Exercise-1

ONLY ONE OPTION CORRECT TYPE

Section (A) : Gaseous air pollutants

1. Pollution is :
(1) removal of top soil
(2) release of toxic/undesirable materials in environment
(3) conservation of energy
(4) all of above

2. Atmosphere of big/metropolitian cities are polluted most by :
(1) automobile exhausts. (2) pesticide residue.
(3) household waste. (4) radio-active fall out.

3. Burning of fossil fuels is the main source of, which of the following pollutants ?
(1) Nitrogen oxide (2) Nitric oxide (3) Nitrous oxide (4) Sulphur dioxide

4. SO_2 and NO_2 produce pollution by increasing :
(1) alkalinity (2) acidity (3) neutrality (4) buffer action

5. Air pollutants that produce photochemical oxidants include :
(1) CO_2, CO and SO_2 (2) N_2O, NO and HNO_3
(3) O_2, Cl_2 and HNO_3. (4) O_3, Cl_2 and SO_2

6. Carbon monooxide is pollutant as it :
(1) inactivates nerves (2) inhibits glycolysis
(3) combines with oxygen (4) combines with haemoglobin

7. Acid rains are produced by :
(1) excess NO_2 and SO_2 from burning fossil fuels
(2) excess production of NH_3 by industry and coal gas
(3) excess release of carbon monoxide by incomplete combustion
(4) excess formation of CO_2 by combustion and animal respiration.

8. Spraying of DDT produces pollution of the type:
(1) air (2) air and water (3) air and soil (4) air, water and soil

9. Ozone layer of upper atmosphere is being destroyed by :
(1) chlorofluorocarbon (2) SO_2
(3) photochemical oxidants/O_2 & CO_2 (4) smog

10. Chlorofluorocarbon releases which of the following chemical harmful to ozone :
(1) fluorine (2) chlorine (3) nitrogen peroxide (4) sulphur dioxide

11. Most hazardous metal pollutant of automobile exhausts is :
(1) mercury (2) cadmium (3) lead (4) copper

12. Classical smog occurs in places of :
(1) excess CO_2 (2) cool and humid (3) warm, dry and sunny (4) excess NH_3

13. The aromatic compounds present as particulates are :
(1) benzene (2) toluene (3) nitrobenzene (4) polycyclic hydrocarbons

14. Which of the following statements is true about photochemical smog ?
(1) It is reducing in nature.
(2) it is formed in winter.
(3) It is a sulphurous smog.
(4) Components of the smog, NO and O_3, irritate the nose and throat and their high concentration causes headache, chest pain, dryness of the throat, cough and difficulty in breathing.

15. Besides CO_2, the other green house gas is :
(1) CH_4 (2) N_2 (3) Ar (4) O_2

16. Which of the following is not a part of green chemistry ?
(1) Photochemistry (2) Sonochemistry (3) Nuclear chemistry (4) Biochemistry

17. Ultraviolet radiation from sun causes a reaction that produces :
(1) fluorides (2) carbon monooxide (3) sulphur dioxide (4) ozone

18. Ozone depletion in stratosphere shall result in :
(1) forest fires (2) increased incidence of skin burns and skin cancer
(3) increase in biological oxygen demand (4) global warming

19. Which of the following statements is true ?
(1) London smog is oxidising in nature.
(2) London smog contains H_2SO_4 droplets.
(3) London smog is mixture of smoke, fog and SO_2.
(4) London smog causes bronchitis.

20. Which of the following processes does not increase the amount of CO_2 in atmosphere ?
(1) Decay of animals (2) Breathing (3) Photosynthesis (4) Burning of petrol

21. Consider the following statement and select the correct option :
S_1 : Dust is the non-viable particle.
S_2 : Particulates acquire negative charge and are attracted by the positive electrode.
S_3 : O_2 is a green house gas.
S_4 : Algae is a viable particulate.
(1) S_1 and S_2 only (2) S_1, S_2 and S_3 only (3) S_1, S_2 and S_4 only (4) S_2, S_3 and S_4

22. Which of the following statements is true about ozone layer ?
(1) It is harmful because ozone is dangerous to living organism.
(2) It is beneficial because oxidation reaction can proceed faster in the presence of ozone.
(3) It is beneficial because ozone cuts off the ultra violet radiation of the sun.
(4) It is harmful because ozone cuts out the important radiation of the sun which are vital for photosynthesis.

23. Incomplete combustion of petrol or diesel oil in automobile engines can be best detected by testing the fuel gases for the presence of ?
(1) CO and water vapour (2) CO
(3) NO_2 (4) SO_2

Section (B) : Water pollution , soil pollution and waste management

1. Which causes water pollution ?
(1) Pathogens (2) Automobile exhausts (3) *PCBs* (4) (1) and (3)

2. Water pollution is less if BOD is :
(1) less than 5 ppm (2) less than 15 ppm (3) less than 50 ppm (4) less than 100 ppm

3. Most abundant water pollutant is :
(1) detergents (2) pesticides (3) industrial wastes (4) ammonia

4. Drained sewage has biological oxygen demand (BOD) :
(1) more than that of water (2) less than that of water
(3) equal to that of water (4) none of the above

5. Eutrophication causes reduction in :
(1) dissolved hydrogen (2) dissolved oxygen (3) dissolved salts (4) all the above

6. Which of the following will increase the BOD of water supply ?
(1) CO_2 (2) O_3 (3) H_2O (4) C_2H_5OH

7. Sewage water is purified by :
(1) microorganism (2) light (3) fishes (4) aquatic plants

8. Which of the following is not a herbicide ?
(1) Sodium chlorate (2) Sodium arsenate (3) Phosphate (4) Triazines

9. DDT is :
(1) green house gas (2) biodegradable pollutant
(3) non-biodegradable pollutant (4) none of above

10. Domestic waste mostly constitutes :
(1) non-biodegradable pollution (2) biodegradable pollution
(3) effluents (4) air pollution

11. Measurement of rate oxygen utilisation by a unit volume of water over a period of time is to measure :
(1) fermentation (2) biogas generation
(3) biosynthetic pathway (4) biological oxygen demand.

12. Fishes die in water bodies polluted by sewage due to :
(1) pathogens (2) clogging of gills by silt
(3) reduction in oxygen (4) foul smell

13. Which of the following statements is false ?
(1) The industrial and domestic sewage discharge is the main reason for river water pollution.
(2) Surface water contains a lot of organic matter and mineral nutrients.
(3) Oil spill in sea water causes heavy damage to fishery.
(4) Oil slick in sea water increases dissolved oxygen.

14. Which of the following statements is false ?
(1) The lower the concentration of dissolved oxygen, the more polluted is the water sample.
(2) The tolerable limit of lead in drinking water is 50 ppm.
(3) Water is considered pure if it has BOD less than 5 ppm.
(4) None of the above

15. Phosphate pollution is caused by :

(1) weathering of phosphate rock only (2) agriculture fertilizers only
(3) phosphate rocks and sewage (4) sewage and agricultural fertilizers.

16. Modes of controlliing pollution in large cities includes :
(1) cleanliness and less use of insecticides
(2) proper disposal of organic wastes, sewage and industrial effluents.
(3) use of liquefied carbondioxide with a suitable detergent in place of tetrachloroethene for dry cleaning.
(4) all the above

Exercise-2

PART - I : OBJECTIVE QUESTIONS

1. Which of the following statement is correct ?
(1) Lower stratosphere consists of considerable amount of ozone.
(2) Ozone layer protects humans living on earth from the harmful effect of ultraviolet radiations coming from sun.
(3) Ozone is thermodynamically stable.
(4) Smoke clouds play significant role in creating ozone over antarctica.

2. Which of the following compound belong to the class of freons ?
(1) CCl_4 (2) $COCl_2$ (3) C_3O_2 (4) CF_2Cl_2

3. The extensive use of CFC'S as refrigerant fluids and in aerosol is because of :
(1) its high chemical stability (2) good absorber of UV radiation
(3) its polar nature (4) high toxicity

4. In stratosphere, which of the following radical retards the formation of O_3 ?
(1) $\dot{C}H_3$ (2) $\dot{C}l$ (3) $\dot{F}$ (4) Cl_2

5. Which of the following helps in creating ozone over antractia ?
(1) Radioactive clouds (2) Polar stratospheric clouds
(3) Spring clouds (4) Smoke clouds

6. Which are natural sinks for $\dot{C}lO$ radicals in other parts of stratosphere ?
(1) SO_2 and NO_2 (2) NO and NO_2 (3) CH_4 and NO_2 (4) Cl_2 and F_2

7. Eutrophication is a source of water pollution. It occurs when water :
(1) is low in nutrients (2) is high in nutrients
(3) has high temperature (4) has excess amount of organic matter

8. Which of the following statements is false ?
(1) Absorption of the terresterially radiated heat by the carbondioxide is the main cause of global warming.
(2) The global warming will increases the rate of melting of **polar ice caps** increasing the sea level.
(3) The global warming of the earth surface is mainly due to reforestation.
(4) CO_2, NO, CH_4, O_3, CCl_4 and water vapour are green house gases.

9. Which of the following is the primary precursor of photochemical smog ?
(1) Hydrocarbon (2) Ozone (3) PAN (4) Water vapour

10. Photochemical smog can be reduced by :
(1) using catalytic converter in the automobiles
(2) plantation of certain plants like pinus, juniperus, vitis etc.
(3) both (1) and (2)
(4) None

11. In stratosphere CFCs gets broken down by the action of powerful UV radiation releasing :
(1) $\dot{C}H_3$ (2) $\dot{C}IO$ (3) $\dot{C}I$ (4) $\dot{C}FCl_2$

12. Which of the following statements is false ?
(1) Over antarctica, the depletion of ozone layer is due to the formation of chlorine nitrate.
(2) Both O_3 and NO_2 reacts with unburnt hydrocarbons in the polluted air to give PAN.
(3) Classical smog consists of a mixture of smog, fog and sulphurdioxide.
(4) Gaseous pollutants consist of oxide of carbon, sulphur and nitrogen along with dust, fumes smoke, smog etc.

13. Which of the following does not contribute to water pollution ?
(1) Pathogens (2) Organic wastes (3) chemical pollutants (4) none

14. BOD is :
(1) The amount of oxygen required to convert the NO in to NO_2 in a certain volume of a sample of water.
(2) The amount of F^- ions required to convert, one mole of hydroxyapatite into fluorapatite.
(3) The amount of oxygen required by bacteria to break down the organic matter present in a certain volume of a sample of water.
(4) The amount of oxygen required to break down the non-biodegradable waste.

15. Which of the following is false.
(1) Green house gases are carbondioxide, methane, water vapours, nitrous oxide, CFCs and ozone.
(2) CO is highly poisonous to living beings because of its ability to block the delivery of oxygen to the organs and tissues.
(3) The troposphere contains dinitrogen, dioxygen, ozone and little water.
(4) The primary source of air borne lead emission is leaded-petrol

16. Which of the following is false.
(1) Photochemical smog has high concentration of reducing agents and is, therefore, called as reducing smog.
(2) Non-viable particulates consist of smoke, dust, mist, fumes etc.
(3) Classical smog occurs in cool humid climate and it is mixture of smoke, fog and sulphurdioxide.
(4) Ozone reacts with unburnt hydrocarbons in polluted air to produce peroxyacetyl nitrate (PAN).

More than one choice type

17. Photochemical smog causes :
(1) headache (2) cracking of rubber
(3) corrosion of painted surface (4) extensive damage to plant life

18. Choose the wrong statements :
(1) CO_2 is responsible for greenhouse effect.
(2) CO_2 can absorb infrafred radiation but does not allow them to pass through.

(3) NO is more harmful than NO_2.

(4) acid rain contains mainly HNO_3.

19. Which of the following is/are correct about the size of particulates ?

(1) Soot particles have diameter of about 5 nm.

(2) H_2SO_4 fog particles have size of 500–1000 nm.

(3) Fly ash particles have diameter of 5×10^5 nm.

(4) All particulates have same size.

20. Which of the following is/are weedicides ?

(1) Sodium chlorate (2) DDT (3) Sodium arsenate (4) BHC

21. The depletion of ozone layer is caused by :

(1) NO (2) SO_2 (3) C_xH_y (4) CFCs

22. Which of the following is/are proper method(s) to dispose sludge ?

(1) Incineration (2) Dumping

(3) Anaerobic digestion by microbes (4) Filtration

23. Which of the following metal(s) is/are toxic and pollutants ?

(1) Cadmium (2) Lead (3) Mercury (4) Zinc

24. Which of the following is/are greenhouse gases ?

(1) Ozone (2) Methane (3) carbon dioxide (4) Water vapours

PART - II : COMPREHENSION

Read the following comprehension carefully and answer the questions :

Comprehension # 1

Ozone is an unstable, dark blue diamagnetic gas. It absorbs strongly the UV radiation, thus protecting the people on the earth from the harmful UV radiation from the sun. The use of chlorofluorocarbon (CFC) in aerosols and refrigerators, and their subsequent escape into the atmosphere, is blamed for making holes in the ozone layer over the Antarctic, and Arctic.

Ozone acts as a strong oxidising agent in acidic and alkaline medium. For this property ozone is used as a germicide and disinfectant for sterilising water and improving the atmosphere of crowded places.

1. CFCs damage ozone layer by reactions :

(1) $O_3 + hv \longrightarrow O + O_2$ (2) $\dot{Cl} + O_3 \longrightarrow Cl\dot{O} + O_2$

(3) $Cl\dot{O} + O \longrightarrow \dot{Cl} + O_2$ (4) all of the above

2. Identify the incorrect statement with respect to ozone ?

(1) Ozone is formed in the upper atmosphere by a photochemical reaction involving dioxygen.

(2) Ozone protects the earth's inhabitants by absorbing UV radiations.

(3) Ozone can also be made by heating O_2 over 2500^0C and quenching

(4) Chlorine gas is preferred over ozone for the purification of drinking water and for water treatment in swimming pools.

3. Which of the following statement is correct ?

(1) The dark blue colour of ozone is due to intense absorption of green light.

(2) Oxides of nitrogen and the halogen cannot damage the O_3 layer.

(3) Ozone oxidises dry iodine to I_2O_5 .

(4) Ozone forms orange coloured compound KO_3 with potassium hydroxide.

Comprehension # 2

Pesticides are synthetic toxic chemicals which are used in agriculture to control the damages caused by insects, rodents, weeds and various crop diseases. Their repeated use give rise to pests that are resistant to that group of pesticides. As a result these pesticides become ineffective for those pests. Examples are DDT, aldrin, dieldrin etc.

Herbicides are the chemicals used to control weeds, earlier inorganic compounds such as sodium chlorate, and sodium arsenite were used but arsenic compounds being toxic to mammals, are no longer preferred instead organic compounds such as triazines, are now considered as better herbicides, especially for the corn-fields.

4. Which of the following is a biodegradable pesticide ?

(1) DDT (2) Aldrin (3) Dieldrin (4) None of these

5. Which of the following compounds belongs to herbicides ?

(1) Sodium arsenite (2) Sodium chlorate (3) Triazines (4) All of these

6. Which of the following statements is false ?

(1) The fly ash and slag of steel industry is being used by the cement industries

(2) Industrial wastes, agricultural pollutants and radioactive pollutants are the sources of soil pollutants.

(3) The recycling of material such as paper, glass and some kinds of plastics would help in the conservation of natural sources.

(4) BHC, malathon and chlorinated hydrocarbon are herbicides.

PART - III : MATCH THE COLUMN

1. Match the entries of column-I with appropriate enteries of column-II. Each entry in column-I may have one or more than one correct option(s) from column-II.

Column-I	**Column-II**
(1) Acid rain	(p) Oxides of nitrogen
(2) Green house effect	(q) Oxides of sulphur
(3) Ozone hole	(r) Carbon dioxide
(4) Eutrophication	(s) Phosphate fertilizer i.e. plant nutrient (excess).
	(t) Chlorofluorocarbon (CFCs)

2. Match the entries of column-I with appropriate enteries of column-II. Each entry in column-I may have one or more than one correct option(s) from column-II.

Column-I	**Column-II**
(1) Classical smog	(p) SO_2
(2) Photochemical smog	(q) NO_2
(3) Particulate Pollutants	(r) bacteria
(4) Gaseous pollutants	(s) smoke
	(t) Fe_3O_4

Exercise-3

MISCELLANEOUS EXAMINATION PROBLEMS

1. The smog is essentially caused by the presence of : **[AIEEE 04]**
(1) O_2 and O_3 (2) O_2 and N_2
(3) Oxides of sulphur and nitrogen (4) O_3 and N_2

2. Which one of the following is responsible for depletion of the ozone layer in the upper stratosphere of the atmosphere ? **[AIPMT 04]**
(1) polyhalogens (2) ferrocene (3) fullerenes (4) freons

3. Ozone in the stratosphere is deleted by : **[AIIMS 04]**
(1) CF_2Cl_2 (2) C_7F_{16} (3) $C_6H_6Cl_6$ (4) C_6F_6

4. The basic component of somg is : **[AMU 05]**
(1) PAN (2) PBN (3) NO_2 (4) All of these

5. In antartica, ozone depletion is due to the formation of the following compound : **[Kerala CEE 05]**
(1) Acrolein (2) peroxy acetyl nitrate
(3) SO_2 and SO_3 (4) chlorine nitrate

6. Pick up the correct statement : **[Kerala CEE 05]**
(1) CO which is a major pollutant resulting from the combustion of fuels in automobiles plays a major role in photochemical smog.
(2) Classical smog has an oxidizing character while the photochemical smog is reducing in character.
(3) The photochemical smog occurs in day time whereas the classical smog occurs in the morning hours.
(4) During formation of smog the level of ozone in the atmosphere goes down.

7. High concentration of fluoride is poisonous and harmful to bones and teeth at levels over **[HP PMT 06]**
(1) 1 ppm (2) 3 ppm (3) 5 ppm (4) 10 ppm

8. Which of the following is not a green house gas ? **[Kerala PMT 06]**
(1) CO_2 (2) CH_4 (3) O_3 (4) CCl_2F_2

9. An object is located at a height of 5 km from the surface of the earth. The object in located in which part of the atmosphere. **[EAMCET 2006]**
(1) Thermosphere (2) Mesosphere (3) Stratosphere (4) Troposphere

10. The atmospheric gas which can not produce green house effect is : **[WB JEE 07]**
(1) N_2 (2) H_2O (3) CO_2 (4) O_3

11. Identify the wrong statement in the following : **[AIEEE 08]**
(1) Ozone layer does not permit infrared radiation from the sun to reach the earth.
(2) Acid rain is mostly because of oxides of nitrogen and sulphur.
(3) Chlorofluorocarbons are responsible for ozone layer depletion.
(4) Green house effect is responsible for global warming.

12. Green chemistry means such reactions which **[AIPMT 08]**
(1) produce colour during reactions.
(2) reduce the use and production of hazardous chemicals.
(3) are related to the depletion of ozone layer.
(4) study the reactions in plants.

13. The process of 'eutrophication' is due to : **[Kerala PMT 08]**
(1) increase in concentration of insecticide in water.
(2) increase in concentration of fluoride ion in water.
(3) the reduction in concentration of the dissolved oxygen in water due to phosphate pollution.
(4) attack of younger leaves of a plant by peroxyacetyl nitrate.

14. Which of the following is secondary pollutant ? **[DPMT 2008]**
(1) CO_2 (2) N_2O (3) PAN (4) SO_2

15. Which of the following compounds helps in achieving equlibrium between O_2 and CO_2 in atmosphere ? **[EAMCET 2008]**
(1) Chlorophyll (2) Vitamin-12 (3) Porphyrin (4) Ethyl salicylic acid

16. Identify the incorrect statement from the following **[AIEEE 2011]**
(1) Ozone absorb the intense ultraviolet rediation of the sun.
(2) Depletion of ozone layer is because of its chemical reaction with chlorofluro alkanes.
(3) Ozone absorbs infrared radiation
(4) Oxides of nitrozen in the atmosphere can cause the depletion of ozone layer

17. **Assertion (A)** : London smog is produced when carbon soot particles combine with gaseous oxides of sulphur. **[AIIMS 2017]**
Reason (R) : Presence of carbon particles and SO_2 makes it reducing in nature.
(1) If both assertion and reason are true and reason is a correct explanation of assertion.
(2) If both assertion and reason are true but reason is not a correct explanation of assertion.
(3) If assertion is true but reason is false.
(4) If assertion and reason both are false.

18. Which of the following is a sink for CO ? **[NEET-2017]**
(1) Haemoglobin (2) Micro organisms present in the soil.
(3) Oceans (4) Plants

19. The recommended concentration of fluoride ion in drinking water is up to 1 ppm as fluoride ion is required to made teeth enamel harder by converting $[3Ca_3(PO_4)_2 \cdot Ca(OH)_2]$ to : **[AIEEE 2018]**
(1) $[3Ca_3(PO_4)_2 \cdot CaF_2]$ (2) $[3\{Ca(OH)_2\} \cdot CaF_2]$
(3) $[CaF_2]$ (4) $[3(CaF_2) \cdot Ca(OH_2]$

20. Among the following, the one that is not a green house gas is **[NEET-1-2019]**
(1) sulphur dioxide (2) Nitrous oxide (3) methane (4) ozone

Answers

EXERCISE - 1

SECTION (A)

1.	(2)	**2.**	(1)	**3.**	(4)	**4.**	(2)	**5.**	(2)	**6.**	(4)	**7.**	(1)
8.	(4)	**9.**	(1)	**10.**	(2)	**11.**	(3)	**12.**	(2)	**13.**	(4)	**14.**	(4)
15.	(1)	**16.**	(3)	**17.**	(4)	**18.**	(2)	**19.**	(3)	**20.**	(3)	**21.**	(3)
22.	(3)	**23.**	(2)										

SECTION (B)

1.	(4)	**2.**	(1)	**3.**	(1)	**4.**	(1)	**5.**	(2)	**6.**	(1)	**7.**	(1)
8.	(3)	**9.**	(3)	**10.**	(2)	**11.**	(4)	**12.**	(3)	**13.**	(4)	**14.**	(4)
15.	(4)	**16.**	(4)										

EXERCISE - 2

PART-I

1.	(2)	**2.**	(4)	**3.**	(1)	**4.**	(2)	**5.**	(2)	**6.**	(3)	**7.**	(2)
8.	(3)	**9.**	(1)	**10.**	(3)	**11.**	(3)	**12.**	(4)	**13.**	(4)	**14.**	(3)
15.	(3)	**16.**	(1)	**17.**	(1,3,4)	**18.**	(3,4)	**19.**	(1,2,3)	**20.**	(1,3)	**21.**	(1,4)
22.	(1,2,3)	**23.**	(1,2,3)	**24.**	(1,2,3,4)								

PART-II

1.	(4)	**2.**	(4)	**3.**	(4)	**4.**	(4)	**5.**	(4)	**6.**	(4)		

PART-III

1. (1 – p,q) ; (2 – r) ; (3 – p,t) ; (4 – s) **2.** (1 – p) ; (2 – q) ; (3 – r,s,t) ; (4 – p,q)

EXERCISE - 3

1.	(3)	**2.**	(4)	**3.**	(1)	**4.**	(1)	**5.**	(4)	**6.**	(1)	**7.**	(3)
8.	(4)	**9.**	(4)	**10.**	(1)	**11.**	(1)	**12.**	(2)	**13.**	(3)	**14.**	(3)
15.	(1)	**16.**	(3)	**17.**	(1)	**18.**	(2)	**19.**	(1)	**20.**	(1)		