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HSSC-I NATIONAL BOOK FOUNDATION FBISE

CHEMISTRY TEST - CHAPTER 19: CARBONYL 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. Carbonyl compounds contain the functional group:	O–H	C–O–C	C=O	C≡N	○○●○
2. The carbonyl group consists of a carbon atom doubly bonded to:	a nitrogen atom	a hydrogen atom	an oxygen atom	a halogen atom	○○●○
3. In aldehydes, the carbonyl carbon is attached to:	two alkyl groups	at least one hydrogen atom	an alkoxy group	a hydroxyl group	○●○○
4. In ketones, the carbonyl carbon is bonded to:	two carbon atoms	an –OH group	a nitrogen atom	one hydrogen atom	●○○○
5. The general formula of saturated aldehydes is:	$C_nH_{2n}O$	$C_nH_{2n+2}O$	$C_nH_{2n-2}O$	$C_nH_{2n+1}O$	●○○○
6. The general formula of saturated ketones is:	$C_nH_{2n+2}O$	$C_nH_{2n}O_2$	$C_nH_{2n}O$	$C_nH_{2n-2}O$	○○●○
7. Aldehydes and ketones with the same number of carbon atoms are:	positional isomers	functional group isomers	chain isomers	geometric isomers	○●○○
8. The simplest aldehyde is:	propanal	ethanal	methanal	propanone	○○●○
9. The simplest ketone is:	propanone	ethanal	butanone	methanal	●○○○
10. The minimum number of carbon atoms in a ketone is:	4	2	1	3	○○○●
11. Acetaldehyde has the IUPAC name:	ethanal	propanal	methanal	ethanol	●○○○
12. Acetone has the IUPAC name:	butanone	ethanone	propanone	propanal	○○●○
13. Vanillin is a carbonyl compound that imparts the flavour of:	orange	mint	vanilla	lemon	○○●○
14. Primary alcohols are oxidised to aldehydes by warming with:	sodium hydroxide	dilute HCl	acidified potassium dichromate	water	○○●○

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Questions	A	B	C	D	A B C D
15. Secondary alcohols are oxidised to:	carboxylic acids	ketones	aldehydes	alkenes	○●○○
16. The colour change in the oxidation of alcohols with acidified $K_2Cr_2O_7$ is:	green to orange	orange to green	yellow to blue	purple to colourless	○●○○
17. To stop the oxidation of an aldehyde into a carboxylic acid, the aldehyde is:	heated with excess oxidant	distilled off as soon as it forms	cooled and stored	refluxed	○●○○
18. The boiling point of an aldehyde is ___ than that of the corresponding alcohol.	equal	lower	double	higher	○●○○
19. The reaction temperature for oxidising a primary alcohol to an aldehyde is kept a little higher than:	50 °C	1000 °C	10 °C	200 °C	●○○○
20. A ketone formed from a secondary alcohol is:	not further oxidised under similar conditions	reduced to an alkane	further oxidised to an aldehyde	further oxidised to an acid	●○○○
21. The characteristic reaction of the carbonyl group is:	free radical substitution	electrophilic addition	nucleophilic addition	elimination	○○●○
22. In the carbonyl group, the carbon atom is:	negatively charged	a free radical	nucleophilic	electrophilic	○○○●
23. In the carbonyl group, the oxygen atom is:	a radical	partially negative	partially positive	neutral	○●○○
24. The carbonyl carbon is sp^2 hybridised, so the carbonyl group is:	tetrahedral	linear	planar	octahedral	○○●○
25. The carbonyl group is polar because oxygen is:	less electronegative than carbon	more electronegative than carbon	a metal	equal in electronegativity	○●○○
26. In nucleophilic addition to carbonyl compounds, the C=O double bond is converted to:	an ionic bond	a triple bond	a single bond	a metallic bond	○○●○
27. In nucleophilic addition, the nucleophile attacks the:	oxygen atom	electrophilic carbon of the carbonyl group	alkyl group	hydrogen atom	○●○○
28. The first intermediate formed in the nucleophilic addition of CN^- to an aldehyde is an:	free radical	carbocation	carbanion	alkoxide ion	○○○●
29. Aldehydes are generally ___ reactive than ketones towards nucleophiles.	never	less	equally	more	○○○●
30. Aldehydes are more reactive than ketones because ketones have:	two electron-donating alkyl groups and more steric hindrance	a polar C–H bond	no alkyl groups	no carbonyl group	●○○○
31. Hydrogen cyanide adds to aldehydes and ketones to form:	nitriles only	cyanohydrins	oximes	imines	○●○○

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Questions	A	B	C	D	A B C D
32. The HCN addition reaction is catalysed by a:	base	noble gas	strong acid	metal	●○○○
33. The nucleophile in the addition of HCN to aldehydes is:	OH^-	CN^-	H^+	HCN molecule only	○●○○
34. HCN is generated from NaCN or KCN by reaction with:	HCl	ethanol	NaOH	water only	●○○○
35. Hydrogen cyanide is a:	solvent	nutrient	very toxic gas/liquid	harmless gas	○○●○
36. The reaction of HCN with an aldehyde gives a product with ___ more carbon atom.	no	three	two	one	○○○●
37. Acetaldehyde cyanohydrin is formed from ethanal and:	HCl	HCN	NH_3	NaOH	○●○○
38. Hydrolysis of a cyanohydrin gives a:	hydroxy acid	amine	alkene	keto acid	●○○○
39. Ethanol can be converted to lactic acid through ethanal, then:	HCN addition and hydrolysis	iodination	dehydration	reduction with $LiAlH_4$	●○○○
40. The iodoform test is used to detect the group:	–COOH	–CHO only	$CH_3CH_2CH_2$–	CH_3CO–	○○○●
41. The reagents for the iodoform test are:	bromine and HCl	iodine and sodium hydroxide solution	iodine and HCl	chlorine and NaOH	○●○○
42. A positive iodoform test gives a pale yellow precipitate of:	CH_2I_2	NaI	CH_3I	CHI_3	○○○●
43. Among aldehydes, the only one that gives a positive iodoform test is:	butanal	ethanal	propanal	methanal	○●○○
44. Among ketones, those that give a positive iodoform test are:	all ketones	methyl ketones	ketones with no methyl groups	ketones with long chains only	○●○○
45. Which of the following gives a positive iodoform test?	Pentan-3-one	Methanal	Propanal	Propanone	○○○●
46. Which of the following does NOT give a positive iodoform test?	Ethanal	Pentan-3-one	Butanone	Propanone	○●○○
47. The iodoform test can distinguish ethanol from:	butan-2-ol	propan-2-ol	ethanal	methanol	○○○●
48. The iodoform test can distinguish methyl ketones from:	aldehydes only	alcohols only	other ketones	acids	○○●○

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Questions	A	B	C	D	A B C D
49. In the iodoform reaction of ethanal, the salt formed along with CHI_3 is:	sodium methanoate	sodium carbonate	sodium propanoate	sodium ethanoate	●○○○
50. In the iodoform reaction of propanone, the salt formed along with CHI_3 is:	sodium methanoate	sodium propanoate	sodium ethanoate	sodium carbonate	○○●○
51. Acid increases the electrophilic character of the carbonyl carbon so that ___ nucleophiles can attack easily.	no	stronger	weaker	only anionic	○○●○
52. Aldehydes and ketones react with 2,4-dinitrophenylhydrazine (2,4-DNPH) to form:	a silver mirror	a blue solution	a yellow or orange precipitate	a red precipitate	○○●○
53. The 2,4-DNPH test is used to detect the presence of:	the hydroxyl group	the carboxyl group	the carbonyl group	the amino group	○○●○
54. The product of the reaction of 2,4-DNPH with a carbonyl compound is a:	ester	nitrile	ether	2,4-dinitrophenylhydrazone	○○○●
55. Reduction of aldehydes with $NaBH_4$ or $LiAlH_4$ gives:	tertiary alcohols	carboxylic acids	primary alcohols	secondary alcohols	○○●○
56. Reduction of ketones with $NaBH_4$ or $LiAlH_4$ gives:	tertiary alcohols	secondary alcohols	carboxylic acids	primary alcohols	○●○○
57. The BH_4^- and AlH_4^- ions act as a source of:	protons (H^+)	hydride ions (H^-)	electrons only	hydroxide ions	○●○○
58. Which is a weaker reducing agent?	$NaBH_4$	H_2/Ni	Both are equally strong	$LiAlH_4$	●○○○
59. Which is a stronger reducing agent?	$LiAlH_4$	Ethanol	$NaBH_4$	Water	●○○○
60. Reduction of propanone with $NaBH_4$ gives:	propan-1-ol	propane	propanal	propan-2-ol	○○○●
61. Reduction of ethanal with $NaBH_4$ gives:	propanol	ethane	ethanol	ethanoic acid	○○●○
62. The addition of a primary amine to an aldehyde or ketone gives an:	imine	ester	ether	alcohol	●○○○
63. Aldehydes are easily oxidised to:	ketones	alcohols	carboxylic acids	alkenes	○○●○
64. Ketones are oxidised only by:	dilute acids	strong oxidising agents	water	mild oxidising agents	○●○○
65. Which of the following is a strong oxidising agent that oxidises ketones?	Fehling's solution	Benedict's solution	Tollens reagent	Acidified $KMnO_4$	○○○●

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Questions	A	B	C	D	A B C D
66. Mild oxidising agents such as Tollens reagent oxidise:	neither	aldehydes only	ketones only	both aldehydes and ketones	○●○○
67. Which reagent will react with both aldehydes and ketones?	Benedict's solution	Tollens reagent	Fehling's solution	2,4-DNPH	○○○●
68. Fehling's solution is an alkaline solution of:	Cr^{3+} ions	Ag^{+} ions and ammonia	Fe^{3+} ions	Cu^{2+} ions and sodium or potassium tartrate	○○○●
69. When an aldehyde is heated with Fehling's solution, a ___ precipitate forms.	white	silver	red	yellow	○○●○
70. The red precipitate formed in Fehling's test is:	Cu_2O	$Cu(OH)_2$	CuO	$CuSO_4$	●○○○
71. In Fehling's test, copper(II) is:	reduced to copper(I)	reduced to copper(0) only	unchanged	oxidised to copper(III)	●○○○
72. Ketones do not respond to Fehling's test because they are:	acidic	not oxidised by mild oxidising agents	ionic	more easily oxidised	○●○○
73. Tollens reagent consists of:	acidified dichromate	iodine and NaOH	copper sulphate and tartrate	aqueous silver nitrate, ammonia and sodium hydroxide	○○○●
74. When an aldehyde is warmed with Tollens reagent, the product observed is a:	red precipitate	yellow precipitate	silver mirror	blue solution	○○●○
75. The silver mirror in Tollens' test is formed by the reduction of:	Cr^{6+} to Cr^{3+}	Ag^{+} to Ag	Ag to Ag^{+}	Cu^{2+} to Cu	○●○○
76. The active species in Tollens reagent is:	$AgNO_3$ solid	AgCl	$[Ag(NH_3)_2]^{+}$	$[Cu(NH_3)_4]^{2+}$	○○●○
77. Tollens' test is also called the:	silver mirror test	Lucas test	Fehling test	iodoform test	●○○○
78. Which test can distinguish an aldehyde from a ketone?	Tollens' test	Litmus test	2,4-DNPH test	Iodoform test for all	●○○○
79. Which of the following gives a silver mirror with Tollens reagent?	Ethanol	Ethene	Propanone	Ethanal	○○○●
80. Which of the following does NOT give a red precipitate with Fehling's solution?	Ethanal	Methanal	Propanal	Propanone	○○○●
81. Oxidation of ethanal with acidified $K_2Cr_2O_7$ gives:	ethanoic acid	ethene	ethanol	propanone	●○○○
82. Oxidation of symmetrical ketones by strong oxidants gives:	a mixture of carboxylic acids	one alcohol	an alkene	an aldehyde	●○○○

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Questions	A	B	C	D	A B C D
83. The carbon atom joined to fewer hydrogen atoms is ___ oxidised in unsymmetrical ketones.	least	never	preferentially	equally	○○●○
84. Carboxylic acids contain the functional group:	–CHO	–OH only	–CO–	–COOH	○○○●
85. The general formula of aliphatic carboxylic acids is:	RCOR	RCHO	RCOOH	ROH	○○●○
86. In aliphatic carboxylic acids, the carboxyl group is attached to:	a halogen	a nitrogen atom	a benzene ring	an alkyl group (or hydrogen)	○○○●
87. In aromatic carboxylic acids, the carboxyl group is attached to:	an oxygen	a halogen	a benzene ring	an alkyl chain	○○●○
88. Hydrolysis of nitriles with dilute acid gives:	carboxylic acids	alcohols	aldehydes	amines	●○○○
89. Hydrolysis of CH_3CN with water and acid gives:	CH_3COOH and NH_4^+	$CH_3CH_2NH_2$	CH_3CHO	CH_3CH_2OH	●○○○
90. The acid produced from a nitrile has ___ more carbon atom than the original alkyl halide.	one	three	no	two	●○○○
91. Primary alcohols can be oxidised to carboxylic acids by refluxing with:	$NaBH_4$	acidified $K_2Cr_2O_7$ or $KMnO_4$	dilute HCl	$LiAlH_4$	○●○○
92. Hydrolysis of esters with dilute acid gives a carboxylic acid and:	an aldehyde	a ketone	an ether	an alcohol	○○○●
93. Basic hydrolysis of esters is known as:	esterification	saponification	hydration	dehydration	○●○○
94. Saponification gives the salt of a carboxylic acid, which is:	an alcohol	soap	an acid	an ester	○●○○
95. Saponification of ethyl ethanoate with NaOH gives:	ethane and sodium	sodium ethanoate and ethanol	sodium ethoxide and ethanal	ethanoic acid and ethanol	○●○○
96. The carboxyl group shows chemistry of both the carbonyl and:	ether groups	halogen groups	hydroxyl groups	amino groups	○○●○
97. Carboxylic acids are ___ acids than mineral acids.	stronger	weaker	more corrosive	equally strong	○●○○
98. Carboxylic acids are the ___ acidic of the common organic functional groups.	most	moderately	never	least	●○○○
99. Carboxylic acids react with NaOH to give:	a salt and water	an aldehyde	an alcohol	an ester and water	●○○○

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Questions	A	B	C	D	A B C D
100. Carboxylic acids react with carbonates to give a salt, water and:	hydrogen	oxygen	methane	carbon dioxide	○○○●
101. $2CH_3COOH + Na_2CO_3 \rightarrow ?$	$2CH_3COONa + H_2O + CO_2$	$CH_4 + NaOH$	$CH_3CH_2OH + Na_2O$	$2CH_3CHO + CO$	●○○○
102. $CH_3COOH + NaHCO_3 \rightarrow ?$	$CH_3CHO + H_2O$	$CH_3CH_2OH + CO$	$CH_3COOCH_3 + NaOH$	$CH_3COONa + H_2O + CO_2$	○○○●
103. Carboxylic acids react with active metals such as Na to give a salt and:	oxygen	carbon dioxide	hydrogen	water only	○○●○
104. The test used to detect carboxylic acids using sodium hydrogencarbonate gives:	effervescence of CO_2	a silver mirror	a red precipitate	a yellow precipitate	●○○○
105. When carboxylic acids are heated with alcohols and concentrated H_2SO_4, they form:	esters	aldehydes	ethers	ketones	●○○○
106. A reaction in which two molecules combine with the elimination of a small molecule like water is called a:	hydrolysis	addition	condensation reaction	reduction	○○●○
107. In acid-catalysed esterification, the first step is protonation of the:	water	ester oxygen	alcohol carbon	carbonyl oxygen	○○○●
108. In acid-catalysed esterification, the alcohol acts as a:	catalyst	free radical	electrophile	nucleophile	○○○●
109. In acid-catalysed esterification, water is eliminated and the final product is an:	ether	ester	alkene	aldehyde	○●○○
110. Carboxylic acids are reduced to primary alcohols by:	dilute acid	$LiAlH_4$	H_2O	$NaBH_4$	○●○○
111. Carboxylic acids are ___ reactive towards reduction by hydride than aldehydes and ketones.	less	more	never	equally	●○○○
112. The product of the reduction of ethanoic acid with $LiAlH_4$ is:	ethanal	ethanol	ethane	ethene	○●○○
113. The condensation of ethanoic acid with ethanol gives:	ethyl ethanoate	ethyl methanoate	propyl ethanoate	methyl ethanoate	●○○○
114. Tertiary alcohols cannot be oxidised because they have no:	carbon	C–C bond	carbinol C–H	oxygen	○○●○
115. Aldehydes are prepared by oxidising:	alkenes only	secondary alcohols	tertiary alcohols	primary alcohols	○○○●
116. Ketones are prepared by oxidising:	secondary alcohols	alkanes only	tertiary alcohols	primary alcohols	●○○○

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117. The carbonyl group readily undergoes nucleophilic addition, sometimes followed by elimination of a water molecule, resulting in a:	elimination	condensation reaction	hydrolysis	polymerisation	○●○○
118. Aldehydes can be oxidised to carboxylic acids by:	only strong reducing agents	only acids	a variety of reagents	only water	○○●○
119. The most important reactions of carboxylic acids convert them into:	alkenes	alkanes	alkynes	carboxylic acid derivatives	○○○●
120. Which of these is a carboxylic acid derivative?	Alkene	Alcohol	Ester	Alkane	○○●○
121. The functional group of esters is:	–OH	–CHO	–CO–	–COO–	○○○●
122. The functional group of an acid chloride is:	–CHO	–CN	–COCl	–COOH	○○●○
123. The IUPAC name of the compound HCHO is:	methanoic acid	ethanal	methanol	methanal	○○○●
124. The IUPAC name of CH_3CH_2CHO is:	propanoic acid	propanone	propanol	propanal	○○○●
125. The IUPAC name of $CH_3COCH_2CH_3$ is:	butanone	butanal	butanoic acid	butan-2-ol	●○○○
126. The IUPAC name of CH_3CH_2COOH is:	propanone	propanoic acid	propanal	ethanoic acid	○●○○
127. The IUPAC name of CH_3COOH is:	ethanol	methanoic acid	ethanal	ethanoic acid	○○○●
128. The IUPAC name of HCOOH is:	methanal	methanoic acid	methanol	ethanoic acid	○●○○
129. The compound that gives a positive Tollens' test but a negative iodoform test is:	propanone	ethanol	ethanal	propanal	○○○●
130. The compound that gives a positive iodoform test but a negative Tollens' test is:	propanone	methanal	ethanal	propanal	●○○○
131. The compound that gives a positive iodoform test AND a positive Tollens' test is:	propanal	ethanal	propanone	butanone	○●○○
132. Which pair can be distinguished by Tollens' test?	Propan-1-ol and propan-2-ol	Ethanoic acid and ethanol	Ethanol and methanol	Propanal and propanone	○○○●
133. Which pair can be distinguished by the iodoform test?	Ethanoic acid and propanoic acid	Propanal and butanal	Ethanol and methanol	Methanol and methanal	○○●○

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134. Which pair can be distinguished by effervescence with $NaHCO_3$?	Methanol and ethanol	Ethanoic acid and ethanol	Ethanal and propanone	Propanal and propanone	○●○○
135. A compound reacts with 2,4-DNPH (orange precipitate), gives no silver mirror and gives a yellow precipitate with iodine/NaOH. It is:	ethanal	propanal	ethanol	propanone	○○○●
136. A compound C_3H_6O gives a silver mirror with Tollens reagent. It is:	propanal	propan-2-ol	propene oxide	propanone	●○○○
137. A compound C_3H_6O gives no silver mirror but gives an orange precipitate with 2,4-DNPH. It is:	propan-1-ol	propene	propanal	propanone	○○○●
138. An organic compound $C_2H_4O_2$ gives CO_2 with sodium carbonate. It is:	methyl methanoate	ethanol	ethanal	ethanoic acid	○○○●
139. A compound $C_2H_4O_2$ that does not give CO_2 with Na_2CO_3 but is hydrolysed by NaOH could be:	ethanal	methyl methanoate	ethane-1,2-diol	ethanoic acid	○●○○
140. The carbonyl carbon in aldehydes and ketones has a bond angle of about:	90°	109.5°	180°	120°	○○○●
141. Methanal is also known as:	acetone	acetaldehyde	formic acid	formaldehyde	○○○●
142. Aqueous solution of methanal is commonly called:	formalin	spirit	vinegar	brine	●○○○
143. The common name of propanone is:	acetaldehyde	acetic acid	acetone	formalin	○○●○
144. Ketones are named by replacing the "e" of alkane with:	oic acid	ol	one	al	○○●○
145. Aldehydes are named by replacing the "e" of alkane with:	ol	al	oic acid	one	○●○○
146. In aldehydes, the carbonyl group is always at the:	end of the carbon chain	branch only	middle of the carbon chain	ring only	●○○○
147. In ketones, the carbonyl group is always:	at the end of the chain	attached to hydrogen	within the carbon chain	attached to OH	○○●○
148. The boiling points of aldehydes and ketones are higher than those of alkanes because of:	metallic bonds	hydrogen bonding	dipole–dipole forces	ionic bonds	○○●○
149. The lower aldehydes and ketones are soluble in water because they can form hydrogen bonds with:	ions only	each other only	alkanes	water molecules	○○○●
150. Aldehydes and ketones cannot form hydrogen bonds with themselves because they lack:	a hydrogen attached to oxygen	a double bond	a carbon atom	an oxygen atom	●○○○

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