



CHAPTER 18 NATURAL RESOURCES

SOLUTIONS

TEXTUAL QUESTIONS AND ANSWERS

1. **Why is the atmosphere essential for life?**

Ans: **Atmosphere** is essential for life because:

- (a) Air is life. (life and burning processes are not possible)
- (b) Atmosphere maintains fairly average temperature of the earth during day and night time.
- (c) Rainfalls, necessary for growth of plants are affected by wind pattern of the atmosphere.

2. **Why is water essential for life?**

Ans: Water is a medium for cellular processes and transportation of substances from one part to the other part of the organism.

3. **What are biogeochemical cycles? Explain the pathway of any one.**

Ans: The circulation or flow of nutrients from non-livings to livings and back to non-livings in a cyclic form is known as biogeochemical cycle. e.g. Nitrogen cycle, Oxygen cycle, Water cycle, Carbon cycle, etc.

Nitrogen cycle:

Nitrogen is the most abundant component of the atmosphere. The atmospheric nitrogen is brought down into the soil as the products of **nitrates** and **nitrites** by bacteria or cyanobacteria through **biological nitrogen fixation** and made available to plants. The nitrogen fixing bacteria may be **free-living** or **symbiotic** and the later occurs inside the root nodules of leguminous plants. The nitrates absorbed by plants are incorporated into **amino acids** and subsequently enter herbivorous organism as plant protein. After the death of organisms they enter the soil through **ammonification**. Thus, the conversion of **nitrates into nitrogen** is called **denitrification** carried out by **denitrifying bacteria** .The conversion of ammonia into nitrate by **nitrifying bacteria** is called **nitrification**.

Similarly, the conversion of death & decay of plants and animals into ammonia by putrefying bacteria is called **ammonification**.



4. **Define nitrogen fixation. Name some bacteria involved in it.**

Ans: The conversion of nitrogen into ammonia, nitrites or nitrates is called **nitrogen fixation**. It may be **biological, physical/atmospheric or chemical** nitrogen fixation. *Rhizobium*, *Azotobacter*, and *Clostridium* are some of nitrogen fixing bacteria.

5. **What is greenhouse effect?**

Ans: The natural process of heating the earth's surface and lower atmosphere by trapping outgoing radiation due to greenhouse gases mainly CO₂ present in the atmosphere (**allow flourishing of life**) is known as greenhouse effect.

6. **What is global warming? How is it caused?**

Ans: The increase in the global mean temperature to a level that affects life forms on the earth surface due to **human enhanced greenhouse effect** is known as **global warming**. It is caused by **burning** of fossil fuels as well as **deforestation** that increases quantity of greenhouse gases in the atmosphere thereby retaining more infrared radiation.

7. **How is depletion in the ozone layer caused?**

Ans: The release of pollutant molecules (such as **CFCs, nitrogen oxides, hydrocarbons** etc.) that reacts with ozone by interfering with the natural cycle of formation and destruction of ozone has increased in the recent years. It has resulted in the reduction of the ozone layer or cause ozone depletion (**Any human activity that use CFCs can release Cl which in turn react with O radicle to form chlorine monoxide and attack more O₃ molecule and repeat the cycle**).





8. Give the diagrammatical representation of nitrogen cycle.

Ans:

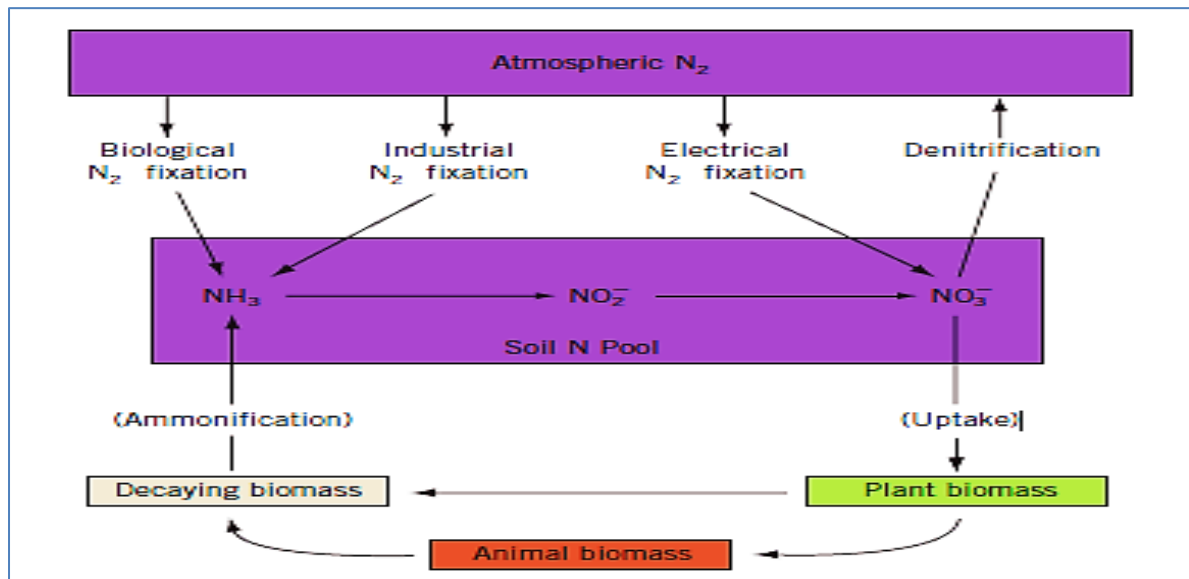


Fig. Nitrogen Cycle

9. Give a diagrammatical representation of carbon cycle.

Ans:

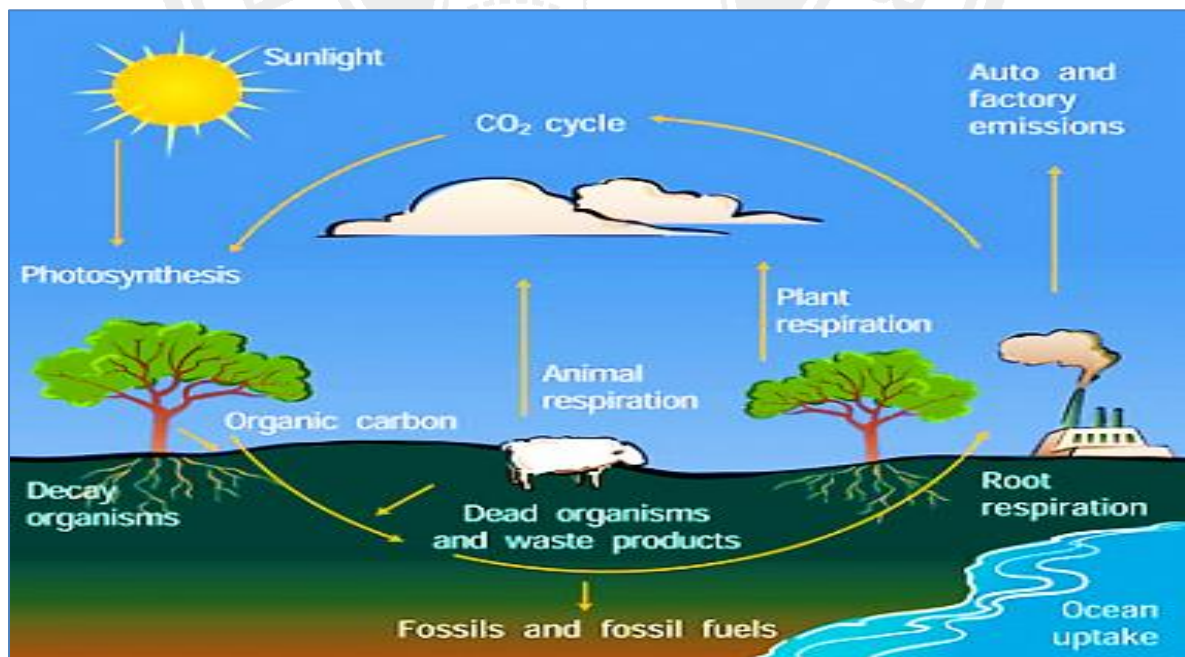


Fig. Carbon Cycle



10. How does oxygen content of the atmosphere get maintained?

Ans: Oxygen content of the atmosphere is maintained through oxygen cycle. It is the second most abundant element in the atmosphere. Oxygen is taken up for respiration, burning, and other oxidative process thereby releases CO_2 and water. Green plants again fix CO_2 from the atmosphere to form glucose through photosynthesis and return oxygen to the atmosphere. Thus, oxygen content of the atmosphere is maintained in the balanced forms mainly exchange of respiration and photosynthesis.

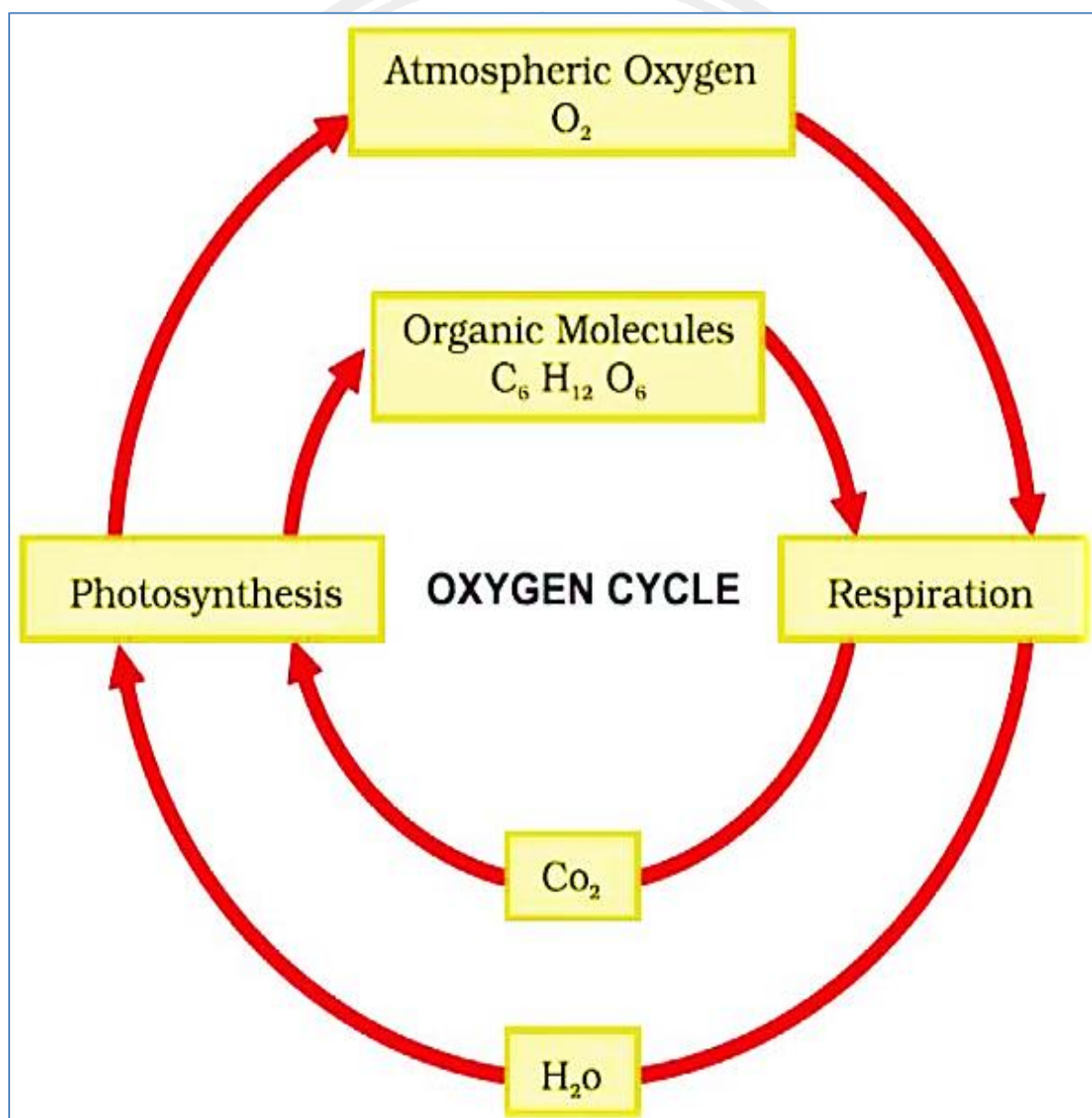


Fig. Oxygen Cycle



11. Write on the importance of water cycle in the environment.

Ans: Water is a medium for cellular processes and transportation of substances from one part to the other part of the organism. It constitutes 75% of the body of living organism.

- (a) The circulation of water between living and non- living components of the biosphere is called water cycle.
- (b) The precipitation mainly occurs in the form of water and snow (on land) through the condensation of water vapours and ultimately gets collected into ocean through rivers.
- (c) However, some of the water absorbed by soil then move to surface through wells or tube well or enter plant and again return to the atmosphere by transpiration and evaporation.

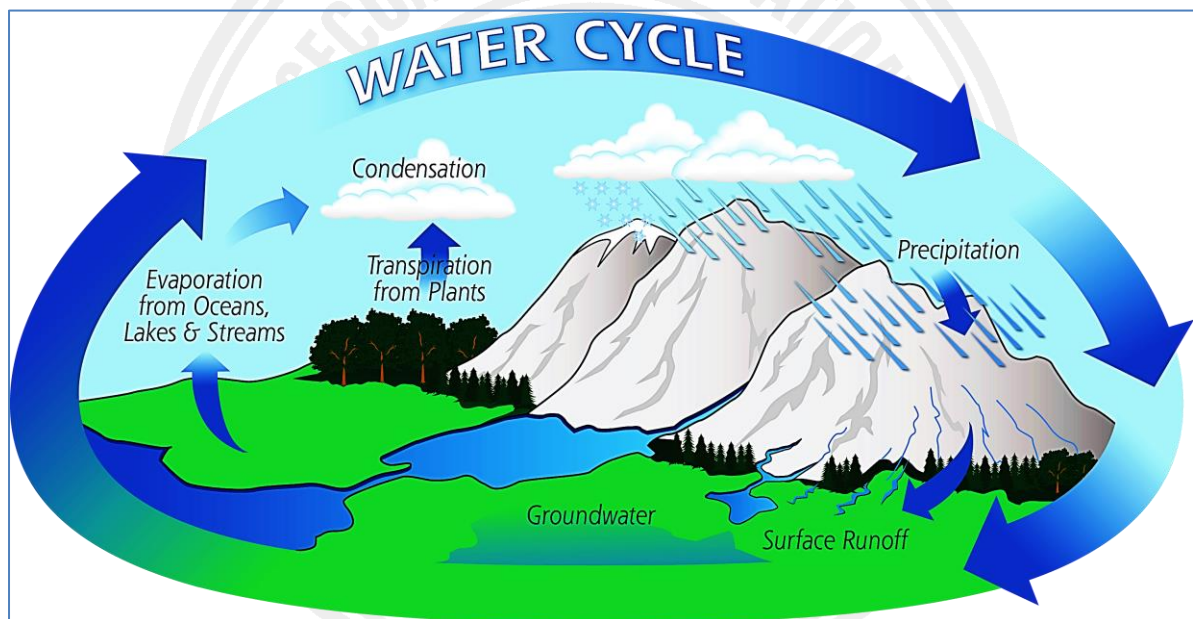


Fig. Water Cycle





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EXTRA QUESTIONS AND ANSWERS

1. What is biosphere? What are biotic and abiotic components of the biosphere?

Ans: The habitable part of the earth where the atmosphere, the hydrosphere and lithosphere interact and make life possible is known as biosphere.

Thus, biosphere includes the **lithosphere** (solid), **hydrosphere** (water) and **atmosphere** (air).

2. What is air? What are its components?

Ans: Air is a mixture of gases that forms a transparent envelope (or atmosphere) around the earth. It extends up to 500 km above the surface of the Earth.

The main components are **nitrogen** (78.04%), **oxygen** (20.94%), CO₂, helium, argon, krypton, xenon and water vapour.

3. How are the biotic and abiotic components of the biosphere inter-related?

Ans: Green plants can synthesize their food from abiotic components like CO₂, H₂O and minerals in the presence of sunlight. Animals also receive their foods from plants directly or indirectly by consuming them.

Finally, the dead bodies of the organisms are broken down and release to the soil which are again used by the biotic components. Thus, the biotic components are converted into abiotic components (Food through decomposition after their death) which are used as raw materials by biotic component. In this way they are interrelated and help to maintain the ecological balance of the biosphere.

4. What are the roles of air in the biosphere?

Ans: Air prevents the sudden increase in temperature during the daylight hours and slows down the escape of heat into outer space during the night and above all air is life. Wind carries the rain drops from a place to another place giving availability of water on the earth.

5. Name the macronutrients and micronutrients.

Ans: Macronutrients are minerals required in larger amount and include - **C, H, O, N, P, K, S, Ca** and **Mg**.

Micronutrients are minerals required in smaller amount and include - **Cl, B, Fe, Mn, Cu, Mo, Zn** and **Ni**.



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6. Give one example of each of the following decomposers:

- a. Denitrifying bacteria
- b. Nitrifying bacteria
- c. Symbiotic bacteria

Ans:

- (a) Denitrifying bacteria - *Pseudomonas*
- (b) Nitrifying bacteria - *Nitrosomonas and Nitrobacter*
- (c) Symbiotic bacteria - *Rhizobium or Clostridium*

7. Write the importance of ozone layer of the atmosphere. What is the height of it from earth?

Ans: Ozone is a poisonous gas containing three atoms of oxygen, which acts as a protective blanket by absorbing most of the harmful **UV radiation** from the sun that might damage many life forms if they reach earth's surface. So, it is important for our survival.

It forms a thin layer in the lower stratosphere between **20 – 30 km** from the earth's surface.

8. What is ozone hole? What are the major pollutants responsible for these holes?

Ans: The ozone layer is getting depleted over **Antarctica** due to the **man-made pollutants** which react with ozone molecules. This reduction of ozone layer is called Ozone hole.

Major pollutants: responsible for ozone hole include chlorofluorocarbon (CFC), **nitrogen oxides**, **hydrocarbons** and oxides of chlorine and bromine. CFCs are released from refrigerators, aerosols spray, fire extinguisher, jet planes etc.



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