

Pollution Of Air & Water

Check point 1

Q. 1. Mention single most important cause of air pollution.

Answer: Vehicles are the most important cause of air pollution. They produce high levels of pollutants like carbon monoxide, carbon dioxide, nitrogen oxides and smoke. Carbon monoxide is a poisonous gas and smoke combines with fog to produce smog.

Q. 2. Natural resources are nature's free gift to us. Name two precious natural resources.

Answer: Water and air are two precious natural resources. About 70% of Earth's surface is covered with water. Water is considered as a renewable resource but water sources are being depleted and polluted faster than they can be replenished. Clean air is essential for existence of plants, animals and wildlife.

Q. 3. Air has various gases in different proportion. What is the ratio of CO₂ in atmosphere?

Answer: Carbon dioxide (CO₂) is an important gas in Earth's atmosphere but on the other hand if it is increased above certain limit then it is considered harmful especially for human beings. Air contains 0.04% carbon dioxide, 21% oxygen, 78% nitrogen. Other gases are present in very small quantities.

Q. 4. NO_x and SO_x combinely produce a harmful pollutant along with fog. What is it? How is it harmful?

Answer: NO_x and SO_x (oxides of nitrogen and sulphur) combine with fog to produce the harmful pollutant called 'SMOG'.

Smog causes breathing difficulties such as asthma, cough and wheezing in children. It also causes lung infections and eye irritation. It inhibits plants growth and causes damage to crops and fields.

Q. 5. A pollutant is known to interfere with hemoglobin. Give its name.

Answer: Carbon monoxide interferes with hemoglobin. It is produced from incomplete combustion of fuels such as petrol and diesel. Carbon monoxide present in atmosphere tends to combine with Haemoglobin to produce carboxyhaemoglobin. It reduces oxygen carrying capacity of blood and leads to suffocation. Excess of carbon monoxide may even lead to death.

Q. 6. Acid rain is caused by two major air pollutants. What are these two air pollutants?

Answer: Acid rain is caused by two major air pollutants named sulphur dioxide and nitrogen dioxide. These gases react with water vapour present in atmosphere to form sulphuric acid and nitric acid respectively. These water vapours makes the rain acidic called 'acid rain'. Natural volcanic emissions, automobiles, factories burning coals etc. are responsible for acid rain.

Check point 2

Q. 1. What are the reasons of greenhouse effects?

Answer: Trapping of sun's radiation by earth's atmosphere is called greenhouse effect. Carbon dioxide is one of the gases responsible for greenhouse effect. Other gases like methane, nitrous oxide and water vapour also contribute to this effect. Burning of fossil and deforestation leads to an increase in amount of carbon dioxide in air because number of trees which consume carbon dioxide is reduced.

Q. 2. Name the major contributing gas of global warming.

Answer: Carbon dioxide is the major contributing gas to global warming. Human activities contribute to increasing carbon dioxide in atmosphere. Carbon dioxide traps sun's heat and doesn't allow it to go back into space, as a result Earth's temperature is gradually increasing which is called global warming. Global warming is a serious threat to environment and people.

Q. 3. Air pollution can be prevented by adopting which measures.

Answer: There are many measures which can be taken to reduce air pollution

- Switch to fuels like CNG and unleaded petrol for vehicles.
- Do not use crackers on Diwali or other festivals.
- Alternative fuels instead of fossil fuels such as solar energy, hydro power and wind energy.
- Plant as many trees as possible and take care of them.
- Use bicycle whenever it is feasible instead of bike or car.

Q. 4. Van Mahotsav has been an important step in controlling deforestation. When did Van Mahotsav start?

Answer: Van Mahotsav was launched in year 1950 by Shri Kanaiyalal M. Munshi, union minister of agriculture and food.

Van Mahotsav is a week-long festival of tree planting organised every year in the month of July all across India and lakhs of trees are planted. It has been an important step in controlling deforestation. It also increases production of fruits, provides fuels and uses cow dung waste as manure. It also reduces soil erosion and air pollution.

Check point 3

Q. 1. If dissolved oxygen of water in lake reduces, what phenomenon it leads to?

Answer: If dissolved oxygen of water in lake reduces, it leads to phenomena called Eutrophication.

When excessive quantities of detergents, fertilizers or sewage are discharged in water bodies then these chemicals act as nutrients for algae and excessive growth of algae result in oxygen depletion of the water body. Eutrophication leads to killing of aquatic organisms.

Q. 2. A lake has been polluted by sewage; compare the water in the lake with unpolluted water.

Answer: A sewage polluted lake has lesser dissolved oxygen in water than unpolluted lake which leads to death of aquatic organisms.

Lake polluted with sewage may contain bacteria, viruses, fungi and parasites which cause diseases like cholera, typhoid and jaundice but lake with unpolluted water would not cause us such diseases or any infections. All plants and organisms being exposed to polluted water lake can be impacted. It can also damage individual species.

Q. 3. Sources of water pollution are categorized into two types. Which sources of pollution are easy to control?

Answer: There are many causes for water pollution but two general categories are - direct and indirect contaminant sources.

Direct sources include pollutants from factories, refineries, waste treatment plants etc. Indirect sources include pollutants that enter the water supply from soils/groundwater systems (fertilizers and pesticides) and from the atmosphere by rain water.

Direct contamination sources are easy to control by amendment of strict laws that polluted water is not disposed off directly into rivers and lakes, water treatment plants should be installed at industrial level.

Check point 4

Q. 1. An ambitious project to save the Ganga was launched. Mention the year in which it was launched?

Answer: An ambitious plan to save the river, called Ganga action plan was launched in year 1985 by Rajeev Gandhi. It aimed to reduce pollution levels in the river and improve quality of water. It also aimed to protect the diversity of water. It controlled human defecation and throwing of unburnt or half-burnt bodies in river. Also sewage treatment through afforestation was implemented and a new technology was developed for this.

Q. 2. The water which looks clear and has no smell will be potable. Is it necessary?

Answer: It is not necessary that water which looks clean and has no smell will be potable i.e. suitable for drinking. Such water may still have disease-carrying microorganisms and dissolved impurities so we should purify it by boiling. Boiling kills the germs present in water. Chlorination is chemical method for purifying water i.e. adding chlorine tablets to the water.

Q. 3. Name a filter commonly used in homes

Answer: A popular household filter is a Candle type filter. It is a physical method of removing impurities.

Ceramic candle filters are simple devices made out of clay and used to filter drinking water. It removes turbidity, suspended materials and pathogens. Water is poured into the upper of two containers and flows through the candle and it is collected in the lower container. This system both treats the water and provides safe storage until it is used.

Chapter Test

Q. 1. Explain the terms:

- (a) Polluted air
- (b) Pollutants.

Answer: Polluted air - The air which is contaminated by impurities has harmful impact on living organisms and non-living components.

Pollutants - The substances which contaminate air and water are called pollutants.

Q. 2. UV rays are harmful to us. How?

Answer: UV (ultraviolet) rays are very harmful to us. They damage the eyes as more than 99% of UV radiation is absorbed by the front of the eyes. It can lead to corneal damage, cataract, skin cancer, blindness. It also causes premature ageing of the skin, suppression of the immune system etc.

Q. 3. Various indicators suggest that water is contaminated. Mention one pollutant that also serves as indicator of water pollution.

Answer: Algae can function as indicator of water pollution. When excessive quantity of chemicals or sewage from field goes in water, we see a lot of algae growing in water.

Q. 4. Name the various air pollutant discharged by motor vehicle exhausts.

Answer: Air pollutants discharged by motor vehicles are carbon monoxide, carbon dioxide, nitrogen oxides and smoke. Carbon monoxide is produced from incomplete burning of fuels such as petrol and diesel.

Q. 5. What causes the hardness of impure water?

Answer: Hardness of impure water is caused by the presence of sulphates, chlorides of calcium and magnesium (Permanent hardness) or hydrogen carbonates of calcium and magnesium (Temporary hardness).

Q. 6. What are the greenhouse gases?

Answer: The gases which trap the heat of sun's radiation are called greenhouse gases and they produce greenhouse effect. Carbon dioxide, methane, water vapour, nitrous oxides are greenhouse gases.

Q. 7. Name some diseases caused by smog.

Answer: Combination of smoke and fog produces smog. Smog causes breathing difficulties such as asthma, cough. Bronchitis, pneumonia and emphysema are some of the lung problems caused by smog.

Q. 8. Name the substances that cause pollution.

Answer: The substance that causes pollution is called pollutant. It may contaminate air or water. Air pollutants are carbon monoxide, carbon dioxide and water pollutants are sewage, industrial waste.

Q. 9. Can high temperature kill germs?

Answer: Yes high temperature can kill the germs. We can purify water by boiling but on the other hand hot water from power plants and industries released into rivers adversely affect the animals and plants living in it.

Q. 10. Suggest methods by which water can be made potable at home.

Answer: Water can be made potable at home by following ways

- Physical method: use of household filter like candle type filter

- Chemical method: adding of chlorine tablets or bleaching powder to water which is called chlorination process. We should not use more chlorine tablets than specified otherwise it may be harmful.
- We can also purify water by boiling at home.

Q. 11. The Gangotri glacier in the Himalayas has started melting. Why?

Answer: The prime reason for melting of Gangotri glacier is global warming which is caused by rapid increase in industrialization, burning of fossil fuels and deforestation. Global warming is increasing average temperature of earth gradually. Melting of glaciers is normal but it is due to this increase in temperature that glaciers are melting more than they actually should.

Q. 12. If we drink polluted water, what is likely to happen?

Answer: If we drink polluted water with it may contain bacteria, viruses, fungi and parasites which cause diseases like cholera, diarrhoea, typhoid and jaundice. Also water contaminated by faecal matter can cause various infections.

Some kinds of reproductive problems, like infertility or cancer like leukemia can happen after drinking polluted water for a long period of time. If you drink water richly in calcium and magnesium can cause stones in kidney

Q. 13. Carbon dioxide in air is essential as plants use it to make food. When does it become a pollutant?

Answer: When there is excess of carbon dioxide in the air, and lack of trees or plants for consuming it in photosynthesis process then it acts as pollutant. Carbon dioxide is being increased continuously in atmosphere due to deforestation, burning of fossil fuels, industrialization, use of petrol and diesel in automobiles.

As a pollutant now carbon dioxide contributes to greenhouse effect and global warming.

Q. 14. What do you mean by global warming?

Answer: The gradual increase in temperature of Earth's atmosphere is called global warming. Excess of carbon dioxide, methane, nitrous oxide, water vapour is responsible for global warming.

Global warming can cause sea levels to rise dramatically. It could result in wide-ranging effect on rainfall patterns, agriculture, forests, plants, human beings and animals. It could also lead to fast melting of glaciers.

Q. 15. What are the harmful effects of acid rain?

Answer: Acid rain is caused by two major air pollutants named sulphur dioxide and nitrogen dioxide.

- Acid rain contaminates water and enters man's body which may cause potential threat to human health.
- Many bacteria, aquatic organisms and blue-green algae are killed due to acidification which disturbs the whole ecological balance.
- Acidification of soil leads to reduced forest productivity.
- Acid rain causes extensive damage to buildings (e.g. - Taj Mahal) and material of marble, limestone, slate etc.

Q. 16. Write the name of some water-borne diseases.

Answer: Disease caused by bacterial infections of water are:

- Cholera - waterborne illness that affects the intestine
- Dysentery - bacterial disease caused by the microorganism called Shigella.
- Typhoid fever - bacteria that brings this type of disease is the Salmonella typhi.
- Legionellosis - legionella bacteria attacks the respiratory system.
- Hepatitis A and E - cause jaundice, vomiting or even liver failure.
- Giardia - Giardia lamblia parasite causes intestinal problems.

Q. 17. Ozone protects our environment. How?

Answer: Ozone layer prevents us from harmful ultraviolet rays of sun by restricting it to enter into earth's atmosphere. Because this radiation causes skin cancer, eye blindness and cataract, the ozone layer plays an important role in protecting human health.

Without layer of ozone in the atmosphere, it would be very difficult for anything to survive on the surface. But now pollutants such as chlorofluorocarbons (CFCs) are damaging the ozone layer of atmosphere.

Q. 18. Afforestation is essential for conservation of natural resources. Explain.

Answer: Afforestation is the effort to plant trees in barren lands so as to create a new forest. In simple words by planting trees and creating forests, many of the commercial needs of human beings are fulfilled. Afforestation is, therefore, a practice that has been propagated in many countries as a way to stop over-exploitation of nature.

With increasing demand for fuel woods and building materials, afforestation helps to meet these demands without cutting down natural forests.

Afforestation will also lead to proper rain in all regions and help in prevention of underground water which is a natural resource. Also large number of trees will absorb more amount of carbon dioxide in photosynthesis process hence reducing air pollution and conserving clean air.

Q. 19. Use of excess fertilizers and pesticides affect water bodies. Do you agree? If yes, explain how.

Answer: Yes, excess fertilizers and pesticides are among the many common pollutants that can degrade water quality.

Fertilizers are made of nutrients, such as nitrogen and phosphorus. When it rains, these nutrients are carried into the nearest river or other water bodies. Too many nutrients in water can cause algae to grow, which uses up the oxygen in the water, this process is called Eutrophication. Low levels of oxygen in water can adversely affect aquatic wildlife and even lead to killing of fish and other aquatic organisms.

Most of the chemical contents used in fertilizers are so poisonous that they also affect human life and whole food chain cycle. Fertilisers containing ammonia can be harmful to aquatic life if large amounts are deposited to surface waters.

Q. 20. Write some causes by which water get polluted.

Answer: Causes of water pollution are as follows -

- Throwing large quantities of garbage, untreated sewage (containing food wastes, detergents, microorganisms), dead bodies and many other harmful things directly in water
- Throwing non-biodegradable polythene bags, Idols of god and goddesses in water.
- Discharging of toxic chemical waste into river by industries. Increased level of chemicals in water bodies act as nutrients for algae and results in decrease in oxygen level which may kill aquatic organisms
- People bathing, washing clothes and defecating in the river.
- Releasing hot water from power plants and industries adversely affects or leads to death of plants and animals living in it
- Discharge of pesticides and insecticides from soil to river after rain.
- Water in sea gets polluted due to oil spills from ships and tankers while traveling.