

BIOLOGY

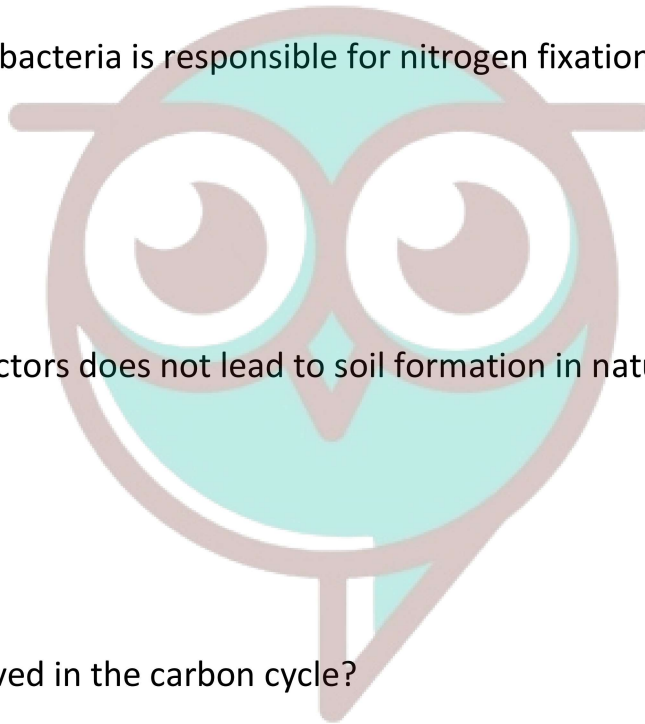
Chapter 14: Natural Resources



Important Question

➤ Multiple Choice Questions:

1. What is the constitution of nitrogen in our atmosphere?
 - (a) 28
 - (b) 78
 - (c) 55
 - (d) 92
2. Which of the following bacteria is responsible for nitrogen fixation?
 - (a) Pseudomonas
 - (b) Nitrosomonas
 - (c) Rhizobium
 - (d) None of these
3. One of the following factors does not lead to soil formation in nature.
 - (a) The sun
 - (b) Water
 - (c) Wind
 - (d) Polythene bags
4. Which step is not involved in the carbon cycle?
 - (a) Photosynthesis
 - (b) Transpiration
 - (c) Respiration
 - (d) Burning of fossil fuels
5. The main function of the Rhizobium bacteria is:
 - (a) To convert free nitrogen into nitrates
 - (b) To convert the nitrates into nitrogen
 - (c) Decomposition of ammonium salts
 - (d) Denitrification
6. Soil pollution mostly occurs by:
 - (a) Water
 - (b) Fertilizers and insecticides
 - (c) Mining



Swotters

(d) Crops

7. What is the percentage constitution of carbon dioxide in the atmosphere of Venus and Mars?

(a) 95 – 97%

(b) 20 – 22%

(c) 35 – 40%

(d) 70 – 72%

8. Oxygen is found in the elemental form in the atmosphere to the extent of:

(a) 78%

(b) 38%

(c) 21%

(d) 95%

➤ **Very Short Question:**

1. What are the resources available on Earth for life to exist?
2. Name the compound of carbon responsible for the ozone hole in the atmosphere.
3. State the temperature range on the surface of the moon.
4. State any one difference between oxygen and ozone.
5. Name the stage in the life cycle of aquatic animals which is affected by a change in temperature.
6. Along with the natural resources available on the Earth, what else is required to meet the basic requirements of all life forms on the Earth?
7. How is biosphere a dynamic and stable system?
8. How do forests play a major role in maintaining the water cycle?
9. Why is step farming done in hills?
10. Why are root nodules useful for plants?

➤ **Short Questions:**

1. What are the sources of oxygen in the atmosphere?
2. What causes winds?

List any two methods of preventing soil erosion.

3. List the importance of oxygen gas and ozone gas in the atmosphere.
4. Mention one method by which living organisms influence the formation of soil.
5. Explain the occurrence of land breeze in coastal areas.

6. What are the two ways in which carbon dioxide is fixed in the environment?

7. Why do terrestrial forms require freshwater?

Give two examples where freshwater can be found in the frozen form on the Earth.

8. What is the role of the atmosphere in climate control?

➤ Long Questions:

1.

- Make a neat and labelled sketch of the nitrogen cycle in nature.
- Describe in brief the role of nitrogen-fixing bacteria and lightning in fixing nitrogen.

2. Explain the role of the atmosphere as a blanket. List the factors deciding the rainfall patterns.

3.

- Many municipal corporations are trying water harvesting to improve the availability of water. Give reason.
- Rainwater sometimes contains traces of acid. Why? Explain in brief.

➤ Assertion Reason Questions:

1. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- Both Assertion and Reason are correct, and reason is the correct explanation for assertion.
- Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.
- Assertion is true but Reason is false.
- Both Assertion and Reason are false.

Assertion: Earth's large area covered with the different forms of water.

Reason: More amount of water present on earth surface as well it also found in the form of ice.

2. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

- Both Assertion and Reason are correct, and reason is the correct explanation for assertion.
- Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

- c. Assertion is true but Reason is false.
- d. Both Assertion and Reason are false.

Assertion: Earth's large area covered with the different forms of water.

Reason: All plants need water hence water quantity is high on earth.

➤ Case Study Questions:

1. Nitrogen gas makes up 78% of our atmosphere and nitrogen is also a part of many molecules essential to life like proteins, nucleic acids (DNA and RNA) and some vitamins. Nitrogen is found in other biologically important compounds such as alkaloids and urea too. Nitrogen is thus an essential nutrient for all life-forms and life would be simple if all these life-forms could use the atmospheric nitrogen directly. Most commonly, the nitrogen-fixing bacteria are found in the roots of leguminous plants (generally the plants which give us pulses) in special structures called root nodules. Other than the bacteria, the only other manner in which the nitrogen molecule is converted to nitrates and nitrites is by a physical process. During lightning, the high temperatures and pressures created in the atmosphere convert nitrogen into oxides of nitrogen. These oxides dissolve in water to give nitric and nitrous acids and fall on land along with rain. These are then utilised by various life forms.

Plants generally take up nitrates and nitrites and convert them into amino acids which are used to make proteins. These proteins and other complex compounds are subsequently consumed by animals. Once the animal or the plant dies, other bacteria in the soil convert the various compounds of nitrogen back into nitrates and nitrites. Thus, there is a nitrogen-cycle in nature in which nitrogen passes from its elemental form in the atmosphere into simple molecules in the soil and water, which get converted to more complex molecules in living beings and back again to the simple nitrogen molecule in the atmosphere.

(i) How much Nitrogen is present in our atmosphere?

- (a) 76 %
- (b) 77 %
- (c) 78 %
- (d) 79 %

(ii) Identify the correct statement:

Statement 1 – Nitrogen is an essential nutrient for all life-forms and life.

Statement 2 – all life-forms use the atmospheric nitrogen directly.

Statement 3 – Nitrogen is a part of DNA & RNA

Statement 4 – Our atmosphere have 79 % nitrogen.

- (a) Both 1 & 2
- (b) Both 1 & 3
- (c) Both 3 & 4

(d) All of the above

(iii) Plants use nitrates and nitrites and convert them into:

(a) Vitamins

(b) Enzymes

(c) Amino acids

(d) Nitrogen

(iv) What is the main function of root nodules in legume plants?

(v) Explain the physical process by which nitrogen molecule is converted to nitrates and nitrites?

2. Oxygen is a very abundant element on our Earth. It is found in the elemental form in the atmosphere to the extent of 21%. It also occurs extensively in the combined form in the Earth's crust as well as also in the air in the form of carbon dioxide. In the crust, it is found as the oxides of many metals and silicon, and also as carbonate, sulphate, nitrate and other minerals. It is also an essential component of most biological molecules like carbohydrates, proteins, nucleic acids and fats (lipids).

When we talk of the oxygen-cycle, we are mainly referring to the cycle that maintains the levels of oxygen in the atmosphere. Oxygen from the atmosphere is used up in three processes, namely combustion, respiration and in the formation of oxides of nitrogen. Oxygen is returned to the atmosphere in only one major process, that is, photosynthesis. And this forms the broad outline of the oxygen-cycle in nature.

Though we usually think of oxygen as being necessary to life in the process of respiration, it might be of interest to you to learn that some forms of life, especially bacteria, are poisoned by elemental oxygen. In fact, even the process of nitrogen-fixing by bacteria does not take place in the presence of oxygen.

(i) How much oxygen is present in our atmosphere?

(a) 20 %

(b) 21 %

(c) 22 %

(d) 23 %

(ii) Identify the correct statement

Statement 1 – Oxygen is also an essential component of most biological molecules.

Statement 2 – Oxygen is returned to the atmosphere through process called photosynthesis

Statement 3 – Oxygen -cycle maintains the levels of oxygen in the atmosphere.

Statement 4 – Our atmosphere have 21 % oxygen.

(a) Only 1

- (b) Both 2 & 3
- (c) Both 1 & 4
- (d) All of the above

(iii) Oxygen from the atmosphere is used up in three main processes,

- (a) Combustion
- (b) Respiration
- (c) Formation of oxides of nitrogen
- (d) All of the above

(iv) By which process Oxygen is returned to the atmosphere

- (a) Respiration
- (b) Photosynthesis
- (c) Photolysis
- (d) None of the above

(v) Write the molecular formula of oxygen?

✓ Answer Key-

➤ **Multiple Choice Answers:**

1. (b) 78
2. (c) Rhizobium
3. (d) Polythene bags
4. (b) Transpiration
5. (a) To convert free nitrogen into nitrates
6. (b) Fertilizers and insecticides
7. (a) 95 – 97%
8. (c) 21%

➤ **Very Short Answers:**

1. Answer: Air, water and land are the resources available on the Earth which help life to exist.
2. Answer: Chlorofluorocarbons (CFC's) are responsible for the ozone hole in the atmosphere.
3. Answer: The temperature ranges from -190°C to 110°C on the moon
4. Answer: Oxygen is a diatomic molecule with formula O₂ whereas ozone is a triatomic molecule-with formula O₃.
5. Answer: The stage of animals which is affected by the change in the temperature is – the

eggs at the hatching stage, the larvae and the young ones of the animals.

6. Answer: Solar energy is required to meet the basic requirements of all life forms on Earth.
7. Answer: There is a constant interaction between the biotic and the abiotic components of the global ecosystem (biosphere) which makes it a stable system. The basic composition and the structure of the system do not change while carrying out the various processes. So, it is a stable system.
8. Answer: The amount of water vapour in the atmosphere is dependent on the transpiration of water from the leaves of the plants present in a forest. Also, the storage of water in watershed is influenced by the forests. So, forests play a major role in maintaining the water cycle.
9. Answer: Step farming is done in hills to prevent soil erosion by slowing down the speed of the water running down the slopes.
10. Answer: The root nodules of leguminous plants contain nitrogen-fixing bacteria like the Rhizobium which help to increase the fertility of the soil by fixing atmospheric nitrogen.

➤ Short Answer:

1. Answer:

The sources of oxygen in the atmosphere are:

- Oxygen released during photosynthesis by plants
- The dissociation of oxides from their compounds
- The disintegration of ozone in presence of UV rays
- As the water in combined form

2. Answer:

Due to the unequal heating of land and water, the land get heated up faster during the day, the air on land rises up and creates a region of low pressure. As a result, the air over the sea moves towards the region of low pressure formed on the land. This causes winds to flow.

(a) Overgrazing by cattle should be avoided.

(b) Large scale afforestation should be done as roots of plants prevent the soil from getting carried away.

(c) Increasing the vegetation cover on the ground reduces the impact of flowing water on soil and prevents it from getting washed away.

(d) Contour farming can be done by ploughing the land in furrows across the natural slope of the land to trap water flowing down.

(e) Step farming is practised in hilly regions which reduce the flow of water and give it more time to percolate into the soil.

3. Answer: Role of Oxygen gas: It helps in the process of combustion, respiration and

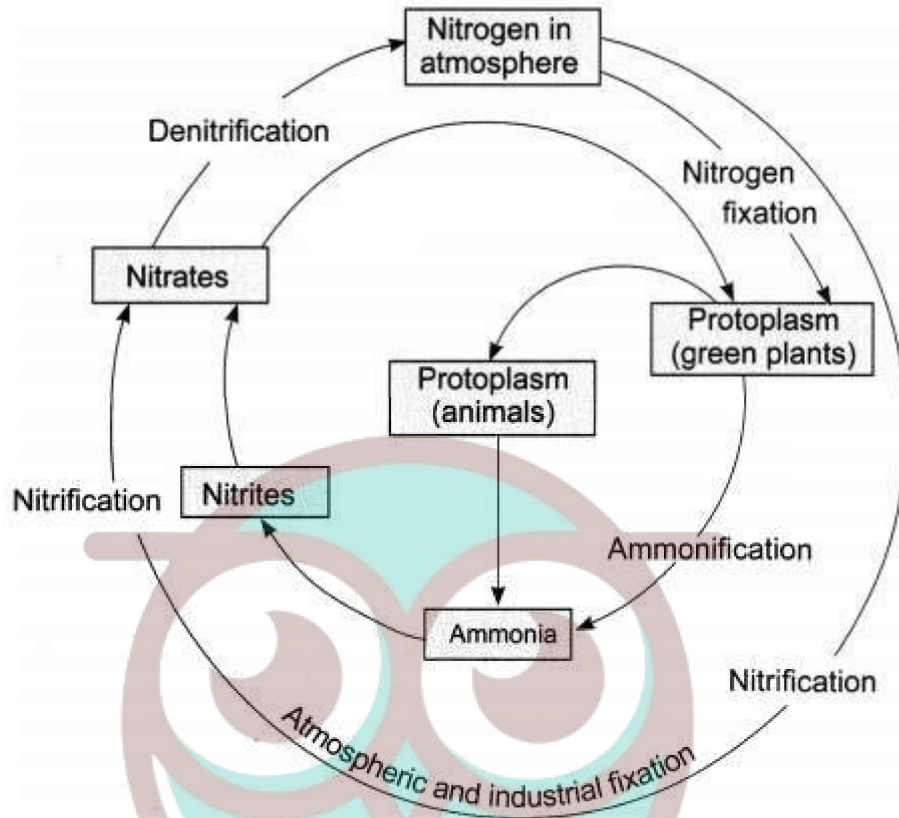
formation of many organic compounds.

Role of Ozone: It absorbs the harmful UV rays of the Sun which can cause skin diseases and cancer on reaching the Earth's surface.

4. Answer: The living organisms like lichens and mosses are the initial colonisers of rocks which secrete certain chemical substances that dissolve the minerals of rock and cause the gradual weathering of rocks. The rocks get broken down into small, fine particles of soil. So, living organisms play an important role in the formation of soil.
5. Answer: During the day, in coastal regions, the air above land gets heated faster and warm air being lighter rises up thereby creating a region of low pressure. The air over the sea then moves towards the area of low pressure. The movement of air from one region to the other creates winds. At night, water cools down slower than the land, so the air above water would be warmer than the air above land. This causes air over the land to move towards the region of low pressure over water.
6. Answer: Carbon dioxide is fixed in the atmosphere when:
Green plants utilise the carbon dioxide and convert it into glucose during photosynthesis.
Carbon dioxide dissolved in seawater in the form of carbonates gets used up by the marine animals for the formation of their shells.
7. Answer: The terrestrial organisms require freshwater as they face osmotic problems if kept in marine water because they have low osmotic concentration. In order to maintain the balance of the salts present in their body, freshwater organisms require a medium having less salt concentration i.e., freshwater.
Freshwater can be found in a frozen form at polar ice-caps and the glaciers.
8. Answer: The atmosphere acts as a buffer which checks excessive rise in temperature during the day and prevents excessive cooling of the Earth during the night. The atmosphere helps to keep the average temperature of the Earth steady.

➤ Long Answer:

1. Answer:
 - The nitrogen cycle is:



- The atmospheric nitrogen can be fixed in the following ways:
 By nitrogen-fixing bacteria: The nitrogen-fixing bacteria live either in a symbiotic association like the Rhizobium in the root nodules of the legumes or live freely like Azotobacter. The bacteria fix the atmospheric nitrogen into nitrates which are absorbed by the plants in soluble form and assimilated in their body.
 By lightning: Lightning has enormous energy which breaks nitrogen molecules and enables their atoms to combine with oxygen present in the air to form nitrogen oxides. These oxides dissolve in rain, form nitrates and are carried to the Earth with the rains.

2. Answer: The atmosphere is a blanket of air around the Earth which acts as a buffer to prevent the excessive or sudden rise of temperature during the day and also prevents excessive cooling of the Earth during the night. It slows down the escape of heat into the outer space during the night. Thus, the atmosphere helps to keep the average temperature of the Earth fairly steady during the day and also during the whole year. The prevailing wind patterns decide the rainfall patterns. The South-West monsoon and the North-East monsoon cause rains in large parts of India.
3. Answer:
 - The Municipal Corporations are trying water harvesting in order to recharge the underground water reservoirs and the underground water level. This ensures the availability of water during the scarcity of rainfall or water. Rainwater harvesting involves the collection of water from surfaces on which rain falls and stores this water for later

use. Generally, the water is collected from the roofs of buildings and stored in rainwater tanks.

- Combustion of fossil fuels releases oxides of nitrogen (NO_2) and sulphur (SO_2) which dissolve in rainwater to form their respective acids. These acids then fall along with rains and such rain is called acid rain. Due to the presence of such acids, the rainwater sometimes contains traces of acids.

➤ Assertion Reason Answer:

1. (b) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.
2. (c) Assertion is true but Reason is false.

➤ Case Study Answers:

1.

(i) (c) 78 %

(ii) (b) Both 1 & 3

(iii) (c) Amino acids

(iv) Nitrogen fixation is the main function of root nodules which is one of the most important features of legumes.

(v) During lightning, the high temperatures and pressures created in the air convert nitrogen into oxides of nitrogen. These oxides dissolve in water to give nitric and nitrous acids and fall on land along with rain.

2.

(i) (b) 21 %

(ii) (d) All of the above

(iii) (d) All of the above

(iv) (b) Photosynthesis

(v) Molecular formula of oxygen is: O_2

