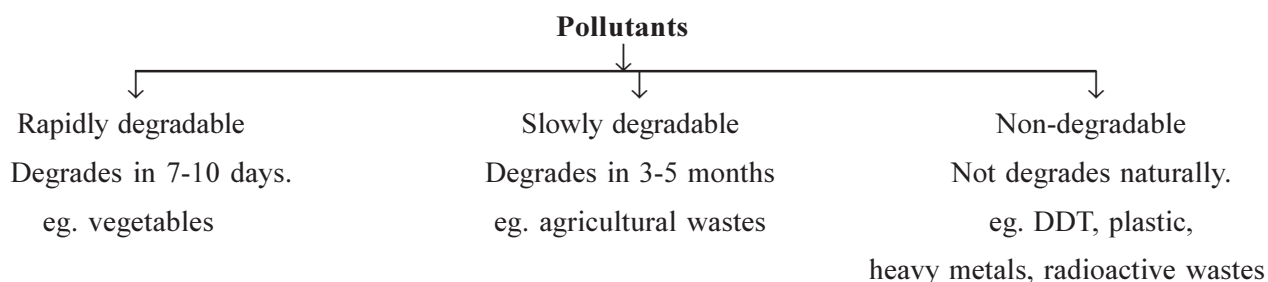


● **Environment** : Surrounding + layer = Region around us

● **Environmental Pollution** : (The sources, reactions, transports, effects and facts of chemical species of environment) + (Effect of human activity on it)

● **Pollution** : Environmental pollution occurs due to harmful wastes produced by natural and human activities.

● **Pollutant** : The substance by which the pollution is spread.



- Environment chemistry is a science.
(A) space (B) physical (C) interbranch (D) non-degradable
- Which of the following is not non-degradable pollutant ?
(A) Radioactive wastes (B) Plastic
(C) DDT (D) Wastes of agriculture
- Which of the following is slowly degradable pollutant ?
(A) Agriculture wastes (B) Heavy metals (C) Discarded vegetables (D) DDT
- Which pollutants are proved to be more harmful to human beings ?
(A) Non-degradable pollutants (B) Rapidly degradable pollutants
(C) Slowly degradable pollutants (D) All of these
- Which of the following is rapidly degradable pollutant ?
(A) Plastic (B) Heavy metal (C) Agriculture waste (D) Vegetables waste

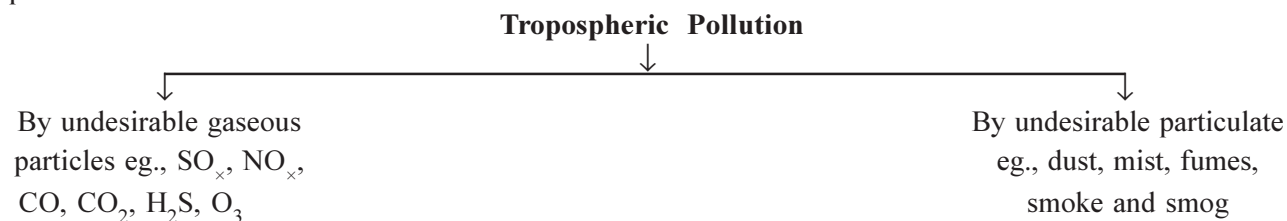
Answers : 1. (C), 2. (D), 3. (A), 4. (A), 5. (D)

● **Atmospheric pollution**

● Cover of gases surround the earth-atmosphere.

● Lowest region of atmosphere (approximately 10 km) where = Troposphere in which N_2 , O_2 , and O_3 are present.

● Above troposphere (10 to 50 km) = Stratosphere, in which N_2 , O_2 , CO_2 , water vapour and Ar are present.



SO ₂	• It causes irritation to eyes and makes them reddish and tearful. • Present in low concentration causes respiratory diseases. • Due to high concentration it leads to stiffness of flower buds which eventually fall off from plants. • Particulate matter of air acts as catalyst and converts SO₂ into SO₃.
NO ₂	• NO₂ is oxidised to NO₃⁻ which when enters into soil, act as a fertilizer. • In congested areas, the irritant red hazy environment is produced by NO₂ • Higher concentration of it damages the leaves of plants and decrease the rate of photosynthesis. • It causes an acute respiratory diseases in children. • Harmful to metals and textile fibres. • Due to incomplete combustion of fuel of vehicles and smoking of cigarettes smoke is produced in which carcinogen 3, 4 benzpyrene is present.
Hydrocarbon	• Due to incomplete combustion of fuel of vehicles and smoking of cigarettes smoke is produced in which carcinogen 3, 4 benzpyrene is present. • They break the tissues of plant, causes shedding of leaves, flowers and twigs.
CO	• It binds with haemoglobin of blood to form carboxyhaemoglobin complex which is about 300 times more stable than the oxygenhaemoglobin complex. If the concentration of this complex reaches to about 3 to 4% in blood, the oxygen carrying capacity of blood reduces. • It causes headache, weak eyesight and cardiovascular disorder. • Smoking by pregnant woman results in increased level of CO in her blood which may increase the possibility of premature birth, spontaneous abortion and a deformed baby.
CO ₂	• Its level in normal atmosphere is 0.03%. • Plants decrease the level of CO₂ in atmosphere by using CO₂ in photosynthesis. • Due to increased use of fossil fuel and deforestation, by growing human population to satisfy their greed, CO₂ level is increasing in atmosphere, which is responsible for global warming.

-
- Which of the following component is present in troposphere ?
 (A) Water vapour (B) All three (C) CO₂ (D) Argon
 - Molecular formula of 3-4 Benzpyrene is
 (A) C₁₀H₁₂ (B) C₂₀H₁₂ (C) C₁₂H₂₀ (D) C₁₂H₁₀
 - Which gas is detected in smoke, produced due to incomplete combustion of petrol or diesel ?
 (A) CO (B) SO₂ (C) NO₂ (D) CO₂
 - Stratosphere is spread in the range of km from the sea level.
 (A) 0 to 10 (B) 10 to 25 (C) 10 to 50 (D) 40 to 50
 - The component which is present in troposphere and also in stratosphere is
 (A) O₂ (B) N₂ (C) None of these (D) Both O₂ and N₂
 - in particulate pollutants ?
 (A) Dust (B) Fumes (C) Smog (D) All of these
 - By presence at low concentration of which gaseous pollutant causes swelling of respiratory tract ?
 (A) SO_x (B) CO₂ (C) O₂ (D) N₂O
-

13. With the help of conversion of SO_2 into SO_3 is possible.
 (A) O_3 (B) H_2O_2 (C) O_2 (D) all three
14. Which gases are present in excess amount as oxides of nitrogen in atmosphere ?
 (A) N_2O , NO , NO_2 (B) N_2O_3 , N_2O_4 , N_2O_5 (C) N_2O_7 , N_2O_5 (D) NO , N_2O_5 , N_2O_7
15. 3, 4-Benzpyrene is
 (A) oxide of nitrogen (B) oxide of sulphur (C) hydrocarbon (D) oxide of carbon
16. is carcinogen.
 (A) Benzene (B) Benzpyrene
 (C) Benzene and Benzpyrene (D) None of these
17. Due to how much concentration of carboxyhaemoglobin, the oxygen carrying capacity of blood reduces ?
 (A) 0.1 and 1.0 % (B) 0.3 and 0.4 % (C) 3 and 4 % (D) 1.0 and 10 %
18. Lower level of atmosphere is also known as
 (A) Mesosphere. (B) Thermosphere. (C) Stratosphere. (D) Troposphere.
19. Which gaseous inorganic pollutants are not present in troposphere ?
 (A) Oxide of nitrogen (B) Oxide of phosphorus
 (C) Oxide of sulphur (D) Oxide of carbon
20. Due to presence of which gas in excess amount causes flower buds fall off from plants ?
 (A) H_2S (B) NO_2 (C) SO_2 (D) CO_2
21. Which pollutant is responsible for asthma, and irritation to eyes ?
 (A) O_2 (B) NO_2 (C) CO_2 (D) SO_2
22. Which pollutant reduces rate of photosynthesis ?
 (A) NO_2 (B) SO_2 (C) CO_2 (D) O_3
23. Which component is present in stratosphere ?
 (A) CO_2 (B) Ar (C) O_3 (D) H_2O
24. Which gas is poisonous for entire living organism ?
 (A) O_3 (B) CO_2 (C) NO_2 (D) SO_2
25. Mention the source of NO_x .
 (A) Hydrocarbon compounds (B) Combustion of dioxygen
 (C) Photosynthesis reaction (D) Smoke of supersonic plane
26. Which gas is highly toxic to living tissues ?
 (A) H_2 (B) N_2 (C) O_3 (D) O_2
27. Which gas is highly toxic to living tissues ?
 (A) SO_2 (B) NO_2 (C) O_3 (D) N_2
28. gas is formed, used as fertilizer by oxidation of nitrogen dioxide.
 (A) Nitrolium (B) Nitrate (C) Nitrite (D) Nitride

Answers : 6. (B), 7. (B), 8. (A), 9. (C), 10. (D), 11. (D), 12. (A), 13. (D), 14. (A),
 15. (C), 16. (C), 17. (C), 18. (D), 19. (B), 20. (C), 21. (D), 22. (A), 23. (C),
 24. (D), 25. (D), 26. (A), 27. (B), 28. (B)

● Global warming

- Global (earth globe) and warming (increase in temperature) it means the phenomenon which keeps earth warm = global warming or Green House Effect (Effect of plant growing house)
- Gases contributing actively in global warming (e.g. methane, CO_2 , O_3 , Chloroflouro carbon, nitrous oxide, water vapour etc.) are called green house gases, which acts as a covering layer of earth.
- Contribution of CO_2 , CH_4 , CFC, O_3 , N_2O and H_2O in global warming is respectively 50 %, 19%, 17 %, 8 %, 4 % and 2 %.
- United Nations Intergovernmental panel on climate change has given the word “Global Warming Potential (GWP)” for heat retaining capacity of green house gases.
- The GWP based sequence of green house gases is as,

10,000 times		150 times		25 times	
CFC	>	N_2O	>	CH_4	>
				CO_2	

This suggests that CH_4 is 25 times stronger than CO_2 , N_2O is 150 times stronger than CH_4 , in terms of GWP. It means N_2O has 3800 times and CFC has 380 lakh times stronger global warming potential than CO_2 .
- If there is disturbance in balance of nature's green house then the temperature of earth increases, as a result
 - increase in water level of sea due to melting of ice on the poles.
 - increase in average temperature of earth may increase the possibilities of contagious diseases and also diseases like malaria, dengue, yellow fever
- That is why it is essential to think about the remedies to control the increasing temperature of earth.

-
29. Which gas is green house gas ?
 (A) CFC (B) N_2O (C) CH_4 (D) All three
30. Which of the following is not green house gas ?
 (A) Oxygen (B) Carbondioxide (C) Methane (D) Water vapour
31. causes green house effect.
 (A) CO_2 (B) NO (C) NO_2 (D) CO
32. In global warming, contribution of laughing gas is how many % ?
 (A) 8 (B) 4 (C) 19 (D) 2
33. In global warming, contribution of ozone is how many % more than CFC ?
 (A) 15 % (B) 17 % (C) 9 % (D) 8 %
34. Contribution ratio of O_2 , N_2O and H_2O in global warming is
 (A) 2 : 2 : 1 (B) 4 : 2 : 1 (C) 4 : 2 : 2 (D) 1 : 2 : 4
35. Contribution of gas is lower and gas is higher in global warming.
 (A) H_2O , CO_2 (B) N_2O , CFC (C) CO_2 , CFC (D) H_2O , CH_4
36. Which is proper decreasing order of green house gases for contribution in global warming ?
 (A) $\text{O}_3 > \text{CO}_2 > \text{CFC} > \text{CH}_4$ (B) $\text{CO}_2 > \text{O}_3 > \text{CH}_4 > \text{CFC}$
 (C) $\text{CO}_2 > \text{CH}_4 > \text{CFC} > \text{O}_3$ (D) $\text{O}_3 > \text{CO}_2 > \text{CH}_4 > \text{CFC}$
-

37. Which order for green house gases is true based on GWP ?
 (A) $\text{CFC} > \text{CO}_2 > \text{N}_2\text{O} > \text{CH}_4$ (B) $\text{CFC} > \text{N}_2\text{O} > \text{CO}_2 > \text{CH}_4$
 (C) $\text{CFC} > \text{CH}_4 > \text{N}_2\text{O} > \text{CO}_2$ (D) $\text{CFC} > \text{N}_2\text{O} > \text{CH}_4 > \text{CO}_2$
38. N_2O has how many times more GWP than CFC ?
 (A) 25th part (B) 10,000th part (C) 150th part (D) 38,000th part
39. Chances of which disease increases due to green house effect ?
 (A) Dengue (B) Malaria (C) Yellow fever (D) All of these
40. In which of the following CFC is used ?
 (A) In foam plastic cup (B) In airconditioner (C) In oil paints (D) All of these
41. If green house effect is not present, then the temperature of earth would be than the present temperature.
 (A) 30°C lesser (B) 30°C higher (C) double (D) half
42. Which gas has half contribution than ozone in global warming ?
 (A) H_2O (B) N_2O (C) CFC (D) CH_4
43. In comparison to CO_2 , CH_4 possesses time, N_2O possesses time and CFC possesses time GWP.
 (A) 25, 3800, 380 lakh (B) 3800, 38 lakh, 25 (C) 380 lakh, 3800, 25 (D) 38 lakh, 25, 3800

Answers : 29. (C), 30. (A), 31. (A), 32. (B), 33. (C), 34. (B), 35. (A), 36. (C), 37. (D), 38. (B), 39. (D), 40. (D), 41. (A), 42. (B), 43. (A)

● Acid-rain

- The pH of rain water is about 5.6 because water reacts with CO_2 of atmosphere and produces carbonic acid (H_2CO_3).
- When the pH of rain water becomes lower than 5.6 then it is called acid rain.
- SO_2 and NO_2 released from burning of fossil fuel react with moisture of air and gets converted into H_2SO_4 and HNO_3 , which is responsible for acid rain.
- It affects living organism, harmful to agriculture and also affects buildings made up of stones and metals.
- Implementation of Clean Air Law may protect from acid rain.

44. When pH of rain water becomes less than, then it is called acid-rain.
 (A) 5.6 (B) 13 (C) 1.6 (D) 7
45. When pOH of rain water becomes greater than, then it is called acid rain.
 (A) 7 (B) 1 (C) 7.4 (D) 12.4
46. acids are responsible for acid rain.
 (A) HNO_3 , CH_3COOH (B) H_2SO_4 , HNO_3 (C) HNO_3 , HCl (D) HCl , H_2CO_3
47. Which main components are present for acid rain ?
 (A) Oxides of sulphur and nitrogen (B) Oxide of carbon
 (C) Oxides of carbon and nitrogen (D) Oxides of phosphorus and nitrogen

Answers : 44. (A), 45. (C), 46. (B), 47. (A)

● Particulate pollutants

- They are minute solid particles or liquid droplets in air.
e.g., present in vehicle exhausts, smoke from fires, dust, ash etc.
- Viable particulate pollutants : Bacteria, fungi, algae etc. microorganism spread in atmosphere.
- Non-viable particulate pollutants : They are classified on the basis of their characteristics and size.
e.g., Smoke, dust, mist, fumes, smog.
- Smog = smoke + fog
- Classical Smog = smoke + fog + SO_2
 - It is reducing mixture, that is why it is called reducing smog.
 - In 1952, such severe smog remained for several weeks in London. More than 4000 people died due to inhalation of the smog.
- Photochemical smog
 - Warm and dry atmosphere + nitrogen oxide + hydrocarbons + Sun light
 - It contains higher concentration of oxidising agent. So, it is called oxidising smog.
 - It is found frequently in the automobile rich-city-Los Angeles (America). So it is called as Los Angeles smog.

-
48. Photochemical smog is produced by
(A) light falling on CO entering atmosphere.
(B) light falling on nitrogen oxides and hydrocarbons entering in atmosphere.
(C) light falling on CO_2 involved from vehicles.
(D) light falling on CO_2 mixed in humid air.
49. is included in particulate type of pollutants.
(A) Smoke (B) Mist (C) Fumes (D) All three
50. Classical smog is a mixture of
(A) smoke + fog + SO_2 (B) smoke + fog + CO_2
(C) smoke + CO_2 + SO_2 (D) smoke + fog
51. What is the diameter of solid particles in smog ?
(A) 10^{-1} meter (B) 10^{-2} meter (C) 10^{-4} meter (D) 10^{-6} meter
52. Oxidising smog is
(A) photochemical smog (B) biochemical smog
(C) classical smog (D) london smog
53. In polluted air, NO_2 and O_3 reacts with unburnt hydrocarbons and
(A) peroxyacetyl nitrate (B) all three
(C) formaldehyde (D) acroline
-

54. Which of the following size of particulate causes diseases related to lungs ?
 (A) 10^{-6} meter (B) 10^{-4} meter (C) 10^{-2} meter (D) 10^{-1} meter
55. In which type of atmosphere classical smog is produced ?
 (A) Dry humid and natural humid atmosphere (B) Dry humid atmosphere
 (C) Natural humid atmosphere (D) Cooled humid atmosphere
56. From which of the following London smog is formed ?
 (A) Smoke produced due to combustion of fuel and carbon oxide.
 (B) Smoke produced due to combustion of fuel and sulphur dioxide.
 (C) Smoke produced due to combustion of fuel and nitrogen oxide.
 (D) Smoke produced due to combustion of fuel and water vapour.
57. Which is responsible for brown colour photochemical smog ?
 (A) $\text{CH}_3\text{COONO}_2$ (B) $\text{CH}_2=\text{CH}-\text{CH}=\text{O}$ (C) NO (D) NO_2
58. Which is viable particulate pollutant ?
 (A) Smoke (B) Fumes (C) Algae (D) Dust
59. Mention non-viable particulate pollutant.
 (A) mist (B) fungi (C) algae (D) microorganism
60. Natural spray of liquid produced by condensation of vapour present in air is called
 (A) Smoke (B) dust (C) mist (D) fumes
61. What size of particulate causes diseases by reaching easily to lungs ?
 (A) $5\ \mu$ (B) $1.5\ \mu$ (C) $1\ \mu$ (D) $2\ \mu$
62. Which is present in photochemical smog ?
 (A) Organic compounds (B) Inorganic gases
 (C) None of these (D) Both (A) and (B)
63. Which of the following component creates acute irritation in eyes ?
 (A) Ozone and peroxyacetylnitrate (B) Nitric oxide
 (C) Formaldehyde (D) Ozone
64. For controlling formation of photochemical smog, which components must be controlled ?
 (A) O_3 (B) NO_2
 (C) Peroxyacetylnitrate (D) All of these

Answers : 48. (B), 49. (D), 50. (A), 51. (D), 52. (A), 53. (B), 54. (A), 55. (D), 56. (B), 57. (D), 58. (C), 59. (A), 60. (C), 61. (C), 62. (D), 63. (A), 64. (D)

● Stratospheric pollution

● Ozone layer = layer of ozone in upper region of stratosphere :

- It protects all living beings against harmful effect of ultraviolet radiations coming from sunlight.

● Depletion of ozone layer :

- In 1980, over Antarctica 30% loss was in ozone layer recorded
- Substances harming or making ozone layer thin are called ODS (Ozon Depletion Substances).

- One molecule of CFC = Depletion of one lakh O_3 molecules.
- 95 derivatives of chloro or bromo fluoro carbon are known which are commonly known as ODS.
- 93 countries have accepted not to use ODS by signing **Montreal protocol** on 16th september, 1987.
- At international level 16th September $\equiv$ Ozone protection Day

● **Depletion Effects :**

- Ultraviolet radiations of sunlight enter directly on the earth causes skin cancer, harmful genetic changes in cell.
- Reduces moisture level in solid and fish production.

● **Remedies to protect depletion of Ozone layer :**

- By spraying chemical compounds of alkane series in atmosphere.
- Decreasing the production of CFC upto 50%.
- Forming more of polar stratospheric clouds.
- Preventing the use of ODS.

65. Which of the following is responsible for depletion of ozone layer ?
 (A) Feraline (B) Freon (C) Polyhalogen (D) Fullarine
66. By depletion of ozone layer occurs.
 (A) CF_2Cl_2 (B) C_7F_{16} (C) C_6H_6 (D) C_6H_5Cl
67. How many derivatives of CFC or BFC are known as ODS ?
 (A) 59 (B) 95 (C) 56 (D) 65
68. ODS is used in
 (A) fire extinguishers (B) refrigerator (C) watercooler (D) all three
69. Ultraviolet radiations break CFC and produce
 (A) $O^\cdot$ (B) $ClO_3^\cdot$ (C) $Cl^\cdot$ (D) $F^\cdot$
70. Chlorine free radical reacts with ozone and forms free radical.
 (A) Cl_2O_7 (B) $ClO^\cdot$ (C) $ClO_3^\cdot$ (D) Cl_2
71. Which free radical is responsible for depletion of ozone layer ?
 (A) $ClO^\cdot$ (B) $BrO^\cdot$ (C) $Cl^\cdot$ (D) $O^\cdot$
72. Reaction of with O_3 concentration of ozone decreases upto 40%..
 (A) NO_x (B) SO_x (C) $ClO^\cdot$ (D) $Cl^\cdot$
73. gas is produced by the reaction of nitric oxide with ozone.
 (A) NO_3 , N_2 (B) NO , N_2 (C) NO , O_2 (D) NO_2 , O_2
74. gas is obtained by the reaction of nitrogen dioxide with ozone.
 (A) NO_3 , O_2 (B) NO_2 , O_2 (C) NO_2 , N_2 (D) N_2O , N_2

75. Chlorofluoro carbon is used in
 (A) production of electric circuits (B) foam plastic cup
 (C) oil paints (D) all of these
76. Which of the following is the remedie to protect depletion of ozone layer ?
 (A) Decreasing the production of CFC upto 50% (B) Both (A) and (C)
 (C) Preventing the use of ODS (D) By producing more CO gas
77. The possibility of which type of diseases is increased due to depletion of ozone ?
 (A) Blood cancer (B) Chest cancer (C) Skin cancer (D) Lungs cancer
78. Due to decrease in amount of polar stratospheric clouds, depletion of ozone layer
 (A) decreases (B) increases
 (C) does not occur (D) decreases or increases

Answers : 65. (B), 66. (A), 67. (B), 68. (D), 69. (C), 70. (B), 71. (C), 72. (A), 73. (D), 74. (A), 75. (D), 76. (B), 77. (C), 78. (B)

● Water pollution

- 97% of all available water on earth is present in sea, 2% water is present in the form of ice in polar regions and only 1% water is left for utilization by human beings.
- Water stored in river, pond, spring and dam is called surface water while water stored in well, stepwell is called ground water.
- When pollutants enter into surface water and ground water, it is called water pollutants.
- World Health Organization (WHO) at world level and BIS and ICMR at India level have prescribed standards for quality of drinking water.
- Standard prescribed by BIS in 1991 for deciding the quality of drinking water.

Characteristics	Desirable limit	Diseases caused due the excess or less amount
pH	6.5 to 8.5	More than 8.5, then effect of chlorination decreases less than 6.5, then harmful metals of pipes mixed in water.
Total Dissolved Solids (TDS)	500 ppm	If it increases, then it causes irritation in stomach and intestine.
Total Hardness CaCO_3	300 ppm	If it increases, then regular intake of such water causes possibilites of heart disease.
Nitrate	45 ppm	If it is higher, then it causes blue baby diseases in children.
Chloride	250 ppm	If it is higher, then harmful metals mixed in water due to corrosion of pipes
Sulphate	200 ppm	If it is higher, then it causes diarrhoea and irritation in stomach.
Fluoride	1 ppm	If it is higher, then it causes diseases related to teeth and bones. Higher than 2 ppm, then brown mottling of teeth occurs and higher than 10 ppm, then it causes fluorosis diseases.
Escherichia Coli	Should be absent	
Coliforms Bacteria	10 per 100 ml	If it is higher, then it results swelling in stomach and intenstine and urinary tract diseases.

● Purification of drinking water :

Based on analysis of drinking water, three methods are used in purificatoin.

- (1) Chemical method : By chemical reactions.
- (2) Physical method : By physical methods
- (3) Biological method : Boiling, adding of O_3 and Cl_2 .

79. Which disease is possible, when concentration of nitrate is higher than 45 ppm ?
 (A) Newmoglobinemia (B) Metheongluconemia
 (C) Newmoconiasis (D) Metheomoglobinemia
80. quantity is responsible for fluorosis diseases through drinking water.
 (A) F– 1 ppm (B) F– more than 0 ppm
 (C) F– more than 1 ppm (D) F– less than 1 ppm
81. If pH of water increases to, chlorination effect is reduced in water.
 (A) 8.5 (B) 5.8 (C) 6.5 (D) 5.6
82. among the following is responsible for water pollution ?
 (A) Smog (B) Industrial wastes (C) Sodium chloride (D) Fungi
83. Which metal pollutes water ?
 (A) Na (B) K (C) Cd (D) None of these
84. By which method pollution of water can be controlled ?
 (A) Adsorption method (B) Ion exchange method
 (C) Reverse osmosis (D) All of these
85. number of coliforms bacteria in 100 ml drinking water causes urinary tract diseases.
 (A) More than 1 (B) Less than 1 (C) More than 10 (D) Less than 10
86. Which are the main pollutants of water ?
 (A) Sewage and domestic waste water (B) Industrial waste water
 (C) Waste water of agriculture (D) All of these
87. Which ion cannot be removed from hard water by ion exchange resin ?
 (A) Mg^{2+} (B) Cl^{-} (C) SO_4^{2-} (D) Na^{+}
88. Which method is easy, safe and reliable to make germ free drinking water ?
 (A) By Boiling of water (B) By passing ultraviolet rays
 (C) By water purification machine (D) By passing chlorine gas
89. Which is the proper method to make the water germfree effectively and rapidly ?
 (A) By passing chlorine gas (B) By boiling water
 (C) By use of ultraviolet rays (D) By passing ozone gas
90. How much bleaching powder is necessary for chlorination of one litre water ?
 (A) 5 gram (B) 0.5 gram (C) 50 gram (D) 500 gram
91. If concentration of fluoride in drinking water is then brown patches are created on teeth.
 (A) more than 1 ppm (B) more than 0.1 ppm (C) more than 2 ppm (D) more than 0.2 ppm
92. The size of pore of semipermeable membrane used in reverse osmosis is
 (A) 0.1 μ (B) 0.005 μ (C) 0.001 μ (D) 0.0001 μ
93. is essential for strength of bones and teeth.
 (A) Chloride (B) Fluoride (C) Sulphate (D) Sodium chloride

Answers : 79. (D), 80. (B), 81. (A), 82. (B), 83. (C), 84. (D), 85. (C), 86. (D), 87. (D),
 88. (A), 89. (D), 90. (A), 91. (C), 92. (D), 93. (B)

● Soil Pollution

- The thin layer covering the matrix surface of earth is called soil.
- In which there are organic components obtained due to decomposition of waste from organisms, in organic components obtained by physical and chemical reaction occurring since thousands of years.
- Reasons for pollution in soil
 - Non judicious use of artificial fertilizers
 - Burning of solid waste
 - Non judicious use of insecticides
 - Deforestation
- Remedies to prevent soil pollution
 - Increase to prevent soil pollution
 - Recycling of solid waste
 - Growing more trees
 - Use of organic methods to control insects
 - Detoxification of industrial waste

-
94. Regular use of which fertilizer increases acidity of soil ?
(A) Ammonium sulphate (B) Potassium Nitrate
(C) Super phosphate of lime (D) Urea
95. Uses of DDT on crop causes which pollution ?
(A) Air (B) Soil and air (C) Soil and water (D) Air and water
96. Main reason for the soil pollution is
(A) Deforestation (B) Indiscriminate use of pesticides
(C) Given all (D) Dumping of solid wastes in soil
97. Which element is present as impurity in artificial fertilizers ?
(A) As (B) Pb (C) Cd (D) Given all
98. Which side effect is seen on soil by using artificial fertilizer like NPK ?
(A) Decreases the capacity of water absorption (B) Soil becomes hard
(C) Production of crop and vegetables decreases (D) Given all three
99. Which of the following is a natural fertilizer ?
(A) Rhizobium (B) Azotobacter (C) Compost (D) Algae
100. Which is natural fertilizer ?
(A) Farmyard manure (B) Rhizobium
(C) Azotobacters (D) Rhizobium and azotobacter both
101. Which fungi is well known insecticide ?
(A) Tridairma (B) Trichoderma (C) Betracosperm (D) Oseletoriya
102. Extract of which leaves is not act as insecticide ?
(A) Neem (B) AK (C) Dhatura (D) Lemon
103. Which herbicides is poisonous for the animals ?
(A) Sodium chlorate (B) A and C both. (C) Sodium arsenite (D) Sodium chloride

Answers : 94. (A), 95. (C), 96. (C), 97. (D), 98. (C), 99. (C), 100. (D), 101. (B), 102. (D), 103. (B)

● **Pollution due to unavoidable unnecessary wastes of industries**

- Necessary wastes of industries pollute the environment.
- Different industries : petroleum, paper and pulp, leather, sugar, electroplating and metal refining, detergent, pesticides, fertilizer, thermal power and dairy etc.
- When the industrial waste is in liquid form then to measure the amount of organic waste in it, two types of measures are used.

(1) BOD (Biochemical Oxygen Demand) :

- During their biochemical reactions amount of dissolved oxygen utilized by bacteria is called BOD.
- To measure BOD the sample of liquid waste is kept at 293 K temperature for 5 days.
- On the basis of difference between amounts of dissolved oxygen on the fifth day and on the first day, the amount of dissolved oxygen used up by bacteria for degradation of organic material of waste sample can be determined. This is known as BOD for liquid waste.

(2) COD (Chemical Oxygen Demand) :

- The amount of dissolved oxygen required for oxidation of all the organic materials present in liquid waste is known as COD.
- To measure the COD, mixture of potassium dichromate and concentrated sulphuric acid are used.
- This measurement requires only 2-3 hours.
- The COD value is higher than BOD for the same liquid waste.
- The unit of COD and BOD is ppm or mgL^{-1} .

-
- 104.** Methyl mercaptan is the waste product of which industry ?
(A) Plastic industry (B) Pesticide industry
(C) Paper and pulp industry (D) Dairy industry
- 105.** Ions of Hg, Ag and Pb are waste product of
(A) Dairy industry (B) Fertilizer industry
(C) Pesticide industry (D) Electroplating industry
- 106.** Salts of Cr and As are waste product of industry.
(A) leather (B) metal refining
(C) thermal power (D) detergent
- 107.** In which industry waste product are phenolic compounds and suspended solid ?
(A) Sugar (B) Paper and pulp (C) Detergent (D) Petroleum
- 108.** Which industry is responsible for presence of fly ash in atmosphere ?
(A) Thermal power (B) Fertilizer (C) Detergent (D) Petroleum
- 109.** Unit of BOD is
(A) mgml^{-1} (B) mmL^{-1} (C) gL^{-1} (D) mgL^{-1}
- 110.** The measurement of COD requires time.
(A) 2-3 hours (B) 5 hours (C) 2 - 5 hours (D) 2 - 3 days
-

111. Amount of organic material which can be degraded by bacteria in liquid waste is useful to know the amount.
 (A) COD (B) BOD (C) GWP (D) ODS
112. H_2S gas is waste product of which industry ?
 (A) Sugar (B) Petroleum (C) Electroplating (D) Given all
113. Waste water produced by sugar industry becomes black in colour smells bad due to
 (A) production of phenolic compounds (B) production of H_2S
 (C) production of CO_2 (D) production of aromatic compounds
114. To measure BOD, the sample of liquids waste is kept at temperature for days.
 (A) 5, 293 K (B) 3, 293 K (C) 5, 298 K (D) 3, 298 K

Answers : 104. (C), 105. (D), 106. (A), 107. (D), 108. (A), 109. (D), 110. (A), 111. (B), 112. (D), 113. (B), 114. (A)

● **Remedies to control environmental pollution**

- By controlling the main source of pollution controlling of environmental pollution becomes easy.

(1) Household waste :

- Biodegradable and non-biodegradable materials of household waste should be kept separate.
- Compost can be prepared from biodegradable waste.
- Nonbiodegradable substances should be recycled.

(2) Exhaust smoke of vehicles :

- A person should check the amount of gases present in the smoke of his/her vehicle and regular service of the vehicles is also necessary.

(3) Industrial waste :

- Air pollution controlling devices should be arranged to control the air pollutants like suspended particles, sulphur dioxide, ammonia, chlorine, hydrogen chloride hydrogen sulphide etc. released in the air by industries.
- Wearing gasmask is beneficial.
- The industry should make effluent treatment plants either individually or collectively.

(4) Biomedical Waste :

- To make germfree, biomedical waste should be burnt or dumped in soil based on its characteristics for its removal.

-
115. Which of the following is non-biodegradable component ?
 (A) glass (B) rotten vegetables (C) edible substances (D) paper
116. Which one is biodegradable compound ?
 (A) Edible compounds (B) Given all (C) Paper (D) Cardboards
117. Which solid waste can be recycled ?
 (A) plastic (B) Glass (C) Paper (D) Given all
118. In metro cities air is polluted due to
 (A) combustion of coal (B) household waste
 (C) combustion of cooking gas (D) exhaust smoke of vehicles.

Answers : 115. (A), 116. (B), 117. (D), 118. (D)

● **Green Chemistry**

- Green chemistry $\equiv$ Environmentally favourable chemical synthesis
- Nobel prize for synthesis of new chemicals based on green chemistry was awarded to Yves Chauvin, Robert H Grubbs and Richard R Schrock.
- Twelve principles formulated for green chemistry on the basis of works done by Paul T. Anastas for development of green chemistry.
- **Green chemistry in day-to-day life :**
 - (1) Tetrachloro ethene was used earlier as solvent for dry cleaning of clothes. It pollutes ground water and is carcinogenic. For this liquified carbon dioxide with suitable detergent is used for drycleaning instead of tetrachloroethene. The use of hydrogen peroxide as bleaching agent for washing of clothes has increased which produces good results using lesser amount of water.
 - (2) **In bleaching of paper :**For good quality of paper it is essential to remove its lignin completely. Most of the lignin is removed during production of paper. Chlorine gas is being used for removal of remaining lignin. But chlorine gas forms dioxins by reaction with aromatic rings of lignin, which is a potential carcinogenic compound. Hence, for bleaching of paper, hydrogen peroxide in presence of suitable catalyst is being used today.

-
119. Which statement is not suitable for principles of green chemistry ?
- (A) Production of hazardous chemicals should be removed.
(B) Use of protecting group should be increased.
(C) Most appropriate solvent should be selected.
(D) Production of softer chemicals should be aimed.
120. Which compound was used earlier for dry cleaning of clothes ?
- (A) $\text{Cl}_2\text{C}=\text{CCl}_2$ (B) $\text{C}_2\text{H}_5\text{Cl}$ (C) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{Cl}$ (D) CCl_4
121. Which compound is used as bleaching agent for washing of clothes ?
- (A) H_2O (B) $\text{Ca}(\text{HCO}_3)_2$ (C) NaHCO_3 (D) H_2O_2
122. Where $\text{CO}_{2(l)}$ is used ?
- (A) In bleaching of paper (B) In dry cleaning of clothes
(C) In soda water (D) None of these
123. Now a days which compound is used for bleaching of paper ?
- (A) Cl_2 (B) bleaching powder (C) H_2O_2 (D) HClO_4
124. gas forms by reaction with aromatic rings of lignin.
- (A) Cl_2 , dioxins (B) H_2O_2 , dioxins (C) Cl_2 , trioxins (D) H_2O_2 , troixins
125. Now a days which is safe compound to remove lignin from paper ?
- (A) Liquified CO_2 (B) Chlorine (C) Hydrogen peroxide (D) Dioxins
126. Dioxins are
- (A) carcinogen (B) bleaching agent (C) oxidising agent (D) none of these
127. Which of the following is used as bleaching agent ?
- (A) Cl_2 (B) H_2O_2 (C) A and B (D) None of these
-

- 128.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) PHBV is a biodegradable compound. (2) Dextran is a nonbiodegradable compound
 (3) DDT is a biodegradable compounds. (4) Compost is a biodegradable compound
 (A) TTFT (B) TTFF (C) TFTF (D) FTFT
- 129.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Plant obtains carbon, hydrogen and oxygen from air and water.
 (2) Plant absorbs N, P, K and Ca from soil.
 (3) Mixed fertilizer contains Ammonium nitrate, phosphorous (as PCl_5) and potassium (as KO_2).
 (4) The excess use of NPK in soil reduces production of crops and vegetables.
 (A) TFTF (B) TTFT (C) TTTT (D) TTFT
- 130.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Ozone layer prevents the entry of infrared radiation of sunlight on earth.
 (2) Acid rains is mainly due to oxides of nitrogen and sulphur.
 (3) CCl_4 is the reason for depletion of ozone layer.
 (4) Green chemistry is responsible for globe warning.
 (A) FFTT (B) FTTF (C) TTFF (D) TTFT
- 131.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Five days are required for COD measurement.
 (2) Amount of inorganic materials present in liquid waste can be determined by measurement of COD.
 (3) COD is measured by use of mixture of reducing agent.
 (4) Unit of BOD is mg l^{-1} .
 (A) FTFT (B) TTFF (C) TTTT (D) TFFF
- 132.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Teeth and bones of a person becomes weak due to fluorosis diseases.
 (2) If concentration of fluoride exceeds 10 ppm it causes fluorosis dissases.
 (3) Muscles of stomach become weak due to fluorosis diseases.
 (4) If fluoride is higher than 2 ppm then it causes fluorosis diseases.
 (A) TFFF (B) TTTF (C) FFFT (D) TTFF
- 133.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Oxidising smog is produced in warm, dry and sunny climate.
 (2) Oxidising smog is a mixture of smoke, fog and sulphur dioxide gas.
 (3) Classical smog is known as Los Angeles smog.
 (4) Los Angeles smog is reducing agent.
 (A) TTFF (B) TFFF (C) TFTF (D) TTFT

- 134.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) If the concentration of fluoride is higher than 2 ppm, then brown mottling of teeth occurs.
 - (2) If the concentration of Nitrate is higher than 45 ppm causes blue baby diseases.
 - (3) If the concentration of chloride is higher than 250 ppm causes irritation in stomach.
 - (4) If the concentration of sulphate is higher than 20 ppm causes irritation in stomach.
- (A) TFTF (B) FFTT (C) FFFF (D) TTFF
- 135.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) SO_2 is poisonous to animals only.
 - (2) SO_2 causes irritation to eyes.
 - (3) The reduction of SO_2 without catalyst is slow.
 - (4) Air acts as catalyst and converts SO_2 into SO_3 .
- (A) FTFF (B) FFTT (C) FFTT (D) FTFT
- 136.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Compost is a natural fertilizer.
 - (2) Algae is a biofertilizer.
 - (3) Solid waste dumped in soil reduces soil fertility.
 - (4) H_2S gas mixes in atmosphere due to sugar industry.
- (A) TTTT (B) FFTT (C) FTTF (D) FTTT
- 137.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Today $\text{Cl}_2\text{C} = \text{CCl}_2$ is used in dry cleaning of clothes.
 - (2) Most of lignin is removed in process of paper production.
 - (3) Use of protecting group should be avoided whenever possible-green chemistry.
 - (4) For some liquids waste $\text{COD} > \text{BOD}$.
- (A) FTTF (B) FTTT (C) FTTF (D) FFTT
- 138.** For the following statement T stands for true and F for false. Then select the correct choice from given choices :
- (1) Natural degradation of agriculture waste requires 150 to 180 days.
 - (2) The region which is above the troposphere and between 10000 to 50000 metres from the sea level is known as stratosphere.
 - (3) In congested area the irritation red-hazy environment is produced due to NO_x .
 - (4) $(\text{CO} + \text{heamoglobin})$ is 30 times more stable than $(\text{O}_2 + \text{heamoglobin})$.
 - (5) GWP of Nitrous oxide 3800 times more than CO_2 .
 - (6) By photosynthesis during a year, 1600 crore tons CO_2 is removed from atmosphere and 2200 crore tons O_2 is added.
- (A) FFTFTF (B) TFFFTF (C) TFTFTF (D) TFTFFF

139. Match part 1 and part 2 select correct choice :

	Part-1	Part-2
(1)	The lowest region of atomosphere is known as	(a) Argon
(2)	Rapidly degradable polutant is	(b) Azone
(3)	Gas present in Troposhphere is	(c) Stratosphere
		(d) Troposphere
		(e) DDT
		(f) Discarded vegetables.

(A) (1)–(c), (2)–(e), (3)–(a)

(B) (1)–(c), (2)–(d), (3)–(a)

(C) (1)–(c), (2)–(b), (3)–(a)

(D) (1)–(d), (2)–(f), (3)–(b)

140. Match part 1 and part 2 select correct choice :

	Part-1	Part-2
(1)	Biodegradable waste	(a) Should be burnt
(2)	Non biodegradable waste	(b) Compost can be prepared
(3)	Air pollution created by smoke	(c) Regular service of the vehicles
(4)	Biomedical waste	(d) Should be recycled

(A) (1)–(b), (2)–(d), (3)–(c), (4)–(a)

(B) (1)–(d), (2)–(c), (3)–(a), (4)–(b)

(C) (1)–(a), (2)–(b), (3)–(d), (4)–(c)

(D) (1)–(c), (2)–(a), (3)–(b), (4)–(c)

141. Match part 1 and part 2 select correct choice :

	Part-1 (Industry)	Part-2 (Unavoidable unnecessary waste)
(1)	Sugar industry	(a) Organic aromatic compounds
(2)	Detergent industry	(b) Phenolic compounds
(3)	Fertilizer industry	(c) Compounds like fly ash
(4)	Pesticide industry	(d) Organic compounds having log chain
		(e) Containt such as arsenic
		(f) Hydrogen sulphide gas

(A) (1)–(b), (2)–(d), (3)–(f), (4)–(a)

(B) (1)–(f), (2)–(d), (3)–(e), (4)–(a)

(C) (1)–(f), (2)–(d), (3)–(a), (4)–(c)

(D) (1)–(a), (2)–(c), (3)–(d), (4)–(f)

142. Match part 1 and part 2 select correct choice :

	Part-1 limit	Part-2 effect on body
(1)	Sulphate more than 200 ppm	(a) Teeth and bones of a person become weak
(2)	Fluoride more than 2 ppm	(b) Heart disease
(3)	Fluoride more than 10 ppm	(c) Irritation in stomach
(4)	Nitrate more than 45 ppm	(d) Brown patches on teeth occurs
		(e) Blue baby disease
		(f) Irritation in intenstine

(A) (1)–(c), (2)–(a), (3)–(d), (4)–(b)

(B) (1)–(d), (2)–(a), (3)–f, (4)–(e)

(C) (1)–(d), (2)–(c), (3)–(a), (4)–(e)

(D) (1)–(c), (2)–(d), (3)–(a), (4)–(e)

143. Match part 1 and part 2 select correct choice :

	Part-1 pollutant	Part-2 Harmful effect
(1)	Carbon monoxide	(a) Carcinogen
(2)	NO_3^{-1}	(b) Bluebaby disease
(3)	Fluoride	(c) Headache and cardio vascular disorder
(4)	3, 4 Benzpyrene	(d) Decreases the rate of photosynthesis
		(e) Fluorosis disease
		(f) Irritation in stomach

- (A) (1)–(d), (2)–(b), (3)–(e), (4)–(a) (B) (1)–(d), (2)–(f), (3)–(e), (4)–(a)
 (C) (1)–(c), (2)–(b), (3)–(e), (4)–(a) (D) (1)–(c), (2)–(b), (3)–(f), (4)–(a)

144. Match part 1 and part 2 select correct choice :

	Part-1 Sources	Part-2 Pollutant
(1)	Sewage water	(a) Micro organism
(2)	Chemical fertilizer	(b) Plant nutrients
(3)	Chemical used for killing insect, fungi and weeds	(c) Heavy metal
(4)	Mining of uranium containing minerals	(d) Pesticides
(5)	Heavy metal producing chemical factories	(e) Pesticides
(6)	Erosion of soil by agriculture and stripmining	(f) Radio active substances

- (A) (1)–(a), (2)–(b), (3)–(c), (4)–(d), (5)–(e), (6)–(f)
 (B) (1)–(a), (2)–(b), (3)–(e), (4)–(f), (5)–(c), (6)–(d)
 (C) (1)–(a), (2)–(b), (3)–(c), (4)–(e), (5)–(f), (6)–(d)
 (D) (1)–(a), (2)–(d), (3)–(e), (4)–(f), (5)–(d), (6)–(c)

● One or more than one correct choice MCQ :

145. Which of the following is responsible for producing photochemical smog ?

- (A) NO (B) CO (C) Hydrocarbon (D) SO_2

146. Which of the following is incorrect statement ?

- (A) NO is more harmful than NO_2 .
 (B) SO_2 is more harmful than SO_3 .
 (C) There is mainly HNO_3 in acid rain.
 (D) There is mainly H_2SO_4 and less amount of HCl and HNO_3 in acid rain.

147. Which of the following is responsible for depletion of ozon layer ?

- (A) PAN (B) CO_2 (C) Freon (D) NO

148. H_2S gas is produced as waste of which industry ?

- (A) Dairy industry (B) Sugar industry
 (C) Petroleum industry (D) Electroplating industry

149. If concentration of chloride in water is higher than it causes corrosion of pipes used for its distribution and results in higher amount of harmful metal in drinking water.
 (A) 250 ppm (B) 7.042 ml mole litre⁻¹
 (C) 7.042×10^{-3} mole litre⁻¹ (D) 0.025 % $\frac{W}{V}$
150. Which statements is incorrect ?
 (A) Herbicides like NaClO₃ and Na₃AsO₄ are harmful for animals.
 (B) Mixed fertilizer contains NH₄NO₂, P₂O₅ and K₂O.
 (C) Prepared 0.5% $\frac{W}{V}$ bleaching powder solution to make water germ free.
 (D) Semipermeable membrane having 0.001 μ pore size are available.
151. Which statements are correct for green chemistry ?
 (A) Production of hazardous chemicals should be prevented.
 (B) Appropriate solvent should be selected.
 (C) Use of protecting group should be avoided whenever possible.
 (D) Obtained product should be nonbiodegradable.
152. Which is not suitable ?
 (A) Sodium arsenate-herbicide - poisonous for mammals.
 (B) Sodium chlorate-herbicide - poisonous effect on rabbit.
 (C) Reproduction of 1 ten paper 71 trees can be saved.
 (D) Chlorine gas + lignin - diotoxin - carcinogen.
153. Unit of COD and BOD is
 (A) ppm (B) ml mole litre⁻¹ (C) mg litre⁻¹ (D) parts per million
154. Which statements are incorrect ?
 (A) Ultraviolet radiations of sunlight causes harmful genetic changes in cell.
 (B) Ozone is responsible for harmful genetic changes in cell.
 (C) To increase the protein content of wheat, maize and grams grown we have to use NPK fertilizer.
 (D) Use of natural fertilizer like farmyard manure and rhizobium should be increased.
155. reduces the effect of chlorination which is used to make the water germ free.
 (A) pH value of water that exceeds 8.5
 (B) pOH value of water is more than 5.5
 (C) concentration of H⁺ is more than 3.2×10^{-10} M
 (D) concentration of H⁺ is less than 3.2×10^{-10} M

Answers : 119. (B), 120. (A), 121. (D), 122. (B), 123. (C), 124. (A), 125. (C), 126. (A), 127. (C), 128. (A), 129. (B), 130. (C), 131. (D), 132. (A), 133. (B), 134. (C), 135. (D), 136. (A), 137. (B), 138. (C), 139. (D), 140. (A), 141. (B), 142. (D), 143. (C), 144. (B), 145. (A), (C), 146. (A), (B), (C), 147. (C), (D), 148. (B), (C), (D), 149. (A), (B), (C), (D), 150. (A), (B), 151. (A), (D), 152. (A), (C), (D), 153. (A), (C), 154. (B), (C), (D), 155. (A), (B), (C).