CHAPTER -16 POLLUTION ---
THE RISING ENVIRONMENTAL PROBLEM

Progress Check 1

Question 1

Mention whether the following statements are True (T) or False (F).

(i) Pollution and pollutant are one and the same thing.

(ii) Rubber tyres of motor vehicles contribute to particulate pollution.

(iii) The chief gaseous air pollutants are CO_2 and SO_2.

(iv) Kitchen garbage and leftovers in food dishes can be used for making manure (compost).

(v) Brick kilns give out both gaseous and particulate pollutants.

Answer

(i) False
Corrected statement — Pollutant are the agents that cause pollution.

(ii) True

(iii) True

(iv) True

(v) True

Question 2

Name any four ways to control vehicular air pollution.

Answer

Four ways to control vehicular air pollution are:

1. Efficient engine
2. Good quality automobile fuels
3. Lead free petrol
4. Greater use of compressed natural gas

Question 3

Name any two small scale industries that can be the source of particulate air pollution.

Answer

Two small scale industries that can be the source of particulate air pollution are:

1. Stone drilling

2. Brick kiln

Question 4

Give two examples of gaseous air pollutants.

Answer

1. Carbon dioxide **(CO_2)**
2. Sulphur dioxide **(SO_2)**

Progress Check 2

Question 1

Mention whether the following statements are True (T) or False (F).

(i) Liquid kitchen waste alone constitutes the sewage.

(ii) Household detergents are safe and non-contributors to water pollution.

(iii) Industrial wastes mainly consist of chemical pollutants.

(iv) Thermal power plants give out a lot of hot waste water.

(v) Hot water discharged into water bodies hardly affects the fish and other aquatic life.

Answer

(i) False
Corrected statement — Liquid waste from kitchen, toilet and household constitutes sewage.

(ii) False
Corrected statement — Household detergents are not safe and are contributors to water pollution.

(iii) True

(iv) True

(v) False
Corrected statement — Hot water discharged into water bodies affects the fish and other aquatic life.

Progress Check 3

Question 1

Mention whether the following statements are True (T) or False (F).

(i) Soil pollution is largely localised.

(ii) Fly-ash and metallic ash are examples of urban domestic waste.

(iii) Chemical fertilisers may reach the rivers but do not harm the fish.

(iv) Biomedical waste may consist of both biodegradable and non-biodegradable waste.

(v) X-rays are a potential source of radiation pollution.

(vi) Unwanted disturbing sound, even if it is music next door, is noise.

(vii) People routinely working in noisy places are not much affected by noise.

Answer

(i) True

(ii) False
Corrected statement — Fly-ash and metallic ash are examples of urban industrial waste.

(iii) False
Corrected statement — Chemical fertilisers may reach the rivers and harm the fish due to eutrophication.

(iv) True

(v) True

(vi) True

(vii) False
Corrected statement — Even though people working in noisy places may appear to adapt, long-term exposure to noise can still negatively impact their health, well-being, and productivity.

Progress Check 4

Question 1

Mention whether the following statements are True (T) or False (F).

(i) Diseases like cholera and jaundice are the results of soil pollution.

(ii) CO_2 and methane are directly contributing to global warming.

(iii) Erosion of ancient monuments and statues is caused by acid rain which itself is the result of gaseous pollution.

(iv) Use of unleaded petrol and Compressed Natural Gas (CNG) in automobiles is one of the methods of abatement of gaseous and particulate air pollution.

Answer

(i) False
Corrected statement — Diseases like cholera and jaundice are the results of water pollution.

(ii) True

(iii) True

(iv) True

(v) True

Multiple Choice Type

Question 1

Which of the following is an example of a green-house gas ?

1. Sulphur dioxide
2. Methane
3. Oxygen
4. Nitrogen

Answer

Methane

Reason — Methane leads to retention of solar radiation in the atmosphere increasing the temperature.

Question 2

The prime source of chlorofluorocarbons is:

1. Domestic sewage
2. Refrigeration equipment
3. Industrial effluents
4. Vehicular emissions

Answer

Refrigeration equipment

Reason — Refrigeration equipment contain chlorofluorocarbons as cooling agent.

Question 3

Which of the following gas can cause acid rain ?

1. Sulphur dioxide
2. Ammonia
3. Hydrogen
4. Nitrogen

Answer

Sulphur dioxide

Reason — Sulphur dioxide reacts with water to form sulphuric acid causing acid rain.

Question 4

Which of the following is responsible for causing the ozone hole ?

1. Methane
2. Carbon dioxide
3. Aerosols
4. Sulphur dioxide

Answer

Aerosols

Reason — Aerosols are responsible for causing the ozone hole.

Question 5

Which of the following is non-biodegradable ?

1. Tea leaves
2. Wood
3. Animal bones
4. Nylon

Answer

Nylon

Reason — Nylon is non-biodegradable.

Question 6

One of the best solutions to get rid of non-biodegradable wastes is :

1. Dumping
2. Incinerating
3. Recycling
4. Composting

Answer

Recycling

Reason — One of the best solutions to get rid of non-biodegradable wastes is Recycling.

Question 7

An undesirable change in the environment is called as :

1. Pollutant
2. Population
3. Pollution
4. None of these

Answer

Pollution

Reason — An undesirable change in the environment is called as pollution.

Question 8

The greenhouse effect leads to:

1. Thermal pollution
2. Oil spills
3. Droughts
4. Global warming

Answer

Global warming

Reason — Global warming is caused due to greenhouse gases like carbon dioxide and methane.

Question 9

The energy content of **X-rays** is usually measured in:

1. Proton
2. Protium
3. Photon
4. None of these

Answer

Photon

Reason — The energy content of X-rays is usually measured in photon.

Question 10

Which of the following is a radioactive pollutant ?

1. Iodine-131
2. Iodine-113
3. Iodine-313
4. Cobalt-16

Answer

Iodine-131

Reason — Iodine-131 is radioactive pollutant which can cause thyroid cancer.

Assertion Reason Type

Question 11

Assertion. Pesticides are the chemical substances used in agriculture to destroy pests.

Reason. DDT is an example of a pesticide which is widely used all over India. Pests are the enemies of crop.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

A is True and R is False.

Explanation
DDT was banned for agricultural use in India in 1972.
Currently, the sole consumer of DDT in India is the Ministry of Health and Family Welfare, which utilizes it to control vector-borne diseases by spraying it on walls in houses and buildings affected by malaria in both rural and urban areas.

Question 12

Assertion. Ozone layer is a sort of sunscreen present high up in the atmosphere which prevents the harmful ultra-violet rays of the sun from harming us.

Reason. Ozone is an allotropic form of carbon which is formed in the atmosphere due to the release of chloroflurocarbons.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.

4. A is False and R is True.

Answer

A is True and R is False.

Explanation
Ozone is an allotropic form of oxygen. Chloroflurocarbons damage the ozone layer.

Question 13

Assertion. The greenhouse effect is exacerbated by the presence of nitrogen oxides and sulphur oxides in the atmosphere, intensifying the absorption of heat and contributing to global warming.

Reason. Oxides of nitrogen and sulphur, primarily released through industrial activities and combustion processes, amplify the greenhouse effect by enhancing the heat-trapping capacities of the atmosphere, leading to an increase in the average global temperatures.

1. Both A and R are True.
2. Both A and R are False.
3. A is True and R is False.
4. A is False and R is True.

Answer

Both A and R are False.

Explanation
While nitrogen oxides and sulphur oxides contribute to air pollution and have various environmental impacts such as acid rain, they are not significant greenhouse gases. The primary greenhouse gases responsible for the greenhouse effect and global warming are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).

Very Short Answer Type

Question 1

Name the following pollutants:

(i) A pollutant which is mainly responsible for causing acid rain.

(ii) Any two chemicals leading to the formation of ozone holes.

Answer

(i) **SO_2**

(ii) Bromochlorodifluoromethane and chlorofluoromethane.

Question 2

Match the items in column I with the closely related ones in column II.

Column I	Column II
(i) Chlorofluocarbons (CFCs)	(a) Global warming
(ii) Fly ash	(b) Biodegradable
(iii) Cow dung	(c) Nuclear radiation pollutant
(iv) CO_2 and methane	(d) Acid rain
(v) Sulphur dioxide	(e) Industrial waste
(vi) Iodine - 131	(f) Ozone depletion

Answer

Column I	Column II
(i) Chlorofluocarbons (CFCs)	(f) Ozone depletion
(ii) Flyash	(e) Industrial Waste
(iii) Cow dung	(b) Biodegradable
(iv) CO_2 and methane	(a) Global Warming
(v) Sulphur dioxide	(d) Acid Rain
(vi) Iodine - 131	(c) Nuclear Radiation Pollutant

Question 3

Fill in the blanks:

(i) Rubber particles and dust raised by running motor vehicles are examples of ..... pollutants.

(ii) Too frequent exposure to ..... in a medical diagnostic technique may damage chromosomes.

(iii) Thermal power plants give out a lot of ..... waste water.

(iv) Sewage is a liquid waste from .....

Answer

(i) Rubber particles and dust raised by running motor vehicles are examples of ***particulate*** pollutants.

(ii) Too frequent exposure to ***X-ray*** in a medical diagnostic technique may damage chromosomes.

(iii) Thermal power plants give out a lot of ***hot*** waste water.

(iv) Sewage is a liquid waste from ***domestic activities***.

Question 4

Write the full forms of each :

(a) DDT

(b) ODF

(c) CFCs

(d) CNG

(e) LPG

Answer

(a) DDT — Dichloro-diphenyl-trichloroethane

(b) ODF — Open Defecation Free

(c) CFCs — Chlorofluorocarbons

(d) CNG — Compressed Natural gas

(e) LPG — Liquefied Petroleum Gas

Question 5

Give two examples of :

(a) Biodegradable wastes

(b) Non-biodegradable wastes

(c) Particulate pollutants

(d) Greenhouse gases

(e) Radioactive pollutants

Answer

(a) Dung, Leaves

(b) Plastics, Electronic waste

(c) Rubber particles, dust particles

(d) Carbon dioxide, Sulphur dioxide

(e) Iodine-131, Cobalt 60

Short Answer Type

Question 1

List two major harmful effects of each of the following:

(i) Rivers contaminated with sewage.

(ii) Too much gaseous exhausts containing CO_2 and SO_2

(iii) Pesticides such as DDT used in agriculture.

(iv) Prolonged noise such as the one produced by crackers

Answer

(i) Two major harmful effects of **rivers contaminated with sewage** are:

1. Sewage disposed of into rivers cause diseases such as diarrhoea, dysentery, cholera, typhoid, and jaundice.
2. The flora and fauna of rivers, sea and oceans is adversely affected.

(ii) Two major harmful effects of **too much gaseous exhausts containing CO_2 and SO_2** are:

1. Excess emissions of CO_2 and SO_2 will increase the temperature of earth i.e global warming would increase.
2. SO_2 emissions would lead to severe lung and respiratory diseases.

(iii) Two major harmful effects of **pesticides such as DDT used in agriculture** are:

1. Pesticides kill soil microbes which are responsible to recycle the nutrients in the soil.
2. Pesticides can cause short-term adverse health effects, and can enter the food chain and affect the health of humans as well as animals.

(iv) Two major harmful effects of **prolonged noise such as the one produced by crackers** are:

1. Prolonged exposure to the high decibel noise damages eardrums and can bring permanent hearing impairment.
2. **Interrupts concentration of thought** and disturbs peace of mind.

Question 2

List the three major constituents of sewage.

Answer

Three major constituents of sewage are:

1. Kitchen wastes
2. Sanitary waste
3. Waste from agricultural lands

Question 3

What are the common sources of oil spills, and how do they affect sea life.

Answer

The common sources of oil spills are the overturned oil tankers, offshore oil mining and oil refineries. Oil pollution kills a lot of marine life (fish, birds, etc.) The sea birds and sea animals sometimes get thick, greasy coating on their bodies due to oil spills.

Question 4

Mention any two measures to minimise noise pollution.

Answer

Measures to minimise noise pollution are:

1. Prohibiting blowing of horns.
2. Restriction on loud speakers, specially during night.

Question 5

Briefly mention about 'Swachh Bharat Abhiyan'. When was it launched and what are its objectives?

Answer

'Swachh Bharat Abhiyan' is a significant cleanliness campaign started by the Government of India. It was officially launched on 2nd October 2014 with a dream of a clean and hygienic India. It emphasized upon people to neither litter nor let others litter. Millions of people from different sections of the society came forward and joined this mass movement of cleanliness. Following are some objectives of the campaign:

1. To clean the streets, roads and infrastructure of the country's cities and towns.
2. To eliminate open defecation through the construction of individual, cluster and community toilets.
3. To establish accountable mechanisms of monitoring latrine use
4. To achieve efficient solid and liquid waste management systems.

<u>Descriptive Type</u>

Question 1

Define the following terms:

(a) Pollution

(b) Waste

(c) Air pollution

(d) Oil spills

(e) Pesticides

(f) Sanitary landfills

(g) Noise

Answer

(a) **Pollution** — **Pollution** is the addition of any such constituent to air, water or land which deteriorates the natural quality of the environment.

(b) **Waste** — **Waste** is any unwanted or undesired material or substance resulting from industrial, commercial mining, and agricultural operations, and from community activities.

(c) **Air pollution** — **Air pollution** means degradation of the air quality which harmfully affects the living organisms as well as certain objects.

(d) **Oil spills** — **Oil spills** are accidental discharges of petroleum in oceans or estuaries.

(e) **Pesticides** — **Pesticides** are substances used to kill, repel, or control certain forms of plant or animal life that are considered to be pests.

(f) **Sanitary landfills** — **Sanitary landfills** are the places where the wastes are dumped in a ground depression and covered with dirt every day.

(g) **Noise** — **Noise** is defined as any unpleasant/loud undesired sound interfering with one's hearing and concentration.

Question 2

Distinguish between the following pairs:

(a) Sewage and effluents

(b) Biodegradable and Non-biodegradable waste

(c) Smoke and smog

Answer

(a) Difference between sewage and effluents —

Sewage	Effluents
Sewage is the liquid waste from domestic activities.	Effluents are the liquid wastes produced by factories.

(b) Difference between biodegradable and non-biodegradable waste —

Biodegradable waste	Non-biodegradable waste
Biodegradable wastes are substances which can be broken down by microorganisms into harmless and non-toxic substances.	Non-biodegradable wastes are substances which cannot be broken down by microorganisms.
Examples: Leaves, dung.	Examples: Plastic, glass.

(c) Difference between smoke and smog —

Smoke	Smog
Smoke contains a lot of particulate pollutants which pollute the air.	Smoke mixed with dust particles and small drops of fog is called smog.

Structured / Application / Skill Type

Question 1

A lot of fish are dying near a sea shore. **Describe** any two possible causes.

Answer

Two possible causes of the death of many fishes near a sea shore can be:

1. **Industrial Waste** — Large number of industries produces waste water which contains various types of chemical pollutants. Such wastes are commonly discharged into the rivers. These chemicals cause irritation to the body systems of fish.
2. **Thermal Pollution** — Many industries such as thermal power plants, oil refineries, nuclear plants use water for cooling their machinery. This hot waste water may be 8-10°C warmer than the intake water. This hot water is released into the nearby streams, rivers or the sea and causes warming. The sudden fluctuation in the temperature of water kills the fishes and harms the plant life growing in it.

Question 2

Look at the cartoonist's presentation of a kind of pollution given below.

(i) **Name** the kind of pollution.

(ii) **List** the sources of pollution.

(iii) **Mention** any two harmful effects of this pollution.

Answer

(i) Noise Pollution

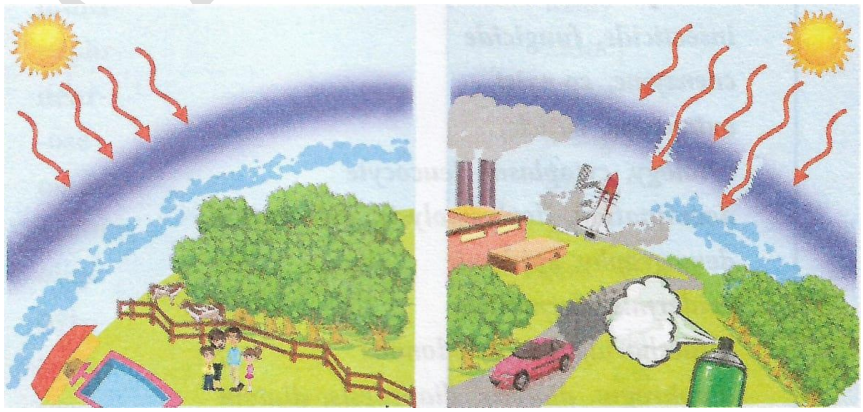
(ii) Industrial machines, workshops, trains, automobiles on the streets, jet aircrafts landing and taking off in the air, loud conversation and the radio or television inside houses, the loudspeakers and musical bands in public places, etc.

(iii) Two harmful effects of noise pollution are:

1. It lowers efficiency of work.
2. It disturbs sleep and leads to nervous irritability.

Question 3

The following picture depicts a certain phenomenon.



(i) **Name** the phenomenon and explain it.

(ii) **Enlist** the sources that are responsible for the above mentioned phenomenon.

(iii) **List** out the effects of the above phenomenon on humans.

Answer

(i) The phenomenon depicted in the picture is **Ozone layer depletion**. It is a phenomenon in which certain gaseous compounds such as chlorofluorocarbons (CFCs) break down into chlorine atoms which in turn break down ozone (O_3) into oxygen (O_2) and O.

(ii) The sources responsible for ozone layer depletion are gaseous compounds such as chlorofluorocarbons (CFCs) released from refrigerators, aerosol spray cans and packaging material styrofoam.

(iii) Effects of ozone layer depletion on humans are:

1. Sun burn
2. Genetic disorders
3. Skin cancer

Question 4

The picture below shows a campaign recently started by the Indian Government.

(i) **When** was this campaign launched ?

(ii) **Mention** the chief objectives of this campaign.

Answer

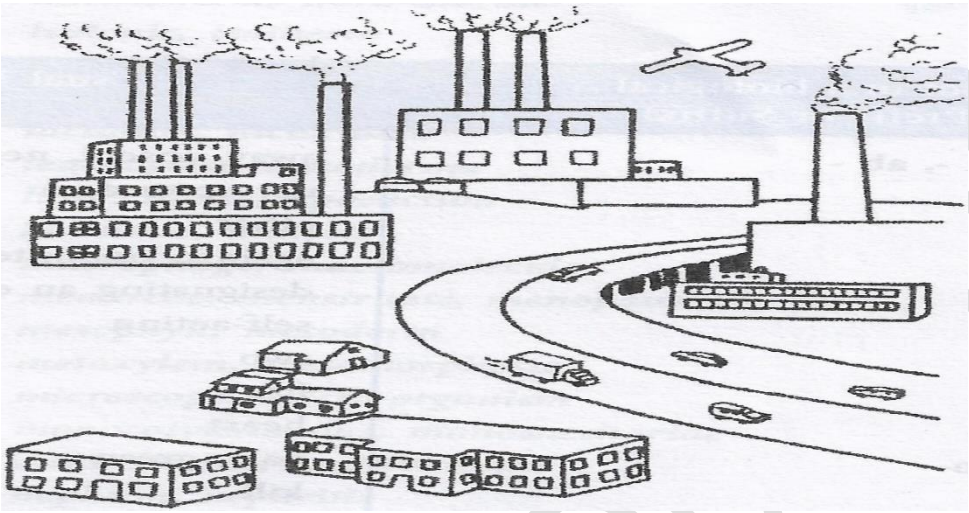
(i) This campaign was **launched on 2nd October 2014**.

(ii) Chief objectives of Swachh Bharat Abhiyan are:

1. To clean the streets, roads and infrastructure of the country's cities and towns.
2. To eliminate open defecation through the construction of individual, cluster and community toilets.
3. To establish accountable mechanisms of monitoring latrine use.
4. To achieve efficient solid and liquid waste management systems.

Question 5

The figure given below shows a kind of pollution. Study the figure and answer the following questions.



(a) **Define** the kind of pollution shown here.

(b) **Name** two types of the kind of pollution shown here.

(c) **Write** two main sources of above mentioned pollution with one example each.

(d) **Write** two points to control the given pollution.

Answer

(a) Air pollution is shown in the figure. Air pollution means degradation of the air quality which harmfully affects the living organisms as well as certain objects.

(b) Two types of Air pollution are:

1. Gaseous pollution
2. Particulate pollution

(c) **Gaseous pollution** — The exhaust given out by vehicles is the source of gaseous pollution, e.g., cars or vehicles running on petrol or diesel.

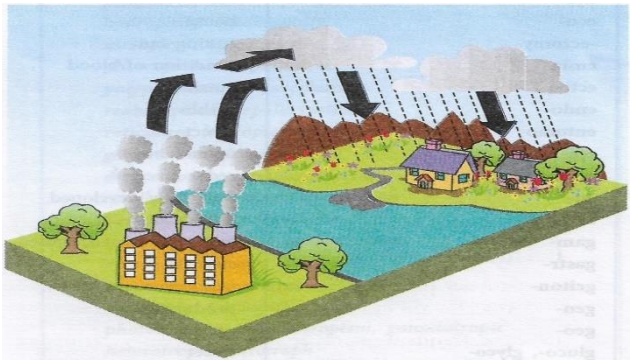
Particulate pollution — The smoke released by the factory chimneys into the air are the main sources of particulate pollution, e.g., factory chimneys, brick kilns.

(d) Two ways to control air pollution are:

1.
2. Use of unleaded petrol and CNG in automobiles.
3. Installation of tall chimneys in factories and fitting them with filters and electrostatic precipitators.

Question 6

Study the figure shown here and answer the following questions.



(a) **Identify** the kind of pollution and define it.

(b) **Mention** four main sources of the pollution.

(c) **Write** two harmful effects of the above-mentioned pollution for the living organisms.

Answer

(a) Acid rain. Gases such as **CO_2**, **SO_2** and oxides of nitrogen get dissolved in rain drops falling on the earth as rain. This constitutes acid rain.

(b) Four main sources of acid rain are:

1. Exhaust from vehicles contains **CO_2, SO_2** and **CO**.
2. Smoke released by factory chimneys contain **CO_2, SO_2** and oxides of nitrogen.
3. Burning of garbage releases **CO_2** and other harmful gases.
4. Brick kilns produce ash which mixes with air to contribute to acid rain.

(c) Two harmful effects of acid rain on the living organisms are:

1. Damage to vegetation by pollution of the soil.
2. Fish and other aquatic organisms are harmed due to increased acidity of water in lakes and rivers.

Question 7

Study the pictures given below of the two main categories of wastes and answer the questions:

(A)

(B)

(i) Identify the categories of wastes in (A) and (B).

(ii) Which of the above category of wastes can be used to prepare compost?

(iii) Mention one control measure to manage the waste of category (B).

Answer

(i) A - Biodegradable waste and B - Non-biodegradable waste

(ii) A

(iii) Recycling the materials into new products.

Question 8

Pollution is on the rise due to a rapid increase in the number of automobiles and buildings. All of these release a large amount of harmful gases and particulate pollutants in the atmosphere which react with atmospheric moisture and produce various kinds of acidic gases.

(i) Mention two main gases which are emitted from the industries into the atmosphere.

(ii) What are the two main acids produced in the atmosphere when poisonous gases combine with the atmospheric moisture ?

(iii) Write two harmful effects of acid rain.

Answer

(i) **CO_2** and **SO_2**

(ii) **H_2SO_4** and **HNO_3**

(iii) Two harmful effects of acid rain

1. Damage to vegetation by pollution in soil.
2. Corrosion of buildings and monuments.