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CHEMISTRY TEST - CHAPTER 20: NITROGEN CONTAINING COMPOUNDS

Name:		Roll No.		Section:

Total Time: 2:30 Hour
Time Allowed: 150 Minutes

Total Marks: 150

PAPER OBJECTIVE
SECTION-A (MARKS 150)

NOTE: Section-A is compulsory. All parts of this section are to be answered on these pages and handed over to the center superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. Amines are organic compounds containing nitrogen linked with alkyl or aryl groups and having on nitrogen:	a double bond to oxygen	no lone pair	a lone pair of electrons	a positive charge	○○●○
2. Amines are derivatives of:	water	methane	ammonia	nitric acid	○○●○
3. Amines are formed by replacing hydrogen atoms of ammonia by:	hydroxyl groups	alkyl or aryl groups	carbonyl groups	halogen atoms	○●○○
4. In primary amines, the number of alkyl groups attached to nitrogen is:	one	three	four	two	●○○○
5. In secondary amines, the number of alkyl groups attached to nitrogen is:	two	one	three	four	●○○○
6. In tertiary amines, the number of alkyl groups attached to nitrogen is:	two	four	three	one	○○●○
7. The general formula of primary amines is:	R_3N	RNH_2	R_2NH	R_4N^+	○●○○
8. The general formula of secondary amines is:	R_3N	RNH_2	R_2NH	$RCONH_2$	○○●○
9. The general formula of tertiary amines is:	R_3N	RNH_2	R_2NH	RCN	●○○○
10. CH_3NH_2 is called:	ethylamine	dimethylamine	trimethylamine	methylamine	○○○●
11. $CH_3CH_2NH_2$ is called:	ethylamine	dimethylamine	methylamine	propylamine	●○○○
12. $(CH_3)_2NH$ is a:	tertiary amine	amide	secondary amine	primary amine	○○●○
13. $(CH_3)_3N$ is a:	nitrile	primary amine	tertiary amine	secondary amine	○○●○
14. $(CH_3CH_2)_2NH$ is a:	tertiary amine	primary amine	secondary amine	amide	○○●○

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Questions	A	B	C	D	A B C D
15. $CH_3NHCH_2CH_3$ is known as:	diethylamine	methylethylamine	dimethylamine	propylamine	○●○○
16. The N–H bond in amines is polar because of the difference in:	atomic mass of N and H	electronegativity of N and H	charge on N and H only	size of N and H only	○●○○
17. Amines form hydrogen bonds with:	noble gases	other amine molecules and water	ions only	alkanes only	○●○○
18. Amines have high melting and boiling points compared with analogous alkanes because of:	metallic bonding	hydrogen bonding	covalent network	ionic bonding	○●○○
19. Lower amines are highly soluble in water due to:	hydrogen bonding with water	their high molar mass	their ionic nature	their non-polarity	●○○○
20. In amines, the nitrogen atom is:	sp^3 hybridised	unhybridised	sp hybridised	sp^2 hybridised	●○○○
21. The shape around the nitrogen atom in amines is nearly:	linear	planar triangular	tetrahedral (with a lone pair)	square planar	○○●○
22. The fourth sp^3 orbital of nitrogen in amines carries:	no electrons	an unpaired electron	a bonding pair	a lone pair of electrons	○○○●
23. The lone pair on nitrogen makes amines:	oxidising agents only	bases and nucleophiles	acids and electrophiles	neutral and inert	○●○○
24. An amine with three different groups on nitrogen is:	always optically inactive	always planar	optically active in principle	always ionic	○○●○
25. When an alcoholic solution of ammonia is heated with an alkyl halide in a sealed tube at 100 °C, the product is:	only a primary amine	a mixture of primary, secondary and tertiary amines and a quaternary ammonium salt	only an alkene	only an alcohol	○●○○
26. In the reaction $C_2H_5I + NH_3 \rightarrow$?	$C_2H_4 + NH_4I$	$C_2H_5OH + NH_4I$	$C_2H_5NH_2 + HI$	$C_2H_6 + NI$	○○●○
27. The addition of strong alkali such as KOH to the mixture of amine salts:	forms alcohols	liberates the free amines	destroys the amines	has no effect	○●○○
28. The three types of amines produced in the alkylation of ammonia are separated by:	crystallisation	filtration	evaporation	fractional distillation	○○○●
29. Over-alkylation of ammonia can be reduced by using:	a strong acid	excess alkyl halide	a higher temperature	excess ammonia	○○○●
30. A quaternary ammonium salt is formed when a tertiary amine reacts with:	an alkyl halide	water	an alcohol	an acid	●○○○
31. A quaternary ammonium salt is unaffected by:	alkyl halides	strong alkali such as KOH	heat above 300 °C	acids	○●○○

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Questions	A	B	C	D	A B C D
32. The nitrogen-containing functional groups reduced to amino groups include nitriles, amides and:	nitro compounds	esters	alcohols	ketones	●○○○
33. Reduction of nitriles gives:	tertiary amines	primary amines	secondary amines	amides	○●○○
34. The reducing agent used to reduce nitriles to amines can be:	$LiAlH_4$	H_2O	dilute HCl	NaCl	●○○○
35. Nitriles can also be reduced by:	water	aqueous NaOH	sodium in ethanol	dilute acids	○○●○
36. Catalytic hydrogenation of nitriles can be done using:	zinc	sodium	iron	Pt or Raney nickel	○○○●
37. The reduction of CH_3CN with $LiAlH_4$ gives:	CH_3NH_2	$CH_3CH_2NH_2$	CH_3CH_2OH	CH_3COOH	○●○○
38. Nitro compounds on reduction give:	primary amines	ketones	alcohols	nitriles	●○○○
39. Nitrobenzene is reduced to aniline by:	tin or iron with concentrated HCl	water	NaOH	dilute HCl only	●○○○
40. Aniline is also called:	methylamine	toluidine only	benzylamine	phenylamine	○○○●
41. Phenylamine is prepared from nitrobenzene by:	oxidation	reduction	dehydration	hydrolysis	○●○○
42. The catalytic hydrogenation of nitrobenzene uses:	HNO_3	H_2O	Cl_2/Fe	H_2/Pd	○○○●
43. When an amide is treated with $LiAlH_4$, the –CO– group is reduced to:	–OH	$–CH_2–$	–COOH	–CHO	○●○○
44. CH_3CONH_2 reduced by $LiAlH_4$ gives:	CH_3NH_2	$CH_3CH_2NH_2$	CH_3COOH	CH_3CN	○●○○
45. In the reduction of amides with $LiAlH_4$, the carbon chain:	becomes shorter by one carbon	is destroyed	becomes longer by one carbon	remains intact	○○○●
46. The Hofmann degradation of amides uses:	hydrogen and nickel	bromine and KOH	iodine and NaOH	chlorine and HCl	○●○○
47. In the Hofmann bromamide reaction, the primary amine formed has:	two carbon atoms less than the amide	one carbon atom more than the amide	the same number of carbon atoms	one carbon atom less than the amide	○○○●
48. The Hofmann degradation of $CH_3CH_2CONH_2$ gives:	$CH_3CH_2CH_2NH_2$	CH_3NH_2	$CH_3CH_2NH_2$	CH_3CH_2OH	○○●○

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Questions	A	B	C	D	A B C D
49. Amines are basic because of the:	non-bonding pair of electrons on nitrogen	bonding pairs on nitrogen	presence of carbon	presence of hydrogen	●○○○
50. The strength of a base is expressed in terms of:	pK_a only	pH of water	pK_b	boiling point	○○●○
51. A lower pK_b value means a ___ base.	acidic	weaker	stronger	neutral	○○●○
52. The pK_b values of ammonia and methylamine are about:	3.38 and 4.76	14.0 and 7.0	4.76 and 3.38	7.00 and 7.00	○○●○
53. Methylamine is a stronger base than ammonia because the methyl group:	withdraws electrons from nitrogen	is polar	donates electrons towards nitrogen	is large	○○●○
54. Methylamine is a stronger base than ammonia as indicated by:	an equal pK_b value	a higher pK_b value	a lower pK_a	a lower pK_b value	○○○●
55. The presence of electron-donating groups ___ the basicity of amines.	has no effect on	eliminates	increases	decreases	○○●○
56. Secondary amines are stronger bases than primary amines (in the gas phase) because they have:	no alkyl groups	two electron-donating alkyl groups	electron-withdrawing groups	one electron-donating group	○●○○
57. Amines are more basic than ammonia because of the:	electron-withdrawing effect of alkyl groups	electron-donating (+I) effect of alkyl groups	larger size of nitrogen	absence of lone pairs	○●○○
58. Aryl amines such as aniline are ___ basic than aliphatic amines.	less	equally	extremely	more	●○○○
59. Aniline is less basic than methylamine because the lone pair in aniline is:	delocalised into the benzene ring	more available	localised on carbon	absent	●○○○
60. An amine reacts with an acid to form a:	ester	ketone	ether	salt	○○○●
61. Methylamine reacts with HCl to form:	methanal	methyl chloride	methylammonium chloride	methanol	○○●○
62. The reaction of an amine with an acid halide gives:	an amide	an ester	an ether	an alcohol	●○○○
63. $CH_3COCl + CH_3CH_2NH_2 \rightarrow$?	$CH_3COOCH_2CH_3 + NH_3$	$CH_3CH_2Cl + CH_3CONH_2$	$CH_3CONHCH_2CH_3 + HCl$	$CH_3COOH + CH_3CH_2NH_2Cl$	○○●○
64. A primary amine reacts with an acid halide to give a:	nitrile	secondary amide	tertiary amide	primary amide	○●○○
65. The reaction of primary amines with alkyl halides is called:	acylation	hydrogenation	hydrolysis	alkylation	○○○●

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Questions	A	B	C	D	A B C D
66. Primary amines react with alkyl halides to form secondary amines, tertiary amines and:	esters	ammonium salts	alcohols	aldehydes	○●○○
67. Amines react with nitrous acid in the presence of HCl to form:	amides	nitro compounds	nitriles	diazonium compounds	○○○●
68. Nitrous acid is prepared in the reaction mixture from:	nitric acid and water	sodium nitrate and NaOH	ammonia and oxygen	sodium nitrite and HCl	○○○●
69. The diazotisation reaction mixture must be kept:	at 200 °C	above 100 °C	below 10 °C	at 50 °C	○○●○
70. The general reaction RNH_2 + HNO_2 + HCl → ?	$RN_2^+Cl^-$ + $2H_2O$	ROH + NH_4Cl	RNO_2 + H_2O	RCN + H_2O	●○○○
71. Aliphatic diazonium salts are:	too unstable for practical use	stable above 100 °C	used as dyes	very stable	●○○○
72. Aromatic diazonium salts are more stable than aliphatic ones because of:	lack of nitrogen	delocalisation of electrons in the benzene ring	hydrogen bonding	ionic character	○●○○
73. Benzene diazonium chloride is a:	black powder	yellow gas	red liquid	colourless crystalline solid	○○○●
74. Benzene diazonium chloride is stable below ___ and decomposes easily above it.	50 °C	100 °C	10 °C	200 °C	○○●○
75. When benzene diazonium chloride combines with phenol, it forms:	a blue solution	an orange-red azo dye	a colourless ester	a white precipitate	○●○○
76. The reaction of a diazonium salt with phenol is called:	hydrolysis	polymerisation	coupling	esterification	○○●○
77. Compounds containing the –N=N– group are called:	azo compounds	amines	amides	nitro compounds	●○○○
78. Phenyl azo compounds are used as:	dyes and pigments	explosives only	fertilisers	fuels	●○○○
79. Phenyl azo dyes are used in the:	food industry only	glass industry	metal industry only	textile, cosmetics, paint and leather industries	○○○●
80. Phenyl azo dyes also have:	no biological properties	only radioactive properties	only explosive properties	antibacterial and antifungal properties	○○○●
81. Methyl orange is an example of an:	azo dye	ester	amide	ether	●○○○
82. The functional group of amides is:	$–CONH_2$	$–NH_2$	$–NO_2$	–CN	●○○○

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Questions	A	B	C	D	A B C D
83. The functional group of nitriles is:	$-CONH_2$	$-NH_2$	$-C\equiv N$	$-N=N-$	○○●○
84. The functional group of nitro compounds is:	$-NH_2$	$-N=N-$	$-CN$	$-NO_2$	○○○●
85. The general formula for nitriles is:	RNO_2	$RCONH_2$	RCN	RNH_2	○○●○
86. Which of the following can donate an electron pair?	Alkyl halides	Acid chlorides	Carbocations	Amines	○○○●
87. Which of the following is a reducing agent for nitriles?	NaCl	$KMnO_4$	$LiAlH_4$	HCl	○○●○
88. Nitriles are prepared from alkyl halides using:	KCN	NaOH	NH_3	water	●○○○
89. RCN has ___ carbon atom more than RX.	one	three	no	two	●○○○
90. Hydrolysis of nitriles gives:	carboxylic acids	alkenes	alcohols	amines	●○○○
91. Reduction of nitriles gives amines having ___ carbon atoms as the nitrile.	one less	the same number of	one more	two more	○●○○
92. Which of the following is the most basic?	Ammonia	Aniline	Water	Dimethylamine	○○○●
93. Which of the following is the weakest base?	Methylamine	Aniline	Ethylamine	Ammonia	○●○○
94. The boiling point of primary amines compared with alcohols of similar mass is:	the same	lower	higher	zero	○●○○
95. The boiling point of primary amines compared with alkanes of similar mass is:	negligible	higher	the same	lower	○●○○
96. Tertiary amines have lower boiling points than primary amines because they:	are ionic	have no nitrogen	cannot form hydrogen bonds among themselves	form stronger hydrogen bonds	○○●○
97. Which type of amine has no N–H bond?	Secondary amine	Tertiary amine	Aryl amine	Primary amine	○●○○
98. Which pair of amines is correctly matched with its type?	CH_3NH_2: primary; $(CH_3)_2NH$: secondary	$(CH_3)_3N$: primary; CH_3NH_2: tertiary	$(CH_3)_2NH$: tertiary; $(CH_3)_3N$: secondary	CH_3NH_2: secondary; $(CH_3)_2NH$: primary	●○○○
99. Amines have a fishy smell because of:	their volatile nature	their metallic nature	their large size	their ionic nature	●○○○

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Questions	A	B	C	D	A B C D
100. Phenylamine reacts with bromine water to give:	a blue solution	a red solution	no reaction	a white precipitate of 2, 4,6-tribromophenylamine	○○○●
101. The ring in phenylamine is ___ reactive towards electrophiles than benzene.	more	never	less	equally	●○○○
102. The $-NH_2$ group in phenylamine ___ the benzene ring towards electrophilic substitution.	does not affect	destroys	deactivates	activates	○○○●
103. Phenylamine is a:	strong base	strong acid	weak base	neutral compound	○○●○
104. Phenylamine (aniline) is used for the manufacture of:	dyes	fertilisers only	plastics only	metals	●○○○
105. The reaction of amine with an acid chloride is called:	acylation	hydrolysis	alkylation	diazotisation	●○○○
106. The reaction of amine with an alkyl halide is called:	acylation	diazotisation	alkylation	hydrolysis	○○●○
107. The reaction of primary aromatic amine with HNO_2/HCl at low temperature is called:	halogenation	sulphonation	nitration	diazotisation	○○○●
108. A student treats aniline with $NaNO_2$/HCl below 5 °C and then adds an alkaline solution of phenol. The orange-red product is a/an:	amide	nitrile	ester	azo dye	○○○●
109. A student reduces nitrobenzene with Sn/HCl. The product is:	benzene	phenylamine	toluene	phenol	○●○○
110. A student treats ethanamide with $LiAlH_4$. The product is:	ethanoic acid	ethylamine	ethanol	methylamine	○●○○
111. A student treats propanamide with Br_2/KOH. The product is:	ethylamine	propylamine	propanol	methylamine	●○○○
112. A student heats ethyl bromide with excess ammonia in ethanol. The major product is:	diethylamine	ethylamine	triethylamine	tetraethylammonium bromide	○●○○
113. A student heats ethyl bromide with limited ammonia. The mixture contains:	primary, secondary and tertiary amines	only an alcohol	only an alkene	only primary amine	●○○○
114. An amine reacts with acetyl chloride to form an N-substituted amide. The by-product is:	H_2	H_2O	HCl	NH_3	○○●○
115. The conversion of an alkyl halide into a primary amine can be done with:	water	dilute HCl	NaOH	excess ammonia in ethanol	○○○●
116. The conversion of an alkyl halide into a nitrile followed by reduction gives a primary amine with ___ carbon atom more than the alkyl halide.	one	three	no	two	●○○○

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Questions	A	B	C	D	A B C D
117. Amine salts are ___ in water.	gaseous	soluble	insoluble	volatile	○●○○
118. Free amines are liberated from their salts by:	a strong acid	an oxidising agent	a strong base	water	○○●○
119. Amines are classified as primary, secondary or tertiary based on the:	colour	number of carbon atoms in the chain	molar mass	number of alkyl groups attached to nitrogen	○○○●
120. Amines are important in the synthesis of:	only plastics	only fuels	drugs and dyes	only metals	○○●○
121. The N–H bond in amines can form hydrogen bonds, but they are ___ than O–H hydrogen bonds in alcohols.	ionic	equal	stronger	weaker	○○○●
122. The nitrogen atom in amines is ___ electronegative than oxygen in alcohols.	equally	not	less	more	○○●○
123. Hydrogen bonding in amines is weaker than in alcohols because nitrogen is:	smaller than oxygen	more electronegative than oxygen	larger than oxygen	less electronegative than oxygen	○○○●
124. A compound with the formula C_2H_7N that is a primary amine is:	ethanamide	dimethylamine	trimethylamine	ethylamine	○○○●
125. A compound with the formula C_2H_7N that is a secondary amine is:	dimethylamine	ethylamine	ethanamine	trimethylamine	●○○○
126. The number of isomeric amines with formula C_3H_9N is:	3	4	2	5	○●○○
127. Methylamine can be prepared from:	ethene	methanol only by oxidation	ethanol	ethanamide by the Hofmann degradation	○○○●
128. Ammonia is a base with pK_b value of about:	3.38	4.76	7.0	14.0	○●○○
129. Dimethylamine is a:	weaker base than methylamine	acid	neutral compound	stronger base than methylamine	○○○●
130. Ethylamine is a stronger base than ammonia because of the:	electron-releasing ethyl group	large size of nitrogen	absence of a lone pair	electron-withdrawing ethyl group	●○○○
131. The conversion of aniline to benzenediazonium chloride is called:	reduction	diazotisation	hydrogenation	esterification	○●○○
132. The organic compounds having the –N=N– linkage between two aryl groups are:	esters	amides	nitriles	azo dyes	○○○●
133. Coupling of benzenediazonium chloride with phenol occurs at a pH that is:	strongly oxidising	strongly acidic	slightly alkaline	extremely acidic	○○●○

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134. The diazonium group ($-N_2^+$) can be replaced by many groups, which makes diazonium salts useful:	only as solvents	in synthesis	only as fuels	as catalysts	○●○○
135. Which of the following has a lone pair on nitrogen available for donation?	$(CH_3)_4N^+$	$CH_3NH_3^+$	NH_4^+	CH_3NH_2	○○○●
136. Which of the following has NO lone pair on nitrogen?	$(CH_3)_4N^+$	$(CH_3)_2NH$	CH_3NH_2	$(CH_3)_3N$	●○○○
137. Which of the following nitrogen-containing species is a quaternary ammonium ion?	$(C_2H_5)_2NH$	$C_2H_5NH_2$	$(C_2H_5)_3N$	$[(C_2H_5)_4N]^+$	○○○●
138. Amines are named by adding the suffix "amine" to the:	aryl group only	halogen name	metal name	alkyl group or by replacing the "e" of alkane	○○○●
139. In IUPAC naming, $CH_3CH_2CH_2NH_2$ is called:	propanenitrile	propan-1-amine	propanamide	propan-2-amine	○●○○
140. In IUPAC naming, $(CH_3)_2CHNH_2$ is called:	propanamide	propan-1-amine	dimethylamine	propan-2-amine	○○○●
141. The groups attached to nitrogen in secondary and tertiary amines are located by the letter:	O	C	S	N	○○○●
142. The compound $CH_3CH_2NHCH_3$ is named as a:	secondary amine	tertiary amine	primary amine	quaternary ammonium salt	●○○○
143. Quaternary ammonium salts have ___ alkyl groups attached to nitrogen.	three	one	four	two	○○●○
144. The hydrogen bonds in amines are formed between the:	N atoms only	C–C bonds	N–H of one molecule and the lone pair of N of another	C–H of one and O of another	○○●○
145. An amine that has three different groups on nitrogen shows optical activity only if the nitrogen:	is sp hybridised	does not rapidly invert	has no lone pair	is flat	○●○○
146. The reaction of ammonia with an alkyl halide is an example of:	nucleophilic substitution	free radical substitution	electrophilic addition	elimination	●○○○
147. In the reaction of ammonia with an alkyl halide, ammonia acts as a:	electrophile	free radical	nucleophile	catalyst	○○●○
148. In the reaction of an alkyl halide with ammonia, the halide ion is the:	catalyst	nucleophile	leaving group	electrophile	○○●○
149. Primary amines when reacted with excess alkyl halide ultimately form:	nitriles	alcohols	alkenes	quaternary ammonium salts	○○○●
150. The strength of nitrogen-containing bases like amines is generally compared using their:	pK_b values	colours	boiling points	densities	●○○○

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