° amine reacts with aldehyde to form Schiff's base or anils.



234 **(a)**

Coupling of diazonium salts takes place in the following order as



235 **(c)**

Quaternary ammonium compounds, *e.g.*, $[R_4N]^+X^-$, tetra alkyl amm. halide or $[R_4N]^+OH^-$, tetra alkyl amm. Hydroxide.

237 **(b)**

$C_2H_5NH_2$

$\xrightarrow{HNO_2} C_2H_5OH \xrightarrow{PCl_5} C_2H_5Cl \xrightarrow{NH_3} C_2H_5NH_2$

Ethyl amine ethyl alcohol ethyl chloride

ethyl amine

(*A*) (*B*)

238 **(c)**

K_2CO_3 is formed in Hofmann's degradation reactio

240 **(d)**

Aniline undergoes diazotisation.

241 **(c)**

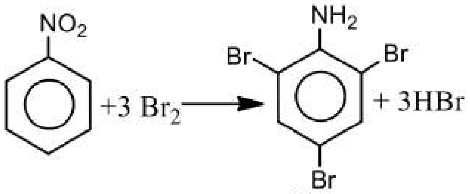
The conversion of —CN to —CH_2NH_2 by catalytic reduction is called Mendius reaction.

244 **(b)**

$$RBr + KCN \longrightarrow RCN \xrightarrow{\text{Reduction}} RCH_2NH_2$$

245 **(d)**

Aniline reacts with bromine and give white ppt. of 2, 4, 6 tribromoaniline.



white ppt.

246 **(b)**

Nitromethane forms methyl hydroxylamine on reduction in netural medium with Zn/NH_4Cl.

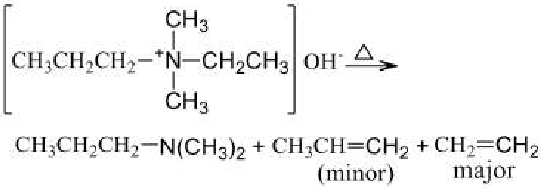
$$CH_3NO_2 + 4[H] \underset{\Delta}{\xrightarrow{Zn/NH_4Cl}} CH_3NHOH + H_2O$$

Nitromethane N-methyl hydroxyl

amine

251 **(c)**

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



$$\left[CH_3CH_2CH_2-\overset{CH_3}{\underset{CH_3}{\overset{|}{\underset{|}{N^+}}}}-CH_2CH_3\right]OH^- \xrightarrow{\Delta}$$

$$CH_3CH_2CH_2-N(CH_3)_2 + \underset{\text{(minor)}}{CH_3CH=CH_2} + \underset{\text{major}}{CH_2=CH_2}$$

253 **(b)**

$$R-NH_2 \xrightarrow{HNO_2} R-OH$$

254 **(d)**

C_6H_5COCl 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.

Dut 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 increase the electron density on nitrogen. So, increases the basicity. Aniline is 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 basic strength of aryl amines (aniline) is lowest.

260 **(c)**

In aqueous solution, basicity order

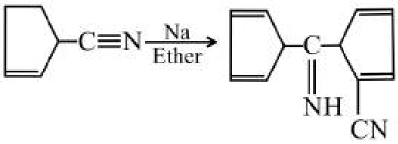
dimethyl amine > methyl amine > trimethyl amine > aniline

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)**

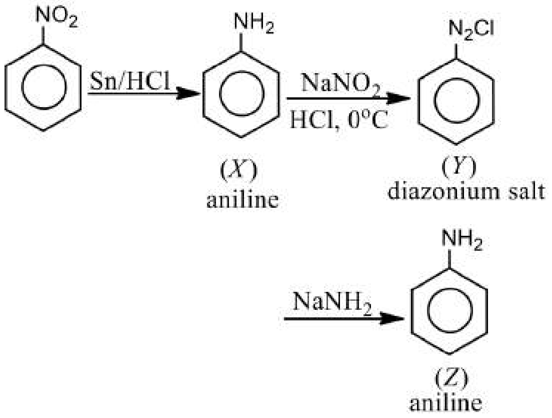


This is thorpe nitrile condensation involving only α-H-atom of nitrile due to strong attraction nature of CN gp.

265 **(a)**

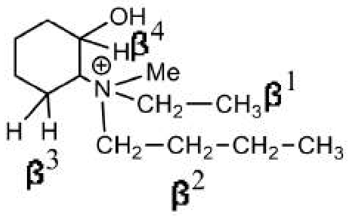
Grabriel's synthesis : Phthalimide is reacted with KOH to form potassium phthalimide. The potassium salt is treated with an alkyl halide. The product N-alkyl phthalimide is put to hydrolyse with hydrochloric acid, then primary amine is formed.

266 **(d)**



∴ *Z* is aniline

267 **(b)**



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

On heating quaternary ammonium salt gives Hofmann elimination (abstraction of most acidic hydrogen which is β^1).

Hence, major product is $CH_2 = CH_2$. (Least substituted alkene).

268 **(b)**

$$C_2H_5NO_2 \xrightarrow{NaOH} CH_3COONa + NH_2OH$$

269 **(b)**

Nitrobenzene is reduced by Zn and alcoholic KOH into hydrazobenzene.

$$2C_6H_5NO_2 + 10H \xrightarrow{Zn+alc.KOH} C_6H_5 - NH - NH - C_6H_5 + H_2O$$

hydrazobenzene

270 **(b)**

$$CH_3NH_2 + CHCl_3 + 3KOH \rightarrow CH_3NC + 3KCl + 3H_2O$$

CH_3NC or $CH_3 - N^+ \equiv C^-$ 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)**

$$(CH_3)_4N^+I^- + NaOH \rightarrow (CH_3)_4N^+OH^- + NaI$$

$$(CH_3)_4N^+OH^- \xrightarrow{\Delta} (CH_3)_3N + CH_3OH$$

methanol

275 **(a)**

$$CH_3CH_2NH_2 \xrightarrow{NaNO_2+HCl} CH_3\,CH_2\,OH + N_2 + H_2O + NaCl$$

Ethylamine

$$NH_2CONH_2 \xrightarrow{NaNO_2+HCl} 2N_2 + H_2O + CO_2 + NaCl$$

Urea

$$CH_3CONH_2 \xrightarrow{NaNO_2+HCl} CH_3\,COOH + N_2 + H_2O + NaCl$$

Acetamide

$$C_6H_5NH_2 \xrightarrow{NaNO_2+HCl} C_6H_5N_2^+Cl^-H_2O + NaCl$$

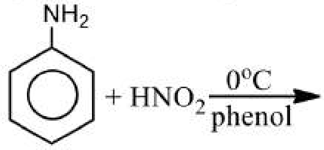
Aniline

276 **(b)**

$$C_2H_5NH_2 + HNO_2 \rightarrow C_2H_5OH + N_2 + H_2O$$

ethyl amine ethyl alcohol

(1°aliphatic amine)



aniline

1°aromatic amine

∴Dye test is used to distinguish between 1°aliphatic and 1° aromatic amine

277 **(c)**

Presence of α-H atom is the main condition for exhibiting tautomerism.

The reactant taken in reaction (*C*) does not contain any α-H atom, thus the product (*Y*) will also show the absence of α-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.

$$(COOC_2H_5)_2 + 2HNHR \rightarrow (CONHR)_2 + 2C_2H_5OH$$

Diethyl oxalate 1° amine solid

$CONR_2$

$(COOC_2H_5)_2 + HNR_2 \rightarrow |$

$COOC_2H_5 + C_2H_5OH$

2°amine liquid

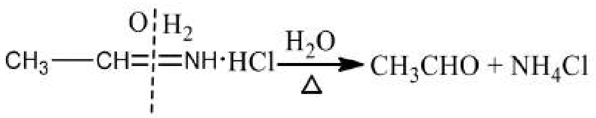
$(COOC_2H_5)_2 + NR_3 \rightarrow$No reaction

3° amino

279 **(a)**

An alkyl cyanide is dissolved in ether or better in ethyl formate or ethyl acetate, and reduced with $SnCl_2$ and HCl and then steam distilled. The whole process is called Stephen reaction. In this process alkyl cyanide is reduced to aldehyde.

$CH_3 - C \equiv NH = 2[H] + HCl \xrightarrow[\text{ether}]{SnCl_2+HCl}$



There is no analogous method for the preparation of ketones.

282 **(a)**

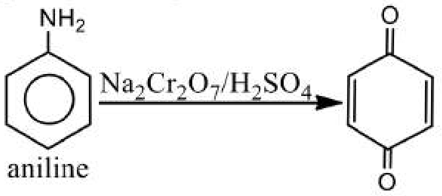
Azoxybenzene is the main product when reducing agent used is $Na_3AsO_3/NaOH$

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 $Na_2Cr_2O_7$and H_2SO_4 gives *p*-benzoquinone.



aniline

p-benzoquinone
(quinone)

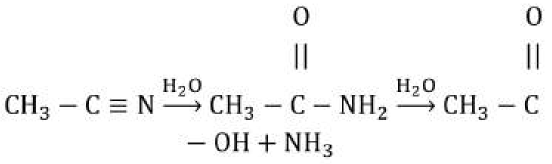
285 **(a)**

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

$CH_3NH_2 < (CH_3)_3\,N < CH_3CH_2N(NH_3)$
$< CH_3CH_2CH_2NH_2$

288 **(b)**

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



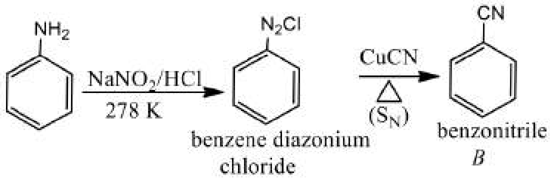
$CH_3 - C \equiv N \xrightarrow{H_2O} CH_3 - \overset{\overset{O}{||}}{C} - NH_2 \xrightarrow{H_2O} CH_3 - \overset{\overset{O}{||}}{C} - OH + NH_3$

Acetonitrile acetamide acetic acid

289 **(a)**

N≡C—CH=CH—C≡N; It has five π-bonds.

292 **(b)**



Formation of *A* is by diazotization and formation of *B* from *A* is by S_N reaction.

293 **(c)**

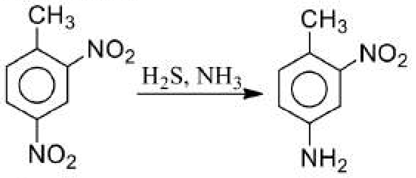
$CCH_3CH_2NH_2 + CHCl_3 + 3KOH$
$\rightarrow CH_3CH_2NC + 3KCl + 3H_2O$

9. (*B*)

This reaction is known as carbylamine reaction

294 **(b)**

By using H_2S, NH_3 as reagent, selective reduction takes place



296 **(b)**

A characteristic reaction of secondary amines.

$(CH_3)_2NH \xrightarrow{HNO_2} (CH_3)_2\ N—N=O$ (nitrosoamine).

299 **(c)**

EDTA is ethylenediamine-tetra acetic acid.

300 **(c)**

$R—CONH_2 + Br_2 + KOH \longrightarrow R—NH_2$

301 **(b)**

C_3H_8O is alcohol and $C_3H_6O_2$ is acid. Thus, C_3H_9N i

302 **(b)**

$R-CN+4[H]\xrightarrow{LiAlH_4}R-CH_2NH_2$

Alkyl nitriles primary amine

303 **(c)**

General formula for any amine is $C_nH_{2n+3}N$; also note that for primary amine, it is $C_nH_{2n+1}\ NH_2$; for secondary amine, it is $C_nH_{2n+2}NH$ and for tertiary amine, it is $C_nH_{2n+3}N$.

304 **(b)**

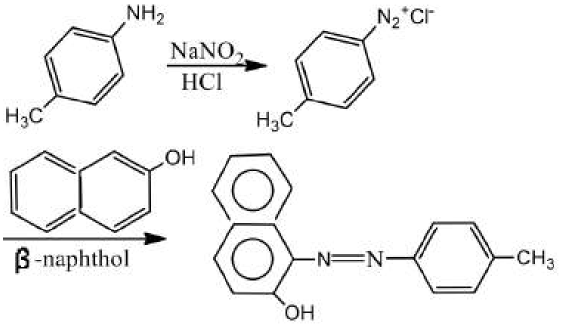
Biuret test is given by compounds having $-CONH_2$gp.

305 **(b)**

$CH_3CH_2-O-N=O$ is a nitrite derivative, hence, it is not a nitro derivative

309 **(c)**

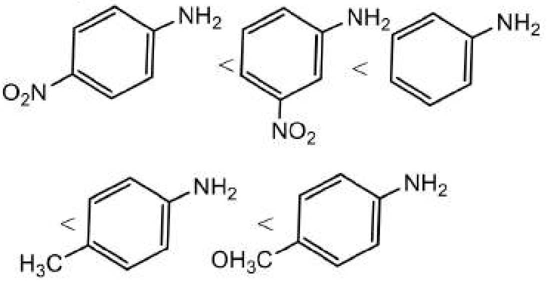
As we know, benzenediazonium salt forms brilliant coloured dye with β-naphthol, the compound under consideration must be *p*-toludine (c) as it is a primary aromatic amine. Primary aromatic amine, on treatment with $NaNO_2$ in dil. HCl forms the corresponding diazonium chloride salt.



310 **(a)**

$-OCH_3$ is strongest electron releasing group (+*M* effect) which opposes most the dispersion of lone pair of electron of nitrogen into the ring.

Thus, $-OCH_3$ being at *para* position imparts hifhest basicity. NO_2 being at *meta* position stabilises the electron pair of nitrogen only by $-I$ effect. While NO_2being 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)**

$R_2NH\ +\ HNO_2\longrightarrow R_2N-N=O\ +\ H_2O$

Nitrosoamines are carcinogens.

318 **(a)**

$R-CN\xrightarrow{\text{Reduction}}RCH_2CH_2$

319 **(a)**

$CH_3NH_2+C_6H_5SO_2CI$

$\rightarrow C_6H_5SO_2NHCH_3$

$\xrightarrow[\text{(alkali)}]{NaOH}C_6H_5SO_2N(Na)CH_3$

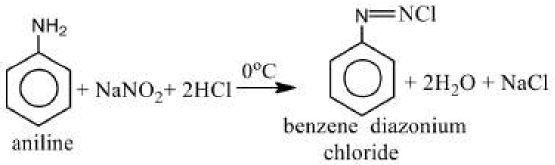
1° amine hinsberg's N-methyl benzene

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.

$C_2H_5NH_2\xrightarrow[\Delta]{CH_3COCl}C_2H_5NHCOCH_3$

N-ethyl acetamide

322 **(b)**

1°aliphatic amines on reduction with HNO_2 form alcohol and evolve N_2.

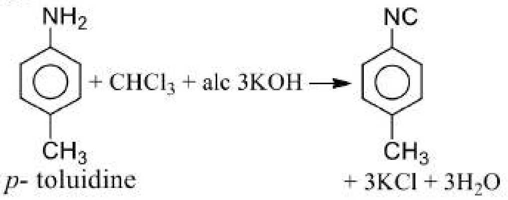
$RNH_2+HONO\xrightarrow{NaNO_2-HCl}ROH+N_2+H_2$

323 **(b)**

$NH_2CONH_2+HNHCONH_2\longrightarrow NH_2CONHCONH_2$

$+NH_3$

324 **(d)**



it is a example of carbylamines reaction

325 **(b)**

$C_6H_5NH_2+CH_3COCl\longrightarrow C_6H_5NHCOCH_3$

326 **(b)**

Due to +ve *IE* in alkylamines and resonance in $C_6H_5NH_2$.

327 **(a)**

Due to +ve *IE* in alkylamines and resonance in $C_6H_5NH_2$.

328 **(c)**

$$CH_3CH_2Br \xrightarrow[\Delta]{aq.KOH} CH_3CH_2OH \xrightarrow[\Delta]{KMnO_4/H^+} CH_3COOH$$

$$\xrightarrow{NH_3} CH_3COONH_4 \overset{\Delta}{\rightarrow} CH_3CONH_2$$

10. Acetic acid

acetamide

(B)

(C)

$$\xrightarrow{Br_2/alkali} CH_3NH_2$$

Methyl amine

(D)

329 **(a)**

Aliphatic primary amines on treatment with $NaNo_2/HCl$ gives alcohols with evolution of nitrogen gas.

$$(CH_3)_2CHNH_2 + HONO \xrightarrow[0°C]{NaNO_2/HCl} (CH_3)_2CHOH + N_2 + H_2O$$

330 **(b)**

$$RNH_2 \xrightarrow{HNO_2} ROH + H_2O + N_2 \uparrow$$

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 pK_b reported in Finar

$$(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N > NH_3$$

3.23 3.32 4.2

4.73

pK_b

$$(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$$

3.07 3.13 3.37

4.73

pK_b

332 **(d)**

The mixture of $SnCl_2 + HCl$, reduces, —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.*,

$$NH_2CONH_2 + HNO_3 \longrightarrow \underset{\text{Urea nitrate}}{NH_2CONH_2 \cdot HNO_3}$$

334 **(b)**

The conversion of —CN to —CH_2NH_2 by catalytic reduction is called Mendius reaction.

335 **(c)**

$$RCONH_2 + NaOH \longrightarrow RCOONa + NH_3$$

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)**

$$HCONHR \xrightarrow{POCl_3} RNC \times H_2O$$

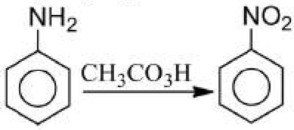
341 **(a)**

$$C_2H_5NC + H_2O \overset{H^+}{\rightarrow} \underset{\text{formic acid}}{HCOOH} + C_2H_5NH_2$$

$$C_2H_5NH_2 + H^+ \rightarrow \underset{\text{salt}}{C_2H_2NH_3^+}$$

342 **(b)**

Aniline on oxidation with per acetic acid, CH_3CO_3H gives nitrobenzene



343 **(d)**

C_3H_9N may have the structures as:

$$\underset{(a)}{(CH_3)_3N}, \underset{(b)}{CH_3CH_2CH_2NH_2}, \underset{(c)}{(CH_3)_2CHNH_2}$$

344 **(b)**

Amines possess fishy smell.

345 **(c)**

$$CH_3NC \xrightarrow{Reduction} CH_3NHCH_3$$

346 **(c)**

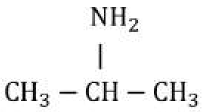
$C_2H_5NH_2$ is stronger base than NH_3. The presence of alkyl group on N-atom intensifies –ve charge on N-atom and thus, electron pair is donated more readily.

$$R \rightarrow \ddot{N}H_2 \qquad H-\ddot{N}H_2$$

(+ve *IE* of alkyl gp.)

347 **(d)**

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



$$CH_3-\underset{}{\overset{NH_2}{\overset{|}{C}H}}-CH_3$$

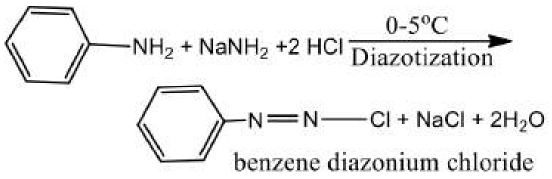
1° amine

349 **(d)**

$(C_2H_5)_2\ddot{N}H$ (2°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° amine is better base than 1° amine and 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.

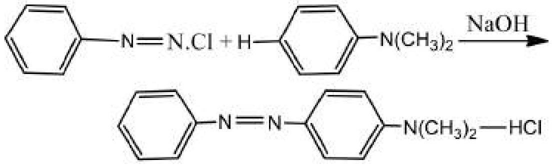
350 **(c)**

Aniline on diazotization in cold (at 0° to 5°C) gives benzene diazonium chloride.



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)**

$$NH_2CONH_2 + HNHCONH_2 \xrightarrow{\Delta} \underset{\text{Biuret}}{NH_2CONHCONH_2}$$

354 **(a)**

$$CH_3CH_2I \xrightarrow{NaCN} CH_3CH_2CN \xrightarrow{OH^-} CH_3CH_2CONH_2 \xrightarrow{Br_2/NaOH} CH_3CH_2NH_2$$

355 **(b)**

This is carbylamine reaction which is used to distinguish 1° amines from other amines. The reaction is given by 1° amines only.

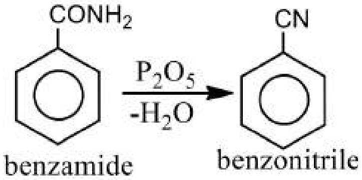
$$C_2H_5NH_2 + CHCl_3 + 3KOH \rightarrow C_2H_5N \overset{=}{\rightarrow} C + 3KCl + 3H_2O$$

$$RNH_2 + CHCl_3 + 3KOH \rightarrow R - N \overset{=}{\rightarrow} C + 3KCl + 3H_2O$$

1°amine chloroform isocyanide (bad smelling)

356 **(d)**

With P_2O_5benzamide loses a water molecule and gives benzonitrile.



Here, P_2O_5 is a dehydrating agent.

357 **(a)**

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

Primary amines > secondary amines > tertiary amines

(1° > 2° > 3°)

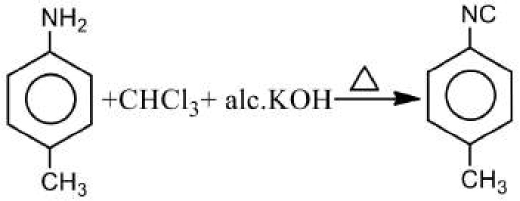
358 **(c)**

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

$$RCONH_2 + Br + 4KOH \rightarrow RNH_2 + K_2CO_3 + 2KBr + 2H_2O$$

amide amine

361 **(d)**



p-toluidine (a carbylamine reaction)

363 **(d)**

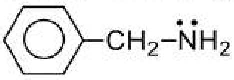
Nitrobenzene is insoluble in water but soluble in benzene alcohol etc.

364 **(c)**

$R—NH_2 + HNO_2 \rightarrow ROH + N_2 + H_2O$; But note that CH_3NH_2 gives CH_3ONO or CH_3OCH_3 on treating with HNO_2.

365 **(d)**

Benzyl amine is the strongest base among the given compounds because lone of $\ddot{N}$ 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.

CH_3CN does not give carbylamine reaction with chloroform because it is not an amine.

CH_3CN undergoes acidic hydrolysis to give carboxylic acid.

$$CH_3CN \xrightarrow{H_2O/H^+} CH_3CONH_2 + NH_3 \xrightarrow{H_2O/H^+} \underset{\text{acetic acid}}{CH_3COOH}$$

CH_3CN undergoes alkaline hydrolysis to give salt of carboxylic acis.

$$CH_3CN \xrightarrow[H_2O]{NaOH} CH_3CONH_2 \xrightarrow[H_2O]{NaOH} \underset{\text{Sodium acetate}}{CH_3COONa} + NH_3$$

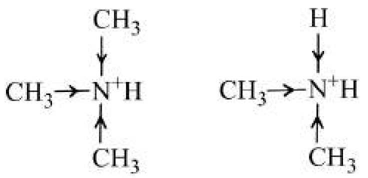
CH_3CN tautomerises to give methyl isocyanide.

$$CH_3-C\equiv N \rightleftharpoons C\equiv N-CH_3$$

367 **(a)**

In vapour phase the basic character of methylamines is $3^{\circ} > 2^{\circ} > 1^{\circ} > NH_3$.

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° 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 $2^{\circ} > 1^{\circ} > 3^{\circ} > NH_3$.

368 **(a)**

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

$$\underset{\text{propyl bromide}}{CH_3CH_2CH_2Br} + KCN \rightarrow \underset{\text{butane nitrile}}{CH_3CH_2CH_2C\equiv N} + KBr$$

369 **(c)**

$$(CH_3)_2CH.NH_2 + 2CH_3COCl \xrightarrow[-HCl]{} (CH_3)_2CH - N(COCH_3)_2$$

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

370 **(a)**

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

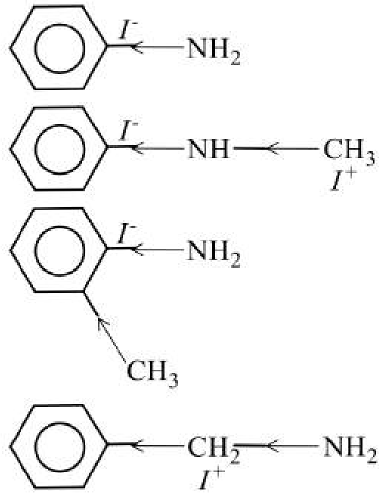
371 **(a)**

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_3- (an electron releasing $(+I)$group) increases electron density at N-atom hence, basic nature is increased.



C_6H_5 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.

$$C_6H_5NC + H_2O \xrightarrow{H^+} C_6H_5NH_2 + HCOOH$$

375 **(b)**

Less substituted alkene is the main product

376 **(a)**

$$RCH_2NO_2 \xrightarrow{HOH} RCOOH + NH_2OH$$

377 **(c)**

$$SnCl_2 + 2HCl(g) \rightarrow SnCl_4 + 2[H]$$

$$CH_3CN + 2[H] + HCl \rightarrow \underset{(X)}{CH_3CH = NH.HCl} \xrightarrow[\text{boil}]{H_2O} \underset{(Y)}{CH_3CHO} + NH_4Cl$$

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

378 **(c)**

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

$$C_6H_5NH_2 + 3CH_3I \rightarrow C_6H_5N^+(CH_3)_3I^-$$

AMINES

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 degradiation and curtius degradation methods are used to prepare 1°amones

Statement 2: Both involves intermolecular alkyl shift

2

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

Statement 2: Cl^- is the leaving group

3

Statement 1: In strongly acidic solutions, aniline becomes more reactive towards electrolphilic 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: Over crowding due to I^+effect of three alkyl groups increases strain

5

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

Statement 2: In carbylamines reaction, $-NH_2$ group changes into$-NC$ group

AMINES

: ANSWER KEY :

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

AMINES

: HINTS AND SOLUTIONS :

1 **(a)**

Hofmann bromamide degrdadation 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 HNO_2, unstable diazonium salt is obtained which readily dissociate to give a carbocation, N_2 and Cl^-(the leaving group). The carbocation upon hydrolysis gives alcohol

$$CH_3CH_2NH_2 \xrightarrow{HONO} CH_3CH_2\overset{+}{N}\equiv N^- Cl$$

$$\longrightarrow CH_3\overset{\oplus}{C}H_2 \xrightarrow{H_2O} CH_3CH_2OH + H^+$$

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 obtaied. On the basis of the name of the product, the reaction is called carbylamines reaction

$$R - NH_2 + CHCl_3 + KOH$$
$$\rightarrow RNC + KCl + H_2O$$

1°amine chloroform alkali isocyanide

or carbylamine