Unit 14

THE ATMOSPHERE

Long Answer Questions

Q.1 What is the role of CO_2 in atmosphere?

Ans. Role of CO_2 in Atmosphere:

The CO_2 forms a layer around the Earth like an envelope. It allows the heat rays of the Sun to pass through it and reaches up to the Earth. These rays are reflected from the Earth surface and go back to upper atmosphere.

Normal concentration of CO_2 layer retains enough heat to keep the atmosphere warm. So, normal concentration of CO_2 is necessary and beneficial for keeping the temperature warm. Otherwise, the Earth would have been uninhabitable. The Earth's average temperature would be about -20°C, rather than presently average temperature 15°C.

Q.2 What are the effects of global warming?

Ans. Effects of Global Warming:

(i) Accumulation of carbon dioxide in air is resulting in increasing atmospheric temperature about 0.05 °C every year.

(ii) It is causing major changes in weather patterns. Extreme weather events are occurring more commonly and intensely than previously.

(iii) It melts glaciers and snow caps that are increasing food risks and intense tropical cyclones.

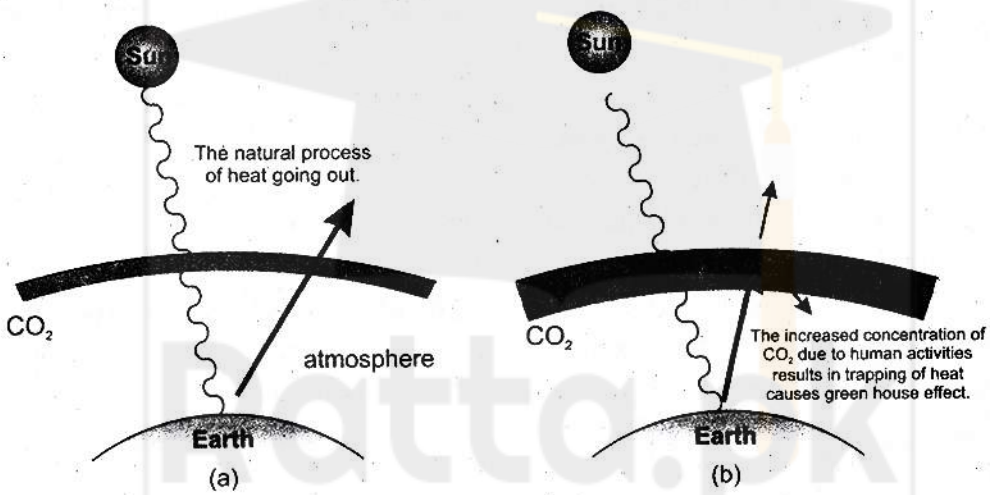
(iv) Sea-level is rising due to which low lying areas are liable to be submerged, turning p2reviously populated areas no longer habitable.

Q.3 Write a note on Green House Effect?

Ans. Green House Effect:

Although CO_2 is not a poisonous gas, yet its increasing concentration due to burning of fossil fuels in different human activities is alarming. Because CO_2 in the atmosphere acts like a glass wall of a green house. It allows UV radiations to pass through it but does not allow the IR radiations to pass through it. It traps some of the infrared radiations emitted by the Earth. Hence, increased concentration of CO_2 layer absorbs the infrared radiations emitted by

the Earth's surface and prevents heat energy escaping from the atmosphere. It helps to stop surface from cooling down during night. As the concentration of CO_2 in air increase, less heat energy is lost from the surface of the Earth. Therefore, the average temperature of the surface gradually increases. This is called greenhouse effect as shown in figure. This effect is proportional to amount of CO_2 in air. Greater is amount of CO_2, more is trapping of heat or warming. Due to increased warming this phenomenon is also called global warming.



Q.4 Is CO an air pollutant? If yes, What are its effect on human health?

Ans. CO is an air pollutant. It is a health hazard being highly poisonous gas. Being colorless and odorless, its presence cannot be noticed easily and readily. When inhaled, it binds with the hemoglobin most strongly than that of oxygen. Thus, hindering the supply of oxygen in body. Exposure to higher concentration of CO causes headache and fatigue. If inhaled for a longer time it results in breathing difficulties and ultimately death. It is the reason burning is not allowed in closed places. It is advised to switch off coal or gas heaters, cooking range, etc., before going to sleep.

Q.5 What should be the role of Government to control pollution?

Ans. Role of Government to Control Pollution:

(i) Quality of Fuel

First of all, quality of fuel must be improved by adding anti-knocking agents in fuels .at the same time, automobiles combustion engines must be efficient so that they should burn the fuel completely. No unburned hydrocarbon molecules (fuel) should come out of the exhaust. So government must guide the people to use converters in auto exhausts.

(ii) Alternative Fuel

Fossil fuel produces a number of air pollutants because of impurities and complex molecule nature of hydrocarbons. Government should promote the use of alternative fuels

such as methanol, ethanol and bio-diesel. These fuels are less polluting than hydrocarbons fuel, as their molecules are simple, and burn completely in the engine. Their burning produces less carbon monoxide, soot and other pollutants.

(iii) Battery-powered Electric Vehicles

The government must plan to avoid using carbon dioxide producing fuels as it is a greenhouse gas. It should go to battery-powered electric vehicles.

Government should provide efficient transport in the big cities, so that people should avoid using their own vehicles.

Q.6 How acid rain is formed? Explain

Ans. Formation of Acid Rain:

The burning of fossil fuels produces oxides of sulphur and nitrogen in air. Rain water converts SO_2 into H_2SO_4 and NO_x to HNO_2 and HNO_3. Normal rain water is weakly acidic because it consists of dissolved CO_2 of the air. Its pH is about 5.6 to 6. But rain water on dissolving air pollutants (acids) becomes more acidic and its pH reduces to 4. Thus, acid rain is formed on dissolving acidic air pollutants such as sulphur dioxide and nitrogen dioxide by rain water.

Q.7 Write harmful effects of acid rain?

Ans. Harmful Effects of Acid Rain:

(i) Effects on Aquatic Life

Acid rain on soil and rocks leaches heavy metals (Al, Hg, Pb, Cr, etc) with it and discharges these metals into rivers and lakes. This water is used by human beings for drinking purpose. These metals accumulate in human body to a toxic level. On the other hand, aquatic life present in lakes also suffers because of high concentration of these metals. Especially high concentration of aluminium metal clogs the fish gills. It causes suffocation and ultimately death of fish.

(ii) Effects on Buildings and Monuments

Acid rain attacks the calcium carbonate present in the marble and limestone of buildings and monuments. Thus, these buildings are getting dull and eroded day by day.

(iii) Effects on Soil

Acid rain increases the acidity of the soil. Many crops and plants cannot grow properly in such soil. It also increases the toxic metals in the soil that poisons the vegetation. Even old trees are being affected due to acidity of soil. Their growth is retarded. They get dry and die.

(iv) Effects on Trees and Plants

Acid rain directly damages the leaves of trees and plants, thus limiting their growth. Depending upon the severity of the damage, plants growth can be hampered.

Q.8 How ozone layer is depleted? Explain

Ans. Depletion of Ozone Layer:

Ozone layer is being depleted through various chemical reactions, such as

(i) The ozone molecule absorbs solar radiations and dissociate readily, i.e., self dissociation of ozone takes place.

(ii) However, chlorofluorocarbons (CFCs) (used as refrigerants in air conditioners and refrigerators) are major cause of depletion of ozone layer. These compounds leak in one way or other escape and diffuse to stratosphere. These ultraviolet radiations break the C-Cl bond in $CFCl_3$ and generates chlorine free radicals as

$$CFCl_3 \xrightarrow{UV} CFCl_2 + Cl$$

These free radicals are very reactive. They react with ozone to form oxygen as

$$O_{3\,(g)} + Cl \longrightarrow O_{2\,(g)} + OCl^{\bullet}$$

$$OCl^{\bullet} \longrightarrow O^{\bullet} + Cl^{\bullet}$$

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

A single chlorine free radical released by the decomposition of CFCs is capable of destroying up to many lacs of ozone molecules. The region in which ozone layer depletes is called ozone hole.

Q.9 What are the after effects of ozone layer depletion?

Ans: Effects of Depletion on Ozone Layer:

Even minor problems of ozone depletion can have major effects.

(i) Depletion of ozone enables ultraviolet radiations of Sun to reach to the Earth, that can cause skin cancer to human beings and other animals.

(ii) Decreased ozone layer will increase infections disease like malaria.

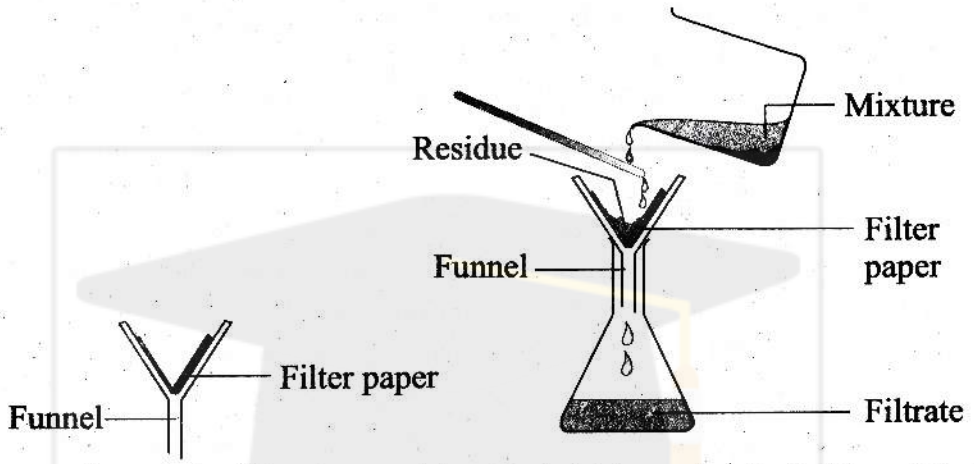
(iii) It can change the life cycle of plants disrupting the food chain.

(iv) It can change the wind patterns, resulting in climatic changes all over the world. Especially, Asia and Pacific will be the most affected regions, facing climate induced migration of people crisis.

Q.10 How the process of filtration is carried out? Explain

Ans: A filter paper is first folded half way, and then another fold is made, so that a filter paper gets four folds. This folded filter paper is placed in a filter funnel in such a way that on one side is three layers and on the other side is one layer as shown in figure.

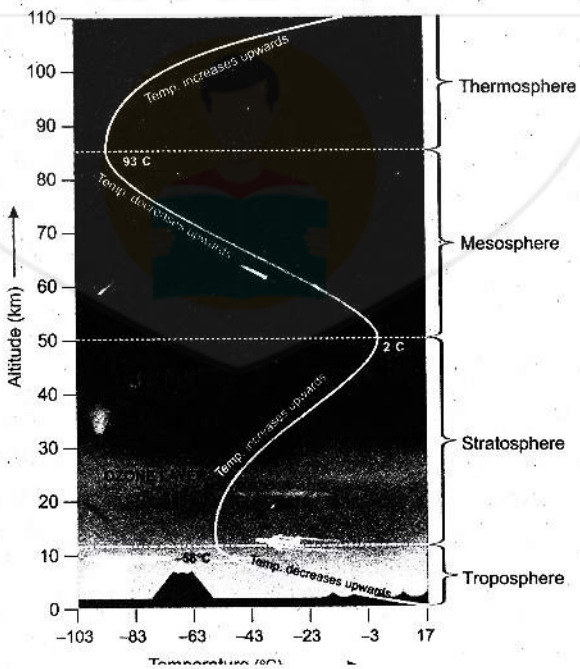
The mixture (sand in water or chalk in water) is poured into the filter paper as shown in figure.



Filtrate passes through the filter paper and is collected in a conical flask. The solid particles (residue) deposit on the filter paper. It is then dried.

Q.11 How atmosphere is divided on the basis of variation in temperature? Explain

Ans: Depending upon the temperature variation, atmosphere is divided into four regions. Temperature decreases form 17°C to -58°C regularly in the lowest layer extending upto 12 km. This layer of atmosphere is called troposphere. Above this layer lies the stratosphere th extends upto 50 km. In this layer temperature rises upto 2°C. Beyond the stratosphere lies t mesosphere, covering upto 85 km. In this region again temperature decreases down to -93°C Beyond 85 km lies the thermosphere in which temperature goes on increasing upwards.



Characteristics of Atmospheric Regions

Name of Region	Height above the Earth Surface	Temperature range and Trend
Troposphere	0 — 12 km	17°C — -58°C (decreases)
Stratosphere	12 — 50 km	-58°C — 2°C (increases)
Mesosphere	50 — 85 km	2°C — -93°C (decreases)
Thermosphere	85 — 120 km	> - 93°C (increases)

Q.12 How ozone is formed in stratosphere? Explain

Ans. Formation of Ozone Layer

This atmospheric region is next to troposphere and extends upto 50 kilometers. In this region, temperature rises gradually upto 2°C. The presence of ozone (due to absorption of radiation) in this region is responsible for the rise of temperature in stratosphere. Within this region, temperature increases as a altitude increases, such as lower layer temperature is about – 58°C and upper layer is about 2°C. Thus, stratosphere is layered in temperature. Since ozone in the upper layer absorbs high energy ultraviolet radiations from the Sun, it breaks down into monoatomic (O) and diatomic oxygen (O_2).

$$O_{3(g)} \longrightarrow O_{2(g)} + O_{(g)}$$

The mid stratosphere has less UV light passing through it. Here O and O_2 recombine to form ozone which is an exothermic reaction. Ozone formation in this region results in formation of ozone layer. Thus, ozone layer exists in mid stratosphere.

$$O_{2(g)} + O \longrightarrow O_{2(g)} + O_{3(g)}$$

The lower stratosphere receives very low UV radiations, thus monoatomic oxygen is not found here and ozone is not formed here.

Q.13 Write a note on troposphere?

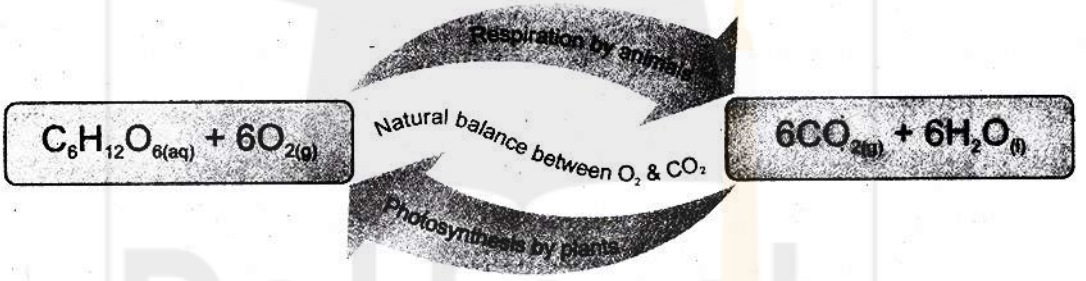
Ans. Troposphere

The major constituents of troposphere are nitrogen and oxygen gases. These two gases comprise 99% by volume of the Earth's atmosphere.

Although concentration of carbon dioxide and water vapours is negligible in atmosphere, yet they play a significant role in maintaining temperature of the atmosphere. Both of these gases allow visible light to pass through but absorb infrared radiations emitted by the Earth's surface. Therefore, these gases absorb much of the outgoing radiations and warm the atmosphere. As the concentration of gases decreases gradually with the increases of altitude, correspondingly temperature also decreases at a rate of 6K per kilometer. This is the region where all weathers occur. Almost all aircrafts fly in this region.

Q.14 Is CO_2 an air pollutant? How a natural balance exists between CO_2 and O_2 in atmosphere.

Ans. CO_2 is not an air pollutant. Rather, it is an essential gas for plants as O_2 is essential for animals. Plants consume CO_2 in photosynthesis process and produce O_2. While animals use O_2 in respiration and give out CO_2. In this way, a natural balance exists between these essential gases as represented here. But this balance is being disturbed by emitting more and more CO_2 in air through different human activities.



Short Answer Questions

Q.1 What is meant by atmosphere?

Ans. Atmosphere is the envelope of different gases around the Earth. It extends continuously from the Earth's surface outwards without any boundary. About 99% of atmospheric mass lies within 30 kilometers of the surface and 75% lies within the lowest 11 kilometers.

Q.2 Write composition of dry air.

Ans.

Gas	% by Volume
Nitrogen	78.09
Oxygen	20.94
Argon	0.93
Carbon dioxide	0.03

Q.3 What is the difference between primary and secondary pollution.

Ans. Primary pollutants are the waste or exhaust products driven out because of combustion of fossil fuels and organic matter. These are the oxides of sulphur (SO_2 and SO_3); oxides of

carbon (CO_2 and CO); oxides of nitrogen (specially nitric oxide NO); hydrocarbon (CH_4); ammonia and compounds of fluorine.

Secondary pollutants are produced by various reactions of primary pollutants. These are sulphuric acid, nitric acid, hydrofluoric acid, ozone and peroxy acetyl nitrate (PAN)

Q.4 What are the sources of CO_2 and CO?

Ans.

(a) Both of these gases are emitted due to volcanic eruption and decomposition of organic matter naturally.

(b) The major source for the emission of these gases is combustion of fossil fuels (coal, petroleum and natural gas). Fossil fuels burnt in combustion engine of any type of automobile, kiln of any industry, or open air fires emit CO_2 and CO.

(c) Forest fires and burning of wood also emit CO_2 and CO. Especially, when supply of oxygen is limited, emission of CO dominates.

Q.5 Why converters should be used in automobile exhausts?

Ans. Converters should be used in automobile exhaust so that they convert CO to CO_2 and oxides of nitrogen NO to N_2 before it enters in air.

Q6. Write importance of CO_2 to life on earth.

Ans. CO_2 is the 'life gas' for plants. CO_2 absorbs infrared radiations emitted by the Earth. Although CO_2 is negligible as compared to N_2 and O_2, yet its heat retaining capacity is tremendous. Without CO_2 life on earth would have been impossible.

Q7. Write occurrence of sulphur compounds in the atmosphere.

Ans. Naturally occurring sulphur containing compounds are emitted in the bacterial decay of organic matter, in volcanic gases and forest fires. But the concentration of sulphur containing compounds in the atmosphere because of natural sources is very small as compared to the concentration of those compounds emitted by fossil fuel combustion in automobiles and industrial units. About 80% of the total SO_2 is released by the combustion of coal and petroleum products.

Q.8 How SO_2 and SO_3 are formed? How these gases cause air pollution?

Ans. Fossil fuels contain Sulphur → Fossil fuels are burned to produce energy → The sulphur in the fuel forms oxides of sulphur. SO_2 and SO_3 → Oxides of sulphur escape into the air. They are air pollutants → Oxides of sulphur dissolve in water and form Acid Rain. That falls on the earth.

Q.9 What are the effects of SO_2 gas? Also writes its properties / characteristics.

Ans. It cause suffocation, irritation SO_2 forms sulphuric acid which damages buildings and vegetations. SO_2 is a colourless gas having irritating smell.

Q.10 How to control pollution because of sulphur?

Ans. To control pollution because of SO_2. It is necessary to remove sulphur from fossil fuels before they are burnt.

Q.11 How nitric oxide is produced in air?

Ans. naturally occurring oxides of nitrogen, mainly nitric oxide (NO), is produced by the electrical lightening in air.

Q12. How nitric oxide is produced by the combustion of fossil fuels?

Ans. Combustion of fossil fuels in internal combustion engine in thermal power stations and factories where huge amount of coal is burnt, NO is formed by the direct combination of nitrogen and oxygen.

$$N_{2(g)} + O_{2(g)} \longrightarrow 2NO_{(g)}$$

Q.13 How nitric oxide reacts with oxygen?

Ans. Nitric oxide quickly reacts with air to form nitrogen dioxide. NO is highly toxic gas.

$$2NO_{(g)} + O_{2(g)} \longrightarrow 2NO_{2(g)}$$

Q.14 How NO and NO_2 are formed? How these gases causes air pollution.

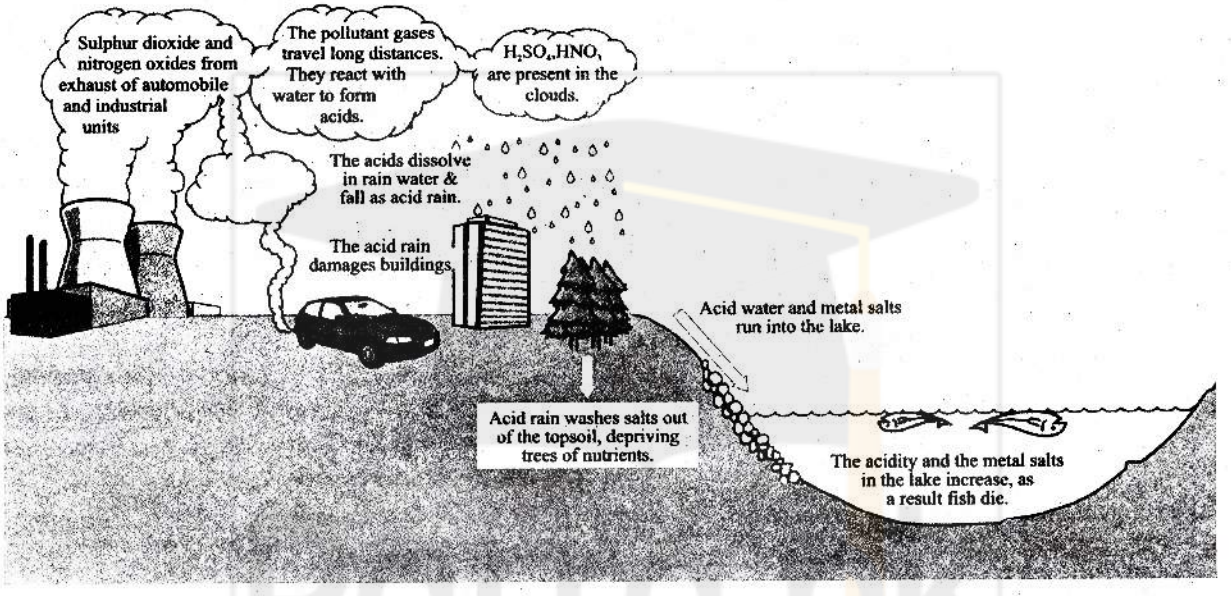
Ans. Nitrogen in the air is normally un-reactive → At high temperature it reacts with oxygen to form oxides of nitrogen. NO & NO_2 → These gases escape into the air. They are pollutants → Oxides of nitrogen dissolve in water and form Acid Rain. That falls on the earth.

Q.15 How the mixture of NO and NO_2 gases are represented? Write their effects.

Ans. Mixture of these gases represented as NO_x enter in the air through automobile exhaust and chimneys of thermal power station and factories. It irritates breathing passage. These oxide form nitric acid combining with water vapours in air. Nitric acid is a component of acid rain which damage soil, animals, plants and aquatic life.

Q.16 Sketch the labeled diagram showing the formation of acid rain and its effect

Ans:



Q.17 What is meant by ozone? How it is formed in atmosphere?

Ans. Ozone is an allotropic form of oxygen consisting of three oxygen atoms. It is formed in atmosphere by the association of an oxygen atom with an oxygen molecule in the mid of stratosphere.

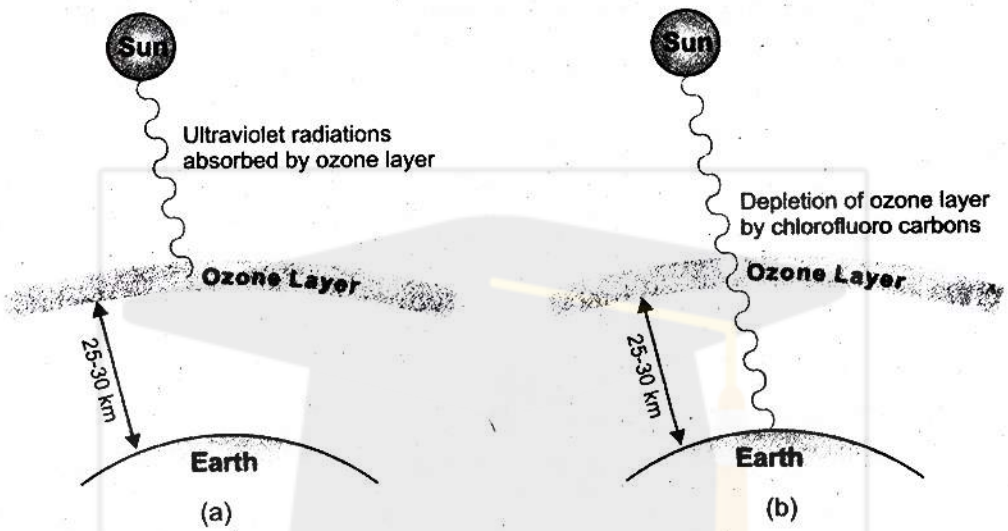
$$O_{(g)} + O_{2(g)} \longrightarrow O_{3(g)}$$

Q.18 What is meant by Ozone? Where ozone layers exist in atmosphere?

Ans. Ozone is an allotropic form of oxygen. It is represented by O_3. Ozone is present throughout the atmosphere. But its maximum concentration called ozone layer lies in stratosphere region about 25 to 30 km away from the Earth's surface.

Q.19 How ozone layer protects our earth?

Ans. Ozone layer surrounds the globe and protects Earth like a shield from harmful ultraviolet radiation of sunlight as shown in figure otherwise, ultraviolet radiations would cause skin cancer. Thus ozone layer is stratosphere is beneficial for life on Earth.



Q.20 How the concentration of ozone in stratosphere remains nearly constant?

Ans. Under normal condition ozone concentration in stratosphere remains nearly constant through a series of complex atmospheric reactions. Two reactions that maintain a balance in ozone concentration are as follows:

$$O_{2(g)} + O_{(g)} \longrightarrow O_{3(g)} \quad \text{(formation)}$$

$$O_{3(g)} + O_{(g)} \longrightarrow 2O_{2(g)} \quad \text{(decomposition)}$$

Q.21 What is meant by incineration?

Ans. Incineration is a waste treatment process that involves the burning of solid waste at high temperature between 650°C to 1100°C in incinerators.

Q.22 What is the function of incinerator?

Ans. Incinerators reduce the solid mass of the original waste by 80-85% and convert the waste materials into ash, flue gas and heat. Although, the volume of solid waste is reduced effectively by incineration, it produces highly poisonous gases and toxic ash.

Q23. Write composition of flue gas.

Ans. The flue gas includes dioxins, furans, sulphur dioxide, carbon dioxide, carbon monoxide, hydrochloric acid and a large amount of particulate matter.

Q.24 What is meant by filtration?

Ans. Filtration is separation of insoluble solid particles (sand, clay, dust or precipitates) from a liquid. It is carried out by filtering a mixture.

Q.25 What is the difference between pollutant and contaminants?

Ans. The pollutants are those substances which cause pollution. While contaminants are those substance that make something impure.

Q26. What is meant by air pollution? Write its effects.

Ans. The harmful substances present in air are called air pollutants. Even a beneficial substance beyond a specific concentration may be harmful. Air pollutants change the weather, badly affects the human health, damage the plants and destroy buildings.

Q.27 What do you mean by atmosphere?

Ans Our planet Earth has four natural systems; lithosphere, hydrosphere, atmosphere, and biosphere. So, atmosphere is the natural system of our planet Earth. It can be defined as Atmosphere is the envelope of different gases around the Earth. It extends continuously from the Earth's surface outwards without any boundary.

Q.28 What is difference between atmosphere and environment?

Ans.

Atmosphere	Environment
1. Atmosphere is the envelope of different gases around the Earth	1. Environment is the sum of all social, biological, physical and chemical factors which constitutes the surroundings of man.
2. It consists of four layers i.e., troposphere, stratosphere, mesosphere, thermosphere.	2. It consists of air, water, food and sunlight.

Q.29 Name the major constituents of atmosphere is maintained?

Ans. The major constituents of troposphere are as follows:

(a) Nitrogen (b) Oxygen

These two gases comprises 99% by volume of the Earth's atmosphere.

Q.30 How the temperature of atmosphere is maintained?

Ans. CO_2 and water vapours are present in atmosphere. Yet these are in low concentration but play an important role in maintaining temperature of atmosphere. Because both these gases allow visible light to pass through but absorb infrared radiations emitted by the Earth's surface. So, temperature of atmosphere is maintained.

Q.31 Where the ozone layer exists?

Ans. Ozone layer exist in mid stratosphere.

Q.32 Why the temperature of upper stratosphere is higher?

Ans. Because ozone in the upper layer absorbs high, energy ultraviolet radiations from the sun, it raises the temperature of stratosphere. That is the reason temperature of upper stratosphere is higher.

Q.33 What do you meant by an air pollutant?

Ans. The harmful substances present in air are called air pollutants.

For example: Carbon monoxide CO

Q.34 Name three primary air pollutants.

Ans. (i) Hydrocarbon (CH_4) (ii) Ammonia (NH_3) (iii) Oxides of nitrogen (NO_x)

Q.35 Identify as primary or secondary air pollutant SO_2, CH_4, HNO_3, NH_3, H_2SO_4, O_3

Ans.

Primary Pollutant	Secondary Pollutant
NH_3	HNO_3
CH_4	H_2SO_4
SO_2	Ozone

Q.36 Why CO_2 is called a greenhouse gas?

Ans. Carbon dioxide is called as a greenhouse gas because it forms a layer around the Earth like an envelope. It allows the heat rays of the sun to pass through it and reaches upto the Earth but does not allow the IR radiations to pass through. So, it acts like a glass and also called as a greenhouse gas.

Q.37 Why the flood risks are increasing.

Ans. CO is an air pollutant. It is a health hazard being highly poisonous gas. Being colorless and odourless, it presence cannot be noticed easily and readily. When inhaled, it binds with the hemoglobin most strongly than that of oxygen. Thus hindering the supply of oxygen in body. Exposure to higher concentration of CO causes headache and fatigue. If inhaled for a longer time it results in breathing difficulties and ultimately death. It is the reason burning is not allowed in closed places, it is advised to switch off coal or gas heaters, cooking range, etc., before going to sleep.

Q.38 How sulphur containing compounds are emitted naturally?

Ans. Naturally occurring sulphur containing compounds are emitted in the bacterial decay of organic matter, in volcanic gases any forest fires.

Q.39 How combustion of fossil fuels in internal combustion engine produces oxides of nitrogen.

Ans. Combustion of fossil fuels in internal combustion engines, in thermal power stations and factories where huge amount of coal is burnt, NO is formed by the direct combination of nitrogen and oxygen.

$$N_{2(g)} + O_2 \longrightarrow 2NO_{(g)}$$

Q.40 How acid rain is produced?

Ans. Acid rain means presence of excessive acids in rain water. This rain is produced when normal rain water dissolved oxides of sulphur and nitrogen in air. Rain water converts SO_2 into H_2SO_4 and NO to HNO_2 and HNO_3. These acids reduces the pH of rain water upto 4. Thus acid rain formed on dissolving acidic air pollutant such as SO_2 and NO_2 in rain water.

Q.41 Why acid rain damages buildings?

Ans. Acid rain attacks the calcium carbonate present in the marble and limestone of buildings and monuments. Thus, these buildings are getting dull and eroded day by day.

Q.42 How aquatic life is affected by acid rain?

Ans. Water Pollution: Acid rain on soil and rocks leaches heavy metals (Al, Hg, Pb, Cr, etc.) with, it and discharges these metals into rivers and lakes. This water is used by human beings for drinking purpose. These metals accumulate in human body to a toxic level. On the other hand, aquatic life present in lakes also suffers because of high concentration of these metals. Especially high concentration of aluminium metal clogs the fish gills. It causes suffocation and ultimately death of fish.

Q.43 Why plants are dying day by day? Comment.

Ans. Damages Leaves of Trees and Plants: Acid rain directly damages the leaves of trees and plants, thus limiting their growth. Depending upon the severity of the damage, plants growth can be hampered. Plants ability to bear cold or diseases reduce to get it die.

Q.44 Justify, ozone is beneficial for human beings.

Ans. Ozone is present throughout the atmosphere. But is maximum concentration called ozone layer lies in stratosphere region about 25 to 30 km away from the Earth's surface. This layer surrounds the globe and protects Earth like a shield from harmful ultraviolet radiations of sunlight. Otherwise ultraviolet radiations would cause skin cancer. Thus ozone layer in stratosphere is beneficial for life on the earth.

Q.45 Why ozone is depleting in atmosphere?

Ans. Cause of Depletion of Ozone Layer:

The ozone layer is being depleted through various chemical reactions, such as:

(a) The ozone molecule absorbs solar radiations and dissociates readily, i.e., self-dissociation of ozone takes place.

(b) However, chlorofluorocarbons (CFCs) (under as refrigerants in air conditioners and refrigerators) are major cause of depletion of ozone layer. These compounds leak in one way or other escape and diffuse to stratosphere. These ultraviolet radiations break the C-Cl bond in $CFCl_3$ and generates chlorine free radicals as;

$$CFCl_3 \xrightarrow{UV} CFCl_2 + Cl^{\cdot}$$

These free radicals are very reactive. They react with ozone to form oxygen as

$$O_{3(g)} + Cl \longrightarrow O_{2(g)} + OCl^{\bullet}$$

$$OCl^{\cdot} \longrightarrow O^{\cdot} + Cl^{\bullet}$$

$$O^{\cdot} + O^{\cdot} \longrightarrow O_2$$

A single chlorine free radical released by the decomposition of CFCs is capable of destroying upto many lacs of ozone molecules. The region in which ozone layer depletes is called ozone hole.

Q.46 What do you mean by ozone hole?

Ans. The region in which ozone layer depletes is called ozone hole. A single chlorine free radical released by the decomposition of CFCs is capable of destroying upto many lacs of ozone molecules.

Q.47 Where the ozone layer is found?

Ans. Ozone layer lies in stratosphere region and formed by the associates of an oxygen atom with an oxygen molecule in the mid of stratosphere.

$$O_{(g)} + O_{2(g)} \longrightarrow O_{3(g)}$$

Multiple Choice Questions

1. About 99% atmosphere's mass lies within:

(a) 30 kilometre
(b) 35 kilometre
(c) 15 kilometre
(d) 11 kilometre

2. Depending upon temperature variation, atmosphere is divided into how many regions?

(a) one (b) two
(c) three (d) four

3. Just above the Earth's surface is

(a) mesosphere (b) stratosphere
(c) thermosphere (d) troposphere

4. A group of gases that maintains temperature of atmosphere is

(a) carbon dioxide and water vapours
(b) nitrogen and carbon dioxide
(c) thermosphere
(d) troposphere

5. The Earth's atmosphere is getting hotter because of

(a) increasing concentration of CO
(b) increasing concentration of CO_2
(c) increasing concentration of O_3
(d) increasing concentration of SO_2

6. Which one of the followings is not a greenhouse Effect?

(a) increasing atmosphere temperature
(b) increasing food chains
(c) increasing flood risks
(d) increasing sea-level

7. Normally rain water is weakly acidic because of

(a) SO_3 gas (b) CO_2 gas
(c) SO_2 gas (d) NO_2 gas

8. Buildings are being damaged by acid rain because it attacks

(a) calcium sulphate
(b) calcium nitrate
(c) calcium carbonate
(d) calcium oxalate

9. Acid rain affects the aquatic life by clogging fish gills because of:

(a) lead metal
(b) chromium metal
(c) mercury metal
(d) aluminium metal

10. Ozone is beneficial for us as it

(a) absorbs infrared radiation
(b) absorbs ultraviolet radiations
(c) absorbs chlorofluorocarbons
(d) absorbs air pollutant

11. Which one of the following is not an air pollutants?

(a) nitrogen
(b) carbon monoxide
(c) nitrogen dioxide
(d) ozone

12. Iron and steel structure are damaged by

(a) carbon monoxide
(b) sulphur dioxide
(c) methane
(d) carbon dioxide

13. Infrared radiations emitted by the Earth are absorbed by

(a) CO_2 and H_2O
(b) N_2 and O_2
(c) CO_2 and N_2
(d) O_2 and CO_2

14. Global warming causes rising of the sea level. The cause of global warming is

(a) CO_2 gas (b) SO_2 gas
(c) NO_x gases (d) O_3 gases

15. Which gas protects the Earth's surface from ultraviolet radiations?

(a) CO_2 (b) CO
(c) N_2 (d) O_3

16. Effects of ozone depletion are following except the one

(a) increases infectious diseases
(b) increases crops production
(c) can cause skin cancer
(d) can cause climatic changes

17. Which one of these pollutants are not found in car exhaust fumes?

(a) CO (b) O_3
(c) NO_2 (d) SO_2

18. The process by which atmospheric nitrogen is turned into nitrates in the soil is called

(a) nitration (b) fixing
(c) oxidation (d) reduction

19. Global warming is because of

(a) absorption of infrared radiation emitted by earth surface
(b) absorption of infrared radiations coming from sun.
(c) absorption of ultraviolet coming from the sun.
(d) emission of ultraviolet radiation from the earth's surface.

20. Carbon monoxide is harmful to us because

(a) it paralyses the lungs
(b) it damages lungs tissues
(c) it reduces oxygen carrying ability of haemoglobin
(d) it makes the blood coagulate.

21. Earth has natural systems

(a) One (b) two
(c) Three (d) Four

22. Atmosphere has regions

(a) One (b) two
(c) Three (d) four

23. The envelope of different gases around the earth is called

(a) Atmosphere (b) brosphere
(c) Lithosphere (d) hydrosphere

24. The percentage by volume of nitrogen in dry gas is

(a) 78.09% (b) 20.94%
(c) 0.93% (d) 0.03%

25. the percentage of sunlight absorbed by atmospheric gases is

(a) 2% (b) 10%
(c) 18% (d) 25%

26. Atmospheric region found between 50-85 km from the earth is

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

27. Mesosphere has a temperature range

(a) 17^0C-58^0C (b) 58^0C-2^0C
(c) 2^0C-93^0C (d) -93^0C

28. Which gas is the major constituent of troposphere?

(a) Nitrogen (b) Oxygen
(c) Hydrogen (d) both a and b

29. Which gas is responsible in warming the atmosphere?

(a) Nitrogen (b) hydrogen
(c) Helium (d) Fluorine

30. At which region all weather occurs?

(a) Troposphere (b) Stratosphere
(c) Mesosphere (d) thermosphere

31. Almost all air crafts fly in which region?

(a) Troposphere (b) stratosphere
(c) Mesosphere (d) thermosphere

32. Major portion of ozone layer is found in

(a) troposphere (b) Stratosphere
(c) Mesosphere (d) thermosphere

33. The region of ozone decomposition in stratosphere is

(a) 20km (b) 30 km
(c) 40 km (d) 50 km

34. The recombination of O and O_2 in mid stratosphere is an

(a) Exotherimic reaction
(b) Endothemic reaction
(c) heat absorbing process
(d) None of these

35. The percentage of SO_2 released by the combustion of coal and petroleum product

(a) 40% (b) 60%
(c) 70% (d) 80%

36. Which is not a character of SO_2

(a) It is a colourless gas
(b) It has irritating smell
(c) It causes suffocation
(d) It do not form sulphuric acid

37. Which gas is produce by the electrical lightening of air

(a) NO (b) SO_2
(c) SO_3 (d) CO_2

38. Which of the following can be used as a fuel?

(a) Methanol (b) Ethanol
(c) bio-diesel (d) all of them

39. The pH of water containing CO_2 is

(a) 4-6 (b) 5.6-6
(c) 6-7 (d) 7-8

40. The PH of acid rain is

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

41. High concentration of which metal clogs the fish gills.

(a) Zinc (b) Aluminium
(c) Sodium (d) copper

42. Ozone is an allotropic form of

(a) Carbon (b) oxygen
(c) Sulphur (d) Phosphorous

43. Ultraviolet radiations can causes

(a) Hepatitis (b) Asthma
(c) Skin cancer
(d) Night Blindness

44. Which gas is in involved in ozone depletion?

(a) nitrogen (b) CFC's
(c) chlorine (d) all of them

45. The region in which ozone layer depletes is called

(a) Ozone hole (b) black hole
(c) both of them (d) None of them

46. Ozone depletion was first noticed is

(a) 1970 s (b) 1980 s
(c) 1990 s (d) 1960 s

47. Which is not an air pollutant?

(a) CO_2 (b) SO_2
(c) CO (d) NH_3

48. The gas used by plants to perform photosynthesis.

(a) O_2 (b) CO_2
(c) N_2 (d) CO

49. The gas used by animals to perform respiration

(a) O_2 (b) N_2
(c) SO_2 (d) Cl_2

50. Which is not a poisonous gas?

(a) Ozone (b) Chlorine
(c) Carbon dioxide (d) all of them

51. Which gas acts as a glass wall of a green house?

(a) Oxygen (b) Carbon dioxides
(c) Sulphur dioxide (d) hydrogen

52. By the increase in the concentration of CO_2 in air,

(a) decrease in heat energy
(b) increase in heat energy

(c) heat energy remains same
(d) None of them

53. The green house effect is proportional to the amount of which gas in air?
(a) CO_2 (b) O_2
(c) N_2 (d) All of them

54. Which is the major effect of global warming?
(a) Increase in temperature
(b) Rise in sea level
(c) Melting of glaciers
(d) All of them

55. Higher concentration of CO causes
(a) fatigue (b) headache
(c) Both of them (d) None of them

56. Catalytic converters convert
(a) CO to CO_2 (b) N_2 to NO
(c) CO_2 to CO (d) N_2 to NO_2

57. Which gas is also known as life gas for plants
(a) CO (b) O_2
(c) CO_2 (d) NO_2

58. In the bacterial decay, the compounds of which element are emitted
(a) Sulphur (b) Carbon
(c) Nitrogen (d) All of them

59. Ozone layer is not found in
(a) Upper Stratosphere
(b) Mid Stratosphere
(c) Lower Stratosphere
(d) All of them

60. A pollutant is a waste material that pollutes
(a) Air (b) Water
(c) Soil (d) All of them

61. Which factor determines the severity of a pollutant?
(a) Chemical nature (b) concentration
(c) Persistence (d) All of them

62. Which pollutant is responsible for changing weather?
(a) Air pollutant (b) Water pollutant
(c) Soil pollutant (d) all of them

63. Ozone has a smell
(a) bitter (b) Rotten egg
(c) Sweat (d) None of them

64. Which of the following is a poisonous gas
(a) oxygen (b) Ozone
(c) Nitrogen (d) Carbon dioxide

65. The waste products driven out because of the combustion of fossil fuels
(a) Primary pollutant
(b) Secondary pollutant
(c) Tertiary Pollutant
(d) None of them

66. The smell of photocopies machine is due to the presence of
(a) Chlorine gas (b) neon gas
(c) helium gas (d) ozone gas

67. PAN strands for
(a) Poly aniline nitrate
(b) peroxy acetyl nitrate
(c) poly acetyl nitrite
(d) Peroxy acetyl nitrite

68. Which of the following is a secondary pollutant
(a) CO_2 (b) CO
(c) SO_3 (d) HF

69. 99% of atmosphere consists of
(a) N_2 and H_2
(b) N_2 and O_2

(c) N_2 and CO_2
(d) O_2 and CO_2

70. Which gas is emitted due to volcanic eruption?
(a) CO_2 (b) SO_2
(c) NO_2 (d) H_2

71. Fossil fuel means
(a) Coal (b) Petroleum
(c) Natural gas (d) All of them

72. Forest fires and burning of wood emit
(a) CO_2 (b) NO_2
(c) SO_2 (d) Cl_2

73. The range of temperature in burning solid waste burning in incinerators is
(a) 650^0-1000^0C (b) 650^0C to 1100^0C
(c) 1000^0-2000^0C (d) 5000C to 1000^0C

74. Incinerator reduces solid waste into
(a) Ash (b) flue gas
(c) heat (d) all of them

75. Which is not a part of flue gas?
(a) Furans (b) Dioxins
(c) HCl (d) H_2SO_4

76. Thermosphere lies beyond
(a) Stratosphere (b) Troposphere
(c) Mesosphere (d) Biosphere

77. The solid particle deposit on the filter paper during filtration is called
(a) Precipitates (b) Residue
(c) Crystals (d) All of them

Answer Key

1	a	2	d	3	d	4	a	5	b
6	b	7	b	8	c	9	d	10	b
11	d	12	b	13	d	14	a	15	d
16	b	17	b	18	a	19	c	20	c
21	d	22	d	23	a	24	a	25	c
26	c	27	c	28	d	29	a	30	a
31	a	32	b	33	c	34	a	35	d
36	d	37	a	38	d	39	b	40	c
41	b	42	b	43	c	44	b	45	a
46	b	47	a	48	b	49	a	50	c
51	b	52	b	53	a	54	d	55	c
56	a	57	c	58	a	59	c	60	d
61	d	62	a	63	a	64	b	65	a
66	d	67	b	68	d	69	b	70	a
71	d	72	a	73	b	74	d	75	d
76	c	77	b						