

**Q.1. Define environment.**

**Ans.** Environment is defined as the combination of air, water and land and the inter-relationship that exists among themselves and with the human beings, other living organisms and materials.

**Q.2. Define environmental science.**

**Ans.** Environmental science is the branch of science which deals with the study of our environment and its interaction with us. Environmental science is a multi-disciplinary subject which deals with different aspects of botany, zoology, biochemistry, microbiology, physics, chemistry, atmospheric science, civil engg. chemical engg., geography etc.

**Q.3. Define environmental education.**

**Ans.** Environment education is defined as the education which helps children and adults develop knowledge, values, skill and behaviours that help them meet present-day needs without compromising the well being of future generations.

**Q.4. What is the full form of IUCN ?**

**Ans.** International Union for Conservation of Nature.

**Q.5. When the following important days related to our environment are being celebrated ?**

- (i) World Forest Day
- (ii) Earth Day
- (iii) International Biodiversity Day
- (iv) World Environment Day
- (v) World Population Day
- (vi) World Conservation Day

- (vii) Anti-tobacco Day  
(viii) Ozone Week  
(ix) Wildlife Week

Ans.

(i)	World Forest Day	21st March
(ii)	Earth Day	22nd April
(iii)	International Biodiversity Day	22nd May
(iv)	World Environment Day	5th June
(v)	World Population Day	11th July
(vi)	World Conservation Day	24th October
(vii)	Anti-tobacco Day	31st May
(viii)	Ozone Week	16th to 23rd September
(ix)	Wildlife Week	1st to 7th October

**Q.6. What is the concept of Ecomark ?**

Ans. In order to increase consumer awareness about environment, the Govt. of India introduced in 1991 a scheme of eco-labelling of consumer products as 'Ecomark'.

Ecomark is an 'earthen pitcher' - a symbol of eco-friendliness and our traditional heritage. A product that is made, used or disposed off in a harmless manner is called eco-friendly and is awarded this eco-mark.

**Q.7. What is the directive of Supreme Court of India regarding environmental studies ?**

Ans. In 1991, the Supreme Court of India issued directions to make all curricula environment-oriented. Based on these directions, Environmental Studies is being taught as a compulsory subject to all the students.

**Q.8. Who filed P.I.L. in the Supreme Court of India regarding environmental studies ?**

Ans. Sh. M.C. Mehta filed a Public Interest Litigation (P.I.L.) titled "M.C. Mehta v/s Union of India (1988)". In response of this P.I.L., the Supreme Court of India gave a mandate for creating environmental awareness among all citizens of India.

**Q.9. Fill in the blanks :**

- (i) Mr. SunderLal Bahuguna is associated with popular environmental movements, ..... and .....  
(ii) ..... and ..... are known for their valuable contribution for 'Narmada Bachao Andolan.'

- (iii) Mrs. .... has been doing a lot for the cause of wildlife protection.  
(iv) Sh. .... is known as green advocate.  
(v) The world Summit on Sustainable Development was held at ..... in 1992. This summit is popularly known as .....

Ans.

- (i) Chipko movement, Tehri Bachao Andolan  
(ii) Smt. Medha Patkar, Ms. Arundhati Roy  
(iii) Menka Gandhi.  
(iv) M.C. Mehta  
(v) Rio de Janeiro, Earth Summit

**Q.10. List the major objectives of environmental education.**

Ans. The major objectives of environmental education is to develop following qualities in an individual toward environment :

- (i) Creating awareness  
(ii) Imparting the basic knowledge  
(iii) Developing an attitude  
(iv) Acquiring skills  
(v) Acquiring evaluation ability  
(vi) Developing participating nature

**Q.12. How can an individual help in improving the environment ?**

Ans. An individual can help in improving the environment in the following ways:

- (i) By minimizing the unnecessary and exhaustive extraction of natural resources.  
(ii) By saving the non-renewable energy sources such as fossil fuels.  
(iii) By increasing the forest cover area  
(iv) By obeying the model code of conduct meant for achieving a better environment.

**Q.13. Define green marketing.**

Ans. Marketing of only such goods which are environment friendly is known as green marketing.

Such products have ecomark or ISO certification.

**Q.14. Define green technology.**

Ans. The technology which is environment friendly and helps a lot in improving the environment is known as green technology. This can be achieved by reducing the pollution and by cutting down the costs of effluent treatment.

**Q.15. What is the scope of environmental education ?**

**Ans.** As the life of all organisms is linked directly or indirectly to the environment, the environmental education becomes important to be utilised in solving various problems faced today by man and other organisms on this planet. Various socio-economic, political and other similar policies of the world are now based on ecological aspect.

Scope of environmental education can be summarized as follows :

- (i) Environmental pollution and its control
- (ii) Conservation of natural resources
- (iii) Population explosion and its control
- (iv) Green technologies
- (v) Ecological study
- (vi) Research & Development (R &D) in Environment
- (vii) Environmental Consultancy



**1.1. What is meant by ecology? Briefly describe the importance of ecology.**

**Ans.** Ecology is the study of how organisms interact with the other living organisms and the non-living components in their surrounding environment.

It may also be defined as *'the interdisciplinary scientific study of the distribution and large amount of organisms and their interactions with their environment.'*

The study of the interrelationships between the living and non-living portions of the environment is the subject matter of ecology.

**Importance of Ecology :** Ecologists study the interactions between living organisms and between organisms and their non-living environment.

Because of technological achievements, humans seem to depend less on the natural environment for their daily needs; many of us forget our continuing dependence on nature for air, water and indirectly, food, not to mention waste digestion, recreation and many other services supplied by nature. Until there is a crisis, humans tend to take natural goods and services for granted; we assume they are unlimited or somehow replaceable by technological innovations, even though we know that life necessities such as oxygen and water may be recyclable but not replaceable.

**1.2. Explain briefly the concept of ecosystem ?**

**Ans.** Ecosystem may be defined as *any unit which includes all the living organisms (i.e. biotic communities) in a given area interacting with the physical environment (e.g. water, air, soil etc.) by means of food chains and chemical cycles resulting in energy flow, biotic diversity and material cycling within the system.*

The interaction involves the transfer of energy and materials among the organisms. Ecosystems have no size limitations. They may be as large as a desert or as small as the drops of water on a plant leaf.

2. **Community** All the members of the different interacting species in an area.
3. **Ecosystem** All the members of a community plus the abiotic (physical) factors influencing them.
4. **Biosphere** Entire region of the earth where living things may be found.

**Q.5.** What is sustainable development ? Enlist the important Components of sustainable development.

**Ans.** *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*

The concept of sustainable development is rooted in this sort of systems thinking. It helps us to understand ourselves and our world. The problems we face are complex and serious—and we can't address them in the same way we created them.

The important components of sustainable development/ ecosystem are :

- (i) Population stabilization.
- (ii) Integrated land use planning.
- (iii) Conservation of biodiversity.
- (iv) Air and water pollution control.
- (v) Renewable energy resources.
- (vi) Recycling of wastes and residues.
- (vii) Environmental education and awareness at all levels.

**Q. 6.** What is food chain ? Explain briefly.

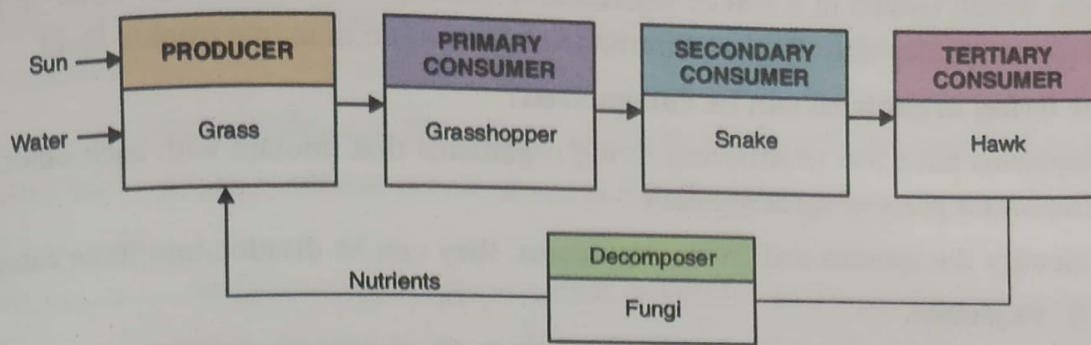
**Ans.** If an ecosystem is to be self-sustaining it must contain a flow of energy. One way of representing the flow of energy through the living components of an ecosystem is through the use of a food chain. A **food chain** indicates the transfer of energy from producers through a series of organisms which feed upon each other.

In any given ecosystem, all the living organisms are linked in a systematic chain with respect to their mode of manufacturing food/feeding habits. In a self-sustaining ecosystem very little is wasted.

For instance, in a grassland ecosystem, the entire stock of green plants (herbs, shrubs and trees) manufacture food by utilizing the radiant energy of the sun by the process of photosynthesis. There are many types of animals that will eat these plant products, food energy and organic compounds are transferred from the plants to the animals. These animals are in turn eaten by other animals, again transferring energy and organic compounds from one animal to another.



Examples would be lions eating deer, foxes eating rabbits, or birds eating worms.



This chain of energy transferring from one species to another can continue several more times, but it eventually ends. It ends with the dead animals that are broken down and used as food or nutrition by bacteria and fungi. These simpler nutrients are returned to the soil and can be used again by the plants. The energy transformation chain starts all over again.

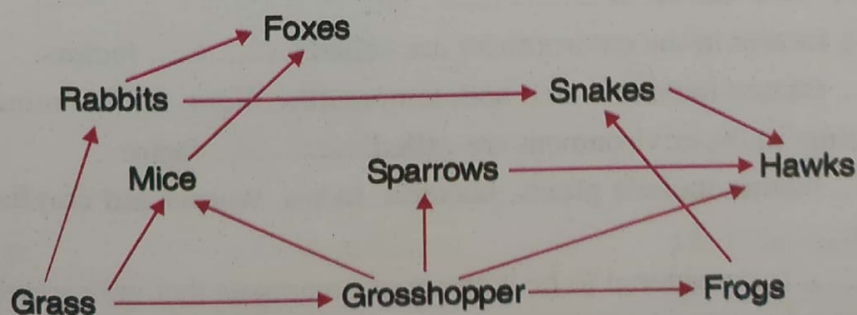
This sequential inter-linking of organisms involving the transfer of food energy from the sun, through a series of organisms with repeated eating and being eaten is referred to as the food chain.

**Q.7. What is food web ? Explain.**

**Ans.** In a natural community, the flow of energy and materials is much more complicated than illustrated by any one food chain. A food web is a series of inter-related food chains which provides a more accurate picture of the feeding relationships in an ecosystem, as more than one thing will usually eat a particular species.

Food web is a network of food chains which become inter-connected at various trophic levels so as to form a number of feeding connections amongst different organisms of a biotic community.

Energy flow in a food web also starts with the producer organisms through the various levels of consumer organisms as in a food chain.



Unlike food chains, food webs are never straight. For instance, in grassland ecosystem, the grass may be eaten by the grazing cattle. In the absence of grazing cattle in the biotic community, grass may be eaten by a rabbit or in the absence of both, rat or mouse may consume the grass. Similarly, rat or mouse may be eaten by predatory birds or snakes,

## Important and Expected Questions

**Q. 1.** What is pollution? What are its sources?

**Ans.** Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem i.e. physical systems or living organisms.

In other words, presence of matter (gas, liquid, solid) or energy (heat, noise, radiation) whose nature, location, or quantity directly or indirectly alters characteristics or processes of any part of the environment, and causes (or has the potential to cause) damage to the condition, health, safety, or welfare of animals, humans, plants, or property is called *pollution*.



**Sources of pollution :** Basically there are two types of the cause of pollution

(i) Natural

(ii) Man-made

- (i) **Natural pollution :** Natural pollution occurs naturally and won't cause excessive harm to our lives due to its regeneration ability; while the man-made pollution is caused by human activities, and hard to get rid of.

Natural activities that cause pollution are, for example, volcanic eruptions, sandstorms and natural forest fires. These events cause a large amount of substances such as ash and dust, which are harmful to our health, to be added to the environment.

- (ii) **Man-made pollution :** Although some natural events may contribute to pollution, human activities have a more harmful impact to the environment.

Man-made activities have caused environmental degradation. We have degraded lands, destroyed forests at suicidal rates, thrown tonnes of toxic waste into rivers indiscriminately and poured toxic chemicals into the seas.

Furthermore, we discharged green-house gases into the atmosphere leading to climatic changes.

**Q. 2. How natural pollution occur ? How does it affect the environment?**

**Ans.** Natural pollution occurs naturally and won't cause excessive harm to our lives due to its regeneration ability; while the man-made pollution is caused by human activities, and hard to get rid of.

Natural activities that cause pollution are, for example, volcanic eruptions, sandstorms and natural forest fires. These events cause a large amount of substances such as ash and dust, which are harmful to our health, to be added to the environment.

On the basis of natural disposal, pollutants are of two types :

- (i) **Non-degradable pollutants :** These are the pollutants, which degrade at a very slow pace by the natural biological processes. These are inorganic compounds such as salts (chlorides), metallic oxides waste producing materials and materials like, aluminium cans, mercuric salts and even DDT.

These continue to accumulate in the environment.

- (ii) **Biodegradable pollutants :** These include domestic sewage that easily decomposes under natural processes and can be rapidly decomposed by natural/ artificial methods. These cause serious problems when accumulated in large amounts as the pace of deposition exceeds the pace of decomposition of disposal.

**Q. 3. How humans contribute to pollution?**

**Ans.** Although some natural events may contribute to pollution, human activities have a more harmful impact to the environment.

Man-made activities have caused environmental degradation. We have degraded lands,



destroyed forests at suicidal rates, thrown tonnes of toxic waste into rivers indiscriminately and poured toxic chemicals into the seas.

Furthermore, we discharged green-house gases into the atmosphere leading to climatic changes. The net result is : we are surrounded by pollution in our daily lives—we breathe, we drink, we eat pollution.

The backbones of man-made pollution are human population and technology. Naturally human needs contact to the environment, we get resources from nature. This is for the sake of living. By the increase of human population, the contact is getting more intensive, because needs are increasing. And by the findings and development of new technologies, human can apply them to get the resources. And it is common that new technologies would bring their respective side effects besides their advantages.

Small population with any level of technology wouldn't have to exploit the nature overwhelmingly. But big population with any level of technology will surely exploit the nature more and even overwhelmingly, this is all for the needs of the people.

**Q. 4. How does air pollution affect living organisms?**

**Ans. Air pollution affect humans as under :**

- (i) Reduced lung functioning.
- (ii) Irritation of eyes, nose, mouth and throat.
- (iii) Asthma attacks.
- (iv) Respiratory symptoms such as coughing and wheezing.
- (v) Increased respiratory disease such as bronchitis.
- (vi) Reduced energy levels.
- (vii) Headaches and dizziness.
- (viii) Disruption of endocrine, reproductive and immune systems.
- (ix) Neurobehavioural disorders.
- (x) Cardiovascular problems.
- (xi) Cancer
- (xii) Premature death

**Air pollution affect animals as under :**

- (i) *Acid rain* (formed in the air) destroys fish life in lakes and streams.
- (ii) Excessive *ultraviolet radiation* coming from the sun through the ozone layer in the upper atmosphere which is eroded by some air pollutants, may cause skin cancer in wildlife.
- (iii) *Ozone* in the lower atmosphere may damage lung tissues of animals.

**Air pollution affect trees and plants as under :**

*Acid rain* can kill trees, destroy the leaves of plants, can infiltrate soil by making it unsuitable for purposes of nutrition and habitation

- (i) *Ozone holes* in the upper atmosphere can allow excessive ultraviolet radiation from the sun to enter the earth causing damage to trees and plants.

- (ii) *Ozone* in the lower atmosphere can prevent plant respiration by blocking stomata (openings in leaves) and negatively affecting plants' photosynthesis rates which will stunt plant growth; ozone can also decay plant cells directly by entering stomata.

**Q. 4. How do water pollution affect living organisms?**

**Ans.** Water is the basic need of not only human beings but of all the living and upto extent of non-living organisms.

**1. On Humans :**

- (a) Waterborne diseases caused by polluted drinking water like
- Typhoid, amoebiasis, giardiasis, ascariasis, hookworm etc.
- (b) Waterborne diseases caused by polluted beach water :
- Rashes, ear ache, pink eye, respiratory infections, hepatitis, encephalitis, gastroenteritis, diarrhoea, vomiting, and stomach aches etc.
- (c) Conditions related to water polluted by chemicals (such as pesticides, hydrocarbons, persistent organic pollutants, heavy metals etc), like
- Cancer, incl. prostate cancer, hormonal problems that can disrupt reproductive and developmental processes, damage to the nervous system, liver and kidney damage, damage to the DNA etc.
  - Exposure to mercury (heavy metal).
- (d) **Other effects :**
- Water pollution may also result from interactions between water and contaminated soil, as well as from deposition of air contaminants (such as acid rain).
  - Damage to people may be caused by fish foods coming from polluted water (a well known example is high mercury levels in fish).
  - Damage to people may be caused by vegetable crops grown/washed with polluted water.

**On Animals**

- *Nutrient pollution* (nitrogen, phosphate etc) causes overgrowth of toxic algae eaten by other aquatic animals and may cause death; nutrient pollution can also cause outbreaks of fish diseases.
- *Chemical contamination* can cause declines in frog biodiversity and tadpole mass.
- *Oil pollution* (as part of chemical contamination) can negatively affect development of marine organisms, increase susceptibility to disease and affect reproductive processes; can also cause gastrointestinal irritation, liver and kidney damage and damage to the nervous system.

**On Trees and Plants**

- May disrupt photosynthesis in aquatic plants and thus affecting ecosystems that depend on these plants.



- Terrestrial and aquatic plants may absorb pollutants from water (as their main nutrient source) and pass them up the food chain to consumer animals and humans.
- Plants may be killed by too much sodium chloride (ordinary salt) in water.
- Plants may be killed by mud from construction sites as well as bits of wood and leaves, clay and other similar materials.
- Plants may be killed by herbicides in water; herbicides are chemicals which are most harmful to plants.

**Q.5. Describe briefly the causes of air pollution.**

**Ans.** Air pollution can be caused by two main components-Natural and Human factors.

Natural factors such as volcano eruptions and natural forest fires often cause tons of ash and tiny air pollutants to be released to our earth's atmosphere.

However, the human factors are much more devastating.

- (i) **Industries :** The most serious cause of air pollution is heavy industrial activity. Many heavy industries produce a large amount of air pollutants. This often causes air pollution.
- (ii) **Power Plants :** When fossil fuels such as coal and oil are burnt to produce electricity, large quantities of sulphur dioxide and nitrogen dioxide (gases that are responsible for acid rain) are released into the air. These substances are damaging to the environment and all things.
- (iii) **Vehicles :** Vehicles use either diesel or petrol to generate power and, as a result, produce fumes that contain lead and carbon monoxide which pollute the environment and harm living things.
- (iv) **Developing Countries :** In these countries, the burning of wood and animal waste for cooking and heating also adds pollutants into the air.

**Q.6. How does air pollution affect living organisms?**

**Ans.** Air pollution refers to the discharge of harmful gases and dust into the atmosphere. When these harmful substances enter the air around us, they may cause irreversible damage to humans and to our environment.

#### **Effects on Humans**

- (i) Reduced lung functioning, irritation of eyes, nose, mouth and throat, asthma attacks, respiratory symptoms such as coughing and wheezing, increased respiratory disease such as bronchitis.
- (ii) Reduced energy levels, headaches and dizziness, neurobehavioural disorders, cardiovascular problems, cancer, premature death etc.

#### **Effects on Animals**

- (i) Acid rain destroys fish life in lakes and streams.
- (ii) Excessive ultraviolet radiation coming from the sun through the ozone layer in the upper atmosphere which is eroded by some air pollutants, may cause skin cancer in wildlife.



- (iii) Ozone in the lower atmosphere may damage lung tissues of animals.

### Effects on Trees and Plants

- (i) Acid rain can kill trees, destroy the leaves of plants, can infiltrate soil by making it unsuitable for purposes of nutrition and habitation.
- (ii) Ozone holes in the upper atmosphere can allow excessive ultraviolet radiation from the sun to enter the earth causing damage to trees and plants.
- (iii) Ozone in the lower atmosphere can prevent plant respiration by blocking stomata (openings in leaves) and negatively affecting plants' photosynthesis rates which will stunt plant growth; ozone can also decay plant cells directly by entering stomata.

### Q. 7. What happens to pollutants in the atmosphere?

**Ans.** Once pollutants enter the troposphere they are transported downwind, diluted by the large volume of air, transformed through either physical or chemical changes or are removed from the atmosphere by rain during which they are attached to water vapour that subsequently forms rain or snow that falls to the earth's surface.

The atmosphere normally disperses pollutants by mixing them in the very large volume of air that covers the earth.

### Q. 8. Write down the effects of following gases :

- (a) Carbon monoxide (CO)
- (b) Sulphur dioxide (SO<sub>2</sub>)
- (c) Ozone (O<sub>3</sub>)
- (d) Nitrogen dioxide (NO<sub>2</sub>)

**Ans.** (a) **Carbon monoxide (CO)** : Carbon monoxide is a colourless, odourless and toxic gas produced when organic materials such as natural gas, coal or wood are incompletely burnt. Vehicular exhausts are the single largest source of carbon monoxide. The number of vehicles has been increased over the years all over the world. Vehicles are also poorly maintained and several have inadequate pollution control equipment resulting in the release of greater amounts of carbon monoxide. Carbon monoxide is however not a persistent pollutant. Natural processes can convert carbon monoxide to other compounds that are not harmful. Therefore, the air can be cleared of its carbon monoxide if no new carbon monoxide is introduced into the atmosphere.

#### Effects :

- (i) Enters the blood stream and reduces the delivery of oxygen to the body's organs and tissues.
- (ii) Elevated levels of CO may result in impairment of visual perception, work capacity, manual dexterity, learning ability and performance of complex tasks.

(b) **Sulphur dioxide (SO<sub>2</sub>)** : SO<sub>2</sub> in the air is caused due to the rise in combustion of fossil fuels. It can oxidize and form sulphuric acid mist.

- Responsible for acid rain.



(c) **Ozone ( $O_3$ )** : Ozone ( $O_3$ ) is a gas composed of three oxygen atoms. It is a colourless compound that has an electric-discharge-type odour. It is not usually emitted directly into the air, but at ground level is created by a chemical reaction between oxides of nitrogen ( $NO_x$ ) and volatile organic compounds (VOCs) in the presence of heat and sunlight.

- (i) Exposure to this gas makes our eyes itch, burn and water and it has also been associated with the increase in respiratory disorders such as asthma.
- (ii) It lowers our resistance to colds and pneumonia.
- (iii) Damage to lung tissues and reduces lung functioning.
- (iv) Reduces agricultural crop yield; causes foliar damage in many crops and trees.

(d) **Nitrogen dioxide ( $NO_2$ )** : **Nitrogen Oxides ( $NO_x$ )**, is the generic term used to describe the sum of  $NO$ ,  $NO_2$  and other oxides of nitrogen.  $NO_x$  is a group of highly reactive gases that play a major role in the formation of ozone. Many of the nitrogen oxides are colourless and odourless. However, one common pollutant, nitrogen dioxide ( $NO_2$ ) along with particles in the air can often be seen as a reddish-brown layer over many urban areas.

- (i) Contributes to acid rain.
- (ii) Irritates lungs and lowers resistance to respiratory infections e.g. influenza.

**Q. 9. What are the health effects of air pollution?**

**Ans.** Following are the health effects of air pollution :

- (i) Asthma is a chronic disease common among children and adults. The shortness of breath, a prime symptom of this disease, can be triggered by pollutants present in the air, such as smog.
- (ii) Lung infections can occur when polluted air is inhaled. This can also lead to shortness of breath.
- (iii) Air pollution may influence the development of Chronic Obstructive Pulmonary Disease (COPD).
- (iv) Air pollution can also lead to lung cancer.
- (v) Air pollution can result in blockage in the coronary artery or blood vessels that supply blood to the heart. This condition is diagnosed as Coronary Artery Disease.
- (vi) High level of pollution in the air can also lead to heart failure. Irregular or abnormal rhythms of heartbeat are often cited as health problems related to air pollution.

**Q.10. What is water pollution?**

**Ans.** Water pollution is any chemical, physical or biological change in the quality of water that has a harmful effect on any living thing that drinks or uses or lives (in) it. When humans drink polluted water it often has serious effects on their health. Water pollution can also make water unsuited for the desired use.

**Q.11. Which are the major water pollutants?**

**Ans.** Following are the major water pollutants :

- (i) The first are disease-causing agents. These are bacteria, viruses, protozoa and parasitic worms that enter sewage systems and untreated waste.



- (ii) A second category of water pollutants is oxygen-demanding wastes; wastes that can be decomposed by oxygen-requiring bacteria. When large populations of decomposing bacteria are converting these wastes it can deplete oxygen levels in the water. This causes other organisms in the water, such as fish, to die.
- (iii) A third class of water pollutants is water-soluble inorganic pollutants, such as acids, salts and toxic metals. Large quantities of these compounds will make water unfit to drink and will cause the death of aquatic life.
- (iv) Another class of water pollutants are nutrients; they are water-soluble nitrates and phosphates that cause excessive growth of algae and other water plants, which deplete the water's oxygen supply. This kills fish and, when found in drinking water, can kill young children.
- (v) Water can also be polluted by a number of organic compounds such as oils, plastics and pesticides, which are harmful to humans and all plants and animals in the water.
- (vi) A very dangerous category is suspended sediment, because it causes depletion in the water's light absorption and the particles spread dangerous compounds such as pesticides through the water.
- (vii) Finally, water-soluble radioactive compounds can cause cancer, birth defects and genetic damage and are thus very dangerous water pollutants.

**Q.12. Where does water pollution come from?**

**Ans.** Water pollution is usually caused by human activities. Different human sources add to the pollution of water.

There are two sorts of sources, point and non-point sources. Point sources discharge pollutants at specific locations through pipelines or sewers into the surface water. Non-point sources are sources that cannot be traced to a single site of discharge.

Examples of point sources are : factories, sewage treatment plants, underground mines, oil wells, oil tankers and agriculture.

Examples of non-point sources are : acid deposition from the air, traffic, pollutants that are spread through rivers and pollutants that enter the water through groundwater.

Non-point pollution is hard to control because the perpetrators cannot be traced.

**Q.13. What are the sources of water pollution?**

**Ans.** Following are the sources of water pollution :

- (i) Dumping of industrial wastes, containing heavy metals, harmful chemicals, by-products, organic toxins and oils, into the nearby source of water is one of the visible causes of water pollution.
- (ii) Another cause for the contamination of water is the improper disposal of human and animal wastes.



(iii) Effluents from factories, refineries, injection wells and sewage treatment plants are dumped into urban water supplies, leading to water pollution.

(iv) A number of pollutants, both harmful and poisonous, enter the groundwater systems through rain water.

(v) The residue of agricultural practices, including fertilizers and pesticides, are some of the major sources of water pollution.

(vi) Untreated pollutants are drained into the nearest water body, such as stream, lake or harbor, causing water pollution.

#### Q.14. What are the effects of water pollution?

Ans. Following are some of the harmful effects of water pollution.

(i) A number of waterborne diseases are produced by the pathogens present in polluted water, affecting humans and animals alike.

(ii) Pollution affects the chemistry of water. The pollutants, including toxic chemicals, can alter the acidity, conductivity and temperature of water.

(iii) Polluted municipal water supplies are found to pose a threat to the health of people using them.

(iv) The concentration of bacteria and viruses in polluted water causes increase in solids suspended in the water body, which, in turn, leads to health problems.

(v) Marine life becomes deteriorated due to water pollution. Lethal killing of fish and aquatic plants in rivers, oceans and seas is an aftereffect of water contamination only.

(vi) Diseases affecting the heart, poor circulation of blood and the nervous system and ailments like skin lesion, cholera and diarrhea are often linked to the harmful effects of water pollution.

#### Q.15. Why does water sometimes smell like rotten eggs?

Ans. When water is enriched with nutrients, eventually anaerobic bacteria, which do not need oxygen to practice their functions, will become highly active. These bacteria produce certain gases during their activities. One of these gases is hydrogen sulphide. This compounds smells like rotten eggs. When water smells like rotten eggs we can conclude that there is hydrogen present, due to a shortage of oxygen in the specific water.

#### Q.16. Describe the causes of white deposit on showers and bathroom walls?

Ans. Water contains many compounds. A few of these compounds are calcium and carbonate. Carbonate works as a buffer in water and is thus a very important component.

When calcium reacts with carbonate a solid substance is formed, that is called lime. This lime is what causes the white deposit on showers and bathroom walls and is commonly known as lime deposit. It can be removed by using a specially suited cleaning agent.

#### Q.17. What is noise pollution?

Ans. Noise pollution is environmental noise that is annoying, distracting, or physically harmful. It violates the peace and privacy of a citizen's life and home and creates problems for the community.

Noise can be defined as an unwanted or undesired sound. Decibel is the standard unit for measurement of sound. Usually 80 dB is the level at which sound becomes physically painful. And can be termed as noise. Humans, animals, plants and even inert objects like buildings and bridges have been victims of the increasing noise pollution caused in the world. Be it human or machine-created, noise disrupts the activity and balance of life. While traffic dons the cap of being the largest noise maker throughout the world, there are many others that add to it, making our globe susceptible to its effects. The effect of noise pollution is multi-faceted and inter-related. In the following lines, we have provided some of the causes and effects of noise pollution.

#### Q.18. What are the effects of noise pollution?

Ans. Following are the effects of noise pollution :

(i) Deafness, temporary or permanent, is one of the most prevalent effects of noise pollution. Mechanics, locomotive drivers, telephone operators etc. all have their hearing impairment.

(ii) The first and foremost effect of noise is a decrease in the efficiency in working. Research has proved the fact that human efficiency increases with noise reduction.

(iii) Too much of noise disturbs the rhythms of working, thereby affecting the concentration required for doing a work. Noise of traffic or the loud speakers or different types of horns divert the attention, thus causing harm in the working standard.

(iv) Fatigue caused is another effect of noise. Due to lack of concentration, people need to devote more time to complete their task, which leads to tiredness and fatigue.

(v) Noise pollution acts as a stress invigorator, increasing the stress levels among people.

(vi) Sometimes, being surrounded by too much of noise, people can be victims of certain diseases like blood pressure, mental illness, etc.

(vii) Noise pollution indirectly affects the vegetation. Plants require cool & peaceful environment to grow. Noise pollution causes poor quality of crops.

#### Q.19. What are the causes of noise pollution?

Ans. Following are the causes of noise pollution :

(i) Traffic noise is the main source of noise pollution caused in urban areas. With the ever-increasing number of vehicles on road, the sound caused by the cars and exhaust system of autos, trucks, buses and motorcycles is the chief reason for noise pollution.

(ii) With the low flying military aircrafts soaring over the national parks, wasteland and



other vacant areas, the level of noise pollution has drastically increased in these previously unaffected zones.

(iii) People living beside railway stations put up with a lot of noise from locomotive engines, horns and whistles and shunting operation in rail yards. This is one of the major sources of noise pollution.

(iv) To meet the demands of the basic necessity of living, the construction of buildings, highways and city streets causes a lot of noise. Pneumatic hammers, air compressors, bulldozers, loaders, dump trucks and pavement breakers are the major sources of noise pollution in construction sites.

(v) Though not a prime reason, industrial noise adds to the noise pollution. Machinery, motors and compressors used in the industries create a lot of noise which adds to the already detrimental state of noise pollution.

**Q.20. How do we control Noise Pollution?**

**Ans.** Noise pollution can be controlled by having following measures :

- (i) Noise producing industries, aerodromes and railway stations to be shifted away from the inhabited areas.
- (ii) Construction of sound proof rooms for noisy machines in industries.
- (iii) Use of horns with jarring sounds to be banned.  
Proper law should be enforced to check the misuse of loudspeakers and public announcements systems.
- (iv) To enforce silence zones near schools/colleges, hospitals etc.
- (v) Growing green plants/trees along roadside to reduce noise pollution as they absorb sound.
- (vi) Loud speakers are banned from 10 pm to 6 am.

**Q.21. What are the different sources of noise?**

**Ans.** Noise pollution like other pollutants is also a by-product of industrialization, urbanizations and modern civilization.

**1. Road Traffic Noise :** In the city, the main sources of traffic noise are the motors and exhaust system of autos, smaller trucks, buses and motorcycles. This type of noise can be increased by narrow streets and tall buildings, which produce a canyon in which traffic noise reverberates.

**2. Air Craft Noise :** Now-a-days, the problem of low flying military aircraft has added a new dimension to community annoyance, as the nation seeks to improve its nap of the earth aircraft operations over national parks, wilderness areas and other areas previously unaffected by aircraft noise has claimed national attention over recent years.

**3. Noise from railroads :** The noise from locomotive engines, horns and whistles and switching and shunting operation in rail yards can impact neighbouring communities and railroad workers. For example, rail car retarders can produce a high frequency, high level

screech that can reach peak levels of 120 dB at a distance of 100 feet, which translates to levels as high as 138 dB, or 140 dB at the railroad worker's ear.

**4. Construction Noise :** The noise from the construction of highways, city streets and buildings is a major contributor to the urban scene. Construction noise sources include pneumatic hammers, air compressors, bulldozers, loaders, dump trucks (and their back-up signals) and pavement breakers.

**5. Noise in Industry :** Although industrial noise is one of the less prevalent community noise problems, neighbours of noisy manufacturing plants can be disturbed by sources such as fans, motors and compressors mounted on the outside of buildings. Interior noise can also be transmitted to the community through open windows and doors and even through building walls. These interior noise sources have significant impacts on industrial workers, among whom noise induced hearing loss is unfortunately common.

**Q.22. Is noise pollution a health issue ? How ?**

**Ans.**

Yes, exposure to daily levels of noise pollution causes hearing loss, hypertension, increased blood pressure and headaches. Excessive noise causes depression in many people and can lead to reduced work efficiency and even violence. When people lose sleep at night, it affects the activities that they do during daytime.

**Q.23. What is Radioactive Pollution? Give sources of radioactive pollution.**

**Ans.**

Radioactive pollution, also called as nuclear pollution is a special form of physical pollution related to all major life-supporting systems – air, water and soil. Radioactivity is the phenomenon of emission of energy from radioactive isotopes (i.e. unstable isotopes such as Carbon-14, Radium-226, Uranium-235, Uranium-238, Uranium-239), etc. The emission of energy from radioactive substances in the environment is often called as '*Radioactive Pollution*'.

**Sources of Radioactive Pollution :** The sources of radioactive pollution can be both natural and man-made.

The natural sources include cosmic rays from outer space and emissions from radioactive materials from the earth's crust.

The man-made or artificial sources include mining and processing of radioactive ores, use of radioactive material in nuclear power plants, use of radioactive isotopes in medical, industrial and research applications, and use of radioactive materials in nuclear weapons.

**Q.24. What are the effects of radioactive pollution ?**

**Ans.**

The effects of radioactive pollutants depend upon half-life, energy releasing capacity, rate of diffusion and rate of deposition of the contaminant. The effects may be *somatic* (affecting individual) *orgentic* (affecting future generations). Some of the effects are cancer, shortening of life span and genetic effects of mutations. The other effects of radioactive pollution include :



- (i) Radiations may break chemical bonds, such as DNA in cells; this affects the genetic make-up and control mechanisms.
- (ii) Fatigue, nausea, vomiting and loss of hair (exposure at low doses of radiations, i.e. 100-250 rad).
- (iii) The bone marrow is affected, blood cells are reduced, decreased in body immunity, blood fails to clot and the irradiated person soon dies of infection and bleeding (exposure at low doses, i.e. 400-500 rad).
- (iv) Higher irradiation doses (10,000 rad) cause damage to the tissues of heart, brain, etc.

**Q.25. How can radioactive pollution be prevented?**

**Ans.** On one hand, the peaceful uses of radioactive materials are so wide and effective that modern civilization cannot go without them and on the other hand, there is no cure for radiation damage.

However, the only option against nuclear hazards is to check and prevent radioactive pollution by taking the following measures and precautions.

- (i) safety measures should be enforced strictly;
- (ii) leakages from nuclear reactors, careless handling, transport and use of radioactive fuels, fission products and radioactive isotopes have to be totally stopped;
- (iii) there should be regular monitoring and quantitative analysis through frequent sampling in the risk areas;
- (iv) waste disposal must be careful, efficient and effective;
- (v) appropriate steps should be taken against occupational exposure;
- (vi) safety measures should be strengthened against nuclear accidents; and
- (vii) preventive measures should be followed so that background radiation levels do not exceed the permissible limits.

Thus, we can say that radioactivity causes long range effects, affecting the future of humans and hence, the future of our civilization.