

# CHEMISTRY

**Class 10th (KPK)**

NAME: \_\_\_\_\_

F.NAME: \_\_\_\_\_

CLASS: \_\_\_\_\_ SECTION: \_\_\_\_\_

ROLL #: \_\_\_\_\_ SUBJECT: \_\_\_\_\_

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## CHAPTER 14

### ENVIRONMENTAL CHEMISTRY

**Q1: How ozone layer is depleted in the atmosphere?**

**Ans: Ozone layer depletion:**

Ozone is present in the stratosphere layer helps to absorb ultraviolet ray. When ozone-depleting substances such as chlorofluorocarbons (CFCs), Hydrochlorofluorocarbons (HCFCs) and volatile organic compounds go to the stratosphere layer, they react with UV-rays. This reaction breaks down the depleting substances and releases the free Cl atom. This free Cl atom reacts with ozone gas and depletes the ozone layer.

**Q2: Differentiate between primary and secondary pollutant. Write the name and sources of greenhouse gases to atmosphere.**

| : Primary pollutant  | Secondary pollutant   |
|--|---|
| Primary pollutant is an air pollutant which is released directly into air.                               | Secondary pollutant is not produced directly. Secondary pollutants are formed from primary pollutants.  |
| <b>Example:</b><br>The gases like SO <sub>2</sub> released from burning fossil fuel. Carbon, Ammonia etc | <b>Example:</b><br>Photochemical oxidants, secondary particulate matter   |
| The products which escape from the chimney of industrial unit. Exhaust of automobiles.                   | Acid rain, like SO <sub>2</sub> mix with water in atmosphere and cause acid rain.<br>Nitrogen oxide and hydrocarbon react with sunlight cause ozone |

**Greenhouse gases name:**

The greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide and ozone.

**Sources:** The main sources of greenhouse effect are human activities. The main human sources of greenhouse gas emissions are, fossil fuel, Deforestation, intensive livestock farming, use of synthetic fertilizers and industrial processes, natural processes like animal and plant respiration.

**Q3. Define Environmental Chemistry and atmosphere.**

**Ans: Environmental Chemistry:**

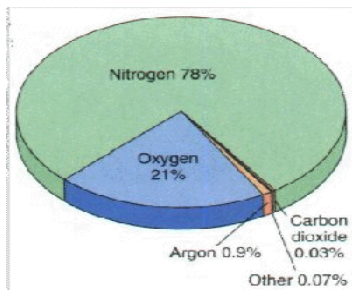
The branch of chemistry which deals with the study of environment and the changes occurring in it, is called environmental system.

**Atmosphere:** the thick protective blanket of air or gases around the earth, which helps to sustain life, is called atmosphere.

**Composition:** The major constituents of atmosphere are N<sub>2</sub> and O<sub>2</sub>. Its minor constituents are CO<sub>2</sub>, Noble gases and some trace gases.

**Q4. Sketch and briefly discuss the composition of atmosphere, by mentioning the percentage of each component.**

**Ans: Sketch of atmosphere:**



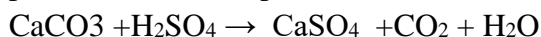
**Percentage of each component:**

| Element               | Chemical Formula      | Percentage       |
|-----------------------|-----------------------|------------------|
| <b>Nitrogen</b>       | <b>N<sub>2</sub></b>  | <b>78.084</b>    |
| <b>Oxygen</b>         | <b>O<sub>2</sub></b>  | <b>20.95</b>     |
| <b>Argon</b>          | <b>Ar</b>             | <b>0.93</b>      |
| <b>Water</b>          | <b>H<sub>2</sub>O</b> | <b>0.0 - 0.4</b> |
| <b>Carbon dioxide</b> | <b>CO<sub>2</sub></b> | <b>0.00397</b>   |
| <b>Neon</b>           | <b>Ne</b>             | <b>0.0018</b>    |
| <b>Helium</b>         | <b>He</b>             | <b>0.000524</b>  |
| <b>Ozone</b>          | <b>O<sub>3</sub></b>  | <b>0.00006</b>   |
| <b>Krypton</b>        | <b>Kr</b>             | <b>0.000114</b>  |
| <b>Hydrogen</b>       | <b>H<sub>2</sub></b>  | <b>0.01</b>      |

**Q5. How the acid rain effect the building material or statues?**

**Ans: Acid rain:** The rain having PH less than 5.6 is called acid rain.

**Effect of acid rain on building materials:** Acid rain damages building material such as steel, paint, plastic, cement sculptural work, material especially of marble and limestone.



The calcium sulphate is soluble in water and washed away with rain water.

The historical statues in Greece and Italy and The Taj Mahal in India were damaged due to acidic rain.

**Q6: Increase in concentration of CO<sub>2</sub> cause greenhouse effect, justify it.**

**Ans:** As we know that CO<sub>2</sub> is produced by burning fuels like oil, natural gas, diesel and organic petroleum. CO<sub>2</sub> is released to the atmosphere where it remains for many years. This leads to an increasing concentration of CO<sub>2</sub> in our atmosphere. Which in turn causes average temperature on earth to rise. The CO<sub>2</sub> is greenhouse gas which emission causes global warming.



**Q7: Briefly discuss how the acid rain affect the aquatic life.**

**Ans: Effect of Acid rain on aquatic life:**

The rain which PH is less than 5.6 is called acid rain. The aquatic life like fish, plants and microorganism are very sensitive to acidity .i.e. at PH-5, most fish eggs cannot hatch. Some adult fish die. If fish or animal survive in acidic water but food they eat might not be available as food. i.e., frog can tolerate the condition at around PH-4 but mayflies the food of frog are more sensitive and not survive below PH-5.6.

**Q8: List the sources which produce CO and CO<sub>2</sub> to the atmosphere.**

**Ans:** The following are sources which produced CO and CO<sub>2</sub> to atmosphere.

**CO: Natural sources:** CO is one of the gaseous pollutant .its natural sources are Volcanic eruption, Natural gas emission and forest fires.

**Anthropogenic sources:** Most of carbon monoxide released to atmosphere by human activities. Automobile release 75% of CO to the environment. Besides this incomplete combustion of fossil fuels, smoking, forest fires and steel industries are the main sources of carb on monoxide.

**Sources of CO<sub>2</sub>:**

the main sources of carbon dioxide gas emission are our everyday activities such Cooking and baking etc. vehicle and industrial emission, petroleum production and thermal power plant are also the source of CO.

**Q9: what are the adverse effects of global warming?**

**Ans: Global Warming:** The gradual increase in the average temperature of the earth due to emission of greenhouse gases is called global warming

**Effect of Global warming:**

Global warming is a phenomenon of climate change characterized by general increase in average temperature. It is adversely effecting sea level, ozone layer, crop yield, precipitation (rain and snow fall) and health.

Global warming is harming the environment in several ways include

**Desertification** increase in temperature around the world changes the water cycle and rainfall patterns which causes desertification of certain areas.

**Increases melting of ice and snow:**

Snow and ice are melting at a faster pace due to increase in temperature.

**Sea level rise:**

Increase in temperature cause ocean waters to expand on other hand glaciers and ice are melting due to rise in temperature which rise the sea level.

**Strong storms and cyclone:**

Rise of temperature also increase the frequency of strong cyclone and strong storms

**Q10:What is the importance of ozone?**

**Ans: Ozone :** Ozone is an allotropic form of oxygen, consisting of three chemically bonded oxygen atoms

**Importance of ozone:**

The ozone acts as a protective layer in the atmosphere. it save earth and living thing from harmful UV rays from sun.it also helps to remove the pollutant from the surface of the earth.



## Long questions

### Q1: Sketch and identify the different layer of atmosphere.

#### A: Definition:

The layer of gases surrounding the earth is called atmosphere. It extends up to about 500km from the earth's surface.

#### Layers of Atmosphere:

The atmosphere is divided into four layers based on the variation in temperature in each layer.

#### (i) Troposphere

#### (ii) Stratosphere

#### (iii) Mesosphere

#### (iv) Thermosphere / Ionosphere

#### Troposphere :

The first layer of the atmosphere which is closest to Earth's surface is called troposphere. We live in this layer. It contains approximately 75% of atmosphere mass and 99% of total mass of water vapor aerosol.

#### Characteristics of Troposphere :

The few characteristics of Troposphere are given below:

##### a. Height:

The average height of this layer from the earth's surface is about 11km. Its height depends upon the latitude and season and pressure. It is lowest over the poles and highest at equator and by season it is lower in winter and higher in summer. The pressure, moisture content, density of air also decrease with height.

##### b. Main components:

The major components of this layer are N<sub>2</sub>, O<sub>2</sub>, and water vapours. 70 to 75% of the atmosphere gases are present in this layer. Dust, particles are also present here.

#### phenomenon occurring in Troposphere:

All the weather phenomenon like cloud formation, winds, rainfall, snowfall takes place in this layer.

#### Lapse rate:

The change in temperature of atmosphere with increase in height is called lapse rate. It may be positive or negative.

##### Positive lapse rate:

If the temperature increases with height it is called positive lapse rate.

##### Negative lapse rate:

If the temperature decreases with height it is called negative lapse rate.

The air of this layer is warmer than other layers because it is heated from the earth's surface below.

#### D. Temperature:

The temperature range of this layer is from 15°C to -56. °C. It shows negative lapse rate.

#### ii. Stratosphere:

The layer which is above the Troposphere is called Stratosphere.

It is second layer of the atmosphere. It is warmer at top than bottom. The lower portion has nearly constant temperature with height but upper part temperature increases with latitude.

#### Characteristics of Stratosphere



**a. Height:**

The height of this layer is from 11km to 50 km.

**b. Temperature:**

The temperature of this layer is increases from -56°C to -2°C with height.

**c. Main component:**

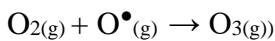
The major component of this layer is ozone O<sub>3</sub>.

**Ozonosphere:**

Stratosphere contains ozone, at height of about 30 km, therefore it is called ozonosphere.

**Production of ozone:**

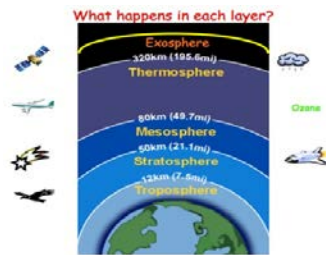
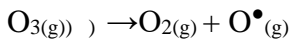
when the oxygen molecules absorbs ultraviolet radiation, it decompose to form oxygen atom. This oxygen atom react with another oxygen and ozone is produced.



**Phenomenon occurring in Stratosphere:**

The ozone layer is present in this layer which absorbs harmful UV radiation .Thus protects the living organism from harm full UV radiation.

The CFCs and ultra violet radiation from the sun, break down the Ozone molecule into mono atomic oxygen and diatomic oxygen, resulting in damage to ozone layer.



**b. Differentiation between Troposphere and Stratosphere?**

**Ans:**

| Troposphere   | Stratosphere                                 |
|---|--|
| The main component of this layer is N <sub>2</sub> , O <sub>2</sub> and CO <sub>2</sub> and water vapor | The main component of this layer is ozone.   |
| It is warmer than Stratosphere  | It is colder than troposphere.               |
| The air density is more in this layer   | The air is less dense in this layer.         |
| Clouds formation, rain, snowfall, and winds occur here.   | No clouds formation, rain, snowfall and wind |
| The temperature is from 15 to -56.  | The temperature is from -56 to -2            |

**Q2.a. Air is polluted in the big cities of Pakistan, justify the statement.**



**Ans: Air pollution:** According to world health organization (WHO), air pollution is defined as: the substances released to air either by human activities or by natural activities, in sufficient concentration to cause harmful effects to human beings, plants and other living thing is called Air pollution.

**Explanation:** Air pollution change the physical, biological and chemical characteristics of air that cause adverse effects on human and other organism.

**Air pollution in Pakistan:** The big cities of Pakistan like Karachi, Lahore, Faisalabad and Islamabad faces the air pollution due to following reasons.

1. Urbanization and population growth
2. Increase in number of vehicles used daily
3. Deforestation for making house and other uses.
4. Inefficient use of energy
5. Burning of garbage and plastic increase the smog and other air pollution due to worst air quality.

**Q2.b. Enlist the main source of air pollution.**

**Ans: Pollutants:** The substances that are responsible for causing air pollution are called air pollutant.

**Sources of air pollution:**

A: There are two main sources of air pollution.

- i. Nature sources
- ii. Anthropogenic/ man made sources

**Natural sources:** Natural sources of air pollutants are as follow,

**A. Particulate:**

The particulate pollutant is produced naturally by volcanic eruption, soil erosion by wind, dust storms, natural forest fires and salts spray from oceans. The contribution of the natural sources towards the particulate emission is greater than man made sources. It has been estimated that natural sources releases millions of tones particulate matter in to air.

**B. Oxides of carbon (Coax):**

CO and CO<sub>2</sub> are the oxides of carbon.

**I. Carbon monoxide;**

The natural concentration of carbon monoxide in air is around 0.2 parts per million (ppm), and that amount is not harmful to humans. Natural sources of carbon monoxide include volcanic eruption, decomposition of organic matter, and electrical discharge during storms, seed germination and natural gas emission etc.

**ii. Carbon dioxide:**

The natural sources of CO<sub>2</sub> are animal and plants respiration, decomposition of organic matter, forest fires and emissions from volcanic eruption.

**iii. Oxides of nitrogen (NO<sub>x</sub>)**

Bacteria and microorganisms are the main sources for emission of oxides of nitrogen into air. They convert nitrates present in soil into oxides of nitrogen. Nitrogen oxides are produced naturally by lightning, and atmospheric nitrogen gas into oxides of nitrogen and ammonia.

**Iv. Oxides of Sulphur dioxides**

The major oxides of Sulphur are Sulphur dioxide and Sulphur trioxide. They are produced by volcanic eruptions, rock weathering and biological activities.

**v. volatile organic compound:**

Volatile organic compounds or VOCs, are chemicals that have a strong tendency to vaporize from liquids or solids into gaseous states e.g. Methane. Wetlands are the largest natural source of methane.



They contribute 78% of natural methane in the environment. Animals like sows, sheep and goats during their normal digestion process produce large amount of methane.

**Anthropogenic/man made sources:**

The burning of different types of fuels by man that produced air pollution is called Anthropogenic /man made sources.

**I. Particulates:**

Particulate matter is the sum of all solid and liquid particles suspended in air. The man-made sources of particulate matter are combustion of fuels wood burning, construction, mining and industrial process. ii.

**Oxides of carbons;**

**a. Carbon dioxide:**

Carbon dioxide is also added to the atmosphere through human activities, such as the burning of fossil fuels and forests and the production of cement. Also thermal power generation and our everyday activities such as cooking and baking released CO<sub>2</sub>.

**Carbon monoxide:**

CO is produced by incomplete combustion, i.e. when there isn't enough oxygen to make CO<sub>2</sub>, Automobiles exhausts, smoking forest fires and steel industries are also the main sources of CO gas.

**Oxides of nitrogen (NO<sub>x</sub>):**

Automobiles exhausts, industrial activities, furnaces, thermal power generation. , jet airplanes are the main sources of nitrogen oxides.

**Sulphur oxides (SO<sub>x</sub>):**

Burning of fossil fuels such as coal, oil and natural gas are the main source of Sulphur dioxide emissions. Coal fired power stations, in particular, are major sources of Sulphur dioxide, other sources of Sulphur dioxide are industrial processes and transportation.

**Volatile organic compounds (VOCs):**

Volatile organic compound e.g. methane is produced by burning fossil fuel.

Common sources of these organic compounds are:

Furniture polish and other wood finishing products

Solvents and thinners, e.g. nail polish remover with acetone or paint thinner.

Aerosols, such as air fresheners and other cleaners

Smoke from burning stoves or candle, as well as cigarettes.

Automobile exhaust and factories are also the main sources of VOCs.

**Chlorofluorocarbons (CFCs) :**

It is anthropogenic compounds that have been released into the atmosphere from various applications such as in air-conditioning, refrigeration, blowing agents in foams, insulations and packing materials.

**Q2.c. Prove that oxides of nitrogen and Sulphur cause air pollution.Oxides of Sulphur:**

The major oxides of Sulphur are SO<sub>2</sub> and SO<sub>3</sub>.

These oxides are produced by the burning of Sulphur containing fossil fuel. Sulphur dioxide is a gas. It is invisible and has a nasty, sharp smell. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulphurous acid and sulphate particles. The main source of Sulphur dioxide in the air is industrial activity e.g. the generation of electricity from coal, oil or gas that contains sulphur. Sulphur dioxide is also present in motor vehicle emissions and air become polluted. When sulphur dioxide combines with water and air, it forms sulfuric acid, which is the main component of acid rain. Acid rain can:

Cause deforestation.

Effect the aquatic life and other organism life.





Corrode building materials and paints.

**Oxides of Nitrogen (NO<sub>x</sub>):** Nitrogen dioxide and nitric oxide are oxides of nitrogen (NO<sub>x</sub>). When nitrogen is released during fuel combustion it combines with oxygen atoms to create nitric oxide (NO). This further combines with oxygen to create nitrogen dioxide (NO<sub>2</sub>). Nitric oxide is not considered to be hazardous to health, but nitrogen dioxide is danger gas. NO<sub>x</sub> react with water, oxygen and other chemicals to form nitric acids. It mix with water and other materials before falling to the ground and cause acid rain NO<sub>x</sub> gases react to form smog.

#### **2.d. Enlist the effects of air pollution.**

**Effects of air pollution:** A variety of air pollutants have harmful effects such as;

##### **i. carbon monoxide:**

carbon monoxide reduce the amount of oxygen carried by hemoglobin around the body in red blood cells. The result is that vital organs, such as the brain, nervous tissues and the heart, do not receive enough oxygen to work properly. Breathing CO can cause headache, dizziness, vomiting, and nausea.

**ii. Carbon dioxide:** carbon dioxide in the atmosphere increases the greenhouse effect. More thermal energy is trapped by the atmosphere, causing the planet to become warmer than it would be naturally. This increase in the Earth's temperature is called global warming

**.iii. Sulphur dioxide:** Sulphur dioxide affects human health when it is breathed in. It irritates the nose, throat, and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest .it reduced the productivity of plants and yellowing it.SO<sub>2</sub> also damages the stone and marble.

**iv. Nitrogen dioxide:** NO<sub>x</sub> gases react to form smog and acid rain as well as being central to the formation of fine particles (PM) and ground level ozone, both of which are associated with adverse health effects. It reduces plant growth.it also effect the heart, respiratory system, skin and eyes.

**V. Chlorofluorocarbons (CFCs):** chlorofluorocarbons (CFCs) destroy the earth's protective ozone layer, which shields the earth from harmful ultraviolet (UV) rays generated from the sun.

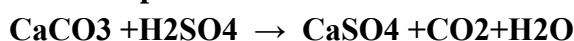
##### **vi. Particulate matter:**

It is toxic matter and affect both our lungs and heart.

#### **Q3.what would be the result if rainwater is acidic?**

**Ans:** Normal rainwater has a pH of 5.6 to 6. As we know that the air is polluted with the oxides of nitrogen and Sulphur. When rainwater is exposed to the carbon dioxide and oxides of nitrogen and Sulphur present in the atmosphere it become acidic and cause the acid rain. Acidic rain has a PH low than normal rain. It has harmful effects on human, plants and materials. 5.6.Acid rain damages building such as steel, paint , plastic ,cement sculptural work ,material especially of marble and limestone.

#### **For example**



The calcium sulphate is soluble in water and washed away with rain water.

The historical statues in Greece and Italy and The Taj Mahal in India were damaged due to acid rain.

(iii)

#### **Q3.b.What could be done to minimize the formation of acid rain?**

There are several solutions to stopping manmade acid rain

**Energy conservation:** The biggest step that we can take to prevent acid rain is to decrease our energy consumption. Close the lights when we leave the room. Whenever we're not using an electrical appliance, simply shut it off to conserve energy

**Transportation:** Because cars are a major contributor to acid rain pollution, it's important to find alternate modes of transportation. By using public transit, carpools, bikes and even your feet, we're



helping reduce auto emissions...

**Alternative fuels:** An excellent way to prevent acid rain is to stop using non-renewable fuels and switch over to renewable sources of energy, such as solar, wind and water energy. As the technology for these alternative energies increases, they will become more accessible to the public. A great way to reduce acid rain is to produce energy without using fossil fuels.

**Q3.C. write down the effect of acid rain on,**

**i. Human (ii) Plants (iii) Soil (IV) Materials**

**i Human:** The acid rain damages the, skin and hair of human beings. It also encourages lungs problems, like asthma and bronchitis. Acid rain increases the acidity of water and cause the waterborne diseases. **(ii)**

**Plants:** Acid rain removes the minerals and nutrients from the soil which is important for plant growth. Young rootlets and leaf shoots are very sensitive to low PH at high altitudes acid fog and clouds decrease the nutrients from trees and plant and their leaves become brown or dead. They are unable to absorb sunlight and weak to survive at freezing point.

**Soil: Acid** rain increase the acidity of soil and increase the amount of aluminium in soil which effect the plant growth.

**(iv).Material:** The rain which have PH 5.6 is called normal rain. Acid rain have PH less than.

**Q4.a. Explain ozone layer depletion.**

**Ans Ozone depletion:** The decrease in the concentration of the ozone in stratosphere below its normal level is called ozone depletion.

**Occurrence of ozone :** ozone is present in the stratosphere layer helps to absorb ultraviolet ray. When ozone depleting substance such as chlorofluorocarbons (CFCs), Hydro chlorofluorocarbons (HCFCs) and volatile organic compound goes to stratosphere layer react with uv-ray. This reaction breakdown the depleting substances and release the free cl atom. This free cl atom reacts with ozone gas and deplete the ozone layer.

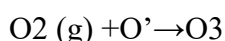
**Q4.B. Where does ozone layer lie in the atmosphere?**

An ozone layer is mainly found in the lower portion of the stratosphere, from approximately 30 kilometers above Earth, although its thickness varies seasonally and geographically.

**Ozonosphere:**The stratosphere contain ozone layer so it is also called ozonosphere.

**Q4.C. what evidence can you find that depletion of ozone occurs in the atmosphere?**

Chlorofluorocarbons are the main class of chemical that depleted the ozone layer in the stratosphere. Measurements reveal that emissions of these compounds are rising, .CFCs are highly stable, synthetic chemicals that were used in various applications from the 1930s onwards — for example, as propellants in aerosol sprays, solvents and refrigerants. CFCs could be destroyed naturally only in the stratosphere, in a process that releases chlorine atoms. Each of these atoms would be able to destroy many ozone molecules and severe ozone depletion was found over Antarctica alone, thus posing a threat to the ozone layer.



**Q4.D. recommend few ways to protect ozone layer.**

**Protection of ozone**

Avoid the consumption of gases dangerous to the ozone layer.

Minimize the use of cars and use public transport

do not use cleaning products that are harmful to the environment and to us.

Buy local products.



Maintain air conditioners

**Q5. Summarize the components of stratosphere and troposphere?**

Main components of Troposphere:

The major components of this layer are N<sub>2</sub>, O<sub>2</sub>, and water vapours. 70 to 75% of the atmosphere gases are present in this layer. Dust particles are also present here

Main component of stratosphere:

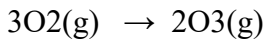
The major component of this layer is ozone O<sub>3</sub>.

Ozonosphere:

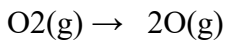
Stratosphere has ozone layer, at a height of 30 km, therefore it is called ozonosphere.

**B. Describe ozone formation.**

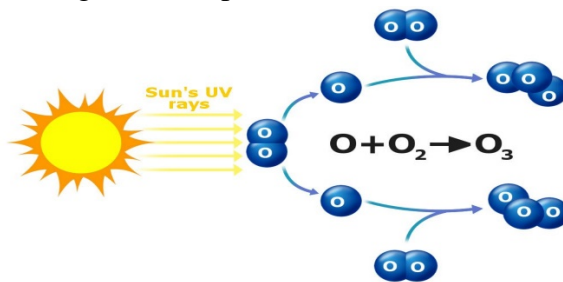
**Ans. formation of ozone:** ozone is formed naturally by chemical reactions involving solar ultraviolet radiation (sunlight) and oxygen molecules.



**First step:** solar ultraviolet radiation breaks apart one oxygen molecule (O<sub>2</sub>) to produce two oxygen atoms (2 O)



**Second step:** Each of these highly reactive atoms combines with an oxygen molecule to produce an ozone molecule (O<sub>3</sub>). These reactions occur continually whenever solar ultraviolet radiation is present the stratosphere. As a result, the largest ozone production occurs in the tropical stratosphere.



**C. Greenhouse effect is good or bad for us, explain it.**

**Ans: Greenhouse effect is good:** The greenhouse effect is essential for humanity to survive, without it the earth would be far colder. This is because if there will be no greenhouse effect then harmful solar radiations will destroy habitat on earth. Some greenhouse gases like carbon dioxide, water vapor and ozone absorb those radiations, they repel harmful radiations back to space and distribute good radiations in all directions. This effect also maintain the temperature on earth.

**Greenhouse effect is bad:** When greenhouse gases cause an increase in temperature by stopping outgoing radiation from leaving the Earth. This causes an imbalance between in-coming and out-going radiation and leads to warming. This effect is responsible for change in climate, so if carbon dioxide (a greenhouse gas) will be emit as it is emitting now then there will be disturbance in climate. This may also result in rise in temperature and possibly melt glaciers which will increase water level on earth, this is so dangerous for us.

**Predict the outcomes of global warming.**

**Rising seas and increased coastal flooding:** Global warming increases the temperature of earth. As temperatures increase, more rain take place, increasing the risk of flooding events.

**Longer and more damaging wildfire seasons:** wildfires are increasing and wildfire season is getting as temperatures rise. Higher spring and summer temperatures and earlier spring snow-melt result in forests that are hotter and drier for longer periods of time.



**More frequent and intense heat waves:** Dangerously hot weather is already occurring more frequently than it did 60 years ago heat waves to become more frequent and severe as global warming intensifies. This increase in heat waves creates serious health risks, and can lead to heat exhaustion and heat stroke. An **increase in extreme weather events:** Global warming is increasing certain types of extreme weather events, including heat waves, coastal flooding, extreme precipitation events, and more severe.

### Topic wise:

#### Q: What are the effect of ozone layer depletion?

##### Effect of ozone layer depletion:

Ozone layer depletion increases the amount of UV radiation that reaches the Earth's surface.

Ultraviolet (UV) radiation from the Sun can cause a variety of health problems in humans, including skin cancers, eye cataracts and a reduction in the ability to fight off disease. Furthermore, UV radiation can be damaging to microscopic life in the surface oceans which forms the basis Some of its major impacts on living things are given below:

**Skin cancer:** Exposure to UV rays from sun can lead to increased risk for developing of several types of skin cancer due to damages of skin tissue. In minor cases, it causes sun burn.

**Eye damage:** UV rays are harmful for our eyes too. Direct exposure to UV rays can lead to Cataract problems.

**Damage to Immune system:** Our immune system is also highly unsafe to UV rays. Increased exposure to UV rays can lead to weakening of the response of immune system and even impairment of the immune system in

**Aging of skin:** Exposure to UV rays can lead to acceleration of the aging process of our skin. We look older than our actual age. It can also lead to photo allergy that result in outbreak of rashes in fair skinned people.

**Other effect on human:** In humans, exposure to UV rays can also lead to difficulty in breathing, chest pain, and throat irritation and can even lead to curbing of lung function.

**Effect on amphibians:** UV rays affect other life forms too. It adversely affects the different species of amphibians and is one of the prime reasons for the declining numbers of the amphibian species. It affects them in every stage of their life cycle; from hampering the growth extreme cases. and development in the larvae stage, deformities and decreases immunities in some species.

**Effect on marine life:** UV rays also have adverse effect on the marine ecosystem. It adversely affects the planktons which plays a vital role in the food chain and oceanic carbon cycle. Affecting phytoplankton will in turn affect the whole ocean ecosystem.

**Effect on plants:** UV rays will also affect the plants. UV radiations can alter the time of flowering in some plant species. It can also directly affect the plant growth by altering the physiological and developmental processes of all the plants.

**Effect on material:** Ozone depletion will cause many materials to degrade faster. These materials include PVC (used in window and doorframes, pipes and gutters), nylon and polyester.