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CHEMISTRY TEST - CHAPTER 16: HYDROCARBONS

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. Hydrocarbons are organic compounds containing:	carbon and nitrogen only	carbon and oxygen only	hydrogen and carbon only	hydrogen and oxygen only	○○●○
2. Hydrocarbons are broadly divided into aliphatic and:	aldehydic hydrocarbons	alcoholic hydrocarbons	aromatic hydrocarbons	acidic hydrocarbons	○○●○
3. The word "aliphatic" comes from a Greek word meaning:	fragrant	fatty	chain	ring	○●○○
4. The word "aromatic" comes from a Greek word meaning:	fragrant	ring	colourless	fatty	●○○○
5. Open chain hydrocarbons are also called:	acyclic hydrocarbons	alicyclic hydrocarbons	aromatic hydrocarbons	cyclic hydrocarbons	●○○○
6. Closed chain hydrocarbons have:	terminal carbon atoms	only triple bonds	no terminal carbon atom	only double bonds	○○●○
7. Each singly bonded carbon in alkanes is:	sp hybridised	sp^3 hybridised	sp^2 hybridised	unhybridised	○●○○
8. Alkenes are commonly known as:	acetylenes	paraffins	olefins	arenes	○○●○
9. Alkanes are commonly known as:	paraffins	acetylenes	olefins	arenes	●○○○
10. Alkynes are commonly known as:	arenes	olefins	paraffins	acetylenes	○○○●
11. Each doubly bonded carbon in an alkene is:	sp^2 hybridised	sp^3 hybridised	sp hybridised	unhybridised	●○○○
12. Each triply bonded carbon in an alkyne is:	sp^3 hybridised	unhybridised	sp hybridised	sp^2 hybridised	○○●○
13. A hydrocarbon with more than one double bond is called a:	alkane	paraffin	polyene	polyyne	○○●○
14. A hydrocarbon with more than one triple bond is called a:	paraffin	polyene	polyyne	olefin	○○●○

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Questions	A	B	C	D	A B C D
15. The name "paraffin" comes from the Latin words meaning:	fat and oil	little and affinity (reactivity)	large and attraction	wax and heat	○●○○
16. Alicyclic hydrocarbons have ___ hydrogen atoms than their corresponding open-chain hydrocarbons.	two more	two fewer	the same number of	four fewer	○●○○
17. Aromatic hydrocarbons have at least one:	triple bond only	benzene ring	hydroxyl group	double bond only	○●○○
18. The simplest aromatic hydrocarbon is:	cyclohexane	benzene	toluene only	ethene	○●○○
19. The benzene molecule has the shape of a:	hexagon	pentagon	triangle	square	●○○○
20. Each carbon of the benzene ring is:	sp^2 hybridised	unhybridised	sp^3 hybridised	sp hybridised	●○○○
21. Alkanes are non-polar because the electronegativity difference between C and H is:	above 1.8	large	negligible	exactly 2.0	○○●○
22. The electronegativity values of C and H used in the book are:	1.0 and 4.0	2.0 and 3.0	3.5 and 2.1	2.5 and 2.1	○○○●
23. Alkanes have only ___ bonds.	metallic	sigma	pi	ionic	○●○○
24. Alkanes are less reactive mainly because of their:	ionic bonds	double bonds	strong sigma bonds and non-polarity	polar bonds	○○●○
25. The two important reactions of alkanes are free radical substitution and:	hydration	cracking	polymerisation	hydrogenation	○●○○
26. Free radical substitution of alkanes requires:	an alkali	an acid catalyst	ultraviolet light	a metal catalyst	○○●○
27. Cracking of alkanes requires:	ultraviolet light	heating	an alkali	a nucleophile	○●○○
28. Cracking converts large molecules into:	noble gases	larger molecules	metals	smaller, more useful molecules	○○○●
29. The three steps of free radical substitution are initiation, propagation and:	hydrolysis	addition	elimination	termination	○○○●
30. In the initiation step, the halogen molecule undergoes:	homolytic fission	addition	heterolytic fission	hydrolysis	●○○○
31. In the chlorination of ethane, the initiation step produces:	ethyl cations	chlorine free radicals	ethene	chloride ions	○●○○

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Questions	A	B	C	D	A B C D
32. In the chlorination of ethane, a chlorine radical reacts with ethane to form:	an ethyl free radical and HCl	an ethyl cation	chloroethane only	ethene and H_2	●○○○
33. An ethyl radical reacts with Cl_2 to form:	ethene and HCl	chloroethane and a chlorine radical	ethane and Cl^-	dichloroethane only	○●○○
34. The step is called propagation because:	the reaction proceeds like a chain reaction	ions are formed	the reaction stops	radicals are destroyed	●○○○
35. The termination step involves:	the breaking of C–H bonds	the formation of ions	the combination of two free radicals	the formation of free radicals	○○●○
36. Which of the following is a termination step?	$CH_3CH_3 + Cl\bullet \rightarrow CH_3CH_2\bullet + HCl$	$CH_3CH_2\bullet + Cl_2 \rightarrow CH_3CH_2Cl + Cl\bullet$	$Cl_2 \rightarrow 2Cl\bullet$	$CH_3CH_2\bullet + \bullet CH_2CH_3 \rightarrow CH_3CH_2CH_2CH_3$	○○○●
37. Which of the following is a propagation step in the chlorination of ethane?	$Cl_2 \rightarrow 2Cl\bullet$	$C_2H_6 + Cl\bullet \rightarrow C_2H_5\bullet + HCl$	$C_2H_5\bullet + Cl\bullet \rightarrow C_2H_5Cl$	$2C_2H_5\bullet \rightarrow C_4H_{10}$	○●○○
38. Excess chlorine in the chlorination of ethane results in:	a mixture of chlorosubstituted alkanes	no reaction	only ethene	only chloroethane	●○○○
39. The most likely reaction alkanes undergo is:	free radical substitution	electrophilic substitution	nucleophilic addition	electrophilic addition	●○○○
40. The H–C–C bond angles in ethane are about:	180°	90°	120°	109.5°	○○○●
41. The shape around each carbon atom in ethane is:	trigonal planar	tetrahedral	square planar	linear	○●○○
42. The C–C–C bond angle in cyclopropane is:	120°	90°	109.5°	60°	○○○●
43. Cyclopropane is:	ionic	not planar	linear	completely planar	○●○○
44. The carbon atoms in cyclopropane are:	sp^2 hybridised	sp^3 hybridised	sp hybridised	unhybridised	○●○○
45. Alkenes can be prepared by the dehydration of:	alkanes	aldehydes	ketones	alcohols	○○○●
46. Dehydration of ethanol is carried out by passing ethanol vapour over hot:	sodium chloride	aluminium oxide	iron filings	zinc dust	○●○○
47. Besides alumina, dehydrating agents/catalysts used in the dehydration of ethanol include:	water	dilute HCl	NaOH	concentrated H_2SO_4 and H_3PO_4	○○○●
48. Dehydration of ethanol gives:	ethane and water	ethyne and water	ethene and water	ethanal and water	○○●○

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Questions	A	B	C	D	A B C D
49. Dehydrohalogenation is the removal of:	hydrogen and halogen as hydrogen halide	hydrogen only	carbon dioxide	water	●○○○
50. Ethene can be prepared from bromoethane by heating with:	aqueous sodium hydroxide	dilute acid	ethanolic sodium hydroxide	water	○○●○
51. Dehydration and dehydrohalogenation are:	redox reactions only	addition reactions	elimination reactions	substitution reactions	○○●○
52. An ethene molecule has a double bond made of:	two sigma bonds	one sigma and two pi bonds	one sigma and one pi bond	two pi bonds	○○●○
53. The sigma bond between the carbon atoms in ethene is formed by:	parallel overlap of p orbitals	overlap of s orbitals only	head-on overlap of sp^2 orbitals	overlap of d orbitals	○○●○
54. The pi bond in ethene is formed by:	overlap of s orbitals	head-on overlap of sp^2 orbitals	ionic attraction	parallel overlap of unhybridised p orbitals	○○○●
55. The pi bond is ___ than the sigma bond.	equal in strength	longer lasting	weaker	stronger	○○●○
56. Ethene is a planar molecule with bond angles of about:	180°	120°	90°	109.5°	○●○○
57. Ethene is more reactive than ethane because it has:	a strong sigma bond	a weak pi bond	polar bonds	more hydrogens	○●○○
58. Alkenes mostly show:	addition reactions	elimination only	no reactions	substitution reactions only	●○○○
59. In addition reactions of alkenes, the double bond is converted into a:	single bond	metallic bond	triple bond	ionic bond	●○○○
60. The addition of hydrogen to alkenes to form alkanes is called:	hydration	dehydration	halogenation	hydrogenation	○○○●
61. Hydrogenation of alkenes takes place in the presence of finely divided:	copper oxide	iron	nickel or platinum	sodium	○○●○
62. Hydrogenation is used for the industrial preparation of:	margarine	soap	plastic bags	alcohol	●○○○
63. The addition of HBr to propene gives mainly:	1-bromopropane	1,2-dibromopropane	2-bromopropane	propane	○○●○
64. Markovnikov's rule states that in the addition of an unsymmetrical reagent to an unsymmetrical alkene, the hydrogen atom bonds to the double-bond carbon having:	a halogen	more hydrogen atoms	no hydrogen atoms	fewer hydrogen atoms	○●○○
65. In the hydrobromination of an alkene, the electrophile is:	$Br•$	OH^-	Br^-	H^+	○○○●

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Questions	A	B	C	D	A B C D
66. The addition of HBr to propene proceeds through:	no intermediates	carbocation intermediates	free radical intermediates	carbanion intermediates	○●○○
67. Markovnikov's rule is explained by the stability of:	anions	free radicals	carbanions	carbocations	○○○●
68. Among carbocations, the most stable is the:	primary carbocation	secondary carbocation	methyl carbocation	tertiary carbocation	○○○●
69. The stability order of carbocations is:	primary > tertiary > secondary	primary > secondary > tertiary	tertiary > secondary > primary	secondary > primary > tertiary	○○●○
70. Alkyl groups stabilise carbocations because they are:	electron donating	neutral	electron withdrawing	polar	●○○○
71. The donation of electrons via sigma bonds by alkyl groups is called the:	inductive effect	Zeeman effect	steric effect	resonance effect	●○○○
72. A carbocation carries a ___ charge on carbon.	double negative	positive	zero	negative	○●○○
73. Hydration of ethene in the presence of acid gives:	ethane	ethanoic acid	ethanal	ethanol	○○○●
74. The first step in the industrial hydration of ethene uses:	hot dilute HCl	NaOH	cold concentrated sulphuric acid	water vapour only	○○●○
75. In the hydration of ethene, the first product is:	diethyl ether	ethyl hydrogensulphate	ethanol	ethanal	○●○○
76. Heating ethyl hydrogensulphate with water gives:	ethane	ethanal	ethanol	ethene	○○●○
77. Hydration of alkenes is an ___ catalysed reaction.	acid	enzyme	metal	base	●○○○
78. Ethene reacts with bromine at room temperature to give:	1,2-dibromoethane	ethyne	bromoethane	1,1-dibromoethane	●○○○
79. The test for unsaturation using bromine water is based on the:	formation of a gas	formation of a green colour	formation of a white precipitate	discharge of the brown colour of bromine	○○○●
80. In the halogenation of alkenes, the electrophile is the:	bromide ion	hydroxide ion	bromine radical	polarised bromine molecule ($Br^{\delta+}$)	○○○●
81. In the halogenation of alkenes, the intermediate formed is a:	cyclic bromonium ion	free radical	primary carbocation	carbanion	●○○○
82. In the second step of bromination of ethene, Br^- acts as a:	nucleophile	electrophile	catalyst	free radical	●○○○

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Questions	A	B	C	D	A B C D
83. Halohydration is the addition of ___ to alkenes.	halogen	hydrogen halide	hypohalous acid (HOX)	hydrogen	○○●○
84. The product of the reaction of ethene with HOBr is:	dibromoethane	ethanol	bromoethane	bromohydrin	○○○●
85. Epoxidation of alkenes uses:	water	alkalis	peracids such as peroxyacetic acid	dilute acids	○○●○
86. Ethene reacts with peroxyacetic acid to form:	ethane	ethanoic acid only	ethanol	epoxyethane	○○○●
87. Ozonolysis of alkenes is carried out at about:	100 °C	400 °C	−78 °C	25 °C	○○●○
88. Ozonolysis cleaves the double bond and forms:	aldehydes and ketones	alcohols and acids	alkanes	halogenoalkanes	●○○○
89. The unstable intermediate formed first in ozonolysis is a:	molozonide	bromonium ion	epoxide	ozonide	●○○○
90. Ozonolysis is used to determine:	the position of the double bond in alkenes	the colour of alkenes	the boiling point of alkenes	the molecular mass of alkenes	●○○○
91. Ozonolysis of ethene followed by reduction with zinc gives:	ethanal	methanal	methanol	ethanoic acid	○●○○
92. Small molecules that join to form a polymer are called:	isomers	isotopes	radicals	monomers	○○○●
93. Ethene polymerises at 400 °C and about 1000 atm in the presence of traces of:	nitrogen	oxygen	hydrogen	chlorine	○●○○
94. The polymer formed from ethene is:	polystyrene	polyethene	polypropene	polyvinyl chloride	○●○○
95. The Ziegler–Natta catalyst consists of triethylaluminium and:	iron	titanium tetrachloride	platinum	nickel	○●○○
96. The Ziegler–Natta catalyst produces polythene that is:	liquid	gaseous	harder with a high melting point	softer with a low melting point	○○●○
97. Ziegler and Natta received the Nobel Prize in the year:	1900	1963	1988	1928	○●○○
98. The word "polymer" comes from the Greek words meaning:	many parts	long chain	small unit	single part	●○○○
99. Conjugation is found in alkenes with:	alternate double and single bonds	only triple bonds	only single bonds	only one double bond	●○○○

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Questions	A	B	C	D	A B C D
100. Conjugated alkenes are stabilised by:	localised pi electrons	ionic bonding	hydrogen bonding	delocalisation of pi electrons	○○○●
101. Which of the following shows conjugation?	Buta-1,3-diene	Penta-1,4-diene	Ethene	But-1-ene	●○○○
102. In conjugated molecules, the carbon atoms are:	sp hybridised	unhybridised	sp^3 hybridised	sp^2 hybridised	○○○●
103. Redox reactions in organic chemistry refer to:	only oxidation	only reduction	oxidation and reduction occurring together	only substitution	○○●○
104. An oxidation reaction involves an increase in the number of bonds of carbon with:	oxygen	hydrogen	metals	carbon only	●○○○
105. A reduction reaction involves a decrease in the number of bonds of carbon with:	oxygen	metals	hydrogen	nitrogen only	●○○○
106. The reduction of CH_3CN with hydrogen gives:	CH_3COOH	CH_3CHO	$CH_3CH_2NH_2$	CH_3CH_2OH	○○●○
107. Stereoisomers have the same molecular formula but different:	functional groups	molecular masses	number of atoms	arrangement of atoms in space	○○○●
108. Stereoisomerism is also called:	chain isomerism	positional isomerism	structural isomerism	configurational isomerism	○○○●
109. The two types of stereoisomerism are optical and:	chain isomerism	geometric isomerism	functional isomerism	positional isomerism	○●○○
110. A carbon atom bonded to four different atoms or groups is called a:	quaternary carbon	chiral carbon	tertiary carbon	primary carbon	○●○○
111. A chiral carbon is also called an:	asymmetric carbon	symmetric carbon	conjugated carbon	primary carbon	●○○○
112. Optical isomers differ in their effect on:	boiling point	plane-polarised light	molecular mass	colour	○●○○
113. Optical isomers are also called:	enantiomers	conformers	homologues	diastereomers	●○○○
114. Enantiomers are:	geometrical isomers	superimposable images	non-superimposable mirror images	structural isomers	○○●○
115. The instrument used to measure optical activity is the:	barometer	spectrometer	calorimeter	polarimeter	○○○●
116. Lactic acid shows optical isomerism because it has:	one chiral carbon	a triple bond	a double bond	no chiral carbon	●○○○

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Questions	A	B	C	D	A B C D
117. A molecule with two different chiral carbons shows ___ optical isomers.	six	four	two	three	○●○○
118. An equimolar mixture of dextrorotatory and levorotatory isomers is called a:	meso compound	polymer	racemic mixture	diastereomer	○○●○
119. A racemic mixture is optically:	dextrorotatory	active	levorotatory	inactive	○○○●
120. A meso compound is optically inactive because it has:	a double bond	a triple bond	a plane of symmetry	no chiral carbon	○○●○
121. Stereoisomers that are not mirror images of each other are called:	isotopes	racemates	enantiomers	diastereomers	○○○●
122. Geometric isomerism is also known as:	chain isomerism	functional isomerism	cis–trans isomerism	optical isomerism	○○●○
123. Geometric isomerism arises from:	difference in functional groups	free rotation around single bonds	difference in molecular mass	restricted rotation around a double bond or ring	○○○●
124. If the same groups are on the same side of the double bond, the isomer is called:	racemic	trans	meso	cis	○○○●
125. If the same groups are on opposite sides of the double bond, the isomer is called:	trans	cis	racemic	meso	●○○○
126. Which of the following shows geometric isomerism?	Pent-1-ene	Hex-3-ene	But-1-ene	Propene	○●○○
127. Geometric isomerism is not shown by propene because the double-bonded carbon has:	a triple bond	a ring	different groups on both carbons	two identical hydrogen atoms on one carbon	○○○●
128. 1,1-Dimethylcyclopropane does not show geometric isomerism because both methyl groups are on:	different carbon atoms	the same carbon atom	opposite sides	a double bond	○●○○
129. Geometric isomers can be interconverted by heating, which breaks the:	sigma bond	hydrogen bond	ionic bond	pi bond	○○○●
130. Which one of the following is a possible propagation step in the chlorination of ethane?	$C_2H_6 + Cl\bullet \rightarrow C_2H_5\bullet + HCl$	$Cl_2 \rightarrow 2Cl\bullet$	$C_2H_5\bullet + C_2H_5\bullet \rightarrow C_4H_{10}$	$Cl\bullet + Cl\bullet \rightarrow Cl_2$	●○○○
131. Which of the following is the most stable (least reactive) hydrocarbon?	An alkyne	An alkane	An alkene	A conjugated triene	○●○○
132. The most important factor responsible for the low reactivity of alkanes is their:	polar bonds	ionic bonds	long C–C bonds	strong sigma bonds	○○○●
133. Which pair are consecutive members of a homologous series?	HCHO and CH_3COOH	CH_3OH and CH_3CHO	CH_3COOH and C_2H_5COOH	CH_4 and C_2H_4	○○●○

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134. Which statement about alkenes is correct?	They contain only sigma bonds	They are more reactive than alkanes due to pi bonds	They are less reactive than alkanes	They are always cyclic	○●○○
135. Which of the following is an unsaturated hydrocarbon?	Cyclopropane	Propane	Ethane	Propene	○○○●
136. Which of the following is a saturated hydrocarbon?	Cyclohexane	Hexyne	Benzene	Hexene	●○○○
137. Which of the following is an aromatic hydrocarbon?	Hexane	Hexene	Cyclohexane	Benzene	○○○●
138. Hydrocarbons that contain at least one benzene ring are called:	alicyclic hydrocarbons	alkynes	paraffins	aromatic hydrocarbons	○○○●
139. Ethene is more reactive than ethyne because the pi bond in ethene is:	shorter	more exposed (diffused)	stronger	less exposed	○●○○
140. The electrophile in the hydrobromination of propene attacks the:	methyl group	sigma bond	C–H bond	pi bond	○○○●
141. Which reagent can be used to distinguish an alkene from an alkane?	Sodium chloride solution	Dilute HCl	Litmus paper	Bromine water	○○○●
142. In the addition of HBr to propene, the minor product is:	1-bromopropane	propane	2-bromopropane	1,2-dibromopropane	●○○○
143. In the ozonolysis of alkenes, zinc is used as a:	strong oxidising agent	dehydrating agent	mild reducing agent	catalyst for halogenation	○○●○
144. The Ziegler–Natta catalyst gives good-quality polythene because it causes no:	pressure	heating	branching	reaction	○○●○
145. In hexa-1,2-diene, the central carbon of the C=C=C unit is:	sp^3 hybridised	sp hybridised	unhybridised	sp^2 hybridised	○●○○
146. But-2-ene can exist as:	cis and trans isomers	optical isomers only	only one form	chain isomers only	●○○○
147. A chiral molecule is one that has:	a plane of symmetry	no carbon atoms	a non-superimposable mirror image	a triple bond	○○●○
148. Hydrogenation of propene gives:	propanal	propyne	propane	propanol	○○●○
149. When alkenes react with a polarised halogen molecule, the first step is attack by:	a base on the pi bond	the sigma electrons on the nucleophile	a free radical on a sigma bond	the pi electrons on the electrophile	○○○●
150. Alkanes burn in excess oxygen to give:	carbon dioxide and water	carbon and hydrogen	carbon monoxide only	methanol	●○○○

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