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CHEMISTRY TEST - CHAPTER 17: HALOGENOALKANES

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. Halogenoalkanes are also known as:	alkanoates	alkanols	alkyl halides	alkanals	○○●○
2. Halogenoalkanes are the compounds in which a hydrogen atom of an alkane is replaced by a:	hydroxyl group	carbonyl group	halogen atom	amino group	○○●○
3. The general formula of an alkyl halide is:	R–OH	R–X	R–COOH	R–CHO	○●○○
4. The general formula of monohalogenoalkanes is:	$C_nH_{2n+1}X$	$C_nH_{2n+2}X$	$C_nH_{2n-1}X$	$C_nH_{2n}X$	●○○○
5. Halogenoalkanes are used as non-polar solvents and in the:	synthesis of many organic compounds	production of fertilisers only	manufacture of metals	storage of energy	●○○○
6. A halogenoalkane containing one halogen atom is called a:	dihaloalkane	polyhaloalkane	monohaloalkane	trihaloalkane	○○●○
7. $CHCl_3$ is an example of a:	dihaloalkane	trihaloalkane	monohaloalkane	tetrahaloalkane	○●○○
8. CCl_4 is an example of a:	dihaloalkane	trihaloalkane	tetrahaloalkane	monohaloalkane	○○●○
9. Halogenoalkanes are classified as primary, secondary and tertiary based on the:	type of carbon to which the halogen is attached	number of carbon atoms	type of halogen only	colour	●○○○
10. In primary alkyl halides, the halogen is attached to a carbon that is bonded to:	four alkyl groups	two alkyl groups	three alkyl groups	one or no alkyl group	○○○●
11. In secondary alkyl halides, the halogen is attached to a carbon that is bonded to:	two alkyl groups	three alkyl groups	one alkyl group	no alkyl group	●○○○
12. In tertiary alkyl halides, the halogen is attached to a carbon that is bonded to:	one alkyl group	no alkyl group	three alkyl groups	two alkyl groups	○○●○
13. CH_3CH_2Cl is a:	dihalide	tertiary alkyl halide	primary alkyl halide	secondary alkyl halide	○○●○
14. $CH_3CHClCH_3$ is a:	tertiary alkyl halide	primary alkyl halide	secondary alkyl halide	dihalide	○○●○

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Questions	A	B	C	D	A B C D
15. $(CH_3)_3CCl$ is a:	primary alkyl halide	tertiary alkyl halide	secondary alkyl halide	dihalide	○●○○
16. The IUPAC name of CH_3Cl is:	methyl chloride	chloromethane	dichloromethane	chloroethane	○●○○
17. The common name of chloroethane is:	propyl chloride	ethyl chloride	vinyl chloride	methyl chloride	○●○○
18. The common name of chloromethane is:	chloroform	methyl chloride	carbon tetrachloride	ethyl chloride	○●○○
19. The IUPAC name of $CH_3CH_2CH_2Cl$ is:	1-chloropropane	propyl alcohol	2-chloropropane	chloroethane	●○○○
20. The IUPAC name of $CH_3CHBrCH_3$ is:	2-bromopropane	isopropanol	bromoethane	1-bromopropane	●○○○
21. Alkyl halides have ___ melting and boiling points compared with alkanes of similar size.	the same	lower	higher	zero	○○●○
22. The higher boiling points of alkyl halides are due to the:	metallic C–X bond	ionic C–X bond	non-polarity of the C–X bond	polarity of the C–X bond	○○○●
23. In the C–X bond, the carbon atom carries a:	no charge	partial positive charge	partial negative charge	full negative charge	○●○○
24. In the C–X bond, the halogen atom carries a:	partial positive charge	full positive charge	partial negative charge	no charge	○○●○
25. The carbon atom of a halogenoalkane is:	sp^2 hybridised	sp^3 hybridised	unhybridised	sp hybridised	○●○○
26. Alcohols can be converted into alkyl halides by treatment with:	water	NaOH	PCl_5 or $SOCl_2$	dilute HCl only	○○●○
27. In the reaction $CH_3CH_2OH + PCl_5 \rightarrow CH_3CH_2Cl + POCl_3 + HCl$, the alcohol is converted into:	an alkene	an alkyl halide	an aldehyde	a ketone	○●○○
28. Ethanol reacts with thionyl chloride ($SOCl_2$) to give:	ethanal	ethene	ethane	chloroethane	○○○●
29. Phosphorus tribromide reacts with ethanol to give:	ethane	ethene	ethanal	bromoethane	○○○●
30. Alcohols react with HCl in the presence of anhydrous $ZnCl_2$ to give:	alkyl chlorides	ethers	alkenes	aldehydes	●○○○
31. The best method of preparing alkyl halides is the reaction of alcohols with:	water	inorganic halides like $SOCl_2$, PX_3 and PX_5	oxidising agents	alkalis	○●○○

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Questions	A	B	C	D	A B C D
32. Alkanes react with chlorine or bromine in UV light to produce:	halogenoalkanes	acids	alkenes	alcohols	●○○○
33. The reaction of alkanes with halogens proceeds by:	a nucleophilic mechanism	a free radical mechanism	an ionic mechanism	an electrophilic mechanism	○●○○
34. The free radical halogenation of alkanes does not give pure alkyl halides because:	di- and polyhalogen derivatives are also formed	the reaction is reversible	no products are formed	only alkenes are formed	●○○○
35. Addition of a halogen acid to an alkene is known as:	halogenation	hydration	hydrohalogenation	hydrogenation	○○●○
36. Hydrohalogenation of alkenes follows:	Pauli's principle	Le Chatelier's principle	Hund's rule	Markovnikov's rule	○○○●
37. The order of reactivity of halogen acids in addition to alkenes is:	HCl > HBr > HI	HI > HBr > HCl	HBr > HI > HCl	HCl > HI > HBr	○●○○
38. Alkenes react with halogens in an inert solvent like CCl_4 at room temperature to give:	vicinal dihalides (1,2-dihaloalkanes)	alcohols	alkyl halides	geminal dihalides	●○○○
39. In the reaction of alkenes with halogens, the effective electrophilic reagents are:	Br_2 and Cl_2	I_2 only	HF only	F_2 only	●○○○
40. Fluorine is not used in the halogenation of alkenes because it is:	a liquid	a solid	unreactive	too reactive to control	○○○●
41. Ethene reacts with Br_2 in CCl_4 to give:	bromoethane	1,2-dibromoethane	ethyne	1,1-dibromoethane	○●○○
42. Two main factors controlling the reactivity of halogenoalkanes are bond polarity and:	molar mass only	density	colour	bond strength (bond energy)	○○○●
43. In the C–X bond, the carbon atom is ___ and attacked by nucleophiles.	a radical	electrophilic	neutral	nucleophilic	○●○○
44. The polarity of the C–X bond decreases in the order:	C–I > C–Br > C–Cl > C–F	C–F > C–Cl > C–Br > C–I	C–Cl > C–F > C–I > C–Br	C–Br > C–F > C–I > C–Cl	○●○○
45. Bond energy is the energy required to break:	one gram of bonds	one molecule only	one atom	one mole of bonds of the same type	○○○●
46. The strongest carbon-halogen bond is:	C–I	C–F	C–Br	C–Cl	○●○○
47. The weakest carbon-halogen bond is:	C–F	C–Br	C–Cl	C–I	○○○●
48. Based on bond strength, the order of reactivity of alkyl halides is:	R–F > R–Cl > R–Br > R–I	R–Cl > R–Br > R–I > R–F	R–I > R–Br > R–Cl > R–F	R–Br > R–I > R–F > R–Cl	○○●○

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Questions	A	B	C	D	A B C D
49. Alkyl fluorides do not react under ordinary conditions because the C–F bond is:	very strong	metallic	ionic	very weak	●○○○
50. Which alkyl halide is the most reactive?	Alkyl bromide	Alkyl chloride	Alkyl iodide	Alkyl fluoride	○○●○
51. Which alkyl halide is the least reactive?	Alkyl iodide	Alkyl chloride	Alkyl fluoride	Alkyl bromide	○○●○
52. Alkyl halides undergo two main types of reactions:	addition and polymerisation	hydration and hydrogenation	nucleophilic substitution and elimination	oxidation and reduction only	○○●○
53. In nucleophilic substitution, the halogen of an alkyl halide is:	added to a double bond	removed as a radical	replaced by an attacking nucleophile	oxidised	○○●○
54. The abbreviation S_N stands for:	nucleophilic synthesis	nuclear substitution	natural substitution	nucleophilic substitution	○○○●
55. The alkyl halide molecule attacked by a nucleophile is called the:	catalyst	solvent	substrate	reagent	○○●○
56. A nucleophile is a species having:	no electrons	a lone pair of electrons to donate	a positive charge only	an empty orbital	○●○○
57. A nucleophile may be neutral or:	positively charged only	negatively charged	a metal atom	radical only	○●○○
58. The halogen of an alkyl halide that leaves during substitution is called the:	leaving group	substrate	electrophile	nucleophile	●○○○
59. Which of the following is a good leaving group?	Br^-	NH_2^-	OH^-	OR^-	●○○○
60. Which of the following is a poor leaving group?	Cl^-	I^-	Br^-	OH^-	○○○●
61. Iodide ion is a good nucleophile as well as a:	catalyst	poor leaving group	good leaving group	radical	○○●○
62. The incoming nucleophile must be ___ than the departing one.	stronger	weaker	equal to	smaller	●○○○
63. When an alkyl halide is heated with aqueous NaOH, the product is:	an alkene	a nitrile	an alcohol	an amine	○○●○
64. $CH_3CH_2Br + NaOH(aq) \rightarrow ?$	CH_3CH_2CN + NaBr	CH_3CH_2OH + NaBr	CH_3CH_3 + NaBr	$CH_2{=}CH_2$ + NaBr + H_2O	○●○○
65. When an alkyl halide is heated with KCN in ethanol, the product is a:	alkene	amine	alcohol	nitrile	○○○●

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Questions	A	B	C	D	A B C D
66. CH_3CH_2Br + KCN (ethanol) → ?	$CH_3CH_2NH_2$ + KBr	CH_3CH_2CN + KBr	CH_3CH_2OH + KBr	$CH_2=CH_2$ + KBr + HCN	○●○○
67. A nitrile has the functional group:	–COOH	$-NH_2$	–OH	–CN	○○○●
68. When an alkyl halide is heated with excess ammonia in ethanol under pressure, the product is a:	alcohol	nitrile	alkene	primary amine	○○○●
69. CH_3CH_2Br + NH_3 (excess, in ethanol) → ?	CH_3CH_2CN + NH_3	CH_3CH_2OH + NH_4Br	$CH_3CH_2NH_2$ + HBr	$CH_2=CH_2$ + NH_4Br	○○●○
70. The reaction of an alkyl halide with ethanolic $AgNO_3$ gives a precipitate of:	silver halide	silver nitrate	silver oxide	silver metal	●○○○
71. The precipitate from bromoethane and ethanolic $AgNO_3$ is:	cream AgBr	black Ag	yellow AgI	white AgCl	●○○○
72. The silver halide test on an alkyl halide gives a white precipitate soluble in aqueous ammonia. The halogen is:	fluorine	chlorine	iodine	bromine	○●○○
73. The silver halide test on an alkyl halide gives a yellow precipitate insoluble in aqueous ammonia. The halogen is:	fluorine	chlorine	bromine	iodine	○○○●
74. The silver halide test on an alkyl halide gives a cream precipitate partially soluble in aqueous ammonia. The halogen is:	iodine	chlorine	bromine	fluorine	○○●○
75. The colour of the AgBr precipitate is:	black	cream	white	yellow	○●○○
76. In the reaction of an alkyl halide with $AgNO_3$, the halide ion combines with:	H^+	OH^-	Ag^+	NO_3^-	○○●○
77. An elimination reaction removes two atoms or groups from:	adjacent carbon atoms	the end carbon only	different molecules	the same carbon atom only	●○○○
78. In elimination from an alkyl halide, the hydrogen is lost from the ___ carbon.	β (beta)	terminal oxygen	α (alpha) only	γ (gamma) only	●○○○
79. The β-hydrogen in alkyl halides is slightly acidic due to the:	presence of a double bond	presence of oxygen	electron-donating effect of alkyl groups	electron-withdrawing effect of the halogen	○○○●
80. The elimination reaction of alkyl halides is also called:	α-substitution	polymerisation	γ-addition	β-elimination	○○○●
81. Strong bases like NaOH in ethanol cause:	elimination reactions	addition reactions	substitution reactions only	no reactions	●○○○
82. Bromoethane heated with ethanolic NaOH gives:	ethene	ethanol	ethyne	ethane	●○○○

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Questions	A	B	C	D	A B C D
83. Heating 2-bromopropane with ethanolic NaOH gives mainly:	propane	propan-2-ol	propene	propyne	○○●○
84. Aqueous NaOH with alkyl halides favours:	elimination	polymerisation	addition	substitution	○○○●
85. Ethanolic NaOH with alkyl halides favours:	polymerisation	addition	elimination	substitution	○○●○
86. The products of the elimination of HBr from bromoethane are ethene and:	ethane	hydrogen only	ethanol	HBr (as NaBr and H_2O with base)	○○○●
87. Alkyl halides are considered very reactive towards nucleophiles because they have:	an electrophilic carbon and a bad leaving group	no polar bonds	an electrophilic carbon and a good leaving group	a nucleophilic carbon and a good leaving group	○○●○
88. Which of the following is NOT a nucleophile?	$AlCl_3$	OH^-	CN^-	NH_3	●○○○
89. Among the following species, the one that acts as a nucleophile is:	CN^-	$AlCl_3$	BF_3	H^+	●○○○
90. A neutral molecule that can act as a nucleophile because of its lone pair is:	NH_3	BF_3	CH_3^+	H^+	●○○○
91. Tertiary alkyl halides mostly show S_N1 reactions because they form a:	stable primary carbocation	stable tertiary carbocation	stable free radical	stable carbanion	○●○○
92. Primary alkyl halides mostly show:	S_N1 reactions	only elimination	no reactions	S_N2 reactions	○○○●
93. S_N2 reactions occur in:	two steps	a single step	three steps	many steps	○●○○
94. S_N1 reactions occur in:	no steps	two steps via a carbocation	a single step	a free radical chain	○●○○
95. The rate of S_N1 reaction depends on the concentration of:	the solvent only	the substrate only	both substrate and nucleophile	the nucleophile only	○●○○
96. The rate of S_N2 reaction depends on the concentration of:	the nucleophile only	neither	both the substrate and the nucleophile	the substrate only	○○●○
97. The order of reactivity of alkyl halides in S_N1 reactions is:	primary > secondary > tertiary	tertiary > secondary > primary	primary > tertiary > secondary	secondary > tertiary > primary	○●○○
98. The order of reactivity of alkyl halides in S_N2 reactions is:	primary > secondary > tertiary	secondary > primary > tertiary	tertiary > primary > secondary	tertiary > secondary > primary	●○○○
99. Chloroethane can be converted into ethanol by:	heating with aqueous NaOH	reacting with Cl_2	reacting with KCN	heating with ethanolic NaOH	●○○○

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Questions	A	B	C	D	A B C D
100. Chloroethane can be converted into propanenitrile by heating with:	NaOH in water	NH_3 in water	$AgNO_3$	KCN in ethanol	○○○●
101. Chloroethane can be converted into ethylamine by heating with:	excess ammonia in ethanol under pressure	$AgNO_3$ in water	NaOH in water	KCN in ethanol	●○○○
102. Chloroethane can be converted into ethene by heating with:	KCN	ammonia in water	aqueous NaOH	ethanolic NaOH	○○○●
103. A halogenoalkane C_4H_9Cl that is primary is:	2-chlorobutane	2-chloro-2-methylpropane	1-chlorobutane	3-chlorobutane	○○●○
104. A halogenoalkane C_4H_9Cl that is secondary is:	2-chlorobutane	1-chlorobutane	1-chloro-2-methylpropane	1-chloro-3-methylpropane	●○○○
105. A halogenoalkane C_4H_9Cl that is tertiary is:	2-chloro-2-methylpropane	2-chlorobutane	1-chlorobutane	1-chloro-2-methylpropane	●○○○
106. Propane reacts with chlorine in UV light to give:	only 1-chloropropane	only 2-chloropropane	a mixture of 1-chloropropane and 2-chloropropane	propene	○○●○
107. Alkyl halides are important intermediates in:	metal extraction	nuclear reactions	inorganic synthesis only	organic synthesis	○○○●
108. Amines are more basic than analogous alcohols because nitrogen is:	larger than oxygen only	a metal	more electronegative than oxygen	less electronegative than oxygen	○○○●
109. Dichloromethane is an example of a:	monohaloalkane	dihaloalkane	tetrahaloalkane	trihaloalkane	○●○○
110. The solvent often used in the reaction of alkenes with halogens is:	ammonia	carbon tetrachloride	ethanol	water	○●○○
111. The reaction of alkenes with halogens is a type of:	electrophilic addition	nucleophilic substitution	elimination	free radical substitution	●○○○
112. The compound $CH_3CH_2CH_2Br$ can be prepared from $CH_3CH_2CH_2OH$ using:	NaOH	PBr_3	water	KCN	○●○○
113. The best reagent for converting alcohols to alkyl halides produces gaseous by-products. This reagent is:	$SOCl_2$	PCl_3	HCl with $ZnCl_2$	PCl_5	●○○○
114. When ethanol reacts with $SOCl_2$, the by-products are SO_2 and:	Cl_2	H_2	HCl	NaCl	○○●○
115. The reaction R–OH + HX → R–X + H_2O is:	polymerisation	addition	elimination	substitution of the –OH group	○○○●
116. Reaction of alcohols with HX or with HBr/H_2SO_4 or H_3PO_4 gives:	halogenoalkanes	aldehydes	ethers only	alkenes only	●○○○

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Questions	A	B	C	D	A B C D
117. The reaction of an alkene with hydrogen halide at room temperature is:	elimination	electrophilic addition	nucleophilic substitution	free radical substitution	○●○○
118. The reaction of CH_3CH_2OH with HBr in the presence of H_2SO_4 gives:	ethene	ethane	bromoethane	ethanal	○○●○
119. The formation of carbon–carbon bonds can be achieved from alkyl halides by reaction with:	water	NaOH	NH_3	KCN	○○○●
120. The nitrile formed from an alkyl halide has ___ more carbon atom than the alkyl halide.	no	three	one	two	○○●○
121. Halogenoalkanes with an –X group on a carbon bonded to hydrogen on the next carbon can undergo:	only reduction	only oxidation	only addition	elimination of HX	○○○●
122. The product of the reaction of 1-bromopropane with aqueous NaOH is:	propane	propanal	propan-1-ol	propene	○○●○
123. The product of the reaction of 1-bromopropane with KCN in ethanol is:	propene	propanenitrile	propanol	butanenitrile	○○○●
124. The product of the reaction of 1-bromopropane with excess NH_3 is:	propanenitrile	propanol	propene	propylamine (propan-1-amine)	○○○●
125. The product of the reaction of 2-bromopropane with ethanolic NaOH is:	propene	propan-2-ol	propanone	propane	●○○○
126. Which compound has the weakest C–X bond?	CH_3Cl	CH_3I	CH_3Br	CH_3F	○●○○
127. Which compound has the strongest C–X bond?	CH_3Br	CH_3I	CH_3Cl	CH_3F	○○○●
128. Which of the following hydrolyses fastest with aqueous $AgNO_3$?	CH_3CH_2Br	CH_3CH_2I	CH_3CH_2Cl	CH_3CH_2F	○●○○
129. A student heats bromoethane with aqueous NaOH and the product has an –OH group. The reaction is:	elimination	free radical substitution	electrophilic addition	nucleophilic substitution	○○○●
130. A student heats bromoethane with ethanolic NaOH and a gas that decolourises bromine water is evolved. The gas is:	ethene	hydrogen	ethanol	ethane	●○○○
131. A student adds ethanolic $AgNO_3$ to an alkyl halide and gets a yellow precipitate. The alkyl halide is an:	alkyl bromide	alkyl iodide	alkyl chloride	alkyl fluoride	○●○○
132. Two test tubes contain chloroethane and iodoethane. With ethanolic $AgNO_3$, the precipitate forms faster in the one with:	neither	both at the same rate	chloroethane	iodoethane	○○○●
133. Which of the following explains why iodoalkanes react faster than chloroalkanes?	Iodine is more electronegative than chlorine	The C–I bond is stronger than the C–Cl bond	The C–I bond is weaker than the C–Cl bond	Iodoalkanes are non-polar	○○●○

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Questions	A	B	C	D	A B C D
134. The number of structural isomers of C_4H_9Cl is:	3	4	2	5	○●○○
135. A halogenoalkane has the formula C_3H_7Br. The number of isomers is:	3	1	4	2	○○○●
136. In nucleophilic substitution, the nucleophile attacks the carbon bearing the halogen because this carbon is:	electron deficient	a free radical	an anion	electron rich	●○○○
137. Excess ammonia is used in the reaction with alkyl halides to:	act as a catalyst	form an alkene	increase the temperature	prevent formation of secondary and tertiary amines	○○○●
138. The reaction of an alkyl halide with KCN is useful in synthesis because it:	shortens the carbon chain	removes the halogen only	gives a gas	lengthens the carbon chain	○○○●
139. The reaction of RX with NaOH to give ROH is an example of:	halogenation	hydrolysis	polymerisation	hydrogenation	○●○○
140. In S_N2 reactions, the nucleophile attacks from the side:	none of these	same as the leaving group	perpendicular to the leaving group	opposite to the leaving group	○○○●
141. In S_N1 reactions, the slow step is the formation of:	a carbanion	a free radical	an alkene	a carbocation	○○○●
142. Tertiary alkyl halides do not favour S_N2 reactions because of:	steric hindrance	lack of polarity	a weak C–X bond	lack of a leaving group	●○○○
143. Which carbocation intermediate forms from 2-chloro-2-methylpropane in S_N1 reaction?	Primary carbocation	Methyl carbocation	Tertiary carbocation	Secondary carbocation	○○●○
144. Primary alkyl halides do not favour S_N1 reactions because primary carbocations are:	ionic	neutral	unstable	very stable	○○●○
145. Alkyl halides are generally insoluble in water because they:	are ionic	cannot form hydrogen bonds with water	are acidic	form strong hydrogen bonds	○●○○
146. Alkyl halides are soluble in:	organic solvents	only ammonia	only water	only acids	●○○○
147. The boiling points of alkyl halides ___ with increasing size of the halogen.	decrease	remain constant	increase	become zero	○○●○
148. Which has the highest boiling point?	Fluoroethane	Bromoethane	Iodoethane	Chloroethane	○○●○
149. Which of the following is a primary halogenoalkane?	$CH_3CHBrCH_2CH_3$	$(CH_3)_2CHBr$	$(CH_3)_3CBr$	$CH_3CH_2CH_2Br$	○○○●
150. Which of the following is a tertiary halogenoalkane?	$(CH_3)_3CBr$	$(CH_3)_2CHBr$	CH_3CH_2Br	$CH_3CH_2CH_2Br$	●○○○

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