

SOLVED QUESTIONS

Q.1 Multiple choice questions:

1. What is responsible for the depletion of ozone?
- (a) Acid rain
 - (b) Chlorofluorocarbons
 - (c) Excess carbon dioxide
 - (d) Sulphur dioxide

Ans: B

2. What can be done to increase soil fertility?
- (a) By crop rotation with leguminous plants
 - (b) By following shifting cultivation
 - (c) By allowing grazing of grasslands
 - (d) By planting trees

Ans: A

3. Following gas is mainly responsible for 'acid rains'.
- (a) SO₂
 - (b) Cl₂
 - (c) CO₂
 - (d) O₃

Ans: A

4. Greenhouse effect is mainly due to increase in concentration of
- (a) CO
 - (b) NO₂ & SO₂
 - (c) CO₂
 - (d) O₃

Ans: C

Q.2 Write true or false:

- a) Industries are the chief sources of air pollution.
- b) CO gas is the most active air pollutant.
- c) The most stable environment occurs in oceans.
- d) Pollution and pollutant is one and the same thing.
- e) Cattle dung is used in biogas or gobar gas plants.

Ans: a → F, b → T, c → T, d → F, e → T

Q.3 How can air pollution be controlled?

Ans: Air pollution can be controlled by the following methods:

- (i) Control of industrial wastes and pollutants by law. Shift factories away from residential area.
- (ii) Use car pools by office goers and bicycle for short distance.
- (iii) Install long chimneys with filters in factories.
- (iv) Use CNG and lead free petrol as a fuel for buses and auto rickshaws.
- (v) Plantation of more trees and not permitting the cutting of trees.

Q.4 a) What is greenhouse effect? Explain how global warming takes place in the presence of greenhouse gases.

Ans: The sun supplies the energy to warm the earth. The atmosphere is mostly transparent to the incoming sunlight, absorbs outgoing reflected or internal thermal radiation to keep the earth warmer. This absorbing property of the atmosphere is the greenhouse effect. Gases in the atmosphere that absorb infrared radiation, thereby preventing some of the outgoing energy from returning to space, are called greenhouse gases. They are mainly water vapor, carbon dioxide, methane, and nitrous oxide. Water vapor and water in clouds absorb nearly 90% of the infrared radiation, while carbon dioxide, methane, and the other minor greenhouse gases together absorb little more than 10% of the infrared radiation.

Green house gases and global warming- "Gas molecules that absorb thermal infrared radiation. These type of gas molecules are called greenhouse gases eg. CO₂ and other greenhouse gases act like a blanket, absorbing IR radiation and preventing it from escaping into outer space. The net effect is the gradual heating of Earth's atmosphere and surface, a process known as global warming. Which leads to melting of ice caps results in sea level rising.

b) State two natural and two man-made sources of the greenhouse gas-methane.

Ans: **Natural source-** Bacterial decay release marsh gas (mainly methane), transpiration and respiration release water vapor and CO₂.

Manmade source- Automobile Exhaust, Chemical processes eg. Coal mining, biomass burning.

Q.5 What are the best option to reduce greenhouse gases by use of fuels better than fossil fuels.

Ans: Use different fuels- Liquefied Petroleum gas [L.P.G.], Liquefied Natural Gas [L.N.G.]
Compressed natural gas [C.N.G.] alternative to petrol and diesel.

Q.6 What is the role of catalytic converter in vehicles?

Ans: A catalytic converter is an emissions control device that converts toxic gases and pollutants. The three harmful compounds are:

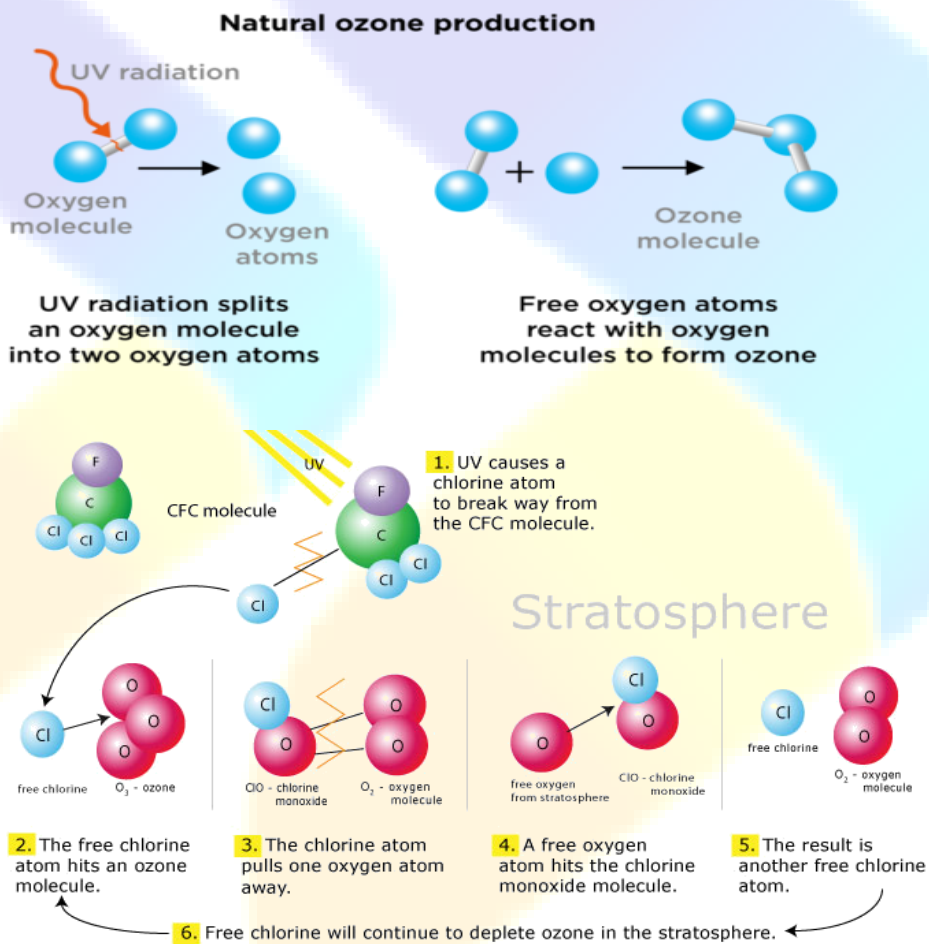
- (i) Hydrocarbons (in the form of unburned gasoline)

- (ii) Carbon monoxide (formed by the combustion of gasoline)
- (iii) Nitrogen oxides (created when the heat in the engine forces nitrogen in the air to combine with oxygen)

In a catalytic converter, the catalyst (in the form of platinum and palladium) is coated onto a ceramic honeycomb or ceramic beads that are housed in a muffler-like package attached to the exhaust pipe. The catalyst helps to convert carbon monoxide into carbon dioxide. It converts the hydrocarbons into carbon dioxide and water. It also converts the nitrogen oxides back into nitrogen and oxygen.

Q.7 Explain how ozone is formed in stratosphere. State how CFCs breaks ozone in the stratosphere.

Ans:



Q.8 What is meant by the term “acid rain”. Give any two impacts of acid rain and also give method of preventing it.

Ans: Rainfall made so acidic by atmospheric pollution basically oxides of sulphur and nitrogen that it causes environmental harm, chiefly to forests and lakes. The main cause is the industrial burning of coal and other fossil fuels.

Impact of acid rain: **Soil**

- (i) Cause nutrient leaching
- (ii) Change the acidity of soil
- (iii) Decrease soil fertility

Water bodies

- (i) Affect marine organism- mercury, lead and zinc present in the soil get leached by acid rain. Destroy marine life.
- (ii) Changes the pH of the environment.

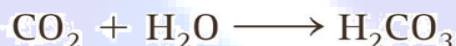
Prevention:

- (i) Using alternative energy source like CNG, Hydropower or wind energy.
- (ii) Usage of technical devices such as catalytic converters.

Q.9 a) Why in an unpolluted atmosphere the rain water is slightly acidic?

Unpolluted rain is slightly acidic due to atmospheric carbon dioxide.

Ans:



b) Give balanced equation for the formation of sulfuric acid in acid rain, when a fossil fuel is burnt in an electric power station.

Ans: Formation of sulfuric acid in acid rain

1. Sulfur impurities in the coal- form pollutant sulphur dioxide (SO_2)
 $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$
2. Sulfur dioxide reacts with water vapor to form sulfurous acid (H_2SO_3)
 $\text{H}_2\text{O} + \text{SO}_2 \rightarrow \text{H}_2\text{SO}_3$
3. SO_2 can be oxidized to sulfur trioxide (SO_3)
 $2\text{SO}_2 + \text{O}_2 \rightarrow 2\text{SO}_3$
4. Sulfur trioxide reacts with water vapor in air forming Sulfuric acid (H_2SO_4)
 $\text{H}_2\text{O} + \text{SO}_3 \rightarrow \text{H}_2\text{SO}_4$

Q.10 Write the impact of ozone layer depletion and also give the prevention of ozone layer.

Ans:

- a) Limit private vehicle driving
- b) Use eco-friendly household cleaning product
- c) Avoid using pesticides
- d) Developing stringent regulations for rocket launches
- e) Banning the use of dangerous nitrous oxide

- f) Use products that contain CFC's replaced by alternative products such as HCFC (hydrochlorofluorocarbons).
- g) International treaty [Montreal protocol] was initiated to prevent ozone depletion

Human health	<ul style="list-style-type: none"> •Skin cancer(every 1% decrease in ozone layer increases the possibility of skin cancer by 2-5% - See Figure 11) •Premature ageing of skin •Cataract •Lung diseases •Weakened immune system
Plants and trees	<ul style="list-style-type: none"> •Reduced crop production •Seed damage •Reduced quality of crops
Amphibians	<ul style="list-style-type: none"> •Death of eggs •Genetic mutation •Reduced population
Marine life	<ul style="list-style-type: none"> •Damages plankton and aquatic plants •Damages fish larvae •Affects marine food chain leading to reduced fish and other marine animals
Materials	<ul style="list-style-type: none"> •Paints, rubber, wood and plastic degraded (especially in tropical regions)