Ravi Maths Tuition

9 Amines

12th Standard

Chemistry

Multiple Choice Question 148 x 1 = 148

1) Nitration of nitrobonzene results in.....

(a) o-dinitrobenzene (b) 1, 3, 5-trinitrobenzene (c) p-dinitrobenzene (d) m-dinitrobenzene

2) Which of the following reactions will not give a primary amine?

(a) $CH_3CONH_2 \xrightarrow{Br_2/KOH}$ (b) $CH_3CN \xrightarrow{LiAiH_4}$ (c) $CH_3NC \xrightarrow{LiAiH_4}$

(d) $CH_3CONH_2 \xrightarrow{LiAiH_4}$

3) $C_6H_5CONHCH_3$ can be converted into $C_6H_5CH_2NHCH_3$ by

(a) $NaBH_4$ (b) H_2-Pd/C (c) $LIAlH_4$ (d) Zn-Hg/HCl

4) $CH_3CH_2 \xrightarrow[\triangle]{Aq.KOH} A \xrightarrow[\triangle]{KMnO_4 \ / \ H^+} B \xrightarrow[\triangle]{NH_3} C \xrightarrow[Alkali]{Br_2} D; D \ \ is$

(a) CH_3Br (b) CH_3CONH_2 (c) CH_3NH_2 (d) $CHBr_3$

5) Amine that cannot be prepared by Gabriel phthalimide synthesis is

(a) aniline (b) benzylamine (c) methylamine (d) isobutylamine (e) tertiary-butylamine

6) Choose the incorrect statement

(a) Primary amines show intermolecular hydrogen bonds. (b) tert-Butylamine is a primary amine.

(c) Tertiary amines do not show intermolecular hydrogen bonds. (d) Isopropylamine is a secondary amine.

(e) Amineshave lower boiling points as compared to those of alcohols of comparable molecular mass.

7) Which of the following is most basic?

(a) Benzylamine (b) Aniline (c) Acetanilide (d) p-Nitroaniline

8) When a primary amine reacts with chloroform and ethanolic KOH, then the product formed is

(a) isocyanide (b) aldehyde (c) cyanide (d) alcohol

9) The amine that reacts with $NaNO_2$+ HCl to give yellow oily liquid is

(a) ethylamine (b) diethylamine (c) isopropylamine (d) secondary but ylamine

10) Ethylamine on heating with CS_2 in presence of $HgCl_2$ forms

(a) C_2H_5NCS (b) $(C_2H_5)_2S$ (c) $(C_2H_5)_2CS$ (d) $C_2H_5(CS)_2$

11) When ethylamine is treated with CH_3MgBr, the product is:

(a) CH_3CH_3 (b) CH_4 (c) $CH_3CH_2CH_3$ (d) $CH_3CH_2CH_2CH_3$

12) When aniline is heated with conc.H_2SO_4 at 455-475 K, it forms:

(a) Aniline hydrogen sulphate (b) m-Aminobenzensulphonic acid (c) Benzenesulphonic acid

(d) Sulphanilic acid

13) Which of the following exists as a zwitterion?

(a) p-Aminophenol (b) Salicylic acid (c) p-Aminophenol (d) Salicylic acid

14) Which of the following will not undergo diazotisation?

(a) m-Toluidine (b) Aniline (c) p-Aminophenol (d) Benzylamine

15) Which of the following compounds gives dye test?

(a) Aniline (b) Methylamine (c) Diphenylamine (d) Ethylamine

16) Which of the following will not show coupling reaction with benzenediazonium chloride?

(a) Aniline (b) Phenol (c) 2-Naphthol (d) Benzyl alcohol

17) When benzenediazonium hydrogen sulphate is warmed with methanol, the product formed is

(a) benzene (b) benzenol (c) benzyl alcohol (d) anisole

18) Which of the following does not react with Hinsberg's reagent?

(a) $C_2H_5NH_2$ (b) $(C_2H_5)_2NH$ (c) $(C_2H_5)_3N$ (d) CH_3NH_2

19) In the following reaction, X is $X \overset{Bromination}{\longrightarrow} Y \overset{NaNO_2 \ /HCI}{\longrightarrow} Z \underset{C_2H_5OH}{\overset{Boiling}{\longrightarrow}} Tribromobenzene$

(a) Benzoic acid (b) Salicylic acid (c) Phenol (d) Aniline

20) The correct IUPAC name for CH_2=$CHCH_2NHCH_3$ is

(a) Allylmethylamine (b) 2-amino-4-pentene (c) 4-aminopent-1-ene (d) N-methylprop-2-en-1-amine

21) Amongst the following, the strongest base in aqueous medium is _____.

(a) CH_3NH_2 (b) $NCCH_2NH_2$ (c) $(CH_3)_2NH$ (d) $C_6H_5NHCH_3$

22) Benzylamine may be alkylated as shown in the following equation: $C_6H_5CH_2NH_2$+R-X $\longrightarrow$ $C_6H_5CH_2NHR$ Which of the following alkyl halides is best suited for this reaction through S_N 1 mechanism?

(a) CH_3Br (b) C_6H_5Br (c) $C_6H_5CH_2Br$ (d) C_2H_5Br

23) Which of the following reagents would not be a good choice for reducing an aryl nitro compound to an amine?

(a) H_2 (excess) / Pt (b) $LiAlH_4$ in ether (c) Fe and HCl (d) Sn and HCl

24) In order to prepare a 1° amine from an alkyl halide with simultaneous addition of one -CH_2 group in the carbon chain, the reagent used as source of nitrogen is _____ .

(a) Sodium amide, $NaNH_2$ (b) Sodium azide, NaN_3 (c) Potassium cyanide, KCN

(d) Potassium phthalimide, $C_6H_6(CO)_2N^-K^+$

25) The source of nitrogen in Gebriel synthesis of amines is..... .

(a) Sodium azide, NaN_3 (b) Soudium nitrite, $NaNO_2$ (c) Potassium cyanide, KCN

(d) Potassium phthalimide, C_6H_4 $(CO)_2$ N^-K^+

26) Amongst the given set of reactants, the most appropriate for preparing 2° amine is..... .

(a) 2° R-Br + NH_3 (b) 2° R-Br+NaCN followed by H_2/Pt (c) 1° R-NH_2+RCHO followed by H_2/Pt

(d) 1° R-Br (2 mol) + potassium phthalimide followed by H_3O^+/heat

27) The best reagent for converting 2-phenylpropanamide into 2-phenylpropanamine is..... .

(a) excess H_2 (b) Br_2 in aqueous NaOH (c) iodine in the presence of red phosphorus (d) $LiAlH_4$ in ether

28) The best reagent for converting, 2-phenylpropanamide into 1-phenylethanamine is..... .

(a) excess H_2/Pt (b) NaOH/Br_2 (c) $NaBH_4$/methanol (d) $LiAlH_4$/ether

29) Hofmann Bromamide Degradation reaction is show by..... .

(a) $ArNH_2$ (b) $ArCONH_2$ (c) $ArNO_2$ (d) $ArCH_2NH_2$

30) Methylamine reacts with NHO_2 to form..... .

(a) CH_3-O-N=O (b) CH_3-O-CH_3 (c) CH_3OH (d) CH_3CHO

31) The gas evolved when methylamine reacts with nitrous acid is..... .

(a) NH_3 (b) N_2 (c) H_2 (d) C_2H_6

32) In the nitration of benzene using a mixture of conc. H_2SO_4 and conc.HNO_3, the species which initiates the reaction is..... .

(a) NO_2 (b) NO^+ (c) NO_2^+ (d) NO_2^-

33) Reduction of aromatic nitro compounds using Fe and HCl gives..... .

(a) aromatic oxime (b) aromatic hydrocarbon (c) aromatic primary amine (d) aromatic amide

34) Nitrobenzene on reaction with conc.HNO_3/H_2SO_4 at 80-100° C forms which one of the following products?

(a) 1, 4-Dinitrobenzene (b) 1, 2, 4-Trinitrobenzene (c) 1,2-Dinitrobenzene (d) 1, 3-Dinitrobenzene

35) The electrolytic reduction of nitrobenzene in strongly acidic medium produces.

(a) azobenzene (b) aniline (c) p-aminophenol (d) azoxybenzene

36) Which of the following compounds will not undergo Friedel-Crafts reaction easily?

(a) Nitrobenzene (b) Toluene (c) Cumene (d) Xylene

37) Number of structural isomers possible from the molecular formula C_3H_9N is

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

38) The total number of structural isomers possible for an amine with molecular formula $C_4H_{11}N$ is

(a) 6 (b) 5 (c) 7 (d) 4 (e) 8

39) In the given set of reactions: $2-Bromopropane \xrightarrow[heat]{alc.AgCN} X \xrightarrow{LiAlH_4} Y$. The IUPAC name of the product Y is

(a) N-isopropylmethanamine (b) N-methylpropan-2-amine (c) N-methylpropanamine (d) butan-2-amine

40) Which of the following amines cannot be prepared by Gabriel's synthesis

(a) Butylamine (b) Isopropylamine (c) 2-Phenylethylamine (d) N-Methylbenzylamine

41) Method by which aniline cannot be prepared is

(a) degradation of benzamide with bromine in alkaline solution

(b) reduction of nitrobenzene with H_2/Pd in ethanol

(c) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

(d) hydrolysis of phenylisocyanide with acidic solution

42) Which on e of the following amines cannot be prepared by Gabriel phthalimide synthesis?

(a) Ethylamine (b) Isopropylamine (c) n-Propylamine (d) Ethylmethylamine

43) Acetamide is treated with the following reagents separatyely. Which one of these would yield methylamine?

(a) PCl_5 (b) NaOH - Br_2 (c) Sodalime (d) Hot. conc.H_2SO_4

44) One of the followng amides will not undergo Hofmann bromamide reaction:

(a) $CH_3CONHCH_3$ (b) $CH_3CH_2CONH_2$ (c) CH_2CONH_2 (d) $C_6H_5CONH_2$

45) Anorganic compound A upon reacting with NH_3 gives B. On heating, B gives C. C in presence of KOH reacts with Br_2 to give $CH_3CH_2NH_2$. A is

(a) CH_3CH_2COOH (b) CH_3COOH (c) $CH_3CH_2CH_2COOH$ (d) $\underset{\underset{CH_3}{|}}{CH_3-CH}-COOH$

46) m-Bromoaniline can be prepared by

(a) $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[2.NaOH,H_2O]{1.Sn-HCI} \xrightarrow[H_2O]{Br_2}$ (b) $C_6H_6 \xrightarrow[FeBr_3]{Br_2} \xrightarrow[H_2SO_4]{HNO_3} \xrightarrow[Pt]{H_2}$

(c) $m-BrC_6H_4COOH \xrightarrow{SOCI_2} \xrightarrow{NH_3} \xrightarrow{Br_2,NaOH}$

(d) $C_6H_5NH_2 \xrightarrow[Cu_2Br_2]{NaNO_2,HCI} \xrightarrow{SOCI_2} \xrightarrow{NaNH_2}$

47) Mendius reduction converts an alkyl cyanide to

(a) a primary amine (b) an aldehyde (c) a ketone (d) an oxime

48) Butylamine (I), dirthylamine (II) and N, N-dimethylethylamine (III) have the same molar mass. The increasing order of their boiling points is

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

49) The correct order of basic strength of CH_3NH_2(I), $(CH_3)_2NH$(II), $(CH_3)_3N$(III), $C_6H_5CH_2NH_2$(IV) in gaseous phase is

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

50) Which of the following is the correct decreasing order of basicity os amines in gaseous phase?

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

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

51) Amongst the following amines, which one has the highest pK_b value in aqueous solution?

(a) Methanamine (b) N, N-Dimethylaniline (c) Ethanamine (d) Benzenamine (e) N, N-Diethylethanamine

52) Which of the following compounds is most basic?

(a) Aniline (b) Cyclohexylamine (c) o-Nitroaniline (d) o-Toluidine (e) p-Methoxyaniline

53) Considering the basic strength of amines in aqueous solution, which one has the smallest pK_b value?

(a) $C_6H_5NH_2$ (b) $(CH_3)_2NH$ (c) CH_3NH_2 (d) $(CH_3)_3N$

54) The strongest base in aqueous solution among the following amines is

(a) N, N-diethylethanamine (b) N-ethylethanamine (c) N-methylmethanamine (d) ethanamine

(e) phenylmethanamine

55) Stronger base is

(a) $C_6H_5NH_2$ (b) CH_2=$CHCH_2NH$ (c) $HC\equiv CCH_2NH_2$ (d) $CH_3CH_2CH_2NH_2$

56) Basicity of $CH_3CH_2NH_2$ (I), CH_3CONH_2 (II) and $C_6H_5CONH_2$ (III) follows the order:

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

57) Among the following, dissociation constant is highest for

(a) C_6H_5OH (b) $C_6H_5CH_2OH$ (c) $CH_3C\equiv CH$ (d) $CH_3NH_3^+CI^-$

58) A compound with molecular mass 180 is acylated with CH_3COCl to get a compound with molecular mass 390. The number of amino groups present per molecule of the former compound is

(a) 6 (b) 2 (c) 5 (d) 4

59) Reaction of cyclohexanone with dimethylamine in the presence of catalytic amount of an acid forms a compound if water during the reaction is continuously removed. The compound formed is generally known as

(a) an enamine (b) a Schiff's base (c) an amine (d) an imine

60) On heating an aliphatic primary amine with chloroform and ethanolic potassium hydroxide, the organic compound formed is

(a) alkyl isocyanide (b) an alkanol (c) an alkanediol (d) an alkyl cyanide

61) In the chemical reaction, $CH_3CH_2NH_2+CHCl_3+3\ KOH \longrightarrow$ (A) + (B) + 3 H_2O. The compopund (A) and (B) are respectively.

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

62) Positive carbylamine test is shown by

(a) N, N-dimethylaniline (b) triethylamine (c) N-methylaniline (d) p-methylbenzylamine (e) dimethylamine

63) The gas leaked from storage tank of the Union Carbide plant in Bhopal gas tragedy was

(a) phosgene (b) methylisocyanate (c) methylamine (d) ammonia

64) The compound which gives an oily nitrosoamine on reaction with nitrous acid at low temperature is

(a) CH_3NH_2 (b) $(CH_3)_2CHNH_2$ (c) CH_3-NH-CH_3 (d) $(CH_3)_3N$

65) Which gives black precipitate on reaction with CS_2 followed by addition of $HgCl_2$?

(a) $(CH_3)_3CNH_2$ (b) $(C_2H_5)_2NH$ (c) $(CH_3)_3N$ (d) all the three

66) Amino group is ortho-, para-directing for aromatic electrophilic substitution. On nitration of aniline, 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 becomes $-NH_3^+$, 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

67) Anilinium hydrogen sulphate on heating with sulphuric acid at 453-473 produces

(a) benzenesulphonic acid (b) anthranilic acid (c) anline (d) m-aminobenzenesulphonic acid

(e) sulphanilic acid

68) $C_6H_5COOH \xrightarrow[2.\triangle]{1.NH_3} P \xrightarrow{NaOBr} Q \xrightarrow[2.\ heat\ to\ 460\ K]{1.\ Conc.H_2SO_4} R$ 'R' is

(a) o-bromosulphanilic acid (b) sulphanilamide (c) sulphanilic acid (d) p-bromosulphanilamide

69) Whaich of the following exist as zwitterion?

(a) p-aminophenol (b) salicylic acid (c) sulphanilic acid (d) Ethanolamine (e) p-aminoacetophenon

70) The compound that will react most ready with NaOH to form methanol is

(a) $(CH_3)_4N^+I^-$ (b) CH_3OCH_3 (c) $(CH_3)_3S^+I^-$ (d) $(CH_3)_3CCl$

71) Which one of the following amines forms a non-acidic and alkali insoluble product with p-toluene sulphonyl chloride?

(a) Tertiary butylamine (b) n-Butylamine (c) Isobutylamine (d) Diethylamine (e) N, N-Dimethylethylamine

72) What reagent is used in Hinsberge test of amines?

(a) $(CH_3CO)_2O$ and pyridine (b) $C_6H_5SO_2Cl$ in aq.NaOH (c) $NaNO_2$ in aq.H_2SO_4

(d) CH_3I (excess) followed by AgOH

73) Which of the following compounds will dissolved in an alkali solution after it undergoes reaction with Hinsberg's reagent?

(a) CH_3NH_2 (b) $(CH_3)_3N$ (c) $(C_2H_5)_2NH$ (d) $C_6H5NHC_6H_5$

74) Which of the following statements about primary amines is 'False' ?

(a) Alkylamines are stronger base than ammonia. (b) Alkylamines are stronger bases than arylamines

(c) Alkylamines react with nitrous acid to produce alcohols

(d) Arylamines react with nitrous acid to produce pheols

75) During the preparation of arenediazonium salts, the excess of nitrous acid, if any, is destroyed by adding.

(a) Aq.NaOH (b) Aq.Na_2CO_3 (c) Aq.NH_2CONH_2 (d) Aq.KI

76) In the diazotisation of aniline with sodium nitrite and hydrochloric acid, the excess of hydrochloric acid is used primarily to

(a) suppress the concentration of free aniline (b) suppress the hydrolysis to phenol

(c) ensure a stochiometric amount of nitous acid (d) neutralise the base liberated

77) Which of the following diazonium salt is most stable?

(a) p-Nitrobenzenediazonium chloride (b) 2, 4-Dinitrobenzenediazonium chloride

(c) 2, 4, 6-Trinitrobenzenediazonium chloride (d) p-Methoxybenzenediazonium chloride

78) In the diazotisation of arylamine, the use of nitrous acid

(a) suppresses hydrolysis of phenol (b) is a source of electropholic nitrosonium ion

(c) neutralise the base liberated (d) all of the above

79) Which of the following will be the most stable diazonium salt, $RN_2^+X^-$?

(a) $CH_3N_2^+X^-$ (b) $C_6H_5N_2^+X^-$ (c) $CH_3CH_2N_2^+X^-$ (d) $C_6H_5CH_2N_2^+X^-$

80) 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

81) Aniline is reacted with bromine water and the resulting product is treated with an aqueous solution of sodium nitrite in presence of dilute HCl. The compound so formed is converted into tetrafluoroborate which is subsequently heated dry. The final product is

(a) p-bromofluorobenzene (b) p-bromoaniline (c) 2, 4, 6-tribromofluorobenzene (d) 1, 3, 5-tribromobenzene

82) Aniline is treated with bromine water to give an organic compound 'X' which when treated with $NaNO_2$ and HCl at gives a water soluble compound 'Y'. Compound 'Y' on treatment with Cu_2Cl_2 and HCl gives compound 'Z'. Compound 'Z' IS

(a) o-bromochlorobenzene (b) p-bromochlorobenzene (c) 2, 4, 6-tribromophenol

(d) 2, 4, 6-tribromochlorobenzene (e) 2, 4-dibromophenol

83) The final product in the following reaction sequence

$$p-Chloroaniline \xrightarrow[0-5^\circ C]{NaNO_2\ /\ HCI} ? \xrightarrow{KCN} ? \xrightarrow{LiAlH_4} ?$$

(a) p-chlorobenzamide (b) p-chlorophenol (c) p-chlorobenzylamine (d) p-chlorobenzyl alcohol

84) The final product in the following sequence of reactions is $C_6H_5NH_2 \xrightarrow[273-278\ K]{NaNO_2\ /\ HCI} A \xrightarrow{C_6H_6/NaOH} B$

(a) $C_6H_5N_2CI$ (b) C_6H_5OH (c) $C_6H_5-C_6H_5$ (d) $C_6H_5N=NOH$

85) Reduction of benzenediazonium chloride with Zn/HCl hives

(a) aniline (b) phenylhydrazine (c) azobenzene (d) hydrazobenzene

86) Which of the following is not the correct reaction of aryldiazonium salts?

(a) $C_6H_5N_2^+CI^- + Cu_2Cl_2 \longrightarrow C_6H_5CI$

(b) $C_6H_5N_2^+CI^- + HBF_4 \xrightarrow{Heat} C_6H_5F$

(c) $C_6H_5N_2^+CI^- + H_3PO_2 \longrightarrow C_6H_5PO_4$

(d) $C_6H_5N_2^+CI^- + SnCI_2/HCI \longrightarrow C_6H_5NHNH_2$

87) For the identification of β- naphthol using dye test, it is necessary to use

(a) dichloromethane solution of β- naphthol (b) acidic solution of β- naphthol

(c) neutral solution of β- naphthol (d) alkaline solution of β- naphthol

88) Isopropylamine can be obtained by

(a) $(CH_3)_2C=O+NH_2OH \longrightarrow ? \xrightarrow{LiAlH_4}$ (b) $(CH_3)_2CO+NH_3 \xrightarrow[\triangle]{Ni/H_2}$

(c) $(CH_3)_2CH-Br+NaNH_2 \longrightarrow$ (d) $(CH_3)_2CH-Br \xrightarrow{NaN_3} ? \xrightarrow{LiAlH_4}$

89) A positive carbylamine test is given by

(a) N, N-dimethylaniline (b) 2, 4-dimethylaniline (c) N-methyl-o-methylaniline (d) p-methylbenzylamine

90) p-Chloroaniline and anilinium hydrochloride can be distinguished by

(a) Sandmeyer reaction (b) $NaHCO_3$ solution (c) $AgNO_3$ solution (d) Carbylamine reaction

91) Which of the following is a 3° amine?

(a) 1-methylcyclohexylarnine (b) Triethylamine (c) tert-butylarnine (d) N-methylaniline

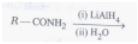
92) IUPAC name of $H_2N - CH_2 - CH_2 - NH_2$ is

(a) ethane-1, 3-diamine (b) ethane-1, 2-diarnine (c) ethyn-1 , 2, diamine (d) ethen-1, 2, diamine

93) What is the common name of 

(a) Aniline (b) Benzenamine (c) Toluidine (d) None of these

94) Which of the following products is formed in the given reaction?

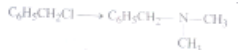


(a) RNH_2 (b) RCH_2NH_2 (c) $RCH_2CH_2NH_2$

95) What would be the side products formed with primary amine in the Hofmann bromamide degradation reaction?

(a) Na_2CO_3 + NaBr (b) NaBr + H_2O + NaOH (c) NaBr + H_2O + Na_2CO_3 (d) Br_2 + H_2O + Na_2CO_3

96) Which of the following reagent is required for the following conversion?



(a) $CH_3NH_2CH_3Cl$ (b) CH_3Cl,RNH_2 (c) NH_3, CH_3Cl (d) $CH_3CH_2NH_2$

97) Choose the correct order of the boiling point of amines.

(a) Primary > secondary > tertiary (b) Secondary > tertiary > primary (c) Tertiary > primary > secondary

(d) Tertiary > secondary > primary

98) Amines on treatment with acids yield salt because they are

(a) basic in nature (b) acidic in nature (c) amphoteric in nature (d) None of these

99) Name the product(s) formed during the reaction of primary aliphatic amines with nitrous acid at room temperature?

(a) $R\,N_2^+Cl^-$ (b) ROH (c) Both (a) and (b) (d) None of the above

100) N-methylbenzamide is formed when methanamine reacts with benzoyl chloride. This reaction is known as

(a) benzoylation (b) Hinsberg test (c) Schmidt reaction (d) Curtius reaction

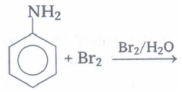
101) $-NH_2$ group in the aniline is activating group and proceed reaction at

(a) only para position (b) only ortho position (c) meta position (d) Both (a) and (b)

102) Which of the following reactions is/are electrophilic substitution?

(a) Bromination of aniline (b) Nitration of aniline (c) Sulphonation of aniline (d) All of the above

103) Which of the following products is formed in the given reaction?

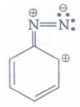
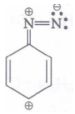
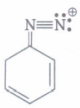
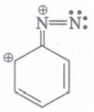


(a)  (b)  (c)  (d) 

104) Which of the following amine will form stable diazonium salt at 273-278K?

(a) $C_2H_5NH_2$ (b) $C_6H_5NH_2$ (c) $C_6H_5CH_2NH_2$ (d) $C_6H_5N(CH_3)_2$

105) The stability of arenediazonium ion is explained on the basis of resonance. Which of the following resonating structure is incorrect?

(a)  (b)  (c)  (d) 

106) The reaction, $\mathrm{ArN_2^+Cl^-} \xrightarrow{\mathrm{Cu/HCl}} \mathrm{ArCl + N_2 + CuCl}$ is named as

(a) Sandmeyer reaction (b) Gattermann reaction (c) Claisen reaction (d) Carbylamine reaction

107) Benzene diazonium chloride when reacts with hypophosphorus acid produces

(a) Benzene (b) Phenol (c) Phenol isocyanide (d) Phenyl phosphate

108) The reagent used for converting benzene diazonium chloride into benzene is

(a) CH_3CH_2OH (b) H_2O (c) HBF_4 (d) KI

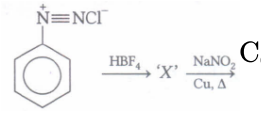
109) Which of the following compound will not undergo azo coupling reaction with benzene diazonium chloride?

(a) Aniline (b) Phenol (c) Anisole (d) Nitrobenzene

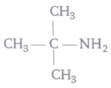
110) The correct name for yellow dye is

(a) p-hydroxy azobenzene (b) p-amino azobenzene (c) o-hydroxyazobenzene (d) o-amino azobenzene

111) The intermediate 'X' in the following reaction is

 $\mathrm{C_6H_5NO_2 + N_2 \uparrow + NaBF_4}$

(a) $\mathrm{C_6H_5\ N = BF_4}$ (b) $\mathrm{C_6H_5\overset{+}{N}_2BF^-{}_4}$ (c) $\mathrm{C_6H_5\ N_2^+BF_2^-}$ (d) $\mathrm{C_6H_5\ N = NBF_4}$

112)  is a

(a) primary amine (b) secondary amine (c) tertiary amine (d) None of these

113) In the reaction $C_6H_5CONH_2 \xrightarrow[\triangle]{Br_2+KOH}$ Major product A is

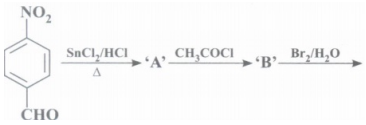
(a) C_6H_6 (b) C_6H_5CHO (c) $C_6H_5NH_2$ (d) C_6H_5COOKI

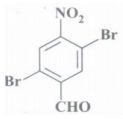
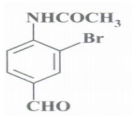
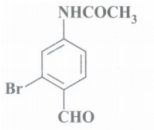
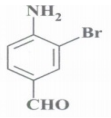
114) Out of the following which one react with $NaNO_2$ + HCl to form alcohol

(a) $C_6H_5NHCH_3$ (b) $(CH_3)_2NH$ (c) CH_3NH_2 (d) C_6H_5NH

115) Which of the following group (s) increases basic strength of substituted aniline?

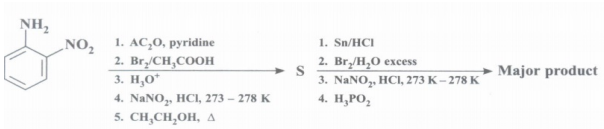
(a) $-\mathrm{OCH}_3$ (b) $-CH_3$ (c) $-SO_3$ (d) Both (a) and (b)

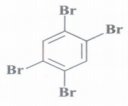
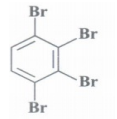
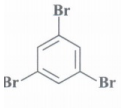
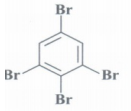
116)  C', Product 'C' is

(a)  (b)  (c)  (d) 

117) The major product of the reaction between m-dinitro benzene with NH_4HS is

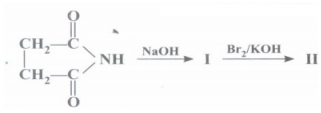
(a) p-Dinitro benzene (b) m-Diamino benzene (c) m-qitroaniline (d) p-Diamino benzene

118) 

(a)  (b)  (c)  (d) 

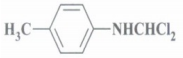
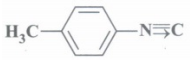
119) An organic compound C_7H_9N forms clear solution when dissolved in KOH after reacting with $C_6H_5SO_2Cl$, 'A' on diazotisation at OQC and then reaction with β-naphthol gives orangish red dye. 'A' on electrophilic substitution gives single product. 'A' is

(a) 4-Methyl aniline (b) 2-Methyl aniline (c) 3-Methyl aniline (d) N-Methyl aniline

120) 

(a) β-Alanine (b) α-Alanine (c) Ethylene diamine (d) Oxamide

121) The reaction of P:Toluidine with $CHCl_3$ and KOH gives

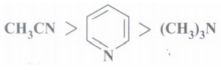
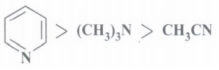
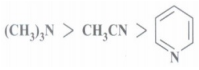
(a)  (b)  (c)  (d) 

122) $'A' \xrightarrow{\text{Reduction}} 'B' \xrightarrow{HNO_2} CH_3CH_2OH$

The compound' A' is

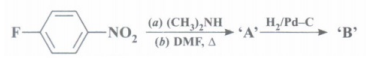
(a) propane nitrile (b) ethane nitrile (c) nitro methane (d) methyl isocyanate

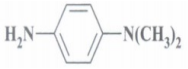
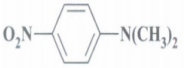
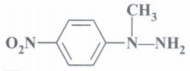
123) Among $(CH_3)_3N$,  and CH_3CN, the electro negativity in the order

(a)  (b)  (c)  (d) all have same

124) Which one of the following can be prepared by Gabriel phthalimide synthesis?

(a) Aniline (b) o-Toluidine (c) Benzylamine (d) N-Methyl ethanamine

125) 

(a)  (b)  (c)  (d) 

126) 4-Nitrotoluene is treated with bromine to get P. 'P' is reduced with Sn/HCl to get compound 'Q'. 'Q' is diazotised and the product is treated with phosphinic acid to get compound 'R'. 'R' is oxidised with alkaline $KMnO_4$ to get 'S'. Compound'S' is

(a) 2-Bromo-4-hydroxy benzoic acid (b) 2-Bromo benzoic acid (c) 3-Bromo benzoic acid

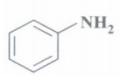
(d) 4-Bromo benzoic acid

127) The order of basic strength of amines in aqueous solution is

(a) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2 > NH_3$ (b) $CH_3NH_2 > (CH_3)_2 NH > (CH_3)_3 > H_3$

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

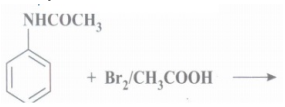
128) Which of the following is the weakest Bronsted base?

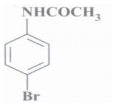
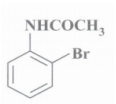
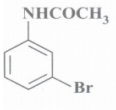
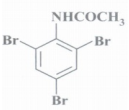
(a)  (b)  (c)  (d) CH_3NH_2

129) Which of the following cannot be prepared by Sandmeyer's reaction?

(a) Chlorobenzene (b) Bromobenzene (c) Iodobenzene (d) Fluorobenzene

130) The product of the following reaction is _____



(a)  (b)  (c)  (d) 

131) Under which of the following reaction conditions, aniline gives p-nitro derivative as the major product?

(a) Acetyl chloride/pyridine followed by reaction with conc. $H_2 SO_4$ + conc. HNO_3 .

(b) Acetic anyhdride/pyridine followed by conc. $H_2 SO_4$ + conc. HNO_3 .

(c) Dil. HCl followed by reaction with conc. $H_2 SO_4$ + cone, HNO_3 .

(d) Reaction with cone. HNO_3 + conc. $H_2 SO_4$.

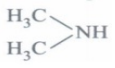
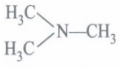
132) Diethyl amine, when treated with HNO_3 gives

(a) Diethyl ammonium nitrite (b) Ethyl alcohol (c) N-nitroso diethyl amine (d) Triethyl ammonium nitrite

133) Choose the amide which on reduction with $LiAlH_4$ gives secondary amine

(a) Ethanamide (b) N-Methyl ethanamide (c) N, N-diethyl ethanamide (d) Benzamid

134) The most reactive amine towards dilute hydrochloric acid is _____

(a) CH_3 - NH_2 (b)  (c)  (d) 

135) Acid anhydrides on reaction with primary amines give _____

(a) amide (b) imide (c) secondary amine (d) imine

136) Which of the following reactions belong to electrophilic aromatic substitution?

(a) Bromination of acetanilide (b) Coupling reaction of aryldiazonium salts (c) Diazotisation of aniline

(d) Acylation of aniline

137) The reduction of benzene diazonium chloride to phenyl hydrazine can be accomplished by

(a) $SnCl_2$ + HCl (b) $Na_2 SO_3$ (c) CH_3CH_2OH (d) $H_3 PO_2$

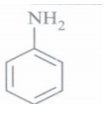
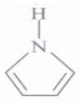
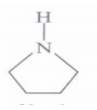
138) The correct decreasing order of basic strength of the following species is _____

H_2O, NH_3 , OH^-, NH^-_2

(a) $NH_2^- > OH^- > NH_3 > H_2O$ (b) $OH^- > NH_2^- > H_2O > NH_3$ (c) $NH_3 > H_2O > NH_2^- > OH^-$

(d) $H_2O > NH_3 > OH^- > NH_2^-$

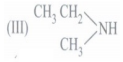
139) Among the following amines, the strongest Bronsted base is _____

(a)  (b) NH_3 (c)  (d) 

140) Which of the following should be most volatile?

(I) $CH_3CH_2CH_2NH_2$

(II) $(CH_3)_3N$

(III) 

(IV) $CH_3CH_2CH_3$

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

141) The correct name of the given reaction is $Ar - N_2^+X^- \xrightarrow{CuCN/KCN} Ar - CN + N_2$

(a) Sandmeyer's reaction (b) Gabriel phthalimide synthesis (c) Carbylamine reaction

(d) Hofmann bromamide degradation reaction

142) Auto-oxidation of chloroform in air and light produces a poisonous gas known as

(a) phosphine (b) mustard gas (c) phosgene (d) tear gas

143) The correct name of the given reaction is

$$Ar - N_2^+X^- \xrightarrow[Cu\ powder]{HBr} Ar - Br + N_2$$

(a) Hofmann bromamide degradation reaction (b) Gabriel phthalimide synthesis (c) Carbylamine reaction

(d) Gattermann reaction

144) Propanamide on reaction with bromine in aqueous NaOH gives

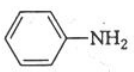
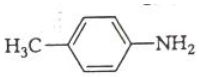
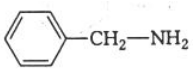
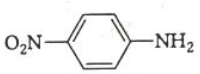
(a) propanamine (b) ethanamine (c) N-methylethanamine (d) propanenitrile

145) IUPAC name of product formed by reaction of methylamine with two moles of ethyl chloride

(a) N,N-dimethylethanamine (b) N,N-diethylmethanamine (c) N-methylethanamine

(d) N-ethyl, N-methylethanamine

146) Among the following which is the strongest base?

(a)  (b)  (c)  (d) 

147) Which of the following would not be a good choice for reducing nitrobenzene to aniline?

(a) $LiAlH_4$ (b) H_2/Ni (c) Fe and HCl (d) Sn and HCl

148) Benzene diazonium chloride on hydrolysis gives.

(a) Phenol (b) Chlorobenzene (c) Benzene (d) Aniline

Fill up / 1 Marks 36 x 1 = 36

149) The IUPAC name of the lowest molecular mass tertiary amine is..... .

150) Ammonolysis of alkylhalides to give amines is an example of .....reactions.

151) Reduction of N-methylacetamide with $LiAlH_4$ in ether gives..... .

152) In Hofmann bromamide reaction, the carbonyl group is lost as..... .

153) .....cannot be prepared by Gabriel phthalimide reaction.

154) Acetonitrile on reduction with sodium and C_2H_5OH gives..... .

155) Reaction of carboxylic acids with hydrazoic acid in presence of conc. H_2SO_4 gives.....with the evolution of CO_2 and..... .

156) Phenyl isocyanide on reduction with hydrogen and Raney nickel gives..... .

157) The reaction of acetone and ammonia in presence of sodium cyanoborohydride gives..... .

158) The boiling points of amines are.....than those of alcohols of comparable molecular mass due to..... .

159) The basic character of an amine is due to presence of.....on nitrogen stom.

160) Benzylamine is.....basic than aniline.

161) Among isomeric o, m- and p-anisidines, ...is the weakest base.

162) Benzenamine reacts with benzoyl chloride in presence of aqueous sodium hydroxide to form.....and the reaction is called.....reaction.

163) Secondary amines react with aldehydes and ketones containing α -hydrogens to form..... .

164) Primary amines on heating with chloroform and alcoholic potash give.....and the reaction is known as..... .

165) N-Methylaniline reacts with nitrous acid to form.....while N, N-dimethylaniline gives..... .

166) .....is formed when ethylamine is heated with CS_2 in presence of $HgCl_2$.

167) The reaction of aniline with sodium nitrite and HCl at 273 K to form benzenediazonium chloride is called..... .

168) Liebermann nitroso reaction is used for the detection of.....amines.

169) Tetra-alkyl ammonium salts are called.....salts.

170) Aniline on treatment with bromine water gives..... .

171) Nitration od acetanilide with con.NHO_3 + conc. H_2SO_4 mixture followed by acid hydrolysis mainly gives..... .

172) Ethanamine reacts with benzenesulphonyl chloride to form.....which deissolves in..... .

173) Carbylamine reaction can be used as a test for..... .

174) .....amine does not react with Hinsberg's reagent.

175) Deamination of arylamines via diazonium salts is best achived by..... .

176) Formation of bromobenzene from benzenediazonium chloride on treatment with CuBr/HBr is called.....reaction.

177) Coupling of diazotised.....with.....gives methyl orange.

178) The conversion of primary aromatic amines into diazonium salts is known as..... .

179) Complete the following reaction equation:
$C_6H_5N_2Cl + H_3PO_2 + H_2O \rightarrow$ .....

180) The pK_b of N, N-Dimethyl aniline is _____than aniline

181) $-OCH_3$ _____ the basic character of amines.

182) $CH_3\ CH_2NH_2$ has_____ boiling point than $(CH_3)_2NH$.

183) The number of isomeric amines which liberate N_2 with HNO_2 are _____

184) The number of isomers of C_7H_9N are _____

True or False 4 x 1 = 4

185) Tertiary amines do not react with Hinsberg's reagent.

(a) True (b) False

186) Tertiary amines form salt with HNO_2 soluble in water

(a) True (b) False

187) Aniline reacts with Conc.H_2SO_4 on heating to give sulphanilic acid.

(a) True (b) False

188) Amides are more basic than amines.

(a) True (b) False

Match the following 16 x 1 = 16

189) Ammonolysis	(1) Conversion to alcohols
190) Gabriel phthalimide synthesis	(2) Amine which does not react with Grignard reagents
191) Homann bromamide reaction	(3) Hinsberg reagent
192) Carbylamine reaction	(4) Gives white ppt. with ammoniacal $AgNO_3$
193) Benzenesulphonyl chloride	(5) Zwitterion
194) Sulphanilic acid	(6) Amine which can be prepared by Gabriel phthalimide reaction
195) Alkyldiazonium salts	(7) Dyes
196) Arydiazonium salts	(8) detection test for primary amines.
197) Ethanamine	(9) With Lucas reagent cloudiness appears after 5 minutes
198) Diethylamine	(10) Alkaline hydrolysis.
199) Triethylamine	(11) Amine which gives Liebermann nitroso reaction
200) Aniline	(12) Amine which gives azo dye test
201) $CH_3CH_2CH_2CH_2NH_2$	(13) With KOH (alcohol) and $CHCl_3$ produces bad smell
202) $CH_3C \equiv CH$	(14) Reaction of alkyl halides with NH_3
203) $CH_3CH_2COOCH_3$	(15) Reaction of phthalimide with KOH and R-X
204) $CH_3CH(OH)\ CH_3$	(16) Amine with lesser number of arbon atoms

Assertion and reason 27 x 1 = 27

205) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis.
Reason (R) Aryl halides do notundergo electrophilic substitution with anion formed by phthalimide.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

206) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) In acylation reaction of amines, equilibrium shifts to the right hand side in the presence of pyridine.
Reason (R) In the presence of strong base, Hel is removed and reaction shifts toward the right hand side.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

207) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Aniline does not undergo alkylation and acetylation.
Reason (R) Nitrogen of aniline acquires positive charge in the presence of $AlCl_3$.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

208) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Benzene diazonium salts are soluble in water.
Reason (R) They are covalent in nature, so they are soluble in water.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

209) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Tertiary butyl amine can be prepared by the action of NH_3 on tert-butyl bromide.
Reason (R) Tertiary butyl bromide being 3° alkylhalide prefers to undergo elimination on the treatment with a base.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

210) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Acetanilide is less basic than aniline.
Reason (R) Acetylation of aniline results in decrease in decrease of electron density of nitrogen.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

211) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Hofmann's bromamide reaction is given by primary amines.
Reason (R) Primary amines are less basic than secondary amines.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

212) In the following questions. an Assertion (A) is followed by a corresponding Reason (R) Use the following keys to choose the appropriate answer.
Assertion (A) Acylation of amines gives a monosubstituted product, whereas alkylation of amines gives polysubstituted product.
Reason (R) Acyl group sterically hinders the approach of further acyl groups.
Codes:
(a) Both (A) and (R) are correct, (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, (R) is not the correct explanation of (A).
(c) (A) is correct; (R) is incorrect.
(d) (A) is incorrect; (R) is correct.

213) **Assertion:** In order to convert R-Cl to pure R-NH_2 , Gabriel pthalimide synthesis can be used.
Reason: With proper choice of alkyl halides, pthalimide synthesis can be used to prepare 1°,2° or 3° amine.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

214) **Assertion:** Ammonolysis of alkyl halides involves the reaction between alkyl halides and alcoholic ammonia.
Reason: Reaction can be used to prepare 1°, 2°, 3° amines and finally quaternary ammonium salts.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

215) **Assertion:** In Hoffmann bromamide reaction, the amine formed has one carbon atom less than the parent 1°amide.
Reason: N-methyl acetamide undergoes Hoffmann bromamide reaction.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

216) **Assertion:** Aniline is a weaker base than ethylamine.
Reason: Lower the value of pK_b stronger is the base.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

217) **Assertion:** Aniline is a weaker base than cyclohexylamine.
Reason: Aniline undergoes halogenation even in the absence of a catalyst.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

218) **Assertion:** Boiling point of amines are lower than those of alcohols and carboxylic acids.
Reason: Amines are much more soluble in water than less polar solvents like alcohol, ether, etc.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

219) **Assertion:** Ammonia is more basic than water.
Reason: Nitrogen is less electronegative than oxygen.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

220) **Assertion:** Carbylamine reaction involves the reaction between 1^o amine and chloroform in basic medium.
Reason: In carbylamine reaction, $-NH_2$ group is converted into - NC group.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

221) **Assertion:** Aniline hydrogen sulphate, on heating, forms p-aminosulphonic acid.
Reason: The sulphonic acid group is electron-withdrawing.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

222) **Assertion:** Me_3N reacts with BF_3 whereas Ph_3N does not.
Reason: The electron pair on nitrogen atom in Ph_3N is delocalised in the benzene ring and is not available for boron in BF_3.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

223) **Assertion:** Controlled nitration of aniline at low temperature mainly gives m-nitroaniline.
Reason: In acidic medium, $-NH_2$ group gets converted into m-directing group.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

224) **Assertion:** Nitration of aniline can be done conveniently by protecting the amino group by acetylation.
Reason: Acetylation increases the electron density in the benzene ring.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

225) **Assertion:** p-Anisidine is weaker base than aniline.
Reason: - OCH_3 group in anisidine exerts +R effect.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

226) **Assertion:** Aniline does not undergo Friedel-Crafts reaction.
Reason: $-NH_2$ group of aniline reacts with $AlCl_3$.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

227) **Assertion:** In strongly acidic solutions, aniline becomes more reactive towards electrophilic reagents.
Reason: The amino group being completely protonated in strongly acidic solution, the lone pair of electrons on the nitrogen is no longer available for resonance.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

228) **Assertion:** In ammonolysis, the order of reactivity of halides with amines is R-I < R-Br > R-Cl.
Reason: Ammonolysis is a nucleophilic substitution reaction.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

229) **Assertion:** Ortho substituted anilines are usually weaker bases than anilines.
Reason: This is due to ortho effect.
Codes:
(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.

230) **Assertion:** Only a small amount of HCI is required in the reduction of nitro compounds with iron scrap and HCI in the presence of steam.
Reason: $FeCl_2$ formed gets hydrolysed to release HCI during the reaction.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertion and reason both are wrong statements.
(c) Assertion is correct but reason is wrong statement.
(d) Assertion is wrong but reason is correct statement.
(e) Assertion and reason both are correct statements but reason is not correct explanation of assertion.

231) In the following question a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.
Assertion: N, N-Diethylbenzene sulphonamide is insoluble in alkali.
Reason: Sulphonyl group attached to nitrogen atom is strong electron withdrawing group.
Codes:
(a) Assertion and reason both are correct and reason is correct explanation of assertion.
(b) Assertion and reason both are wrong statements.
(c) Assertion is correct statement but reason is wrong statement.
(d) Assertion is wrong statement but reason is correct statement.
(e) Both assertion and reason are correct statements but reason is not correct explanation of assertion.

Passage Based Questions 10 x 1 = 10

232) Amines are very reactive due to the difference in electro negativity between nitrogen and hydrogen atoms and due to the presence of unshared pair of electrons over N-atom. The number of hydrogen atoms attached to the N -atorn decides the course of reactions of amine, that is why amines differ in many reactions. In aromatic amines like aniline, electron density at ortho and para-positions with respect to $-NH_2$ group is high. Therefore, this group is ortho or para directing and a powerful activating group.
Amines behave as Lewis base. Why?

233) Amines are very reactive due to the difference in electro negativity between nitrogen and hydrogen atoms and due to the presence of unshared pair of electrons over N-atom. The number of hydrogen atoms attached to the N -atorn decides the course of reactions of amine, that is why amines differ in many reactions. In aromatic amines like aniline, electron density at ortho and para-positions with respect to $-NH_2$ group is high. Therefore, this group is ortho or para directing and a powerful activating group.
Aromatic amines are weaker bases than ammonia. Give reasons?

234) Amines are very reactive due to the difference in electro negativity between nitrogen and hydrogen atoms and due to the presence of unshared pair of electrons over N-atom. The number of hydrogen atoms attached to the N -atorn decides the course of reactions of amine, that is why amines differ in many reactions. In aromatic amines like aniline, electron density at ortho and para-positions with respect to $-NH_2$ group is high. Therefore, this group is ortho or para directing and a powerful activating group.
What is carbylamine reaction?

235) Amines are very reactive due to the difference in electro negativity between nitrogen and hydrogen atoms and due to the presence of unshared pair of electrons over N-atom. The number of hydrogen atoms attached to the N -atorn decides the course of reactions of amine, that is why amines differ in many reactions. In aromatic amines like aniline, electron density at ortho and para-positions with respect to -NH_2 group is high. Therefore, this group is ortho or para directing and a powerful activating group.
Why NH_2 group of aniline is acetylated before carrying out bromination? Give reason.

236) Amines are very reactive due to the difference in electro negativity between nitrogen and hydrogen atoms and due to the presence of unshared pair of electrons over N-atom. The number of hydrogen atoms attached to the N -atorn decides the course of reactions of amine, that is why amines differ in many reactions. In aromatic amines like aniline, electron density at ortho and para-positions with respect to -NH_2 group is high. Therefore, this group is ortho or para directing and a powerful activating group.
Why does aniline does not undergo Friedel-Craft's reaction?

237) Basic character of amines depend upon the ease for the formation of cation by accepting a proton from the acid. The more stable the cation is relative to the amine, more basic is the amine. Basicity of an amine in aqueous solution depends upon stability of ammonium cation formed by accepting proton from water. The stability of ammonium cation depends upon the following three factors:
(i) + I-effect (alkyl group)
(ii) Sterk effect (alkyl group)
(iii) Solvation effect
How does value of pK_b and basicity is related?

238) Basic character of amines depend upon the ease for the formation of cation by accepting a proton from the acid. The more stable the cation is relative to the amine, more basic is the amine. Basicity of an amine in aqueous solution depends upon stability of ammonium cation formed by accepting proton from water. The stability of ammonium cation depends upon the following three factors:
(i) + I-effect (alkyl group)
(ii) Sterk effect (alkyl group)
(iii) Solvation effect
Why pK_b value of aniline is greater than that of methylamine ?

239) Basic character of amines depend upon the ease for the formation of cation by accepting a proton from the acid. The more stable the cation is relative to the amine, more basic is the amine. Basicity of an amine in aqueous solution depends upon stability of ammonium cation formed by accepting proton from water. The stability of ammonium cation depends upon the following three factors:
(i) + I-effect (alkyl group)
(ii) Sterk effect (alkyl group)
(iii) Solvation effect
Arrange the following compounds in the increasing order of their basic strength.
$(CH_3)_2NH_2, (CH_3)_3\ N, C_6H_5NH_2, CH_3NH_2$

240) Basic character of amines depend upon the ease for the formation of cation by accepting a proton from the acid. The more stable the cation is relative to the amine, more basic is the amine. Basicity of an amine in aqueous solution depends upon stability of ammonium cation formed by accepting proton from water. The stability of ammonium cation depends upon the following three factors:
(i) + I-effect (alkyl group)
(ii) Sterk effect (alkyl group)
(iii) Solvation effect
$(CH_3)_2NH$ is more basic than $(CH_3)_3N$ in an aqueous solution. Why?

241) Basic character of amines depend upon the ease for the formation of cation by accepting a proton from the acid. The more stable the cation is relative to the amine, more basic is the amine. Basicity of an amine in aqueous solution depends upon stability of ammonium cation formed by accepting proton from water. The stability of ammonium cation depends upon the following three factors:
(i) + I-effect (alkyl group)
(ii) Sterk effect (alkyl group)
(iii) Solvation effect
How does size of ion affect the solvation effect?

242) Why cannot aromatic primary amines be prepared by Gabriel phythalimid synthesis?

243) Classify the following amines as primary, secondary or tertiary:
(i)

(ii)

(iii) $(C_2H_5)_2CHNH_2$
(iv) $[C_2H_5)_2NH$

244) Write chemical equations for the following conversions:
(i) CH_3-CH_2-Cl into CH_3-CH_2-CH_2-NH_2
(ii) C_6H_5-CH_2-Cl into C_6H_5-CH_2-CH_2-NH_2

245) Arrange the following in decreasing order of their basic strength:
$C_6H_5NH_2$, $C_2H_5NH_2$, $(C_2H_5)_2$ NH, NH_3

246) Complete the following acid-base reactions and name the products:
(a) CH_3-CH_2-CH_2-NH_2 + HCl $\rightarrow$
(b) $(C_2H_5)_3$N+HCl $\rightarrow$

247) How will you convert 4-nitrotoluene to 2-bromobenzoic acid?

248) Write structures and IUPAC names of
(i) the amide which gives propanamide by Hoffmann bromamide reaction.
(ii) the amine produced by the Hofmann degradation of benzamide.

249) How will you convert
(i) Benzene into aniline
(ii) Benzene into N, N-dimethylaniline
(iii) Cl-$(CH_2)_4$-Cl into hexane-1, 6-diamine?

250) Write chemical reaction of aniline with benzoyl chloride and write the name of the product abtained.

251) Convert
(i) 3-Methylaniline into 3-nitrotoluence
(ii) Aniline into 1, 3, 5-tribromobenzene.

252) Accomplish the following conversions:
(i) Nitrobenzene to benzoic acid,
(ii) Benzene to m-bromophenol
(iii) Benzoic acid to aniline,
(iv) Aniline to 2, 4, 6-tribromofluorobenzene,
(v) Benzyl chloride to 2-phenylethanamine
(vi) Chlorobenzene to p-bromoaniline
(vii) Aniline to p-bromoaniline
(viii) Benzamide to toluene
(ix) Aniline to benzyl alcohol.

253) Write the reactions of
(i) aromatic and
(ii) aliphatic primary amines with nitrous acid.

254) Give plausible explanation for each of the following:
(i) Why are amines less acidic than alcohols of comparable molecular masses?
(ii) Why do primary amines have higher boiling points than tertiary amines?
(iii) Why are aliphatic amines stronger bases than aromatic amines?

255) Arrange the following in increasing order of their basic strength:
(i) $C_2H_5NH_2$, $C_6H_5NH_2$, NH_3, $C_6H_5CH_2NH_2$ and $(C_2H_5)2NH$
(ii) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_6H_5NH_2$
(iii) CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, $C_6H_5NH_2$, $C_6H_5CH_2NH$

256) Why is an alkylamine more basic than ammonia?

257) Write one reaction that can be used as a test for primary amines.

258) Give the IUPAC name of
$H_2N\text{-}CH_2\text{-}CH_2\text{-}CH = CH_2$

259) Arrange the following compounds in an increasing order of basic strengths in their aqueous solutions:
NH_3 , CH_3NH_2 , $(CH_3)_2NH$, $(CH_3)_3N$

260) Write a chemical reaction in which the iodide ion replaces the diazonium group in a diazonium salt.

261) Why do amines react as nucleophiles?

262) Mention one commercial use of N, N-Dimethylaniline (DMA).

263) Write the chemical equations for the following chemical reactions:
A primary amine is prepared from a primary alkyl halide.

264) Give a chemical test to distinguish between aniline and N-methlaniline.

265) Why are aqueous solutions of amines basic in nature?

266) How is m-nitroaniline obtained from nitrobenzene?

267) State the reaction taking place when:
Bromine water is added to the aqueous solution of aniline.

268) How is the basic strength of aromatic amines affected by the presence of an electron released group on the benzene ring?

269) Hoe is aniline obtained from benzoic acid?

270) An organic compound 'A' having molecular formula C_2H_7N on treatment with NHO_2 gave an oily yellow substance. Identify 'A' .

271) Give the common and IUPAC name of the following compound:

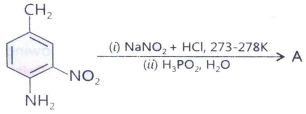
272) What is the role of NHO_3 in the nitrating mixture used for nitration of benzene?

273) Why is NH_2 group of aniline acetylated before carrying out nitration?

274) What is the product when $C_6H_5CH_2NH_2$ reacts with HNO_2 ?

275) What is the best reagent to convert nitrile to primary amine?

276) Give the structure of 'A' in the following reaction.



277) What is Hinsberg reagent?

278) Why isbenzene diazonium chloride not stored and is used immediately after its preparation?

279) Why does acetylation of $-NH_2$ group of aniline reduce its activating effect?

280) Explain why $MeNH_2$ is stronger base than MeOH?

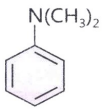
281) Under what reaction conditions (acidic/basic), the coupling reaction of aryldiazonium chloride with aniline is carried out?

282) Predict the product ofreaction of aniline with bromine in non-polar solvent such as CS_2.

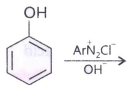
283) Arrange the following compounds in increasing order of dipole moment.
$CH_3CH_2CH_3$, $CH_3CH_2NH_2$, CH_3CH_2OH.

284) What is the structure and IUPAC name of the compound, allyl amine?

285) Write down the IUPAC name of



286) Complete the following reaction.



287) How can you convert aniline to iodobenzene?

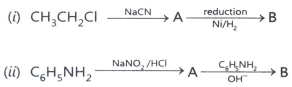
288) Account for the following:
(i) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.
(ii) Amines are more basic than alcoholes of comparable molecular masses.

289) How will you bring about the following conversions?
(i) Nitrobenzene to Phenol.
(ii) Aniline to Chlorobenzene.

290) How will you bring about the following conversions?
(i) Ethanamine to Ethanoic acid
(ii) Aniline to Benzonitrile

291) How will you bring the following conversions?
(i) Methanamine into Iodomethane
(ii) Chlorobenzene into p-chloroaniline.

292) Identify A and B in each of the following process:



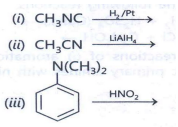
293) Complete the following reaction equations:
$(i)\ C_6H_5NH_2 + CHCl_3 + KOH(alc) \rightarrow$
(ii) $C_6H_5N_2Cl + H_3PO_2 + H_2O \rightarrow$

294) Arrange the following substances:
$C_6H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_2H_5NH_2$
(i) In an increasing order of basic strength in water
(ii) In a decreasing order of basic strength in gas phase.

295) State the reactions and reaction conditions for the following conversions:
(i) Benzene diazonium chloride to nitrobenzene.
(ii) Aniline to benzene diazonium chloride.

296) How will you distinguish between $C_6H_5CH_2NH_2$ and $C_6H_5NH_2$? Write the chemical equations for the reactions involved.

297) Fill in the blanks:



298) Out of ethylamine and ethyl alcohol which has higher boiling boiling point and why?

299) Amino group is o, p-directing for aromatic electrophilic substitution. Why does aniline on nitroaniline?

300) Why does bromination of aniline, even under very mild conditions give 2, 4, 6- tribromoaniline instantaneously?

301) How can you convert p-toluidine to 2-bromo-4-methylaniline?

302) Write IUPAC names of the following compounds and classify them into primary, secondary and teetiary amines.
(i) $(CH_3)_2CHNH_2$
(ii) $CH_3(CH_2)_2NH_2$
(iii) $CH_3NHCH(CH_3)_2$
(iv)$(CH_3)_3CNH_2$

303) According for the following:
(i) Although amino group is o- and p-directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.
(ii) Aniline does not underdo Friedel-Crafts reaction.

304) How will you convert:
(i) Ethanoic acid into methanamine,
(ii) Hexanenitrile into 1-aminopentane?

305) How will you convert:
(i) Methanol to ethanoic acid.
(ii) Ethanamine into methanamine?

306) How will you convert:
(i) Ethanoic acid into propanoic acid,
(ii) Methanamine into ethanamine?

307) How will you convert:
(i) Nitromethane into dimethylamine,
(ii) Propanoic acid into ethanoic acid?

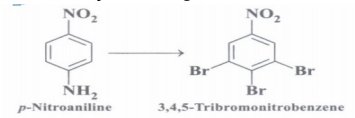
308) Complete the following reactions:
(i) CHNH+HSO(Conc.) $\rightarrow$
(ii) $C_6H_5N_2Cl+C_2H_5OH \rightarrow$

309) How will you carry out the following conversions?
(i) toluene $\longrightarrow$ p-toluidine
(ii) p-toluidine diazonium chloride $\longrightarrow$ p-toluic acid

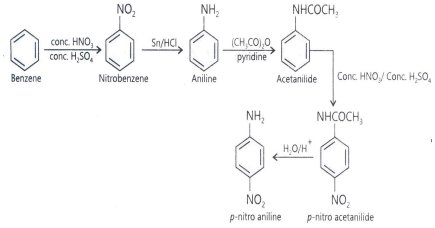
310) Write following conversions:
(i) nitrobenzene$\longrightarrow$ acetanilide
(ii) acetanilide$\longrightarrow$ p-nitroaniline

311) A solution contains 1 g mol. each of p-toluene diazonium chloride and p-nitrophenyl diazonium chloride. To this 1 g mol. of alkaline solution of phenol is added. Predict the major product. Explai9n your answer.

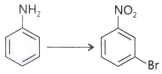
312) How will you bring out the following conversion?



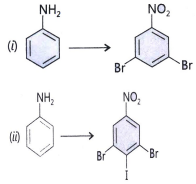
313) How will you cary out the following conversion?



314) How will you carry out the following conversions?



315) How will you carry out the following conversions?



316) During nitration of benzene with a mixture of concentrated nitric acid and concentrated sulphuric acid, nitric acid acts as a base. Explain.

317) Can we prepare aniline by Gabriel phthalimide reaction? Comment. (Or) Aromatic primary amines cannot be prepared by Gabriel phthalimide reaction. Explain.

318) Amines are more basic than comparable alcohols.

319) Rearrange the following in an increasing order of their basic strengths:
$C_6H_5NH_2$, $C_6H_5N(CH_3)_2$, $(C_6H_5)_2NH$ and CH_3NH_2.

320) Predict, giving reasons, the order of basicity of the following compounds in gaseous in gaseous phase.
(i) $(CH_3)_3N$, $(CH_3)_2NH$, CH_3NH_2,NH_3
(ii) $C_2H_5NH_2$, $(C_2H_5)_2NH$, (CH)N, CH_3NH_2

321) How will you distinguish between $(CH_3)_2NH$ and $(CH_3)_3N$?

322) What is the rol of HNO_3 in the nitrating mixture used for nitration of benzene?

323) Why is NH_2 group of aniline acetylated before carrying out nitration?

324) What is the product when $C_6H_5CH_2NH_2$ reacts with NHO_2?

325) What is the best reagent to convert nitrile to primary amine?

326) What is Hinsberg reagent?

327) Why is benzenediazonium chloride not stored and is used immediately after its preparation?

328) Why does acetylation of - NH_2 group of aniline reduce its activating effect?

329) Explain why $MeNH_2$ is stronger base than MeOH?

330) What is the role of pyridine in the acylation reaction of amines?

331) Under what reaction conditions (acidic, basic), the coupling reaction of aryldiazonium chloride with aniline is carried out?

332) Predict the product of reaction of aniline with bromine in non-polar solvent such as CS_2.

333) Arrange the following compounds in increasing order of dipole moment.
$CH_3CH_2CH_3$, $CH_3CH_2NH_2$, CH_3CH_2OH

334) What is the stroctur and IUPAC name of the compound, allyl amine?

335) A compound Z with molecular formula C_3H_9N reacts with $C_6H_5SO_2Cl$ to give a solid, insoluble in alkali. Identify Z.

336) A primary amine, RNH_2 can be reacted with CH_3-X to get secondary amine, R-$NHCH_3$ but the only disadvantage is that 3° amine and quaternary ammonium salts are also obtained as side products. Can you suggest a method where RNH_2 forms only 2° amine

337) Why is aniline soluble in aqueous HCl?

338) Identify A and B in the following sequence of reactions: $CH_3CH_2Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B$

339) Write the main products of the following reactions:
(i) $CH_3 - \underset{\underset{O}{\|}}{C} - NH_2 \xrightarrow{Br_2+NaOH}$
(ii) $CH_3CN \xrightarrow{LiAlH_4}$

340) How can a carboxylic acid be converted to an amine in one step having one carbon atom less?

341) Arrange the following in increasing order of their boiling point:
C_4H_9-NH_2, $(C_2H_5)_2NH$, $C_2H_5N(CH_3)_2$.

342) Arrange the following in increasing order of their boiling point: $C_2H_5NH_2$, C_2H_5OH, $(CH_3)_3N$

343) Arrange the following compounds in increasing order of solubility in water $C_2H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$.

344) What amine salts are used for determining their molecular masses?

345) Why is carbon-nitrogen bond length in aromatic amines shorter tan in aliphatic amines?

346) How is the basic strength of aromatic amines affected by the presence of electron releasing group on the benzene ring?

347) Arrange the following in order of their increasing basicity : p-toluidine, N, N-dimethyl-p-toluidine, p-toluidine p-nitroaniline, aniline.

348) Arrange the following in increasing order of their acid strength:methylamine, dimethylamine, aniline, N-methylaniline.

349) Give a chemical test to distinguish between a primary and a secondary amine.

350) Direct nitration of aniline is not carried at all. Explain why?

351) Aniline gets coloured on standing in air for a long time. Why? (or) Why does aniline turn blackish brown in open air.

352) Mention two important uses of sulphanilic acid.

353) Name one reagent used for the separation of primary, secondary and tertiary amines.

354) A (C_3H_9N) reacts with benzenesulphonyl chloride to give a solid insoluble in alkali. Give the structure of A.

355) Mention the chief use of quaternary ammonium salts derived from long chain amines. (or) What for are quaternary ammonium salts widely used?

356) Write the structure of benzenediazonium chloride.

357) Why are benzenediazonium salts soluble in water?

358) What is Sandmeyer reaction?

359) What is a coupling reaction?

360) Give an example of Gomberg reaction.

361) How is phenylhydrazine prepared from aniline?

362) Name reagents required for preparation of methyl orange indicator (no reaction).

363) What is Baker Mulliken's test? Discuss its chemistry.

364) How will you convert toluene into sym-trinitrobenzene?

365) Write the IUPAC name of the following compounds:

$$H_3C-\underset{H_3C}{\overset{|}{N}}-\underset{C_2H_5}{\overset{CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2CH_3$$

366) Arrange the following is increasing order of their solubility in water
$C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$

367) What is diazotisation? Why are benzenediazonium salts more stable than alkanediazonium salts?

368) In the following sequence of reactions, write the structures of the compounds P, Q and R.

$$P \xrightarrow[Sn/HCI]{Br_2} Q \xrightarrow[(ii)\ H_2O/H_3PO_2]{(i)\ NaNO_2\ /\ HCI,\ 273-278K} R \xrightarrow{KMnO_4\ /\ OH^-} o-Bromobenzoic\ acid$$

369) Write the IUPAC name of the given compound:

370) Give the IUPAC name and structure of the amine obtained when 3-Chlor-butanamide undergoes Hoffmann-bromamide reaction.

371) Arrange the following in increasing order of basic strength: Aniline, p-Nitroaniline and p-Toluidine

372) Give one chemical test to distinguish between $CH_3CH_2NH_2$ and $C_6H_6NH_2$.

373) Write the chemical equations involved in the following reactions:
(i) Hoffmann-bromamide degradation reaction,
(ii) Carbylamine reaction.

374) Explain the following reactions:
(i) Gabriel phthalimide reaction
(ii) Coupling reaction

375) Give chemical tests to distinguish between the following pairs of compounds:
(i) Aniline and Ethylamine
(ii) Ethylamine and Dimethylamine

376) Give reasons:
(i) Aniline is a weaker base than cyclohexyl amine.
(ii) It is difficult to prepare pure amines by an ammonolysis of alkyl halides.

377) Give reasons:
(i) Electrophilic substitution in aromatic amines takes place more readily than benzene.
(ii) CH_3CONH_2 is a weaker base than $CH_3CH_2.NH_2$.

378) Which is soluble in water NH_3 or methylamine?

379) How can you distinguish between p-chloro aniline and anilinium hydrochloride?

380) Which of the following is stronger base?
$CH_2CH_2NH_2$ and F-$CH_2CH_2NH_2$?

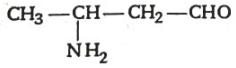
381) Give the name of any two naturally occurring amines.

382) Draw the structure of N-methylethanamine.

383) Draw the structure of 2-aminotoluene.

384) Write the IUPAC name of the following compound and classify it into primary, secondary and tertiary amine.
m-$BrC_6H_4NH_2$

385) Write the IUPAC name of the following compound.

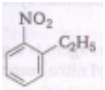


386) Write the IUPAC name of the following compound:
$(CH_3)_2\ N-CH_2CH_3$

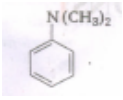
387) Write the IUPAC name of the following compound:
$(CH_3CH_2)_2NCH_3$

388) Write the IUPAC name of the following compound:
$CH_3NHCH(CH_3)_2$

389) Write the IUPAC name of the following compound.



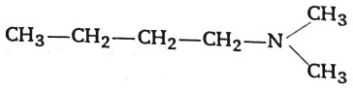
390) Write down the IUPAC name of



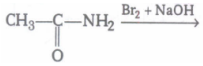
391) Draw the structure of prop-2-en-1-amine.

392) Wrlte the IUPAC name and structure of allyl amine.

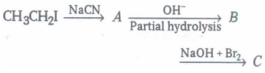
393) Write the IUPAC name of the following compound:



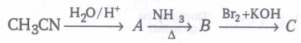
394) Write the main product of the following reaction:



395) Give the structures of A, Band C in the following reaction.

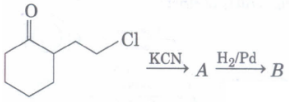


396) Give the structures A, B and C in the following reaction.



397) How will you convert the following?
(i) Nitrobenzene into aniline
(ii) Ethanoic acid into methanamine

398) Identify A and B in the following reaction.



399) Consider the following statement in considering whether amine is 1°,2° or 3°. "The amine is gaseous and smells like ammonia".

400) Why does the higher aliphatic amines are not soluble in water?

401) Arrange the following compounds in the increasing order of basic strength.
$C_6H_5NH_2, C_6H_5NHCH_3, C_6H_5CH_2NH_2$

402) Arrange the following compounds in the increasing order of dipole moment.
$CH_3CH_2CH_3, CH_3CH_2NH_2, CH_3CH_2OH$

403) Give reason why amines are reactive?

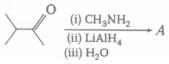
404) In the following reaction, which species behave as a Lewis base?
$R-\ddot{N}H_2+H-X \rightleftharpoons R-NH_3X$

405) Complete the following reaction.
$CH_3CH_2NH_2+CHCl_3+3KOH\ (Alc.) \longrightarrow$

406) Give the chemical test to distinguish between the following pair of compounds, ethylamine and dimethylamine.

407) In this reaction, $RNH_2 \xrightarrow{HNO_2} A+B+C\uparrow$ Name the gas C.

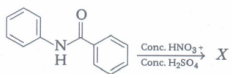
408) What is the major organic compound A, formed from the following reaction?



409) How will you convert the following? Aniline into N-phenylethanamide (write the chemical equations involved).

410) Complete the following reaction.
$C_6H_5NH_2+H_2SO_4(\ Conc.\ ) \longrightarrow$

411) In the following reaction,

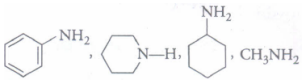


what is the structure of product X?

412) Benzylamine may be alkylated as shown in the following equation:
$C_6H_5CH_2NH_2$+R-X $\longrightarrow$ $C_6H_5CH_2NHR$
Which of the following alkyl halides is best suited for this reaction through S_N 1 mechanism?

413) Arrange the following in the order of their increasing basicity: p-toluidine, N, N-dimethyl-p-toluidine, p-nitroaniline, aniline

414) Write the decreasing order of the following Bronsted bases.



415) Complete the following reactions.
$(i) \mathrm{C_6H_5NH_2} + \mathrm{CHCl_3} + alc.\ 3\mathrm{KOH} \longrightarrow$
$(ii) \mathrm{C_6H_5NO_2} \overset{\mathrm{Fe/HCl}}{\longrightarrow} A \overset{\mathrm{HNO_2}}{\underset{273\ \mathrm{K}}{}} \mathrm{B}$

416) Account for the following.
(i) Methylamine in water reacts with ferric chloride to precipitate hydrated ferric oxide.
(ii) Aniline does not undergo Friedel-Crafts reaction.

417) $C_5H_{13}N$ reacts with HNO_2 to give an optically active alcohol. What is this compound? Give its IUPAC name.

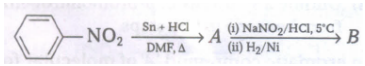
418) Complete the following reactions.
$(i)\ \mathrm{C_6H_5NH_2} + 3\mathrm{Br_2}(aq) \longrightarrow$
$(ii)\ \mathrm{C_6H_5NH_2} + (\mathrm{CH_3CO})_2\mathrm{O} \longrightarrow$

419) Write the structures of A, B and C in the following reactions.
(i)

$$\text{(i)}\ \mathrm{C_6H_5 - CONH_2} \xrightarrow{\mathrm{Br_2}/aq.\mathrm{KOH}} A \xrightarrow{\mathrm{NaNO_2,HCl}} B \xrightarrow[\mathrm{C}]{\mathrm{KI}\downarrow}$$

$$\text{(ii)}\ \mathrm{CH_3Cl} \xrightarrow{\mathrm{KCN}} A \xrightarrow{\mathrm{LiAlH_4}} B \xrightarrow{CHCl_3+alc.KOH} C$$

420) Find the structures of A and B in the following reaction.



421) What is a diazo group?

422) Diazonium salts of aromatic amines are more stable than those of aliphatic amines. Explain.

423) Benzene diazonium salts are more stable than alkyl diazonium salts. Give reason.

424) Write a short note on diazotisation.

425) Benzene diazonium chloride is not stored and used immediately after its preparation. Give reason.

426) Why diazonium group gets easily substituted by other groups?

427) Complete the following reaction.
$\mathrm{C_6H_5\ N_2Cl} + \mathrm{C_2H_5OH} \longrightarrow$

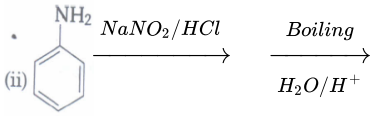
428) Define Gattermann reaction.

429) Write a short note on coupling reaction.

430) Explain the coupling reaction.

431) Complete the following reactions.

(i) $C_6H_5\ N_2^+Cl^- \xrightarrow[(Room\ temperature)]{H_2O}$

(ii) 

432) Why does trimethylamine have an angle of 108°?

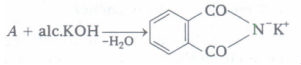
433) Draw the structure of N, N-bis (1-bromo ethyl) ethanamine.

434) Write the IUPAC nomenclature of the compound.

435) Name the reagent that reacts with nitro methane to form methyl hydroxylamine.

436) Find out the incorrect names and correct them.
(a) N-butylaminoethane
(b) 1-amino 2-ethanol
(c) methylaniline (d) propanediamine
(e) 1-phenylaminoethane

437) Give the structure of A in the following reaction:



438) What is the number of 1°H-atoms present in an amine, obtained by reduction of benzamide?

439) Account for the following:
Ammonolysis of alkyl halide does not give a corresponding amine in pure state.

440) Write A in the following sequence:

441) Reduction of nitrobenzene depends upon pH. Give reason.

442) How can you convert an amide into amine having one carbon atom less than the starting compound?

443) What happens when nitro ethane is treated with $LiAlH_4$?

444) Arrange the following in the decreasing order of basic strength in gaseous phase.
$NH_3, (C_2H_5)_2NH, (C_2H_5)_3\ N, C_2H_5NH_2$

445) Which is more acidic, aniline or ammonia?

446) (i) Tert-butylamine cannot be prepared by the action of NH_3 on tert-butylbromide. Give reason.
(ii) How is aminomethane obtained from ethanal?

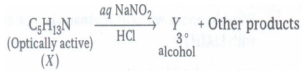
447) Why the hydrogen atoms of the methyl group in o-and p-nitrotoluenes are acidic in nature while those of toluene are not?

448) How will you convert cyclohexane carboxamide to N -methyl cyclohexylamine?

449) Which is the best method for preparing primary amines from alkyl halides, without changing the number of carbon atoms in the chain? Give mechanism.

450) Why does aliphatic amines are more reactive towards hydrochloric acid as comparison to arylamine?

451) What happens when
(i) toluene is treated with conc. HNO_3 and conc. H_2SO_4 at 293 K?
(ii) nitrobenzene is treated with conc. HNO_3 and conc. H_2SO_4 at 363 K?

452) 

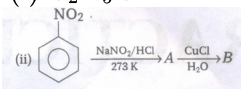
(i) Identify X and Y. (ii) Is Y optically active?

453) Usually, benzene diazonium salts are unstable but benzene diazonium fluoroborate is stable. Why?

454) Aniline is diazotised in cold and then treated with dimethyl aniline to give a coloured product. What is the structure of this product?

455) Identify A and B in the following reactions.

$$\text{(i) } C_2H_5C \equiv N \xrightarrow{LiAlH_4} A \xrightarrow{HNO_2} B$$



456) Starting from toluene, outline a synthesis of each of the following compounds using diazonium salts as intermediates.
(i) p-fluorotoluene
(ii) p-cresol

457) Account for the following:
(i) Amines are basic substances while amides are neutral.

458) (i) Under what conditions, aniline gives p-nitro derivative as the major product?
(ii) Write the IUPAC name of the product formed when nitrobenzene is reduced using tin and concentrated hydrochloric acid.

459) How will you distinguish between the following pairs of compounds?
(i) Ethylamine and trimethylamine
(ii) Aniline and N-methylaniline

460) Which reaction is used to convert primary aromatic amines into their diazonium salts?

461) Name the best reagent for converting 2-phenyl-propanamide into 2-phenylpropanamine?

462) Name the species formed when methylamine reacts with HNO_2.

463) Which gas is evolved when methylamine reacts with nitrous acid?

464) Name the product formed with the reduction of aromatic nitro compounds using Fe and HCl.

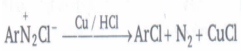
465) Which is the best method for preparing amines from alkyl halides without changing the number of carbon atoms in the chain?

466) Name a reagent which is used to distinguish between primary, secondary and tertiary amine.

467) Name the reagent used to convert nitrile to primary amines.

468) Which ofthe following compound will not undergo azo coupling reaction with benzene diazonium chloride?

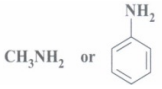
469) What is the name given to the following reaction?



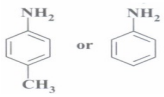
470) Out of CH_3NH_2 and $(CH_3)_3N$, which one has higber boiling point?

471) Arrange the following compounds in increasing order of solubility in water:
$C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$

472) Which of the two is more basic and why?



473) Which of the two is more basic and why?



474) Which of the two is more basic and why CH_3NH_2 or NH_3?

475) Arrange the following in increasing order of basic strength:
$C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5N(CH_3)_2$

476) Arrange the following in increasing order of basic strength:
$C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5CH_2NH_2$

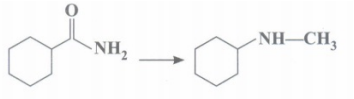
477) Arrange in decreasing order of basic strength in gas phase:
$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$, NH_3

478) Give a chemical test to distinguish between Aniline and Ethanamine.

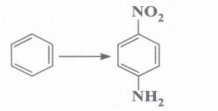
479) Give the significance of coupling reaction of aryldiazonium salts.

480) Arrange the following in increasing order of basic character:
(a) $C_6H_5NH_2$, CH_3NH_2, $(C_2H_5)_2NH$, $C_6H_5N(CH_3)_2$
(b) $C_2H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$, $C_6H_5NHCH_3$ in decreasing order of pK_b.

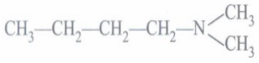
481) Suggest a route by which the following conversion can be accomplished.



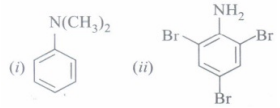
482) How will you carry out the following conversion?



483) (a) Name the best reagent to convert nitrile to primary amine?
(b) write the IUPAC name of



484) Write down the IUPAC name of

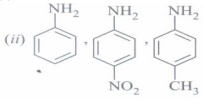


485) Name the process to convert aromatic primary amine to diazonium salt.

486) Acccount for the following:
On reaction with benzene sulphonyl chloride, primary amine yields product soluble in alkali whereas secondary amine yield product insoluble in alkali.

487) Propanamine and N, N-dimethylmethanamine contain the same number of carbon atoms, even though Propanamine has higher boiling point than N, N-dimethylmethanamine. Why?

488) Arrange the following in increasing order of their basic strength.
(i) $C_6H_5NH_2$, $C_6H_5CH_2NH_2$, $C_6H_5NHCH_3$



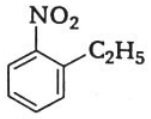
489) Arrange the following:
(i) In increasing order of their basic strength:
$C_6H_5NH_2$, $CH_3CH_2NH_2$, CH_3NHCH_3
(ii) In increasing order of solubility in water:
CH_3NH_2 , $(CH_3)_2N$, $(CH_3)_2NH$

490) Arrange the following:
(i) In increasing order of basic strength:
$C_6H_5NH_2$, $CH_3CH_2NH_2$, $C_6H_5NHCH_3$
(ii) In increasing order of boiling point:
C_2H_5OH, $CH_3CH_2NH_2$, CH_3NHCH_3

491) Carry out the following conversions:
(a) Nitrobenzene to aniline
(b) Aniline to phenol

492) (a) Write a chemical test to distinguish between dimethyl amine and ethanamine.
(b) Write the product formed when benzene diazonium chloride is treated with KI.

493) Write the IUPAC name of the following compound.



494) Write the IUPAC names of the following compounds and classify them into primary, secondary and tertiary amines.
(i) $C_6H_5NHCH_3$
(ii) $(CH_3CH_2)_2$ - N - CH_3

495) Ammonolysis of alkyl halides is not a good method to prepare pure primary amines.

496) Arrange the following in increasing order of their boiling points,
C_2H_5OH, $C_2H_5NH_2$, $(C_2H_5)_3N$.

497) Write the reaction involved in carbylamine test.

498) Write the IUPAC names of the following compounds and classify them into primary, secondary and tertiary amines.
(i) $CH_3NHCH(CH_3)_2$
(ii) $(CH_3)_3CNH_2$

499) Convert bromoethane to propanamine.

500) Give a chemical test to distinguish between N-methylethanamine and N,N-dimethyl ethanamine.

501) Identify A,B and C in the following reactlons:

$$CH_3CH_2Cl \xrightarrow{KCN} A \xrightarrow{H_2/NI} B \xrightarrow{CH_3COCl/Base}$$ C

3 Marks 89 x 3 = 267

502) Draw the structures of different isomers corresponding to the molecular formula, C_3H_9N. Write the IUPAC names of the isomers which will liberate nitrogen gas on treatment with nitrous acid.

503) (i) Give the structures of different isomeric amines corresponding to the molecular formula, $C_4H_{11}N$.
(ii) Write the IUPAC names of all the isomers.
(iii) What type of isomerism is exhibited by different pairs of amines?

504) Write chemical equations for the following reactions:
(i) Reaction of ethanolic NH_3 with C_2H_5Cl
(ii) Ammonolysis of Benzyl chloride and reaction of amine so formed with two moles of CH_3Cl.

505) An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula C_6H_7N. Write the structures and IUPAC names of compounds A, B and C.

506) Describe a method for the identification of primary, secondary and tertiary amines. Also write chemical equations of the reactions involved.

507) Write reactions of the final alkylation product of aniline with excess of methyl iodide in the presence of sodium carbonate solution.

508) Write IUPAC names of the following compounds and classify them into primary, secondary and tertiary amines.
(i) $(CH_3)_2CHNH_2$
(ii) $CH_3(CH_2)_2NH_2$
(iii) $CH_3NHCH(CH_3)_2$
(iv) $(CH_3)_3CNH_2$
(v) $C_6H_5NHCH_3$
(vi) $(CH_2CH_2)_2NCH_3$
(vii) m-$BrC_6H_4NH_2$.

509) Give the structures of A, B and C in the following reactions.
(i) $\mathrm{CH_3CH_2I \xrightarrow{NaCN} A \xrightarrow[\text{Partial hydrolysts}]{OH} B \xrightarrow{NaOH+Br_2} C}$
(ii) $\mathrm{C_6H_5\ N_2Cl \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B \xrightarrow[\Delta]{NH_3} C}$
(iii) $\mathrm{CH_3CH_2Br \xrightarrow{KCN} A \xrightarrow{LAAH_4} B \xrightarrow[0^\circ C]{HNO_2} C}$
(iv) $\mathrm{C_6H_5NO_2 \xrightarrow{Fe/HCl} A \xrightarrow[273\ K]{NaNO_2+HCl} B \xrightarrow[\Delta]{H_2O/H^+} C}$
(v) $\mathrm{CH_3COOH \xrightarrow[\Delta]{NH_3} A \xrightarrow{NaOBr} B \xrightarrow{NaNO_2/HCl} C}$
(vi) $\mathrm{C_6H_5NO_2 \xrightarrow{Fe/HCl} A \xrightarrow[273\ K]{HNO_2} B \xrightarrow{C_6H_5OH} C}$

510) Give one chemical test to distinguish between the following pairs of compounds.
(i) Methylamine and dimethylamine
(ii) Secondary and tertiary amines
(iii) Ethylamine and aniline
(iv) Aniline and benzylamine
(v) Aniline and N-methylaniline

511) Write chemical equations for the following conversions:
(i) Nitrobenzene to benzoic acid
(ii) Benzyl chloride to 2-phenylethanamine.
(iii) Aniline to benzyl alcohol.

512) Illustrate the following reactions giving a chemical equation in each case:
(i) Gabriel phthalimide synthesis
(ii) A coupling reaction.
(iii) Hoffmann's bromamide reaction.

513) Complete the following chemical equations:
(i) $C_6H_5N_2Cl+C_6H_5NH_2 \xrightarrow{OH^-}$
(ii) $C_6H_5N_2Cl+CH_3CH_2OH \rightarrow$
(iii) $RNH_2+CHCl_3+KOH \rightarrow$

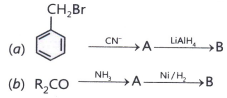
514) Complete the folowing reaction equations:
(i) $C_6H_5N_2Cl+CH_3COCl \longrightarrow$
(ii)$C_2H_5NH_2+C_6H_5SO_2Cl \longrightarrow$
(iii) $C_2H_5NH_2+HNO_2 \longrightarrow$

515) How are the following conversions carried out?
(i) Aniline to nitrobenzene
(ii) Ethanamine to N-ethylethanamid
(iii) Chloroethane to propan-1-amine

516) Give one chemical test each to distinguish between the compounds in the following pairs:
(i) Methyleamine and dimethylamine
(ii) Aniline and benzylamine
(iii) Ethylamine and aniline

517) How would you achieve the following conversions?
(i) Nitrobenzene to aniline
(ii) An alkyl halide to a quaternary ammonium salt.
(iii) Aniline to benzonitrile.
Write the chemical equation with reaction conditions in each case.

518) (i) Stating the necessary reaction condition write chemical reaction equations to obtain the following:
Chlorobenzene from aniline
(ii) Identify A and B in the following:



519) A compound 'A' of molecular formula $C_3H_7O_2N$ on reactin with Fe and conc.HCl gives a compound 'B' of molecular formula C_3H_9N. Compound 'B' on treatement with $NaNO_2$ and HCl gives another compound 'C' of molecular formula C_3H_8O. The compound 'C' gives effervescence with Na. On oxidation with CrO_3, the cmpound 'C' gives a saturated aldehyde containing three carbon atoms. Deduce the structures of A, B and C and write the equations for the reaction involved.

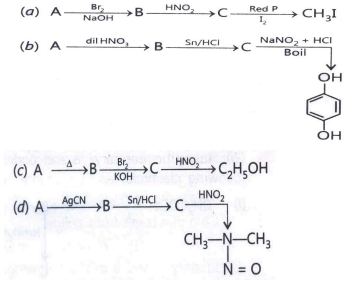
520) A compound 'X' having molecular formula C_3H_7NO, reacts with Br_2 in presence of KOH to give another compound 'Y'. The compound Y reacts with NHO_2 to form ethanol and N_2 gas. Identify the compounds X and Y and write the reactions involved.

521) An aliphatic compound 'A' with molecular formula C_2H_3Cl on treatment with AgCN hives two isomeric compounds of unequal amounts with the molecular formula C_3H_3N. The minor of nthese two products on complete reduction with H_2 in the presence of Ni gives a compound 'B' with molecular formula C_3H_9N. Identify the compounds 'A' , 'B' and write the reactions involved.

522) Iodomethane reacts with KCN to form a major product 'A' . Compund 'A' on reduction in presence of $LiAlH_4$ forms a higher amine 'B'. Compound B on treatment with $CuCl_2$ frms a blue colour complex 'C'. Identify the compounds 'A', 'B' and 'C' .

523) An organic compound 'A' having molecular formula C_3H_5N on hydrolysis gave another compound 'B' The compound 'B' on treatment with $CHCI9_3$ and alcoholic caustic potash gave an offensive smelling substance 'C' . Identify 'A' , 'B' and 'C'.

524) Identify the compounds A, B and C in the following reactions:



525) What is Gabriel phthalimide synthesis? For what purpose is it used? Give equation only to explain your answer.

526) Carry out following conversions:
(a) Toluene to m-bromotoluene
(b) Benzene to m-bromoaniline

527) Explain why the amino group in aniline acts as a powerful activator and ortho and para director towards electrophilic substitution reaction.

528) An organic compound 'A' having molecular formula $C_2H_5O_2N$ reacts with HNO_2 and gives'B' $C_2H_4O_3N_2$. On reduction, 'A' gives a compound 'C' on treatment with HNO_2 gives 'D' which gives positive iodoform test. Identify 'A' .

529) Two isomeric compounds A and B having molecular formula $C_4H_{11}N$, both lose N_2 on treatment with HNO_2 and gives compound C and D respectively. C is resistant to oxidation but immediately responds to Lucas reagent, where as 'D' responds to Lucas reagent after 5 minutes and gives a positive iodoform test. Identify A and B.

530) Arrange the following in increasing order of this basic strength:
(a) $C_2H_5NH_2$, $C_6H_5NH_2$, NH_3, $C_6H_5CH_2NH_2$ and $(C_2H_5)_2$ NH
(b) $C_2H_5NH_2$, $(C_2H)_2NH$, $(C_2H_5)_3N$, $C_6H_5NH_2$
(c) CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, $C_6H_5NH_2$, $C_6H_5CH_2NH_2$

531) Accomplish the following conversions:
(i) Benzene to m-bromophenol
(ii) Benzoic acid to aniline

532) Accmplish the following conversions:
(i) Aniline to 2,4,6-tribromofluorobenzene
(ii) Benzyl chloride to 2-phenylethanamine
(iii) Chlorobenzene to p-chloroaniline.

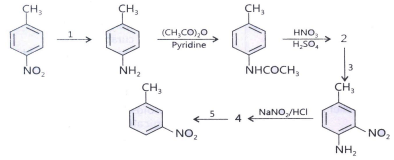
533) Accomplish the following conversions:
(i) Aniline to p-bromoaniline
(ii) Benzamide to toluene
(iii) Aniline to benzyle alcohol

534) Complete the following reactions:
(i)$C_6H_5NH_2 + Br_2(aq) \rightarrow$
(ii)$C_6H_5NH_2 + (CH_3CO)_2O \rightarrow$
(iii)$C_6H_5N_2Cl \xrightarrow[(ii)NaNO_2/Cu,\Delta]{(i)HBF_4}$

535) Give plausible explanation for each of the following:
(i) Why are amines less acidic than alcoholes of comparable molecular masses?
(ii) Why do primary amines has higher boiling point than tertiary amines?
(iii) Why are aliphatic amines stronger bases than aromatic amines?

536) A colourless substance 'A' (C_6H_7N) is sparingly soluble in water and gives a water soluble compound 'B' on treating with mineral acid. On reacting with $CHCl_3$ and alcoholic potash 'A' produces an obnoxious smell due to the formation of compoung 'C'. Reaction of 'A' with benzenesulphonyl chloride gives compound 'D' which is soluble in alkali. With $NaNO_2$ and HCl, 'A' forms compound 'E' which reacts with phenol in alkaline medium to give an orange dye 'F' . Identify compounds 'A' to 'F'.

537) Predict the reagent or the product in the following reaction sequence.



538) Why does bromination of aniline, even under very mild conditions, gives 2, 4, 6-tribromoaniline instantaneously?

539) Write the structures of A, Band C in the following:
(i) C_6H_5-$CONH_2$
(i) $CH_3 - CI \xrightarrow{KCN} A \xrightarrow{LiAIH_4} b \xrightarrow{CHCI_3+alc.KOH} C.$

540) Give the structures of A, B and C in the following reaction:
(a) $C_6H_5NO_2 \xrightarrow{Fe/HCI} A \xrightarrow{HNO_2;273K} B \xrightarrow{C_6H_5OH} C$
(b) $C_6H_5N_2CI \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B \xrightarrow{NH_3;\triangle} C$

541) Give the structure of A, B and C in the following reactions:
(i) $C_6H_5NO_2 \xrightarrow{Sn/HCI} A \xrightarrow[273K]{NaNO_2+HCI} B \xrightarrow{H_2O} C$
(ii) $CH_3CN \xrightarrow{H_2O/H^+} A \xrightarrow[\triangle]{NH_3} B \xrightarrow{Br_2+KOH} C$

542) Give the structure of A, B and C in the following reactions:

(i) $CH_3Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow[273K]{HNO_2} C$

(ii) $CH_3COOH \xrightarrow[\triangle]{NH_3} A \xrightarrow{Br_2+KOH} B \xrightarrow{CHCl_3+NaOH} C$

543) How will you convert the following:
(i) Nitrobenzene into aniline,
(ii) Ethanoic acid into methenamine,
(iii) Aniline into N-phenylethanamide.
(Write the chemical equations involved.)

544) Give reasons for the following:
(i) Aniline does not undergo Friedel-Crafts reaction,
(ii) $(CH_3)_2NH$ is more basic than $(CH_3)_2N$ in an aqueous solution,
(iii) Primary amines have higher boiling point than tertiary amines.

545) Account for the following:
(i) Primary amines $(R\text{-}NH)_2$ have higher boiling point than tertiary amines $(R_3\text{-}N)$.
(ii) Aniline does not undergo Friedel-Crafts reaction.
(iii) $(CH_3)_2$ NH is more basic than $(CH_3)_3$ N in an aqueous solution.

546) Which type of reagent is a good choice for reducing an aryl nitro compound to an amine?

547) Account for the following.
(i) Primary amines $(R\text{-}NH_2)$ have higher boiling point than tertiary amines (R_3N).
(ii) $(CH_3)_2NH$ is more basic than $(CH_3)_3N$ in an aqueous solution.

548) Arrange the following.
(i) in the decreasing order of basic strength in gas phase
$C_2H_5NH_2, (C_2H_5)_2NH, (C_2H_5)_3\ N \text{ and } NH_3$
(ii) in the increasing order of boiling point
$C_2H_5OH, (CH_3)_2NH, C_2H_5NH_2$.
(iii) in the increasing order of solubility in water
$C_6H_5NH_2, (C_2H_5)_2NH, C_2H_5NH_2$.

549) Arrange the following
(i) In the decreasing order of pK_b values
$C_2H_5NH_2, C_6H_5NHCH_3, (C_2H_5)_2NH \text{ and } C_6H_5NH_2$
(ii) In the increasing order of basic strength
$C_6H_5NH_2, C_6H_5\ N(CH_3)_2, (C_2H_5)_2NH$ and CH_3NH_2
(iii) In the increasing order of basic strength.
$C_6H_5NH_2, C_6H_5NHCH_3, C_6H_5CH_2NH_2$

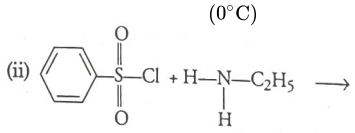
550) Arrange the following in the increasing order of their basic strength.
$(i) C_2H_5NH_2, C_6H_5NH_2, NH_3, C_6H_5CH_2NH_2\ and\ (C_2H_5)_2NH$
$(ii) C_2H_5NH_2, (C_2H_5)_2NH, (C_2H_5)_3\ N, C_6H_5NH_2$
$(iii) CH_3NH_2, (CH_3)_2NH, (CH_3)_3\ N, C_6H_5NH_2 C_6H_5CH_2NH_2$

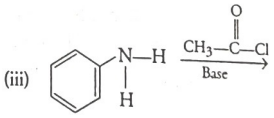
551) How will you convert
(i) ethanamine into methanamine?
(ii) ethanoic acid into propanoic acid?
(iii) methanamine into ethanamine?

552) How will you convert
(i) ethanoic acid into methanarnine?
(ii) hexane nitrile into 1-aminopentane?
(iii) methanol into ethanoic acid?

553) Write the main products of the following reactions.

(i) $CH_3CH_2NH_2 \xrightarrow[(0^\circ C)]{HNO_2}$

(ii) 

(iii) 

554) Accomplish the following conversions.

(i) Benzyl chloride to 2-phenylethanamine

(ii) Chlorobenzene to p-chloroaniline

555) Account for the following.

(i) Although, amino group is o-and p-directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.

(ii) Gabriel phthalimide synthesis is preferred for synthesising primary amines.

556) Give reasons for the following.

(i) Acetylation of aniline reduces its activation effect.

(ii) CH_3NH_2 is more basic than $C_6H_5NH_2$

557) Identify A, B and C in the following reactions.

(i) $CH_3CH_2Cl \xrightarrow{KCN} A \xrightarrow{H_2/Ni} B \xrightarrow{CH_3COCl/\ Base} C$

(ii) $C_6H_5\ N_2^+Cl^- \xrightarrow{HBF_4} A \xrightarrow[\triangle]{NaNO2/Cu} B \xrightarrow{Sn/HCl} C$

558) Accomplish the following conversions.

(i) Aniline to 2, 4, 6-tribromofluorobenzene

(ii) Nitrobenzene to benzoic acid

(iii) Benzene to m-bromophenol

559) Accomplish the following conversions.

(i) Aniline to p-bromoaniline

(ii) Benzamide to toluene

(iii) Aniline to benzyl alcohol

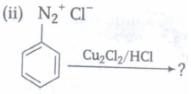
560) Give the structures of A, B and C in the following reactions.

(i) $C_6H_5\overset{+}{N}_2Cl^- \xrightarrow{CuCN} A \xrightarrow[\Delta]{H_2O/H^+} B \xrightarrow{NH_3} C$

(ii) $C_6H_5NO_2 \xrightarrow{Sn+HCl} A \xrightarrow[273\ K]{NaNO_2+HCl} B \xrightarrow[\Delta]{H_2O/H^+} C$

561) Write the major product(s) in the following reactions.

(i) $C_6H_5 - NO_2 \xrightarrow{Sn/HCl} ?$

(ii) 

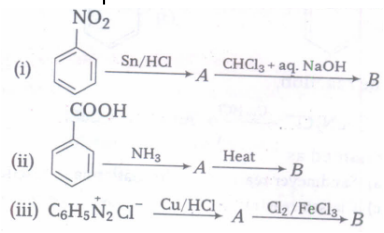
(iii) $CH_3CONH_2 \xrightarrow{Br_2/KOH(aq.)} ?$

562) Write the structures of compounds A,B and C in the following reactions.

(i) $CH_3 - COOH \xrightarrow{NH_3/\Delta} A \xrightarrow{Br_2/KOH(aq)} B \xrightarrow{CHCl_3+alc.KOH} C$

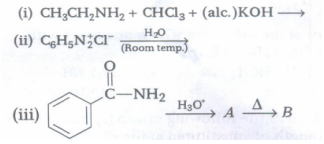
(ii) $C_6H_5\ N_2^+BF_4 \xrightarrow[\triangle]{NaNO2/Cu} A \xrightarrow{Fe/HCl} B \xrightarrow{CH_3COCl/pyridine} C$

563) Write the products A and B in the following.



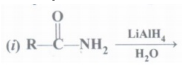
564) Explain the following observations.
(i) Electrophilic substitution in case of aromatic amines takes place more readily than benzene.
(ii) Tertiary amines do not undergo acylation.

565) Complete the following reactions.



566) Accomplish the following conversions:
(i) Benzene to m-bromophenol
(ii) Aniline to 2, 4, 6-tribromofluorobenzene

567) Complete the following reaction equations:



(ii) $\mathbf{C_6H_5N_2Cl + H_3PO_2 + H_2O \longrightarrow}$
(iii) $\mathrm{C_6H_5NH_2 + Br_2(aq) \longrightarrow}$

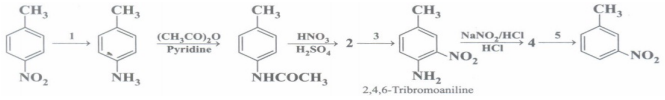
568) When benzene reacts with CH_3Cl in presence of $AlCl_3$ to give 'A' (C_7H_8), 'A' reacts with 1 mole of Cl_2 in presence of sun light to form 'B' (C_7H_7Cl). 'B' on reaction with KC to form 'C'. 'c' on hydrolysis gives 'D'. 'C' on reduction with Na and C_2H_5OH gives 'E'. Identify 'A' to 'E' and explain the reactions.

569) Give the structures of A, Band C in the following reactions:
(i) $\mathrm{CH_3Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow[273\ K]{HNO_2} C}$
(ii) $\mathrm{CH_3COOH \xrightarrow[\Delta]{NH_3} A \xrightarrow{Br_2+KOH} B \xrightarrow{CHCl_3+NaOH} C}$

570) A mixture of two aromatic compounds' A' and 'B' was separated by dissolving it in chloroform followed by the extraction with aqueous KOH solution. The organic layer containing compound' A' when heated with alcoholic KOH produced a compound 'C' (C_7H_5N) associated with an unpleasant odour. The alkaline aqueous layer, on the other hard, when heated with chloroform and then acidified gave a mixture of two isomeric compounds 'D' and 'E' of molecular formula $C_7H_6O_2$. Identify the compounds 'A', 'B', 'C', 'D' and 'E' and write their structures.

571) Complete the following reaction equations:
(i) $\mathrm{C_6H_5\ N_2Cl + CH_3COCl \longrightarrow}$
(ii) $\mathrm{C_2H_5NH_2 + C_6H_5SO_2Cl \longrightarrow}$
(iii) $\mathrm{C_2H_5NH_2 + HNO_2 \longrightarrow}$

572) Predict the reagent or the product in the following reaction sequence.



573) Write the chemical equations involved when $C_2H_5NH_2$ is treated with the following reagents:
(i) CH_3COCl/pyridine
(ii) $C_6H_5SO_2Cl$
(iii) $CHCl_3$ + KOH

574) Write chemical equations involved when aniline is treated with the following reagents:
(i) Br_2(aq)
(ii) CHCl3 + KOH
(iii) HCl

575) Give reasons:
(i) Aniline does not undergo Friedel-Crafts Reaction.
(ii) p-methyl aniline is more basic thanp-nitroaniline.
(iii) Acetylation of -NH_2 group is done in aniline before preparing its o and p compounds.

576) How do you convert the following:
(i) Aniline to Benzene
(ii) Ethanamide to Methanamine
(iii) Nitrobenzene to Aniline

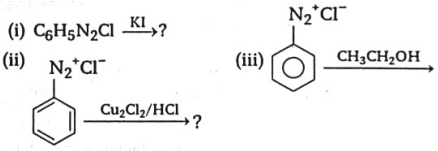
577) (a) Account for the following:
(i) Aniline is weaker base than cyclohexylamine.
(ii) Silver chloride dissolves in CH_3NH_2 solution .
(b) Arrange the following compounds in increasing order of basic strength in aqueous solution:
NH_3 , RNH_2 , R_2NH, R_3N (R is CH_3)

578) How do you convert the following:
(i) $C_6H_5CONH_2$ to $C_6H_5NH_2$
(ii) Aniline to phenol
(iii) Ethane nitrile to Ethanamine.

579) An aromatic compound 'A' on heating with Br_2 and KOH forms a compound 'B' of molecular formula C_6H_7N which on reacting with $CHCl_3$ and alcoholic KOH produces a foul smelling compound 'C'. Write the structures and IUPAC names of compounds A, B and C.

580) Give reasons for the following.
(i) pK_b of aniline is more than that of methylamine.
(ii) Ethylamine is soluble in water, whereas aniline is not.

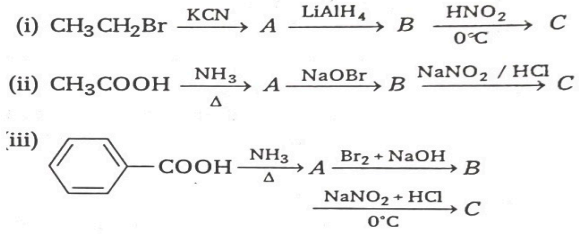
581) Write the major product(s) in the following reactions.



582) Give one chemical test to distinguish between the following pairs of compounds.
(i) Methylamine and dimethylamine
(ii) Secondary and tertiary amines
(iii) Ethylamine and aniline

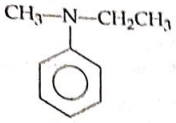
583) Account for the following:
(i) Aniline gets coloured on standing in air for a long time.
(ii) $MeNH_2$ is stronger base than MeOH.

584) Give the structures of A, B and C in the following by reactions.



585) Convert the following
(i) Phenol to N-phenylethanamide
(ii) Chloroethane to methanamine
(iii) Propane nitrile to ethanal

586) (i) Write the IUPAC name for the following organic compound.



(ii) Complete the following.

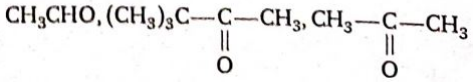
$$C_6H_5NO_2 \xrightarrow{Sn/HCl} A \xrightarrow{Br_2/H_2O} B \xrightarrow[273-278\ K]{NaNO_2/HCl} \qquad C \xrightarrow[\Delta]{HBF_4} D$$

587) Aniline on nitration gives good amount of m-nitroaniline, though -NH_2 group is o/p directing in electrophilic substitution reactions.

588) How can the activating effect of -NH_2 group in aniline be controlled?

589) Account for the following.
(i) Aniline cannot be prepared by the ammonolysis of chlorobenzene under normal conditions.
(ii) N-ethylethanamine boils at 329.3 K and butanamine boils at 350.8 K, although both are isomeric in nature.
(iii) Acylation of aniline is carried out in the presence of pyridine.

590) (i) Arrange the following compounds in increasing order of their reactivity towards CH_3MgBr

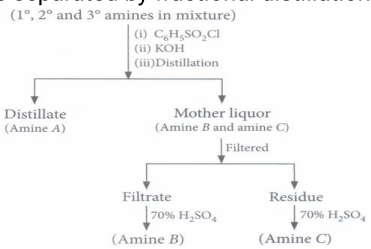


(ii) Write a chemical test to distinguish between propanal and propanone?

Case Study Questions 13 x 4 = 52

591) **Read the passage given below and answer the following questions:**

When the mixture contains the three amine salts (1°, 2° and 3°) along with quaternary salt, it is distilled with KOH solution. The three amines distill, leaving the quaternary salt unchanged in the solution. Then the mixture of amines is separated by fractional distillation, Hinsbergs method and Hoffmann's method.



The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Hinsberg reagent is

(a) aliphatic sulphonyl chloride

(b) phthalamide

(c) aromatic sulphonyl chloride

(d) anhydrous $ZnCl_2$ + conc. HCl.

(ii) Primary amine with Hinsberg's reagent forms

(a) N-alkyl benzene sulphonamide soluble in KOH solution

(b) N-alkyl benzene sulphonamide insoluble in KOH solution

(c) N, N-dialkyl benzene sulphonamide soluble in KOH solution

(d) N, N-dialkyl benzene sulphonamide insoluble in KOH solution.

(iii) To separate amines in a mixture Hoffmann's method is used. The Hoffmann's reagent is

(a) benzenesulphonyl chloride

(b) diethyloxalate

(c) benzeneisocyanide

(d) p-toulenesulphonic acid.

(iv) 3^o amines with Hinsberg's reagent give

(a) no reaction

(b) product which is same as that of 1^0 amine

(c) product which is same as that of 2° amine

(d) products which is a quaternary salt.

592) **Read the passage given below and answer the following questions:**

A mixture of two aromatic compounds (A) and (B) was separated by dissolving in chloroform followed by extraction with aqueous KOH solution. The organic layer containing compound (A), when heated with alcoholic solution of KOH produce C_7H_5N (C) associated with unpleasant odour.

The following questions are multiple choice questions. Choose the most appropriate answer:

The reaction of (A) with alcoholic solution of KOH to produce (C) of unpleasant odour is called

(a) Sandmeyer reaction (b) Carbylamine reaction

(c) Ullmann reaction (d) Reimer-Tiemann reaction

(ii) The alkaline aqueous layer (B) when heated with chloroform and then acidified give a mixture of isomeric compounds of molecular formula $C_7H_6O_2$. (B) is

(a) C_6H_5CHO (b) C_6H_5COOH (c) C_6H_5CH3 (d) C_6H_5OH

(iii) In the chemical reaction,

$\mathrm{CH_3CH_2NH_2 + CHCl_3 + 3KOH \longrightarrow (\mathit{A}) + (\mathit{B}) + 3H_2O,}$ the compounds (A) and (B) are respectively

(a) C_2H_5NC and KCl (b) C_2H_5CN and KCl

(c) $CH_3CH_2CONH_2$ and KCl (d) C_2H_5NC and K_2CO_3

(iv) Direct nitration of an aromatic compound (A) is not feasible because

(a) the reaction cannot be stopped at the mononitration stage

(b) a mixture of o, m and p-nitroaniline is always obtained

(c) nitric acid oxidises most of the aromatic compound to give oxidation products along with only a small amount of nitrated products

(d) all of the above

593) **Read the passage given below and answer the following questions:**

The amines are basic in nature due to the presence of a lone pair of electron on N-atom of the -NH2 group, which it can donate to electron deficient compounds. Aliphatic amines are stronger bases than NH_3 because of the +1 effect of the alkyl groups. Greater the number of alkyl groups attached to N-atom, higher is the electron density on it and more will be the basicity. Thus, the order of basic nature of amines is expected to be 3° > 2° > 1°, however the observed order is 2° > 1° > 3°. This is explained on the basis of crowding on N-atom of the amine by alkyl groups which hinders the approach and bonding by a proton, consequently, the electron pair which is present on N is unavailable for donation and hence 3° amines are the weakest bases. Aromatic amines are weaker bases than ammonia and aliphatic amines. Electron -donating groups such as $-CH_3$, $-OCH_3$, etc. increase the basicity while electron-withdrawing substitutes such as $-NO_2$, -CN, halogens, etc. decrease the basicity of amines. The effect of these substituents is more at p than at m-positions.

The following questions are multiple choice questions. Choose the most appropriate answer :

(i) Which one of the following is the strongest base in aqueous solution?

(a) Methyl amine (b) Trimethyl amine (c) Aniline (d) Dimethyl amine

(ii) Which order of basicity is correct?

(a) Aniline > m-toluidine > o-toluidine (b) Aniline > o-toluidine > m-toluidine (c) o-toluidine > aniline > m-toluidine (d) o-toluidine < aniline < m-toluidine

(iii) What ts the decreasing order of basicity of primary, secondary and tertiary ethylamines 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) $(C_2H_5)_2NH > C_2H_5NH_2 > (C_2H_5)_3N > NH_3$ (d) $(C_2H_5)_2NH > (C_2H_5)_3N > C_2H_5NH_2 > NH_3$

(iv) Choose the correct statement.

(a) Methylamine is slightly acidic. (b) Methylamine is less basic than ammonia. (c) Methylamine is a stronger base than ammonia. (d) Methylamine forı with alkalie

594) **Read the passage given below and answer the following questions:**

Amines are alkyl or aryl derivatives of ammonia formed by replacement of one or more hydrogen atoms. Alkyl derivatives are called aliphatic amines and aryl derivatives are known as aromatic amines. The presence of aromatic amines can be identified by performing dye test. Aniline is the simplest example of aromatic amine. It undergoes electrophilic substitution reactions in which - NH_2 group strongly activates the aromatic ring through delocalisation oflone pair of electrons of N-atom. Aniline undergoes electrophilic substitution reactions. Ortho and para positions to the -NH_2 group become centres of high electrons density. Thus, -NH_2 group is ortho and para-directing and powerful activating group. The following questions are multiple choice questions.

Choose the most appropriate answer:

(i) Cyclohexylamine and aniline can be distinguished by

(a) Hinsberg test **(b) carbylamine test** **(c) Lassaigne test** **(d) azo dye test**

(ii) Which of the following compounds gives-dye test?

(a) Aniline **(b) Methyl amine** **(c) Diphenyl amine** **(d) Ethyl amine**

(iii) Oxidation of aniline with manganese dioxide and sulphuric acid produces

(a) phenylhydroxylamine **(b) nitrobenzene** **(c) p-benzoquinone** **(d) nitrobenzene.**

(iv) Aniline when treated with conc, HNO_3 and H_2SO_4 gives

(a) phenylhydroxylamine **(b) m-nitroaniline** **(c) p-benzoquinone** **(d) nitrobenzene.**

595) **Read the passage given below and answer the following questions:**

Amines are basic in nature. The basic strength of amines can be expressed by their dissociation constant, K_b or pK_b.

$$RNH_2 + H_2O \rightleftharpoons RNH_3^+ + OH^-$$

$$K_b = \frac{[RNH_3^+][OH^-]}{[RNH_2]} \text{ and } pK_b = -\log K_b$$

Greater the K_b value or smaller the pK_b value, more is the basic strength of amine. Aryl amines such as aniline are less basic than allphatic amines due to the involvement of lone pair of electrons on N-atom with the resonance in benzene. In derivatives of aniline, the electron releasing groups increase the basic strength while electron withdrawing groups decrease the basic strength. The base weakening effect of electron withdrawing group and base strengthening effect of electron releasing group is more marked at p-position than at m-position. o-Substituted aniline is less basic than aniline due to ortho effect and is probable due to combination of electronic and steric effect.

The following questions are multiple choice questions.Choose the most appropriate answer :

(i) Which of the following has lowest pK_b value?

(ii) The strongest base among the following is

(a) $C_6H_5NH_2$ **(b) p-NO_2 - $C_6H_4CH_2NH_2$**

(c) m-NO_2 - $C_6H_4NH_2$ **(d) $C_6H_5NH_2$**

(iii) Maximum pK_b value of

(c) $(CH_3CH_2)_2NH$ **(d) $(CH_3)_2NH$**

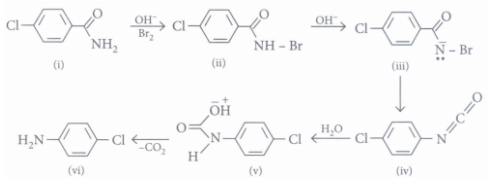
(iv) Which of the following statements is not correct?

(a) Methylamine is more basic than NH_3 **(b) Amines form hydrogen bonds.**

(c) Ethylamine has higher boiling point than propane. **(d) Dimethylamine is less basic than methylamine.**

596) **Read the passage given below and answer the following questions:**

$RCONH_2$ is converted into RNH_2 by means of Hoffmann bromamide degradation. During the reaction amide is treated with Br_2 and alkali to get amine. This reaction is used to descend the series in which carbon atom is removed as carbonate ion (CO_3^{2-}). Hoffmann bromide degradation reaction can be written as :



The following questions are multiple choice questions. Choose the most appropriate answer:

(i) Hoffmann bromamide degradation is used for the preparation of

(a) primary amines **(b) secondary amines** **(c) tertiary amines** **(d) secondary aromatic amines.**

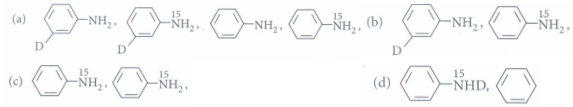
(ii) Which is the rate determining step in Hoffmann bromamide degradation?

(a) Formation of (i) **(b) Formation of (ii)** **(c) Formation of (iii)** **(d) Formation of (iv).**

(iii) Which of the following are used for the conversion of (i) to (ii)?

(a) KBr **(b) KBr + CH_3ONa** **(c) KBr + KOH** **(d) Br_2 + KOH**

(iv) What are the constituent amines formed when the mixture of (i) and (ii) undergoes Hoffmann bromamide degradation?



597) **Read the passage given below and answer the following questions:**

Amines are produced when an alcoholic solution of ammonia and an alkyl or a benzyl halide is heated in a sealed tube at 373 K. This reaction is called ammonolysis and usually gives a mixture of primary, secondary and tertiary amines along with some quarternary ammonium salts. This reaction is an example of nucleophilic substitution reaction in which ammonia acts as a nucleophile due to the presence of a lone pair of electrons on the nitrogen atom. However this method cannot be used for the preparation of aryl amines. One of the most convenient methods for the preparation of aryl amines is reduction of nitro compounds. Aryl amines can also be prepared by reduction of nitrites or Gabriel phthalimide synthesis.

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement. .

(i) Assertion: Ammonolysis of alkyl halides only produces 2^o amines.

Reason: Ammonolysis of alkyl halides involves the reaction between alkyl halides and alcoholic ammonia.

(ii) Assertion: Ammonolysis method cannot be used for the preparation of aryl amines.

Reason: Aryl halides are much less reactive than alkyl halides towards nucleophilic substitution reaction.

(iii) Assertion: Ammonolysis can be used to prepare pure primary amines.

Reason: Ammonolysis of haloalkanes lead to multiple ammonium salts.

(iv) Assertion: Aromatic 1^p amines can not be prepared by Gabriel phthalimide synthesis.

Reason: Aryl halides do not undergo nucleophilic substitution with anion formed by phthalimide.

598) **Read the passage given below and answer the following questions:**

Aniline activates the benzene ring by increasing electron density at ortho- and para-positions. Hence, it is o-, p-directing. -NH_2 group strongly activates the ring therefore it is difficult to stop the reaction at monosubstitution stage. Among electrophilic substitution reaction, direct nitration of aniline is not done to get o- and p-nitroaniline because lone pair of electrons present at nitrogen atom will accept proton from nitrating mixture to give anilinium ion which is meta-directing. Aniline with $NaNO_2$ and HCl forms benzene diazonium chloride at very low temperature. Aromatic amines react with nitrous acid to form a yellow oily liquid known as N-nitrosoamines.

In these questions (i-iv), a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

(i) Assertion: Nitrating mixture used for carrying out nitration of benzene consists of cone. conc. HNO_3 +conc. H_2SO_4 .

Reason: In presence of H_2SO_4 , HNO_3 acts as a base and produces NO_2^+ ions.

(ii) Assertion: Anilinium chloride is more acidic than ammonium chloride.

Reason: Anilinium ion is not resonance-stabilised.

(iii) Assertion: Nitrobenzene can be prepared from benzene by using mixture of conc. HNO_3 and conc. H_2SO_4 .

Reason: In the mixture,H_2SO_4 act as a acid.

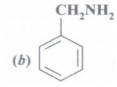
(iv) Assertion: In strongly acidic solution, aniline becomes less reactive towards electrophilic reagents.

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

599) Amines are classified as primary, secondary and tertiary amines. Primary amines cannot be obtained by ammonolysis of alkyl halide because we will get mixture of 1°, 2 c and 3° amines. Cyanides, on reduction give primary amines where as isocyanides on reduction give secondary amines. Nitro compounds, on reduction also give primary amines. Primary amines react with $CHCl_3$ and KOH to form foul smelling isocyanide. They react with HNO_2 and liberate N_2 gas. They react with Hinsberg's reagent to form salt soluble in KOH. Secondary amine form yellow oily compounds with HNO_2 and salt formed with $C_6H_5SO_2Cl$, is insoluble in KOH. 3° amines form salt soluble in water with HNO_2 but does not react with C6Hs SO_2Cl.

Diazonium salts are prepared by reaction of Aniline with $NaNO_2$ and conc. HCl at 0 - 5 0c. Aromatic diazonium salts are more stable because phenyl diazonium ion is stabilized by resonance. Benzene diazonium chloride can be used to prepare halo benzene, phenol, nitro benzene, benzene, p-hydroxy azo benzene (azo dye) and large number of useful compounds.

(a) Write the isomer of C_3H_9N which does not react with Hinsberg reagent.

(b)  on heating with $CHCl_3$ and KOH gives 'X'. Identify 'X'.

(c) Convert Aniline to phenol.

(d) Distinguish between Aniline and ethyl amine.

(e) Complete the following reaction

$C_6H_5NO_2 \xrightarrow{Fe/HCl} A \frac{NaNO_2+HCl}{0-5^\circ C} B$ Identify' A' and 'B'.

(f) $C_6H_5\ N_2^+Cl \xrightarrow{CuCN} A \xrightarrow{H_2O/H^+} B$ Identify 'A' and 'B'.

(g) What is use of quarternary ammonium salts of long chain tertiary amines?

600) Organic compounds containing amine as functional group are present in wide variety of compounds namely amino acids, hormones, neurotransmitters, DNA, alkaloids, dyes etc. Drugs including nicotine, morphine, codein, heroin etc. which have physiological effects on human also contain -NH_2 group in one form or another. Amines are basic in nature due to presence of lone pair of electron on nitrogen. Adrenaline hormone and ephedrine drug, both contain second amino group are used for increasing blood pressure. Novacain, a synthetic compound contains both primary ana tertiary amino group, is used as anaesthetic in dentistry. Benadryl, a widely used antihistamine drug contains tertiary amino group, Quarternary ammonium salts of long chain, tertiary amines are used as cationic detergents. Diazonium salts are used for synthesis of azodyes and useful aromatic compounds.

(a) Write the formula of tertiary amine with molecular formula C_3H_9N, which does not react with Hinsberg reagent?

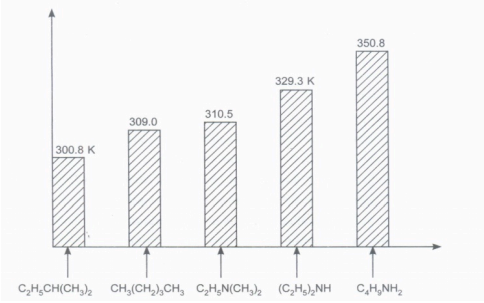
(b) Convert Aniline to p-hydroxy azo benzene.

(c) Give one example of cationic detergent.

(d) What is formula of paracetamol, (crosin), a well known antipyretic?

(e) How will you distinguish between Aniline and Benzyl amine?

601) Observe the histogram showing boiling points of pentane, iso pentane, 1°,2° and 3 ° amines. Answer the questions that follow based on table and related concepts.



(a) Why does $CH_3CH_2CH_2CH_2NH_2$ (1° amine) has higher boiling point than $(C_2H_5)_2NH$ and $C_2H_5N(CH_3)_2$?

(b) Why does ethanol have higher boiling point than ethanamine?

(c) Why amines are more basic than alcohol?

(d) Why are Primary amines more soluble in water than 2° and 3° amines?

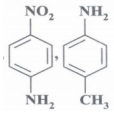
(e) Arrange the compounds shown in graph, increasing order of boiling points. Give reason.

602) Table relates various amines with pK_b values. Study this table and answer the questions related to table and studied concepts.

Compounds	pK_b
Ammonia	4.75
CH_3NH_2	3.38
$(CH_3)_2NH$	3.27
$(CH_3)_3N$	4.22
$CH_3CH_2NH_2$	3.29
$(C_2H_5)_2NH$	3.00
$(C_2H_5)_3N$	3.25
$C_6H_5NH_2$	9.38
$C_6H_5NHCH_3$	9.30
$C_6H_5N(CH_3)_2$	8.92
$C_6H_5CH_2NH_2$	4.70
p-nitro aniline	13.0
p- Toluidine	9.21
p-Anisidine	8.71

(a) Arrange CH_3NH_2 , $(CH_3)NH$, $(CH_3)_3N$ in decreasing order of basic character in aqueous solution. Give reason.

(b) Arrange $C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ in decreasing order of basic character in aq. solution. Give reason.

(c) Arrange, $C_6H_5CH_2NH_2$, $C_6H_5NH_2$,$C_6H_5N(CH_3)_2$  in increasing order or basic character.

(d) Arrange CH_3NH_2 , $(CH_3)_2NH$, $(CH_3)_3N$ in increasing order of basic character in gaseous state. Give reason.

(e) Why is Aniline less basic than benzyl amine?

603) Amines are usually formed from nitro compounds, halides, amides, imides, etc. They exhibit hydrogen bonding which influences their physical properties. In alkyl amines, a combination of electron releasing,steric and hydrogen bonding factors influence the stability of the substituted ammonium cations in protic polar solvents and thus affect the basic nature of amines.

In aromatic amines, electron releasing and withdrawing groups, respectively increase and decrease their basic character. Influence of the number of hydrogen atoms at nitrogen atom on the type of reactions and nature of products is responsible foridentification and distinction between primary, secondary and tertiary amines.

Presence of amino group in aromatic ring enhances reactivity of the aromatic amines. Aryl diazonium salts provide advantageous methods for producing aryl halides, cyanides, phenols and arencs by reductive removal of the diazo group.

Answer the following questions

(i) Arrange the following in the increasing order of their pK_b values in aqueous solutions:

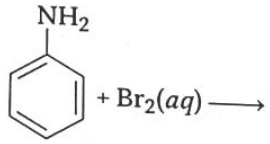
$C_2H_5NH_2, (C_2H_5)_2NH, (C_2H_5)_3\ N$

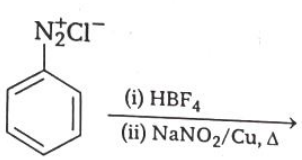
(ii) Aniline on nitration gives a substantial amount of m-nitroaniline though amino group is o/p directing. Why?

(iii) An aromatic compound 'A' of molecular formula $C_7H_6O_2$ on treatment with aqueous ammonia and heating forms compound 'B'. Compound 'B' on heating with Br_2 and aqueous KOH gives a compound 'C' of molecular formula C_6H_7N. Write the structures of A, B and C.

Or

(iii) Complete the following reactions giving main products:

(a) 

(b) 

5 Marks 36 x 5 = 180

604) Write short notes on the following:

(i) Carbylamine reaction

(ii) Diazotisation

(iii) Hoffmann's bromamide reaction

(iv) Coupling reaction

(v) Ammonolysis

(vi) Acylation

(vii) Carbylamine reaction

605) Account for the following:

(i) pK_b of aniline is more than that of methylamine.

(ii) Ethylamine is soluble in water whereas aniline is not.

(iii) Methylamine in water reacts with ferric chloride to precipitate hydrated ferric oxide.

(iv) Although amino group is o– and p– directing in aromatic electrophilic substitution reactions, aniline on nitration gives a substantial amount of m-nitroaniline.

(v) Aniline does not undergo Friedel-Crafts reaction.

(vi) Diazonium salts of aromatic amines are more stable than those of aliphatic amines.

(vii) Gabriel phthalimide synthesis is preferred for synthesising primary amines.

606) Arrange the following:
(i) In decreasing order of the pKb values:
$C_2H_5NH_2$, $C_6H_5NHCH_3$, $(C_2H_5)2NH$ and $C_6H_5NH_2$
(ii) In increasing order of basic strength:
$C_6H_5NH_2$, $C_6H_5N(CH_3)_2$,$(C_2H_5)_2NH$ and CH_3NH_2
(iii) In increasing order of basic strength:
(a) Aniline, p-nitroaniline and p-toluidine
(b) $C_6H_5NH_2$, $C_6H_5NHCH_3$, $C_6H_5CH_2NH_2$.
(iv) In decreasing order of basic strength in gas phase:
$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$ and NH_3
(v) In increasing order of boiling point:
C_2H_5OH, $(CH_3)_2NH$, $C_2H_5NH_2$
(vi) In increasing order of solubility in water:
$C_6H_5NH_2$, $(C_2H_5)_2NH$, $C_2H_5NH_2$.

607) How will you convert:
(i) Ethanoic acid into methanamine
(ii) Hexanenitrile into 1-aminopentane
(iii) Methanol to ethanoic acid
(iv) Ethanamine into methanamine
(v) Ethanoic acid into propanoic acid
(vi) Methanamine into ethanamine
(vii) Nitromethane into dimethylamine
(viii) Propanoic acid into ethanoic acid

608) Complete the following reactions
(i) $\mathrm{C_6H_5NH_2 + CHCl_3 + alc.\,KOH \rightarrow}$
(ii) $\mathrm{C_6H_5\ N_2Cl + H_3PO_2 + H_2O \rightarrow}$
(iii) $\mathrm{C_6H_5NH_2 + H_2SO_4(\ conc.\ ) \rightarrow}$
(iv) $\mathrm{C_6H_5\ N_2Cl + C_2H_5OH \rightarrow}$
(v) $\mathrm{C_6H_5NH_2 + Br_2(aq) \rightarrow}$
(vi) $\mathrm{C_6H_5NH_2 + (CH_3CO)_2O \rightarrow}$
(vii) $\mathrm{C_6H_5\ N_2Cl \xrightarrow[(H)NaNO_2/Cu,\Delta]{(1)HBF_4} \longrightarrow}$

609) A hydrocarbon 'A' (C_4H_8) on reaction with HCl gives a compound 'B' , ($C_4H_{11}N$). On reacting with $NaNO_2$ and HCl followed by treatment with water, compound 'C'. Ozonolysis of 'A' gives 2 moles of acetaldehyde. Identify compounds 'A' to 'D' . Explain the reactions involved.

610) How is 2, 4-dinitrophenylhydeazine prepared from chlorobenzene?

611) How will you convert toluene into sym-trinitrobenzene?

612) (i) tert-Butylamine cannot be prepared by the action of NH_3 on tert-butyl bromide. Explain why?
(ii) Suggest a convenient method for the preparation of tert-butylamine.

613) Why is an amide more acidic than amine?

614) (a) Write the structures of the main products when aniline reacts with the following reagents:
(i) Br_2 water
(ii) HCl
(iii) $(CH_3CO)_2O$ / pyridine
(b) Arrange the following in the increasing order of their boiling point:
$C_2H_5NH_2$, C_2H_5OH, $(CH_3)_3N$
(c) Give a simple chemical test to distinguish between the following pair of compounds:
$(CH_3)_2NH$ and $(CH_3)_3N$

615) (a) Write the structures of main products when products when benzene diazonium chloride reacts with the following reagents:
(i) $H_3PO_2+H_2O$
(ii) CuCN/KCN
(iii) H_2O
(b) Arrange the following in the increasing order of their basic character in an aqueous solution:
$C_2H_5NH_2$, $(C_2H_5)_2NH$, $(C_2H_5)_3N$
(c) Give a simple chemical test to distinguish between the following pair of compounds:
C_6H_5-NH_2 and C_6H_5-NH-CH_3

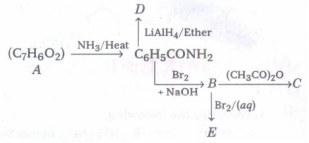
616) Lakshay and Varun were going to the market.On the way they saw tie and dye shop of clothes Varun was surprised to see that and was unable to understand surprised to see that and was unable to understand how the clothes get coloured there. When they came back Lakshay explained reason to Varun Diazonium salts are the most reactive derivatives of aromatic primary amines These are formed as a result of diazotization reaction carried under ice cooled conditions.Diazonium salts lead to coloured azodyes by coupling reactions under acidic or alkaline conditions. A very popular azodye is methyl orange.
Give the answer of two following questions:
(i) What are the constituents of methyl orange?
(ii) How is methyl orange is useful?
(iii) How is methyl orange is useful?
(iv) What are the values shown by them?

617) The leakage of the vapors of a highly poisonous gas in Union Carbide India Ltd in Bhopal about 30 years ago was one of the dreadful disaster which people of bhopal had faced Thousands lost their lives and many more get crippled for rest of their lives.
(i) What is the chemical name of the poisonous vapours?
(ii) How it can be synthesized in the laboratory?
(iii) How did it damage human system?
(iv) As a student of chemistry what remedial measures do you suggest?

618) On adding glycerol slowly to a nitrating mixture of conc. HNO_3 and conc. H_2SO_4 at room temperature glycerol trinitrate or nitroglycerine is formed. It is a yellow oily liquid which explodes violently when heated to evolve a gaseous mixture which is highly explosive .
(i) How is nitroglycerine actually formed?
(ii) Why is it so highly explosive?
(iii) What is dynamite?
(iv) Some bad elements of our society are using these explosives for causing destruction using these explosives for causing destruction of people, property and lives. What are the values shown by them?

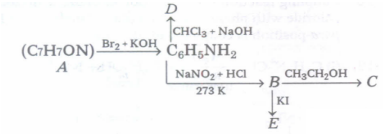
619) Amines may be regarded as alkyl or aryl derivatives of ammonia. They may be primary, secondary or tertiary. Quaternary salts are also quite common. They occur in nature among proteins, vitamins,alkaloids and hormones. Several polymer, dyestuffs and drugs are amines.
(i) Name two drugs which contain secondary amino groups and are used to increase blood pressure.
(ii) Which amino drug is used as an anaesthetic in dentistry?
(iii) Benadryl is an antihistamine drug and is commonly used in cough syrups, what type of amino group does it contain?
(iv) Name a quaternary salt which is used both as detergent and as a germicide.

620) An aromatic compound 'A' of molecular formula $C_7H_6O_2$ undergoes a series of reactions as shown below. Write the structures of A, B, C,D and E in the following reactions.



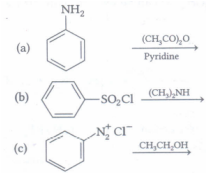
621) Answer the following questions:
(i) The compound of A(C_3H_9N) reacts with benzene sulphonyl chloride to give a solid, insoluble in alkali. Identify 'A'.
(ii) Outline a synthesis of p-bromonitrobenzene from benzene in two steps.

622) An aromatic compound 'A' of molecular formula C_7H_7ON undergoes a series of reactions as shown below. Write the structures of A, B, C, D and E in the following reactions.



623) Write the reactions involved in the following:
(i) Hofmann bromamide degradation reaction
(ii) Diazotisation
(iii) Gabriel phthalimide synthesis

624) (a) Write the structures of the main products of the following reactions:



(b) Give a simple chemical test to distinguish between aniline and N, N-dimethylaniline.
(c) Arrange the following in the increasing order of their pK_b values:
$C_6H_5NH_2, C_2H_5NH_2$,$C_6H_5NHCH_3$

625) (a) Illustrate the following reactions giving suitable example in each case:
(i) Ammonolysis
(ii) Coupling reaction
(iii) Acetylation of amines
(b) Describe Hinsberg method for the identification of primary, secondary and tertiary amines. Also write the chemical equations of the reactions involved.