# ENVIRONMENTAL CHEMISTRY

**CHEMISTRY**

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**Single Correct Answer Type**

1. Aerosols present in atmospheric air may be:
   a) Positively charged
   b) Negatively charged
   c) Neutral
   d) Combination of all (a), (b) and (c)
2. The process which does not evolve $CO_2$ in air is:
   a) Burning b) Breathing c) Organic decay d) Photosynthesis
3. High concentration hydrocarbon pollutants in atmospheric air causes:
   a) Cancer
   b) Silicosis
   c) Respiratory diseases (e.g. Asthma)
   d) Reduced crop yield
4. Ozone layer of stratosphere requires protection from indiscriminate use of
   a) Pesticides b) Atomic explosions
   c) Aerosols and high flying jets d) Balloons
5. Which of the following is the hottest region of the atmosphere?
   a) Mesosphere b) Stratosphere c) Thermosphere d) Troposphere
6. Lead exhausted in the atmosphere by automobiles using leaded petrol (i.e., tetraethyl lead for improving octane number) is a lethal air pollutant, which causes:
   a) Paralysis of muscles and loss of appetite
   b) Nervous depression
   c) Gastritis and diarrhea
   d) All of the above
7. Green house effect is accelerated by:
   a) Deforestation
   b) Rapid industrialization
   c) Increased transportation activity
   d) All of the above
8. Mercury is emitted into air by:
   a) Burning coal b) Burning garbage c) Coal fire d) Steam engine
9. Chlorofluorocarbon releases which of the following chemical harmful to ozone?
   a) Fluorine b) Chlorine c) Nitrogen dioxide d) Sulphur dioxide
10. Green house effect is caused by
    a) $NO_2$ b) CO c) NO d) $CO_2$
11. 'Particulate' air pollutants are finely divided solids ($<10^{-6}$m size) and liquids. Which of the given is not a 'particulate'?
    a) Dust and mists
    b) Smoke and fumes
    c) Photochemical smog and soot
    d) None of the above
12. Bhopal gas tragedy of 1984 was caused by
    a) Carbon monoxide b) Phosgene c) Methyl cyanate d) Methyl isocyanate
13. Higher concentration of nitrogen dioxide in atmosphere air causes:
    a) Cancer b) Bronchitis c) Asphyxiation d) Corrosion

14. London smog is found in:
    a) Summer during day time
    b) Summer during morning time
    c) Winter during morning time
    d) Winter during day time
15. Burning of fossil fuels is the main source of
    a) Nitrogen oxide b) Nitric oxide c) Nitrous oxide d) Sulphur dioxide
16. Phosphate pollution is caused by
    a) Weathering of phosphate rocks only b) Agricultural fertilizers only
    c) Phosphate rocks and sewage d) Sewage and agricultural fertilizers
17. Which compound is mainly responsible for the depletion of ozone layer?
    a) $CO_2$ b) $CH_4$ c) $CH_3OH$ d) $CF_2Cl_2$
18. Carbon monoxide, emitted by automobiles, prevents transport of oxygen in body due to
    a) Combining with oxygen to form carbon dioxide
    b) Destruction of haemoglobin
    c) Preventing reaction between oxygen and haemoglobin
    d) Forming stable compound with haemoglobin
19. Organomercury compounds are
    a) Herbicides b) Fungicides c) Soil conditioners d) Fumigants
20. Carbonaceous particles having size less than $10^{-6}$ m are called:
    a) Gril b) Aggregates c) Aerosols d) Smoke
21. Which one of the following statements regarding photochemical smog is not correct?
    a) Photochemical smog is formed through photochemical reaction involving solar energy
    b) Photochemical smog does not cause irritation in eyes and throat
    c) Carbon monoxide does not play any role in photochemical smog formation
    d) Photochemical smog is an oxidising agent in character
22. The biotic and abiotic components that are affected adversely from harmful substances are called
    a) Target b) Receptor c) Atmosphere d) Both (a) and (b)
23. Which of the following pollutants is not emitted during volcanic eruptions?
    a) $SO_2$ b) $H_2S$ c) CO d) Hydrocarbons
24. Radioactive pollution is caused by
    a) Solid pollutants b) Liquid pollutants c) Gaseous pollutants d) None of these
25. Harmful chemical present in tobacco is:
    a) Nicotine b) Atropine c) Tannic acid d) Morphine
26. Which of the following is/are the main agents of soil erosion?
    a) Wind and water b) Rocks c) Sand d) None of these
27. Drawback of DDT as pesticides is that
    a) It is less effective than others
    b) It becomes ineffective after some time
    c) It is a nondegradable substance
    d) It is very costly
28. Which of the following is present in maximum amount in acid rain?
    a) $HNO_3$ b) $H_2SO_4$ c) HCl d) $H_2CO_3$
29. Minamata disease is due to pollution of
    a) Organic waste into drinking water b) Oil spill in water
    c) Industrial waste mercury into fishing water d) Arsenic into the atmosphere
30. Carbon monoxide is harmful to human being as it
    a) Is carcinogenic
    b) Is antagonistic to $CO_2$
    c) Has higher affinity for haemoglobin as compared to oxygen

d) Is destructive to $O_3$

31. Lack of oxygen at high altitude produces:
    a) Bends b) Anoxia c) Asthma d) Artificial respire
32. Atmospheric pollutant is
    a) $CO_2$ b) CO c) $O_2$ d) $N_2$
33. Photochemical smog is related to pollution of
    a) Air b) Water c) Soil d) Nostoc
34. Which of the following statement is false?
    a) London smog is oxidising in nature
    b) London smog contains $H_2SO_4$ dorplets
    c) London smog is formed in winter
    d) London smog causes bronchitis
35. Among the following compounds, which one is not responsible for the depletion of ozone layer?
    a) $CH_4$ b) $CFCl_3$ c) NO d) $Cl_2$
36. DDT is
    a) Biodegradable pollutant b) Non biodegradable pollutant
    c) Not a pollutant d) An antibiotic
37. Which of the following is not a major constituent of air pollutants?
    a) Oxides of sulphur b) Oxides of nitrogen c) Carbon monoxide d) Hydrogen sulphide
38. Depletion of ozone layer is due to
    a) Oxides of nitrogen b) Oxides of carbon c) Oxides of sulphur d) None of these
39. Modes of controlling pollution in large cities include
    a) Less use of insecticides
    b) Proper disposal of organic wastes, sewage and industrial effluents
    c) Shifting of factories out of the residential area
    d) All of the above
40. DDT and BHC may act as:
    a) Allergens b) Carcinogens c) Asthematic agents d) None of these
41. Ozone hole is maximum over
    a) Europe b) Antarctica c) India d) Africa
42. $CFCl_2$ is responsible for the decomposition of ozone to oxygen. Which of the following reacts with ozone to form oxygen?
    a) $Cl_2$ b) $Cl^-$ c) $F^-$ d) $Cl^*$
43. Atmospheric content of $CO_2$ is
    a) 0.0034% b) 0.034% c) 0.34% d) 3.4%
44. What is DDT among the following?
    a) A fertilizer
    b) Biodegradable pollutant
    c) Non-biodegradable pollutant
    d) Greenhouse gas
45. Which of the following is a living component of atmosphere?
    a) Lithosphere b) Biosphere c) Hydrosphere d) Troposphere
46. Chlorofluorocarbons (CFC*s*) are widely used in air conditioners, refrigerators etc because of being
    a) Highly reactive b) Flammable c) Non reactive d) All of these are true
47. When rain is accompanied by a thunderstorm, the collected rain water will have a pH value
    a) Uninfluenced by occurrence of thunderstorm
    b) Which depends of the amount of dust in air
    c) Slightly lower than that of rain water without
    d) Slightly higher than that when the thunderstorm is not there
48. For a healthy aquatic life, the amount of dissolved oxygen in a water body must be equal to

a) 5 ppm b) 4 ppm c) 3 ppm d) 2 ppm

49. Lead is
    a) Air pollutant
    b) Water and soil pollutant
    c) Radioactive pollutant
    d) Noise pollutant
50. Negative soil pollution is
    a) Reduction in soil productivity due to erosion and over use
    b) Reduction in soil productivity due to addition of pesticides and industrial wastes
    c) Converting fertile land into barren land by dumping ash, sludge and garbage
    d) None of the above
51. The region which is greatly affected by air pollution is
    a) Troposphere b) Stratosphere c) Mesosphere d) Thermosphere
52. Most hazardous metal pollutant of automobile exhaust is
    a) Mercury b) Lead c) Cadmium d) Copper
53. Which of the following is not a herbicide?
    a) Sodium chlorate b) Sodium arsenite c) Polyphosphate d) Triazines
54. Which of the following is a sink for CO?
    a) Haemoglobin
    b) Microorganisms present in the soil
    c) Oceans
    d) Plants
55. Which of the following statements is false?
    a) The main reason for river water pollution is industrial and domestic sewage discharge
    b) Surface water contains a lot of organic matter, mineral nutrients and radioactive materials
    c) Oil spill in sea water causes heavy damage to fishery
    d) Oil slick in a sea water increases DO value
56. Saline soil contains:
    a) High concentration of salt
    b) Lot of moisture
    c) Hard rocks
    d) None of the above
57. Which of the following is not a natural source of air pollution?
    a) Volcanic eruptions and lightening discharges
    b) Biological decay of vegetable matter
    c) Photochemical oxidation of organic matter
    d) None of the above
58. Which of the following is a viable particulate?
    a) Algae b) Smoke c) Mist d) Fumes
59. Taj Mahal is threatened by pollution from
    a) Chlorine b) Sulphur dioxide c) Hydrogen d) Oxygen
60. The instrument used for measuring soil salinity is
    a) Photometer b) Voltameter c) Conductivitymeter d) Calorimeter
61. Acid rains are produced by
    a) Excess $NO_2$ and $SO_2$ from burning fossil fuels
    b) Excess production of $NH_3$ by industry and coal gas
    c) Excess release of carbon monoxide by incomplete combustion
    d) Excess formation of $CO_2$ by combustion and animal respiration
62. Growing more trees help to:
    a) Reduce oxygen in the environment
    b) Increase carbon dioxide in the environment
    c) Reduce carbon dioxide only in the environment
    d) Reduce $CO_2$ and increase $O_2$ in the environment
63. The ozone layer forms naturally by

a) The interaction of CFC with oxygen.
b) The interaction of UV radiation with oxygen.
c) The interaction of IR radiation with oxygen.
d) The interaction of oxygen and water vapour.

64. The progressive warming up of the earth surface is mainly due to:
a) Automobile exhaust
b) Blanketing effect of carbon dioxide in atmosphere
c) Reforestation
d) Thickening of ozone layer

65. Most abundant water pollutant is
a) Detergents b) Industrial wastes c) Pesticides d) Oil spills

66. Biodegradable pollutant is
a) Domestic waste b) DDT c) Mercury salt d) Aluminium foil

67. Identify the incorrect statement from the following.
a) Oxides of nitrogen in the atmosphere can cause the depletion of ozone layer.
b) Ozone absorbs the intense ultraviolet radiations of the sun.
c) Depletion of ozone layer is because of its chemical reactions with chlorofluoro alkanes.
d) Ozone absorbs infrared radiations.

68. Which of the following is the uppermost region of the atmosphere?
a) Stratosphere b) Troposphere c) Exosphere d) Thermosphere

69. Depletion of ozone layer over Antarctica takes place
a) In November
b) In the months of September and October
c) In the months of October and November
d) In summers

70. Drained sewage has BOD
a) More than that of water
b) Less than that of water
c) Equal to that of water
d) None of these

71. BOD is
a) Biological oxygen deficit
b) Biosphere oxygen demand
c) Biological oxygen demand
d) None of the above

72. Ozone is an important constituent of stratosphere because it
a) Prevents the formation of smog over large cities
b) Removes poisonous gases of the atmosphere by reacting with them
c) Absorbs ultraviolet radiations which is harmful to human life
d) Destroys bacteria which are harmful to human life

73. Which one is the most toxic?
a) Carbon b) CO c) $CO_2$ d) $SO_2$

74. Which of the following causes water pollution?
a) Flyash b) Auto exhausts c) Aeroplanes d) Pesticides

75. Identify the wrong statements in the following.
a) Chlorofluorocarbons are responsible for ozone layer depletion.
b) Green house effect is responsible for global warming.
c) Ozone layer does not permit infrared radiation from the Sun to reach the earth.
d) Acid rain the is mostly because of oxides of nitrogen and sulphur.

76. A secondary pollutant is
a) CO b) $CO_2$ c) PAN d) Aerosol

77. Global warming may result in:
a) Flood
b) Cyclone
c) Decrease in forest productivity

d) All of the above

78. Cyclone collector is used for minimising
a) Radioactive pollution b) Air pollution c) Noise pollution d) Water pollution

79. Which of the following methods is most effective to remove particulates?
a) Bag filter method
b) Cyclone collector method
c) Gravity settling chamber
d) Electrostatic precipitators

80. Which of the following is responsible for the depletion of the ozone layer in the upper strata of the atmosphere?
a) Polyhalogens b) Ferrocenes c) Fullerenes d) Freons

81. Green chemistry means such reactions which:
a) Reduce the use and production of hazardous chemicals
b) Are related to depletion of ozone layer
c) Study the reactions in plants
d) Produce colour during reactions

82. Result of ozone hole is
a) Green house effect
b) Global warming
c) Acid rain
d) UV rays reach the earth

83. Photochemical smog is formed in
a) Summer during morning time
b) Summer during day time
c) Winter during morning time
d) Winter during day time

84. Pick up the correct statement
a) CO plays a major role in photochemical smog
b) London smog has an oxidising character whereas Los Angeles smog is reducing in nature
c) Classical smog is good for health but photochemical somg not
d) Los Angeles smog forms in day time whereas London smog forms in early morning hours

85. Pneumoconiosis is caused by in halation of
a) Coal dust b) Silica dust c) Cotton fibre dust d) Asbestos dust

86. The water pollutants mainly responsible for the eutrophication are
a) Cd, Pb and Hg present in industrial waste.
b) Heavy metals present in mining waste.
c) Detergents and fertilizers containing phosphate anion.
d) Polychlorinated biphenyls.

87. Which of the following is not a green house gas?
a) $CO_2$ b) Water vapour c) $CH_4$ d) $O_2$

88. What does $BOD_5$ represent?
a) Biological ozone depletion in five days
b) Dissolved oxygen left after five days
c) Dissolved oxygen consumed in five days
d) Micro-organisms killed by ozone in sewage treatment plants in five hours

89. Pick out the correct statement?
a) CO which is major pollutant resulting from the combustion of fuels in automobiles plays a major role in photochemical smog
b) Classical smog has an oxidising character while the photochemical smog is reducing in character
c) Photochemical smog occurs in day time whereas the classical smog occurs in early morning hours
d) During formation of smog the level of ozone in the atmosphere goes down

90. Gas released during Bhopal tragedy was
a) Methyl isocyanate
b) Potassium isothiocyanate

c) Sodium isothiocyanate d) Ethyl isothiocyanate

91. Mesosphere and thermosphere are collectively known as
a) Exosphere b) Thermopause c) Ionosphere d) Interstellar region

92. It is dangerous to leave the car engine running in a closed garage, because it may cause serious pollution due to poisoning by emission of:
a) $CO_2$ b) CO c) Unburnt petrol d) $SO_2$

93. Region/regions of the atmosphere where temperature decreases with altitude is/are
a) Thermosphere b) stratosphere c) Troposphere d) Ozonosphere

94. The brown haze of photochemical smog is largely attributable to
a) NO b) $NO_2$ c) $CH_3COONO_2$ (||O) d) $CH_2 = CHCH = O$

95. UV radiations bring about
a) Skin cancer b) Mouth cancer c) Lung cancer d) Liver cancer

96. Solid component of the earth consisting of soil, rocks and mountains is called
a) Hydrosphere b) Lithosphere c) Atmosphere d) Biosphere

97. Which of the following is not an air pollutant?
a) $N_2$ b) $N_2O$ c) NO d) CO

98. Which of the following is not considered to be a pollutant?
a) $NO_2$ b) $CO_2$ c) $O_3$ d) $C_xH_y$

99. Which one of the following is not an application of green chemistry?
a) Replacement of CFCs by $CO_2$ as blowing agent in the manufacture of polystyrene foam sheets
b) Reacting methylamine and phosgene to produce methyl isocyanate
c) Replacement of organotins by 'sea-nine' as anti fouling compound in sea marines
d) Catalytic dehydrogenation of the diethanol amine without using cyanide and formaldehyde

100. Gradual warming of the atmosphere due to trapping of long wave radiations is called:
a) Air pollution b) Air heating c) Photosynthesis d) Greenhouse effect

101. Which one of the following statement is not true?
a) Oxides of sulphur, nitrogen and carbon are the most widespread air pollutant
b) pH of drinking water should be between 5.5—9.5
c) Concentration of DO below 6 ppm is good for the growth of fish
d) Clean water would have a BOD value of less than 5 ppm

102. Most poisonous pollutant in water is:
a) Zinc b) Phosphate c) Arsenic d) Detergent

103. The compound responsible for depletion of ozone layer is
a) Methyl chloroform b) Carbon tetrachloride c) Both (a) and (b) d) None of these

104. Air pollution is not caused by
a) Pollen grains b) Hydroelectric power c) Industries d) Automobiles

105. Increasing skin cancer and high mutation rate are due to
a) Acid rain b) Ozone depletion c) CO pollution d) $CO_2$ pollution

106. Photochemical smog is caused by
a) CO b) $CO_2$ c) $O_3$ d) $NO_2$

107. The main source of atmospheric pollution is
a) Carbon monoxide b) Hydrocarbons c) Particulates d) NO

108. A fertile soil is likely to have a pH of:
a) 3 b) 9 c) 6-7 d) 14

109. Ozone layer of upper atmosphere is being destroyed by
a) Chlorofluorocarbon b) $SO_2$
c) Photochemical oxidants/ $O_2$ and $CO_2$ d) Smog

110. Lead in water can cause:

a) Eye disease b) Arthritis c) Kidney damage d) Hair falling

111. Green chemistry involves
   a) Production of chemicals of our daily use from green house gases
   b) Such chemical processes in which green plants are used
   c) Those reactions which are of biological origin
   d) Use of non toxic reagents and solvents to produce environment friendly products

112. Which of the following pollutants is main product of automobile exhaust?
   a) CO b) $CO_2$ c) NO d) Hydrocarbons

113. Eutrophication causes reduction in
   a) Nutrients b) Dissolved salts c) Dissolved oxygen d) All of these

114. Select the incorrect statement.
   a) Water is considered pure if it has BOD less than 5 ppm
   b) In COD determination, the pollutants resistant to microbial oxidation are not oxidised by oxidising agent like $K_2Cr_2O_7$
   c) The lower the concentration of DO, the more polluted is the water sample
   d) The tolerable limit of lead in drinking water is 50 ppm

115. Man dies in the atmosphere of CO, because it:
   a) Dries up the blood
   b) Combines with $O_2$ present in the body
   c) Reduces the organic matter of tissues
   d) Combines with the haemoglobin of blood, thereby making the later incapable of absorbing $O_2$

116. Methane gas producing field is
   a) Wheat field b) Paddy field c) Cotton field d) Groundnut field

117. The aromatic compounds present as particulates are
   a) Benzene b) Toluene
   c) Nitrobenzene d) Polycyclic aromatic hydrocarbons

118. Which of the following is secondary air pollutant?
   a) Photochemical smog b) $NO_2$ c) Dust particles d) $SO_2$

119. Which among the given is not a natural source of air pollution?
   a) Automobile exhausts b) Vegetation decay c) Forest fire d) Volcanic eruptions

120. The greatest affinity for haemoglobin is shown by
   a) NO b) CO c) $O_2$ d) $CO_2$

121. Identify the wrong statement in the following
   a) Chlorofluorocarbons are responsible for ozone layer depletion.
   b) Acid rains is mostly because of oxides of nitrogen and sulphur
   c) Green house effect is responsible for global warming
   d) Ozone layer does not permit infrared radiation from the sun to each the earth

122. The principal gas evolved from sludge digestion tank is:
   a) CO b) $CO_2$ c) $CH_4$ d) $N_2$

123. Pollution is
   a) Removal of top soil
   b) Release of toxic/undesirable materials in environment
   c) Conservation of energy
   d) All of the above

124. PAN stands for
   a) $CH_2O$
   b) $CH_2 = CH - CHO$
   c) $CH_3CH_2O - N = O$
   d) $CH_3 - C(=O) - OONO_2$

125. Which of the following gases present in air protects life on the earth from the harmful effects of UV rays from the sun?
a) Carbon dioxide b) Nitrogen c) Oxygen d) Ozone
126. Which of the following region is the coldest?
a) Stratosphere b) Troposphere c) Mesosphere d) Thermosphere
127. Rain containing dissolved air pollutants like oxides of S, N and C are referred to as;
a) Artificial rain b) Acid rain c) Hails d) None of these
128. Which is not an example of gaseous air pollutant?
a) Oxides of halogens b) Oxides of sulphur c) Oxides of carbon d) Oxides of nitrogen
129. Which of the following is not a part of green chemistry?
a) Photochemistry b) Sonochemistry c) Nuclear chemistry d) Biochemistry
130. Which of the following statements about control of particulate pollution is false?
a) Gravity settling chamber removes larger particles from the air.
b) Cyclone collector removes fine particles in the diameter range 5-20 microns.
c) Wet scrubbers are used to wash away all types of particulates.
d) In electrostatic precipitator, the particulates are made to acquire positive charge which are then attracted by the negative electrode and removed.
131. The point of temperature inversion between troposphere and ionosphere is called
a) Stratopause b) Mesopause c) Tropopause d) Ionopause
132. Which of the following is not regarded as a pollutant?
a) $NO_2$ b) $CO_2$ c) $O_3$ d) Hydrocarbons
133. Which of the following is not a pollutant?
a) Carbon monoxide b) Nitrogen peroxide c) Carbon dioxide d) Sulphur dioxide
134. The contribution of which of the following pollutants is least for causing atmospheric pollution?
a) Nitrogen oxides b) Sulphur oxides c) Hydrocarbon d) Particulates
135. Sulphur dioxide present in the industrial chimney exhaust causes:
a) Respiratory and lung disease
b) Reduction in plant's productivity owing to acid rain
c) Corrosion of building materials
d) All of the above
136. Which of the following process in involved in the biochemical treatment of sewage effluents?
a) Oxidation b) Reduction c) Dehydration d) Fermentation
137. The smog is essentially caused by the presence of
a) $O_2$ and $O_3$ b) $O_2$ and $N_2$
c) Oxides of sulphur and nitrogen d) $O_3$ and $N_2$
138. Which of the following is responsible for peeling of ozone umbrella?
a) PAN b) Coal burning c) CFC*s* d) $CO_2$
139. Most efficient and suitable dust removal equipment for removal of flyash from flue gas in a thermal power plant is:
a) Gravity setting chamber
b) Cyclone separator
c) Electronic precipitator
d) Bag filter
140. Main pollutants released from iron and steel industry are:
a) $CO, CO_2$ and $SO_2$ b) $NO, SO_3$ and $H_2S$ c) $CO_2, H_2S$ and $NO_2$ d) $CO_2, NO_2$ and $SO_3$
141. Identify the correct decreasing order of the following with respect to altitude from atmosphere.
I. Troposhere
II. Mesopshere
III. Thermosphere
a) II, III, I b) III, II, I c) I, II, III d) I, III, II

142. Which is not a green house gas?
a) $CO_2$ b) $CH_4$ c) $N_2O$ d) Chlorofluorocarbons
143. Which of the following metals is not a pollutant?
a) Mercury b) Arsenic c) Lead d) Aluminium
144. Smog is:
a) Nothing but black smoke
b) A combination of smoke and fog
c) A liquid particle resulting from vapour condensation
d) A solid particle, e.g., flyash
145. Ozone hole refers to
a) Hole in ozone layers
b) Reduction in thickness of ozone layer in stratosphere
c) Reduction in thickness of ozone in troposphere
d) Increase concentration of ozone
146. Which of the following is a biodegradable pollutant?
a) Plastic b) Sewage c) Asbestos d) Mercury
147. Which of the following is a man-made source of air pollution?
a) Automobile exhaust
b) Forest fire
c) Bacterial action in soil and swamp areas
d) All of the above
148. Which of the following is secondary pollutant?
a) $CO_2$ b) $N_2O$ c) PAN d) $SO_2$
149. The basic component of the smog is
a) PAN b) PBN c) $NO_2$ d) All of these
150. Highly toxic gas which causes headache, visual difficulty, paralysis and even death is:
a) $CO_2$ b) $O_3$ c) CO d) All of these
151. The main source by which Taj Mahal may be destroyed is
a) Flood in Yamuna b) Flue gases from Mathura refinery
c) Excessive use of natural gas d) All of the above
152. Which of the following gases cause pollution when present in the exhaust fumes of vehicles?
a) $CO_2$ b) CO c) Water vapours d) $C_2H_6$
153. Main source of lead pollution is from:
a) Sewage b) Leaded gasoline c) Tobacco d) Insecticides
154. Main pollutants released from petroleum refineries are
a) CO, $SO_2$ and $H_2S$ b) $CO_2$, NO and $SO_3$ c) $CO_2$, $H_2S$ and $NO_2$ d) $SO_3$, $NO_2$ and $CO_2$
155. Particulate matter with size less than micron that remain suspended in air indefinitely and transported by wind currents are called:
a) Fumes b) Mist c) Aerosols d) Soot
156. The depletion of ozone layer in the stratosphere would lead to:
a) Increased human cataracts and skin cancer
b) Reduction of planktons in ocean water
c) Depletion of plants and crops
d) All of the above
157. The following do/does not cause water pollution:
a) Heavy metals such as Cd, Pb, Hg
b) Detergents
c) Polychlorobiphenyls
d) Freons
158. Aerobic oxidation is caused by:

a) Aerobic bacterias in presence of excess of oxygen
b) Anaerobic bacterias in presence of insufficient oxygen
c) Aerobic bacterias in the absence of oxygen
d) Both anaerobic and aerobic bacterias in any condition

159. UV radiation from sun causes a reaction that produces
a) Carbon monoxide b) Sulphur dioxide c) Fluorides d) Ozone

160. Ozone depletion in the stratosphere is mainly caused by:
a) $SO_2$ b) $NO_2$ c) NO d) chlorofluorocarbons

161. The oxygen present today in atmosphere:
a) Is a plant product
b) Came from ozone
c) Was present in the beginning
d) Produced by carbon dioxide

162. Ozone in stratosphere is depleted by
a) $CF_2Cl_2$ b) $C_7F_{16}$ c) $C_6H_6Cl_6$ d) $C_6F_6$

163. As it passes into food chain, the concentration of DDT
a) Remains same b) Decreases c) Increases d) Unpredictable

164. Which of the following statements about polar stratospheric clouds (PSCs) is not correct?
a) Type I clouds are formed at about $-77°C$ and contain solid $HNO_3 \cdot 3H_2O$
b) Type II clouds are formed at about $-85°C$ and contain some ice
c) A tight whirlpool of wind called polar vortex is formed which surrounds Antarctica
d) PSCs do not react with chlorine nitrate and HCl

165. In Antarctica ozone depletion is due to the formation of following compound
a) acrolein b) Peroxyacetyl nitrate
c) $SO_2$ and $SO_3$ d) Chlorine nitrate

166. In the upper layer of the atmosphere, ozone is formed by the:
a) Action of UV rays on oxygen
b) Combination of oxygen molecules
c) Action of electric discharge of oxygen molecules
d) Effect of high pressures on oxygen

167. Chief source of water and soil pollution is
a) Mining b) Thermal power plant
c) Agro-industry d) All of these

168. Air pollution from the leakage of methyl isocyanate gas from the Union carbide factory in Bhopal caused a major tragedy on:
a) Dec. 2, 1984 b) Dec. 15, 1983 c) Dec. 10, 1982 d) Dec. 4, 1988

169. The term acid rain was coined by
a) Robert Boyle b) Robert Augus c) Alfred Nobel d) Havoisier

170. The lowest layer of earth's atmosphere is
a) Troposphere b) Mesosphere c) Stratosphere d) Ionsphere

171. .....plant emits large amount of $SO_2$ as an air pollutant.
a) Nitric acid b) Sulphuric acid c) Chloroalkali d) Iron and steel

172. 'Los Angeles' smog is
a) Sulphurous smog b) Photochemical smog c) Industrial smog d) All of these

173. Solar ultraviolet radiation is absorbed by:
a) Exosphere b) Ionosphere c) Ozonosphere d) Stratosphere

174. The concentration of salts in soil is increased by
a) Canal water b) Excessive use of pesticides
c) Excessive use of fungicides d) All of the above

175. In which part of the atmosphere, ozone layer is present?

a) Stratosphere b) Troposphere c) Mesosphere d) Thermosphere

176. Persons working in cement plants and limestone quarries are more prone to disease like:
a) Cancer b) Asthma c) Silicosis d) Pneumoconiosis

177. Many people died in London in 1952 as a result of air pollution producing……
a) Mist b) Fog c) Smog d) Sleet

178. The total amount of oxygen (in ppm), consumed by a pollutant in a water sample is termed as
a) Dissolved oxygen (DO) b) Biochemical oxygen demand (BOD)
c) Chemical oxygen demand (COD) d) None of the above

179. Ozone layer is present in
a) Troposphere b) Stratosphere c) Mesosphere d) Exosphere

180. Addition of phosphate fertilizers into water leads to
a) Increased growth of decomposers b) Reduced algal growth
c) Increased algal growth d) Eutrophication

181. The smog is essentially caused by the presence of
a) $O_2$ and $O_3$ b) $O_2$ and $N_2$
c) Oxides of sulphur and nitrogen d) $O_3$ and $N_2$

182. Temperature of troposphere decreases with altitude. This is because of
a) High pressure of air b) Gases present in air c) Lower density of air d) All of these

183. Which of the following is a primary pollutant?
a) CO b) PAN c) Aldehydes d) $H_2SO_4$

184. The gas that is not considered as a 'green house gas' is
a) $CO_2$ b) $CH_4$ c) $O_2$ d) $O_3$

185. Presence of high concentration of ozone and smog in atmospheric air causes:
a) Embrittlement and decrease of folding resistance of paper
b) Cracking of rubber products
c) Fading of dye on textiles
d) Damage of electrical insulator on high tension power line.

186. Which of the following statements is not false?
a) $SO_2$ does not affect larynx
b) $SO_2$ is more harmful air pollutant than $SO_3$
c) $NO_2$ is more toxic to living tissues than NO
d) $NO_x$ do not play any role in photochemical smog

187. Photochemical smog always contains
a) $O_3$ b) CO c) $CO_2$ d) $CH_4$

188. Which of the following is not a soil pollutant?
a) Polythene bags b) Pesticides
c) Detergents d) Nitrate and phosphate fertilizers

189. Among the following statements which one is incorrect?
a) Suspended particulate matter (SPM) is an important pollutant released by diesel vehicles.
b) Soot particles (size $< 5$ μ) cause fibrosis of the lung lining
c) $H_2SO_4$ particulates have size of 500-1000 nm.
d) Photochemical smog is formed by oxides of sulphur, smoke and dust particles.

190. Sewage water is purified by
a) Microorganism b) Light c) Fishes d) Aquatic plants

191. The number of ozone molecules converted into oxygen by one molecule of chlorofluorocarbon compound is
a) One hundred (approximately) b) Ten thousand (approximately)
c) Hundred thousand (approximately) d) Only one

192. Use of chlorofluoro carbons is not encouraged because
a) They are harmful to the eyes of people that use it.

b) They damage the refrigerators and air conditioners.
c) They eat away the ozone in the atmosphere.
d) They destroy the oxygen layer.

193. An important product in the ozone depletion by chloroflurocarbons is
a) $Cl_2$ b) OCl c) $OF_2$ d) $O_2F_2$

194. The size of particulates of $H_2SO_4$ fog lies in the range:
a) 5—100 nm b) 100—500 nm c) 500—1000 nm d) 1000—10,000 nm

195. Which one of the following can cause depletion of ozone?
a) $H_2S$ b) NO c) Smoke d) Aerosols

196. Oxides of sulphur and nitrogen are important pollutants of
a) Water b) Air c) Soil d) All of these

197. Measurement of rate of oxygen utilisation by a unit volume of water over a period of time is to measure
a) Fermentation b) Biogas generation
c) Biosynthetic pathway d) Biological oxygen demand

198. The most abundant pollutant is
a) Ethane b) Methane c) Propane d) Butane

199. Which of the following types of pollution is caused by invisible pollutants?
a) Thermal pollution b) Noise pollution c) Radioactive pollution d) All of these

200. Which of the following statements is not true?
a) Ammonia acts as sink for $NO_x$
b) Limestone acts as sink for $SO_x$
c) The average residence time of NO is one month
d) $SO_x$ can be removed from flue gases by passing through a solution of citrate ions

201. The photochemical smog can be suppressed by
a) Nitrogen oxides b) Hydrocarbons
c) Radical trapes d) Formaldehyde

202. Proper management of disposal of household and industrial wastes can be done by
a) Recycling the waste material to give useful products again
b) Burning and incineration of combustible waste
c) Sewage treatment
d) All of the above

203. Ultraviolet light causes
a) Formation of pyrimidines
b) Sticky metaphases
c) Photodynamic action
d) Destruction of hydrogen bonds between complementary DNA strands

204. Classical smog occurs in places of
a) Excess $SO_2$ b) Low temperature c) High temperature d) Excess $NH_3$

205. Spraying of DDT produces pollution of the type
a) Air and water b) Air c) Air, water and soil d) Air and soil

206. Which of the following produces another air pollutant by reacting with oxides of nitrogen in presence of sunlight?
a) HCl b) $SO_2$ c) $O_3$ d) HCN gas

207. White lung cancer is caused by
a) Asbestos b) Silica c) Paper d) Textiles

208. Water is often treated with chlorine to
a) Increases oxygen content b) Kill germs
c) Remove suspended particles d) Remove hardness

209. When rain is accompanied by a thunderstorm, the collected rain water will have a pH value
a) Slightly lower than that of rain water without thunderstorm.

b) Slightly higher than that when the thunderstorm is not there.
c) Uninfluenced by occurrence of thunderstorm.
d) Which depends on the amount of dust in air.

210. Which of the following acts as a sink for chlorine free radicals?
a) Nitrogen dioxide b) Methane c) Carbon dioxide d) Both (a) and (b)

211. A 'body' which allows the short wavelength incoming solar radiation to enter in but does not allow long wave outgoing infra-red radiation to escape out is called:
a) Global warming b) Green house c) Atmospheric effect d) Ionosphere

# ENVIRONMENTAL CHEMISTRY

**CHEMISTRY**

## : ANSWER KEY :

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | d | 2) | d | 3) | a | 4) | c | 109) | a | 110) | c | 111) | d | 112) | c |
| 5) | c | 6) | d | 7) | d | 8) | b | 113) | c | 114) | b | 115) | d | 116) | b |
| 9) | b | 10) | d | 11) | a | 12) | d | 117) | d | 118) | d | 119) | c | 120) | a |
| 13) | b | 14) | c | 15) | d | 16) | d | 121) | d | 122) | c | 123) | b | 124) | d |
| 17) | d | 18) | d | 19) | b | 20) | d | 125) | d | 126) | c | 127) | b | 128) | a |
| 21) | b | 22) | d | 23) | d | 24) | d | 129) | c | 130) | d | 131) | c | 132) | b |
| 25) | a | 26) | a | 27) | c | 28) | b | 133) | b | 134) | a | 135) | d | 136) | a |
| 29) | c | 30) | c | 31) | b | 32) | b | 137) | c | 138) | c | 139) | c | 140) | a |
| 33) | a | 34) | a | 35) | a | 36) | b | 141) | b | 142) | c | 143) | d | 144) | b |
| 37) | d | 38) | a | 39) | d | 40) | b | 145) | b | 146) | b | 147) | a | 148) | c |
| 41) | b | 42) | d | 43) | b | 44) | c | 149) | d | 150) | c | 151) | b | 152) | b |
| 45) | b | 46) | c | 47) | c | 48) | a | 153) | b | 154) | a | 155) | c | 156) | d |
| 49) | b | 50) | a | 51) | a | 52) | b | 157) | d | 158) | a | 159) | d | 160) | d |
| 53) | c | 54) | b | 55) | d | 56) | a | 161) | a | 162) | a | 163) | c | 164) | d |
| 57) | d | 58) | a | 59) | b | 60) | c | 165) | d | 166) | a | 167) | d | 168) | a |
| 61) | a | 62) | d | 63) | b | 64) | b | 169) | b | 170) | a | 171) | b | 172) | b |
| 65) | b | 66) | a | 67) | d | 68) | c | 173) | d | 174) | a | 175) | a | 176) | c |
| 69) | b | 70) | a | 71) | c | 72) | c | 177) | c | 178) | c | 179) | b | 180) | d |
| 73) | b | 74) | d | 75) | c | 76) | c | 181) | c | 182) | c | 183) | a | 184) | c |
| 77) | d | 78) | b | 79) | d | 80) | d | 185) | b | 186) | c | 187) | a | 188) | c |
| 81) | a | 82) | d | 83) | b | 84) | d | 189) | d | 190) | a | 191) | c | 192) | c |
| 85) | a | 86) | c | 87) | d | 88) | c | 193) | b | 194) | c | 195) | d | 196) | b |
| 89) | d | 90) | a | 91) | c | 92) | b | 197) | d | 198) | b | 199) | d | 200) | c |
| 93) | c | 94) | b | 95) | a | 96) | b | 201) | c | 202) | d | 203) | d | 204) | b |
| 97) | a | 98) | b | 99) | b | 100) | d | 205) | c | 206) | c | 207) | d | 208) | b |
| 101) | c | 102) | c | 103) | c | 104) | b | 209) | a | 210) | d | 211) | b | | |
| 105) | b | 106) | d | 107) | a | 108) | c | | | | | | | | |

# ENVIRONMENTAL CHEMISTRY

**CHEMISTRY**

## : HINTS AND SOLUTIONS :

4 **(c)**
Aerosols and high flying jets release nitric oxide into the upper atmosphere which leads to the destruction of ozone layer

10 **(d)**
Green house effect is caused by $CO_2$.

12 **(d)**
Bhopal gas tragedy of 1984 was caused by methyl isocyanate (MIC). This gas was released from a pesticide manufacturing plant union carbide.

17 **(d)**
Chlorofluorocarbons provide $Cl^{\bullet}$ free radical, which reacts with ozone and converts it into $O_2$ as

$$CF_2Cl_2 \longrightarrow Cl^{\bullet} + \dot{C}F_2CH$$

$$Cl^{\bullet} + O_3 \longrightarrow ClO^{\bullet} + O_2$$

$$ClO^{\bullet} + O \longrightarrow Cl^{\bullet} + O_2$$

The reaction, once start, continues for a long time. Thus, chlorofluorocarbons ($CF_2Cl_2$) are responsible for the depletion of ozone layer.

18 **(d)**
Carbon monoxide is highly toxic to living being because it has an ability to form more stable carboxyhaemoglobin complex with haemoglobin due to which the delivery of oxygen to the organs and tissues is blocked

35 **(a)**
In stratosphere the following reactions takes place which are responsible for the depletion of ozone layer

$$NO + O_3 \rightarrow NO_2 + O_2$$

$$CF_2Cl_2 \xrightarrow{h\nu} \dot{C}F_2Cl_2 + \dot{C}l$$

$$CFCl_3 \xrightarrow{h\nu} \dot{C}FCl_2 + \dot{C}l$$

$$\dot{C}l + O_3 \longrightarrow \dot{C}lO + O_2$$

$$\dot{C}lO + O \longrightarrow \dot{C}l + O_2$$

Hence, methane ($CH_4$) is not responsible for ozone layer depletion.

38 **(a)**
Oxides of nitrogen and chlorofluorocarbons, when reach into the stratosphere, react with ozone molecules and convert them into oxygen. Thus, these compounds lead to depletion of ozone layer.

$$\underset{\text{oxide of nitrogen}}{NO} + O_3 \longrightarrow NO_2 + O_2$$

$$\underset{\text{chlorofluoro carbon}}{CF_2Cl_2} \xrightarrow{h\nu} \dot{C}l + \dot{C}F_2Cl$$

$$\dot{C}l + O_3 \longrightarrow \dot{C}lO + O_2$$

41 **(b)**
Ozone hole is maximum over Antarctica

42 **(d)**
CFC (Chlorofluorocarbons) are causing depletion of ozone in the stratosphere. This occurs because ultra violet light also causes CFC's to decompose, producing atomic chlorine. The chlorine atoms react with ozone molecules, resulting in a net removal of $O_3$ molecules from the stratosphere.

45 **(b)**
Biosphere is a living component of atmosphere

46 **(c)**
Chlorofluoro, carbons *ie*, freons are non reactive, non inflammable, non toxic organic molecules, these are widely used in air conditioners, refrigerators

47 **(c)**
When rain is accompanied by thunderstorm, the $N_2$ and $O_2$, present in the atmosphere, combine together to give oxides of nitrogen which dissolve is rain water and give nitric acid (a strong acid). Due to presence of acid, the pH of rain water gets slightly lower

$$N_2 + O_2 \xrightarrow{\text{Thunderstorm}} 2NO$$

$$2NO + O_2 \rightarrow 2NO_2$$

$$4NO_2 + O_2 + 2H_2O \rightarrow 4HNO_3 + \text{rain water}$$

$$\rightarrow \text{acid rain}$$

53 **(c)**
Herbicides are used to kill weeds, eg, sodium chlorate, sodium arsinite, triazines are used as herbicides

54 **(b)**

Microorganisms present in the soil act as a sink for carbon monoxide

55 **(d)**

Oil slick causes water pollution, thus it decreases DO value (dissolved oxygen value) of sea water

60 **(c)**

Conductivitymeter is used for measuring soil salinity

63 **(b)**

$O_2 \xrightarrow[\text{rays}]{h\nu} O + O$

$O_2 + O \rightarrow O_3$

67 **(d)**

(a)$NO + O_3 \rightarrow NO_2 + O_2$

$O_3 + h\nu \rightarrow O_2 + O$

$NO_2 + O \rightarrow NO + O_2$

**Net reaction** $2O_3 + h\nu \rightarrow 3O_2$

Thus, ozone layer is depleted by oxides of nitrogen.

(b)Ozone layer is a protective layer and absorbs harmful UV rays coming from the sun.

(c )$Cl + O_3 \rightarrow ClO + O_2$

$O_3 + h\nu \rightarrow O + O_2$

$ClO + O \rightarrow Cl + O_2$

**Net reaction** $2O_3 + h\nu \rightarrow 3O_2$

Thus, ozone layer is also depleted by reaction with freons.

(d)is a incorrect statement as

69 **(b)**

During spring season *ie*, in the month of September and October, the sunlight returs to the Antarctica and breaks up the clouds and photolysis HOCl and $Cl_2$

$HOCl \xrightarrow{h\nu} \dot{O}H + \dot{C}l$

$Cl_2 \xrightarrow{h\nu} 2\,\dot{C}l$

These $\dot{C}l$ free radical again reacts with ozone molecules and leads to ozone depletion

73 **(b)**

Carbon monoxide is highly poisnous to living being

75 **(c)**

Ozone layer permits the infrared radiations to pass through but doesn't permit the higher range of ultraviolet radiation to pass through.

78 **(b)**

Cyclone collector is used to remove particulate particles, thus it minimises air pollution

80 **(d)**

Freons or chlorofluoro carbons are responsible for depletion of the ozone layer in the upper strata of the atmosphere. They are used as propellants, aerosol spray caps, refrigerants, fire fighting reagents etc. They are stable and chemically inert compounds. They absorb UV-radiation and break down liberating free atomic chlorine which causes decomposition of ozone through free radical reaction. This results in the depletion of the ozone layer.

Freons are mainly freon-1 ($CFCl_3$)and freon − 12 ($CF_2Cl_2$). They form free radical of chlorine in the presence of UV-radiation. Such free radical decomposes $O_3$ as follows

$Cl^{\bullet} + O_3 \longrightarrow ClO^{\bullet} + O_2$

$ClO^{\bullet} + O_3 \longrightarrow \underset{\text{chlorine free radical}}{Cl^{\bullet}} + 2O_2$

84 **(d)**

Classical or London type smog is formed by the combination of soot particles with oxides of sulphur while climate is cool and humid. Due to presence of soot and oxides of sulphur, it is reducing in nature.

Photochemical smog or Los Angeles smog is obtained from nitrogen oxides when climate is warm, dry and sunny. Due to presence of $O_3$ and $NO_2$ (strong oxidising agents), it is oxidising in nature.

CO does not play any role in the formation of photochemical smog

85 **(a)**

Pneumoconiosis is caused by in halation of coal dust

86 **(c)**

Detergents and fertilizers contain phosphates as additives. The addition of phosphorous to water, in the form of the phosphate anion ($PO_4^{3-}$), encourages the formation of algae, which reduces the dissolved oxygen concentration of water. This process is known as eutrophication.

88 **(c)**

$BOD_5$ means, dissolved oxygen consumed in five days

89 **(d)**

During the formation of photochemical smog the level of ozone in the atmosphere goes down.

$$NO + O_3 \xrightarrow{h\nu} NO_2 + O_2$$

In the atmosphere the organic compounds rapidly react with $O_3, NO_2$ to form other noxious photochemical products known as peroxyacyl nitrates (PANs) and acrolein. Photochemical smog occurs in warm, dry and sunny climate, generally during the day time while classical smog occurs in cool humid climate, generally in the early morning hours of winter months.

90 **(a)**

Methyl isocyanate (MIC) gas was released during Bhopal tragedy

91 **(c)**

Mesosphere and thermosphere are collectively known as ionosphere as in these, gases are present in their ionised form

94 **(b)**

Photochemical smog is initiated by the photochemical dissociation of $NO_2$ and the resulting secondary reactions involving unsaturated hydrocarbons, other organic compounds and free radicals, lead to the formation of organic peroxides and ozone.

$$NO_2(g) \xrightarrow{\text{UV light}} NO(g) + [O]$$
$$O_2(g) + [O] \rightarrow O_3(g)$$
$$O_3 + NO \rightarrow \underset{\substack{\text{Brown gas}\\(\text{In high concentration}\\\text{Forms haze})}}{NO_2} + O_2$$

Hydrocarbons $+O_3, O_2, O, NO_2, NO$ peroxides, peroxyacetyl nitrate, formaldehyde, ozone aldehyde, acrolein, etc. oxidised hydrocarbons and ozone in the presence of humidity cause photochemical smog, which dissipates at night.

97 **(a)**

Nitrogen gas is present in air up to 78% by volume. It does not cause pollution.

105 **(b)**

Due to ozone depletion of ozone layer, harmful UV radiations reach the earth surface. These radiations causes skin cancer, sunburn, and also lead to harmful mutation of cell

114 **(b)**

In COD determination, the pollutants, which are resistant to microbial oxidation, are also oxidised by strong oxidising agents such as $K_2Cr_2O_7$

116 **(b)**

Methane gas producing field is paddy field. It is also known as marsh gas

120 **(a)**

Nitrous oxide (NO) has the highest affinity towards haemoglobin. However, due to its larger size, it cannot be inhaled

121 **(d)**

Ozone layer is permeable for infrared radiations but is does not allow the harmful UV radiations to reach on the earth

126 **(c)**

Mesosphere is the coldest region having $-100°C$ temperature

129 **(c)**

Green chemistry involves photochemistry (related to light), sonochemistry (related to sound waves) and biochemistry (related to enzymes) but it does not involve nuclear chemistry

130 **(d)**

In electrostatic precipitator, the electrode plate is positively charged. Thus, the particulates acquire negative charge and are attracted by the negative electrode plate

132 **(b)**

Carbon dioxide, being limiting factor, when present in small amount (*ie*, 0.033%), has no adverse effect but when its concentration is slightly higher than 0.033%, it has an adverse effect on our climate. Thus, in normal conditions, $CO_2$ is not regarded as a pollutant

141 **(b)**

Atmosphere is divided into four parts

Troposhere 0-10 km

Stratosphere 10-50 km

Mesosphere 50-85 km

Thermosphere 85-100 km

146 **(b)**

Sewage is a biodegradable pollutant because it is easily decompose by microorganism

148 **(c)**

Pollutants which are formed by reaction of

primary pollutants (persist in the environment in the form they are passed into it) are called as secondary pollutants *e*. *g*., peroxyacyl nitrates (PAN) are formed through reaction between nitrogen oxides and hydrocarbons in the presence of sunlight.

149 **(d)**
Peroxyacetyl nitrate (PAN), peroxybenzoyl nitrate, nitrogen dioxide ($NO_2$) and hydrogen peroxide ($H_2O_2$) are the components of smog.

162 **(a)**
In stratosphere, chlorofluorocarbons ($CF_2Cl_2, CFCl_2$) etc. are responsible for the depletion of ozone layer

163 **(c)**
When a pesticide such as DDT passes from lower tropic level to higher level, through food chain, the amount of pesticide per unit weight of organism increases due to accumulation in fat. This process is called biomagnification

164 **(d)**
PSCs (polar stratospheric clouds) of type II provide a surface for the conversion of chlorine nitrate ($ClONO_2$) and HCl into HOCL and $Cl_2$

$ClONO_2 + H_2O \xrightarrow{PSCs} HOCl + HNO_3$

$ClONO_2 + HCl \rightarrow Cl_2 + HNO_3$

165 **(d)**

$ClONO_2 + H_2O \rightarrow HOCl + HNO_3$

$ClONO_2 + HCl \rightarrow Cl_2 + HNO_3$

HOCl and $Cl_2$ can get converted into chlorine radicals and thus, responsible for $O_3$ depletion.

169 **(b)**
The term acid rain was coined by 'Robert Augus'

175 **(a)**
Ozone layer is found in the stratosphere region of atmosphere. It prevents harmful UV radiation from coming to earth.

179 **(b)**
In, stratosphere, at about 20 to 40 km, there is a part of relatively high ozone concentration, called ozone layer

181 **(c)**
$NO, NO_2, SO_2$ and $SO_3$ are responsible for smog (environmental pollution).

182 **(c)**
In troposphere, as we move towards the altitude, the density and pressure of air decreases. Due to which temperature also decreases

184 **(c)**
Oxygen gas does not absorb I.R. radiation of high wavelengths reflected back by earth, hence it does not cause 'green house effect'.

186 **(c)**
$SO_2$ affects larynx, between $SO_2$ and $SO_3$, $SO_3$ is more harmful air pollutant and between $NO_2$ and $NO$, $NO_2$ is more toxic. Photochemical smog is caused by oxides of nitrogen

189 **(d)**
When climate is warm, dry and sunny, the oxides of nitrogen and unsaturated hydrocarbons are converted in the components such as PAN, formaldehyde which form photochemical smog, by the action of sunlight

191 **(c)**
One chlorine free radical can convert about one lakh ozone molecules into oxygen

192 **(c)**
Chlorofluorocarbon is used in air conditioning and in domestic refrigerators for cooling purposes. Its main drawback in this, it is responsible for ozone depletion.

193 **(b)**
We know that,

$O_3 + CCl_2F_2 \rightarrow 2OCl + F_2O$ . Thus, in this reaction OCl is produced.

200 **(c)**
The average residence time of NO is 4 days

201 **(c)**
Photochemical smog can be suppressed by radical traps. When the compounds are sprayed to the atmosphere, they generate free radicals which readily combine with free radical precursors of photochemical smog. Diethyl hydroxylamine has been found to possess smog inhibiting characteristics.

203 **(d)**
The hydrogen bonds present between complementary strands of DNA are destructed by UV light

209 **(a)**
During thunderstorm, there is formation of NO which changes to $NO_2$ and ultimately to $HNO_3$ (acid rain).

$N_2 + O_2 \rightarrow NO \xrightarrow{O_2} NO_2 \xrightarrow{O_3} NO_3 + O_2$

$$NO_3 + O_2 \rightarrow N_2O_5 \xrightarrow{H_2O} HNO_3(pH < 7)$$

210 **(d)**

Nitrogen dioxide and methane which act as sink for chlorine free radicals and prevent much ozone depletion