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HSSC-I NATIONAL BOOK FOUNDATION FBISE

CHEMISTRY TEST - CHAPTER 13: ENVIRONMENTAL CHEMISTRY AIR

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. The environment of the Earth is composed of how many main components?	5	2	4	3	○○●○
2. Which of the following is NOT a component of the environment?	Atmosphere	Stratosphere	Hydrosphere	Lithosphere	○●○○
3. The envelope of gases surrounding the Earth is called the:	hydrosphere	atmosphere	biosphere	lithosphere	○●○○
4. The hydrosphere includes all of Earth's:	water in various forms	living organisms	gases	rocks and minerals	●○○○
5. The solid outermost layer of the Earth (rocks, minerals and soils) is the:	hydrosphere	biosphere	atmosphere	lithosphere	○○○●
6. The biosphere includes:	only plants	only rocks and soil	all living organisms and their interactions	only the oceans	○○●○
7. Earthquakes and volcanic activity occur in the:	hydrosphere	biosphere	troposphere	lithosphere	○○○●
8. The atmosphere consists mainly of nitrogen (about 78%) and:	argon (about 21%)	oxygen (about 21%)	carbon dioxide (about 21%)	hydrogen (about 21%)	○●○○
9. The atmosphere protects the planet from hazardous:	earthquakes	moonlight	solar radiation	tides	○○●○
10. The Earth's atmosphere is divided into how many main layers?	4	7	2	3	●○○○
11. The lowest layer of the atmosphere is the:	troposphere	mesosphere	stratosphere	thermosphere	●○○○
12. The layer in which weather keeps changing is the:	mesosphere	exosphere	stratosphere	troposphere	○○○●
13. The troposphere extends up to about:	500 km	12 km	100 km	50 km	○●○○
14. Most of the Earth's clouds and water vapour are found in the:	mesosphere	stratosphere	thermosphere	troposphere	○○○●

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Questions	A	B	C	D	A B C D
15. In the troposphere, temperature generally ___ with altitude.	decreases	remains constant	increases	doubles	●○○○
16. The layer containing the ozone layer is the:	troposphere	exosphere	mesosphere	stratosphere	○○○●
17. The ozone layer absorbs and scatters the Sun's:	visible light only	ultraviolet radiation	radio waves	infrared radiation only	○●○○
18. In the stratosphere, temperature ___ with altitude.	increases	remains constant	becomes zero	decreases	●○○○
19. The temperature increases in the stratosphere due to the absorption of:	X-rays by clouds	UV radiation	infrared radiation	radio waves	○●○○
20. The layer in which meteors burn up is the:	mesosphere	exosphere	stratosphere	troposphere	●○○○
21. The mesosphere is characterised by:	a thick ozone layer	extremely high temperatures	dense clouds	extremely low temperatures	○○○●
22. The aurora occurs in the:	hydrosphere	stratosphere	mesosphere	troposphere	○○●○
23. The layer characterised by high temperature due to intense solar radiation is the:	stratosphere	mesosphere	thermosphere	troposphere	○○●○
24. The thermosphere is divided into the ionosphere and the:	exosphere	mesosphere	troposphere	stratosphere	●○○○
25. The ionosphere contains electrically charged particles that play a role in:	rainfall	radio communication	ozone formation	photosynthesis	○●○○
26. The outermost layer of the atmosphere, which gradually merges into space, is the:	exosphere	mesosphere	ionosphere	stratosphere	●○○○
27. The exosphere contains a thin mixture of gases such as:	nitrogen and oxygen only	carbon dioxide and ozone	methane and ammonia	hydrogen and helium	○○○●
28. Substances that contaminate the air and are harmful to humans and the environment are called:	noble gases	greenhouse gases only	nutrients	air pollutants	○○○●
29. Pollutants directly emitted into the air are called:	primary pollutants	natural gases	secondary pollutants	tertiary pollutants	●○○○
30. Pollutants formed by chemical reactions in the atmosphere are called:	noble pollutants	secondary pollutants	primary pollutants	natural pollutants	○●○○
31. Which of the following is a secondary pollutant?	PAN	Carbon monoxide from engines	Lead from petrol	Soot from a chimney	●○○○

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Questions	A	B	C	D	A B C D
32. Particulate matter can cause:	a cooler climate	improved lung function	respiratory and cardiovascular problems	bone growth	○○●○
33. Nitrogen oxides (NO_x) are produced by burning fossil fuels, especially in:	vehicles and industrial processes	oceans only	forests only	volcanoes only	●○○○
34. Nitrogen oxides contribute to:	cooling of the Earth	ozone layer formation	noble gas formation	smog and acid rain	○○○●
35. Sulphur dioxide is emitted mainly by burning:	hydrogen	coal and oil	wood only	natural gas only	○●○○
36. Sulphur dioxide combines with water vapour to form:	acid rain	a buffer	ozone	photochemical smog only	●○○○
37. Volatile organic compounds (VOCs) contribute to the formation of:	stratospheric ozone	oxygen	noble gases	ground-level ozone	○○○●
38. Carbon monoxide is produced by the:	neutralisation reactions	incomplete combustion of carbon-containing fuels	photosynthesis	complete combustion of fuels	○●○○
39. Carbon monoxide is hazardous because it:	forms ozone	forms acid rain	reduces the blood's ability to carry oxygen	increases oxygen in blood	○○●○
40. Ground-level ozone is formed when VOCs and NO_x react in the presence of:	rain	sunlight	cold	darkness	○●○○
41. Ground-level ozone irritates the respiratory system and:	cures asthma	has no effect on crops	exacerbates asthma	improves lung function	○○●○
42. Heavy metals released from industrial processes include lead, mercury and:	cadmium	calcium	potassium	sodium	●○○○
43. Heavy metals contaminate soil and water, entering the:	food chain	stratosphere	ozone layer	noble gases	●○○○
44. Ammonia in the air is emitted mainly from:	burning of coal	volcanoes only	agricultural activities and livestock waste	car engines	○○●○
45. PAHs are organic compounds composed of multiple:	straight chains	fused aromatic rings	metal atoms	ionic lattices	○●○○
46. PAHs are formed during the:	neutralisation	photosynthesis	incomplete combustion of organic materials	complete combustion of methane	○○●○
47. Some PAHs are considered:	nutritious	carcinogenic	beneficial	inert	○●○○
48. CFCs stands for:	carbon-fluorine chlorides	chlorofluorocarbons	chlorine-fluorine compounds	carbon-flame chemicals	○●○○

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Questions	A	B	C	D	A B C D
49. CFCs were commonly used in:	fuels	detergents	refrigeration and aerosol propellants	fertilisers	○○●○
50. CFCs became pollutants due to their ability to:	break down ozone molecules	form acid rain	form smog	absorb CO_2	●○○○
51. The depletion of the ozone layer allows more ___ to reach the Earth's surface.	sound waves	infrared radiation	radio waves	ultraviolet radiation	○○○●
52. The "hole" in the ozone layer was dangerously growing during:	the 1950s	the 1980s and 1990s	the 2050s	the 1700s	○●○○
53. The ozone layer depletion is mainly caused by:	greenhouse gases	volcanic eruptions	deforestation	chlorofluorocarbons	○○○●
54. Air pollutants can lead to which of the following?	Cleaner water	Respiratory diseases and premature death	Better health	Reduced temperatures	○●○○
55. Burning fossil fuels releases large amounts of:	helium	carbon dioxide	neon	argon	○●○○
56. Greenhouse gases trap heat, leading to:	ozone formation	noble gas release	global cooling	global warming	○○○●
57. Deforestation contributes to higher CO_2 levels because trees act as:	carbon sources	carbon sinks	nitrogen sources	ozone sources	○●○○
58. Smog is a combination of:	fog and smoke or other pollutants	snow and dust	mist and steam	clouds and rain	●○○○
59. Smog usually has a hazy, often ___ appearance.	red	yellowish	blue	green	○●○○
60. Photochemical smog forms in urban areas with high levels of:	volcanic activity	rainfall	vehicular emissions	plant growth	○○●○
61. Photochemical smog results from reactions between NO_x and VOCs in the presence of:	rain	darkness	sunlight	snow	○○●○
62. Photochemical smog contains the harmful gas:	ozone	argon	nitrogen	helium	●○○○
63. Industrial smog is also known as:	brown smog	white smog	black smog	green smog	○○●○
64. Industrial smog results from burning:	coal or other fossil fuels	wind	hydrogen	solar energy	●○○○
65. Industrial smog contains large amounts of particulate matter and:	sulphur dioxide	ammonia	helium	ozone	●○○○

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Questions	A	B	C	D	A B C D
66. Industrial smog is commonly associated with areas where the primary source of energy is:	hydroelectric power	solar energy	wind power	coal	○○○●
67. The compound PAN stands for:	phenyl acetate nitrate	polyacetyl nitrate	peroxyacid nitrite	peroxyacetyl nitrate	○○○●
68. Smog can worsen conditions such as:	broken bones	diabetes	vitamin deficiency	asthma and bronchitis	○○○●
69. Smog affects the eyes by causing:	no effect	improved vision	redness, itching and watering	colour blindness	○○●○
70. Smog increases the risk of road accidents because it:	reduces visibility	cools the air	improves visibility	reduces traffic	●○○○
71. Ozone in smog harms plant growth and:	cleans water	decreases crop yields	improves soil	increases crop yields	○●○○
72. Rain with a pH less than ___ is called acid rain.	3.0	8.5	5.6	7.0	○○●○
73. Normal rain water is slightly acidic because of dissolved:	helium	carbon dioxide forming carbonic acid	nitrogen	oxygen	○●○○
74. The primary causes of acid rain are sulphur dioxide and:	carbon dioxide	nitrogen oxides	ozone	methane	○●○○
75. SO_2 reacts with oxygen and water to form:	ammonia	sulphurous gas	sulphuric acid	hydrogen sulphide	○○●○
76. The nitrogen oxides react with atmospheric moisture to form:	ammonia	sulphuric acid	nitrous oxide	nitric acid	○○○●
77. Acid rain harms aquatic life by:	adding nutrients	lowering the pH of water bodies	increasing oxygen	raising the pH	○●○○
78. Acid rain damages buildings and statues made of:	glass only	marble and limestone ($CaCO_3$)	plastic	steel only	○●○○
79. The reaction of acid rain with marble is represented by:	$NaCl + H_2SO_4 \rightarrow NaHSO_4 + HCl$	$CaCO_3 \rightarrow CaO + CO_2$	$CaO + H_2O \rightarrow Ca(OH)_2$	$CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2O + CO_2$	○○○●
80. Acid rain affects fish by forming aluminium compounds that clog their:	gills	fins	scales	eyes	●○○○
81. Pollutants causing acid rain can travel long distances, leading to:	transboundary pollution	no effects	local-only effects	cooling of the planet	●○○○
82. Which technology is used in power plants to reduce acid rain?	Boilers	Compressors	Scrubbers	Turbines	○○●○

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Questions	A	B	C	D	A B C D
83. AQI stands for:	Air Quality Index	Acid Quality Indicator	Atmospheric Quantity Index	Air Quantity Indicator	●○○○
84. AQI is a standardised measure of:	water quality	temperature	overall air quality	soil quality	○○●○
85. $PM_{2.5}$ refers to particles with a diameter of:	25 nanometres or smaller	25 micrometres	2.5 millimetres	2.5 micrometres or smaller	○○○●
86. PM_{10} refers to particles with a diameter of:	100 micrometres	10 micrometres or smaller	1 micrometre exactly	10 millimetres	○●○○
87. Which instrument measures particulate matter by analysing the attenuation of beta radiation?	Electrochemical sensor	Barometer	Beta attenuation monitor	Gas chromatograph	○○●○
88. In the gravimetric method of measuring PM, the filter is:	weighed before and after sampling	burnt and analysed	dissolved in acid	photographed	●○○○
89. Optical particle counters measure particles using:	electrolysis	light scattering or laser diffraction	gravity	beta radiation	○●○○
90. Which instruments are used to measure concentrations of gases like CO_2, CO and NO_2?	Hydrometers	Gas chromatographs and gas sensors	Thermometers	Barometers	○●○○
91. Satellites are used in air quality monitoring to provide data over:	only laboratories	only rooms	only cars	large geographic areas	○○○●
92. Carbon monoxide in indoor environments is commonly detected by:	barometers	hygrometers	seismographs	electrochemical sensors	○○○●
93. Electrochemical CO sensors generate an electrical current proportional to the:	temperature	humidity	CO concentration	pressure	○○●○
94. Infrared CO detectors work by measuring the absorption of:	radio waves by CO	UV light by ozone	infrared light by CO molecules	visible light by CO_2	○○●○
95. Chemical colour change detectors for CO are:	not able to detect CO	used only for quantitative analysis	less precise but give a visible indication	more precise than electrochemical sensors	○○●○
96. Cap-and-trade systems allow companies to buy and sell:	land	pollution allowances	water	fuel	○●○○
97. In Pakistan, the board working on renewable energy promotion is the:	Alternative Energy Development Board (AEDB)	Pakistan Atomic Energy Commission	Oil and Gas Regulatory Authority	Water and Power Development Authority	●○○○
98. Periodic emission testing of vehicles helps to ensure:	bigger engines	louder vehicles	compliance with emission standards	higher fuel prices	○○●○
99. The greenhouse effect is a natural phenomenon that:	destroys ozone	regulates Earth's temperature	forms acid rain	cools the Earth	○●○○

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Questions	A	B	C	D	A B C D
100. The greenhouse effect occurs when certain gases trap:	infrared radiation from the Sun's energy	ultraviolet radiation permanently	sound waves	radio waves	●○○○
101. The primary greenhouse gases include CO_2, CH_4, N_2O and:	neon	helium	argon	water vapour	○○○●
102. Which of the following is NOT a greenhouse gas?	Nitrous oxide	Water vapour	Argon	Methane	○○●○
103. Among the following, the gas that is NOT a greenhouse gas is:	Carbon dioxide	Methane	Sulphur dioxide	Nitrous oxide	○○●○
104. The intensification of the greenhouse effect by human activities results in:	global cooling	global warming	ozone formation	acid rain only	○●○○
105. A main cause of global warming is the burning of:	wind energy	solar energy	fossil fuels	hydropower	○○●○
106. Methane and nitrous oxide are emitted by:	photosynthesis only	sunlight only	earthquakes only	industrial processes	○○○●
107. A major consequence of global warming is:	decrease in temperature	increase in glaciers	melting of ice and rising sea levels	decrease in sea level	○○●○
108. Global warming may lead to more frequent:	earthquakes	hurricanes, droughts and floods	volcanoes	snowfall everywhere	○●○○
109. Which of the following is a measure to reduce greenhouse gas emissions?	Burning more coal	Transition to renewable energy	Using more CFCs	Cutting forests	○●○○
110. Solar, wind and hydropower reduce air pollution by decreasing dependence on:	fossil fuels	trees	sunlight	water	●○○○
111. Electric vehicles help reduce:	emissions from conventional automobiles	noise only	traffic only	road length	●○○○
112. Planting trees helps to improve air quality because trees:	absorb pollutants and CO_2	release CO_2	release SO_2	release CFCs	●○○○
113. Which action can individuals take to reduce air pollution?	Use single-use plastics	Drive gasoline-powered cars more	Burn waste openly	Reduce energy consumption	○○○●
114. Poor air quality leads to ___ healthcare expenditures.	zero	lower	no change in	higher	○○○●
115. Vulnerable groups most affected by air pollution include:	children and the elderly	farmers only	athletes only	soldiers only	●○○○
116. Air pollution in urban areas of developing countries is linked to increased cases of ___ among children.	vision loss	asthma	fractures	diabetes	○●○○

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Questions	A	B	C	D	A B C D
117. Air pollution often crosses borders and therefore needs:	private control	no cooperation	international agreements and cooperation	local laws only	○○●○
118. The null hypothesis in the classroom experiment is that indoor plants:	improve air quality	remove CO_2 completely	worsen air quality	have no significant effect on air quality	○○○●
119. In the classroom experiment, the classroom without plants is the:	variable	control group	experimental group	hypothesis	○●○○
120. In the experiment, the presence or absence of indoor plants is the:	control	constant	dependent variable	independent variable	○○○●
121. Which is a primary source of air pollution?	All of these	Natural volcanic eruptions	Industrial emissions	Forest fires	●○○○
122. Which gas is primarily responsible for the greenhouse effect?	Hydrogen	Nitrogen	Carbon dioxide	Oxygen	○○●○
123. The main component of smog that poses health risks to humans is:	carbon monoxide	sulphur dioxide	nitrogen dioxide	oxygen	○○●○
124. Acid rain is primarily caused by the emission of:	oxygen	carbon dioxide	ammonia	sulphur dioxide	○○○●
125. A short-term effect of air pollution on human health is:	respiratory problems	improved immunity	increased cancer risk	long-term memory loss	●○○○
126. Which of these is NOT an adverse effect of air pollution on the environment?	Acid rain	Increased agricultural productivity	Damage to forests	Damage to buildings	○●○○
127. The main consequence of global warming is:	increased ozone thickness	decreased carbon dioxide levels	reduced temperatures	rising sea levels	○○○●
128. Industrialisation and the use of fossil fuels in transport and domestic use have polluted the air considerably in the last:	500 years	5000 years	50 years	5 years	○○●○
129. Substances such as lead, mercury and cadmium in the air are called:	noble gases	greenhouse gases	photochemical oxidants	heavy metal pollutants	○○○●
130. Smog is a mixture of smoke and:	fog	steam	rain	dust only	●○○○
131. The atmospheric layer closest to the surface of the Earth is:	troposphere	mesosphere	exosphere	ionosphere	●○○○
132. Which gas makes up about 78% of the Earth's atmosphere?	Carbon dioxide	Oxygen	Argon	Nitrogen	○○○●
133. In which layer of the atmosphere is the ozone layer located?	Exosphere	Mesosphere	Stratosphere	Troposphere	○○●○

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Questions	A	B	C	D	A B C D
134. The balanced equation for the formation of sulphuric acid in acid rain is:	$2SO_2 + O_2 + 2H_2O \rightarrow 2H_2SO_4$	$S + O_2 \rightarrow SO_3$	$SO_2 + H_2 \rightarrow H_2SO_4$	$SO_3 \rightarrow SO_2 + O$	●○○○
135. Nitric acid in acid rain ionises in water to give:	H_2 and N_2	OH^- and NH_4^+	NO and O_2	H_3O^+ and NO_3^-	○○○●
136. Deforestation increases the CO_2 level in the atmosphere because it:	increases photosynthesis	increases the oxygen level	decreases the temperature	reduces the Earth's ability to absorb CO_2	○○○●
137. In photochemical smog, NO_2 in sunlight splits into NO and:	a nitrogen atom	a CO molecule	an ozone molecule	an oxygen atom	○○○●
138. Heatwaves and changing disease patterns are linked to:	decreased CO_2	noble gas release	improved air quality	poor air quality and climate change	○○○●
139. Acid rain leads to increased:	agricultural productivity	maintenance and repair costs of infrastructure	forest growth	soil fertility	○●○○
140. The air quality standards for industrial sources and vehicles are set under:	trade laws	water laws	food laws	clean air laws and regulations	○○○●
141. The EU Ambient Air Quality Directive sets air quality standards for PM, NO_2 and:	neon	helium	argon	SO_2	○○○●
142. NAAQS stands for:	National Ambient Air Quality Standards	National Air Acid Quality System	National Atmosphere Acid Quality Standards	New Ambient Air Quality System	●○○○
143. Air pollution reduces labour productivity because of:	more machinery	increased holidays	illness and absenteeism	better health	○○●○
144. A city has a yellowish-brown haze in the afternoon, with high levels of ozone and NO_x. The type of smog is:	industrial smog	acid fog	photochemical smog	volcanic smog	○○●○
145. A coal-burning industrial city has black smog with high SO_2 and soot. This is:	ozone depletion	industrial smog	acid rain	photochemical smog	○●○○
146. A student finds that rain water in his city has a pH of 4.5. This rain is:	acid rain	alkaline rain	neutral rain	normal rain	●○○○
147. A student finds that normal clean rain water has a pH of about 5.6 due to:	dissolved O_2	dissolved SO_2	dissolved CO_2	dissolved N_2	○○●○
148. A scientist finds high NO_2 levels in a city during morning traffic hours, followed by an increase in ozone later in the day. The ozone is a:	primary pollutant	noble gas	secondary pollutant	natural gas	○○●○
149. In a scrubber used to control SO_2 from power plants, SO_2 is removed by:	filtering with cloth	burning	cooling only	reaction with a basic substance	○○○●
150. Burning fossil fuels, deforestation and industrial processes have increased the concentration of:	greenhouse gases	helium	noble gases	ozone in the stratosphere	●○○○

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