Nutrient Cycling & Ecosystem Services

2 Marks Questions

1.Explain the function of reservoir in nutrient cycle. List the two types of nutrient cycles in nature. [Foreign 2011]

Ans. Reservoir in an ecosystem meets the deficit that arises due to the imbalance in the influx and efflux of nutrients. The two types of nutrient cycles are:

(i) Gaseous cycle (ii) Sedimentary cycle

2.Name the two types of nutrient cycles existing in nature. Where are their reservoirs present? State the function of reservoirs. [All India 2010 c]

Ans. Two types of nutrient cycles in nature:

(i) (a) Gaseous cycles (carbon and nitrogen cycle).

(b) Sedimentary cycles (phosphorus and sulphur cycle).

(ii) (a) Reservoir for gaseous cycle is atmosphere.

(b) Reservoir for sedimentary cycle is earth's crust.

Function of Reservoir It meets the deficit which occurs due to the imbalance in the state of influx and efflux of nutrients

3 Marks Questions

3. State the function of a reservoir in a nutrient cycle. Explain the simplified model of carbon cycle in nature.

Ans. For function of a reservoir in a nutrient cycle.

Two types of nutrient cycles in nature:

(i) (a) Gaseous cycles (carbon and nitrogen cycle).

(b) Sedimentary cycles (phosphorus and sulphur cycle).

(ii) (a) Reservoir for gaseous cycle is atmosphere.

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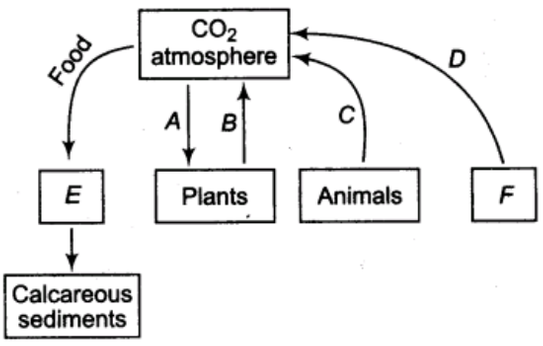
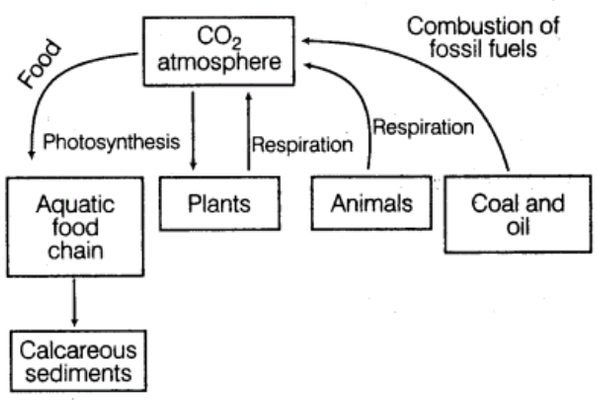
Function of Reservoir It meets the deficit which occurs due to the imbalance in the state of influx and efflux of nutrients

4.Draw and complete the following model of carbon cycle filling A, B,C,D,E and F.



Ans.Carbon cycle in

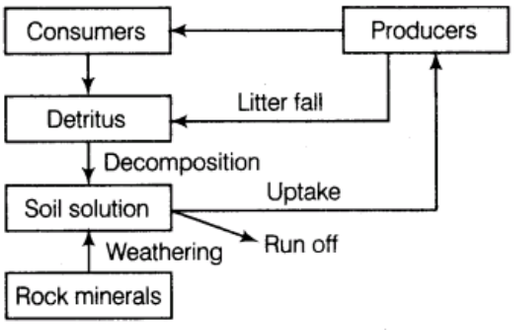


5 Marks Questions

5.(i) Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.

(ii) Write the importance of such cycles in ecosystems. [All India 2014 C]

Ans. (i) Simplified model of phosphorus cycling in a terrestrial ecosystem.



(ii)The importance of such nutrient cycles in ecosystem can be briefed as:

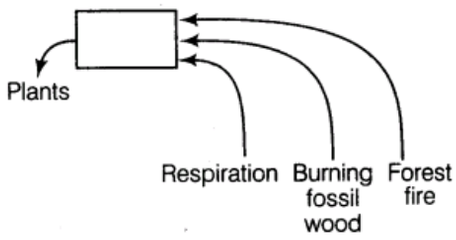
- It allows exchange, storage and transfer of biogenetic nutrients through various biotic components of ecosystem.
- It also allows exchange of nutrients between abiotic and biotic components of ecosystem.
- Recycling of nutrients allows them to be used repeatedly and indefinitely.

6.(i) (a) Name the given biogeochemical (nutrient)cycle.

(b) Name an activity of the living organisms not depicted in the cycle by which this nutrient is returned to the atmosphere.

(ii)How would the flow of nutnent m the cycle be affected due to the large scale

deforestation? Explain giving reasons.[Delhi 2011]



Ans.(i)(a) It is a carbon cycle.
(b) Decomposition of organic wastes by decomposers cycles the carbon back into atmosphere. (ii)Deforestation leads to increase in carbon dioxide levels in the air. Because the $C0_2$ present is not being utilised, i.e. fixed for photosynthesis in the absence of plants.

7.Carbon cycle in nature is a biogeochemical event. Explain.[Delhi 2009 C]
Ans.Carbon cycle is the most common nutrient or biogeochemical cycle of an ecosystem.
(i) Carbon constitutes 49% of dry weight of an organism.
(ii) About 71 % of carbon is found dissolved in oceans, which is responsible for its regulation in atmosphere.
(iii) Carbon cycle occurs through atmosphere, ocean and through living and dead organisms.
(iv)According to an estimate, 4×10^{13} kg of carbon is fixed in the biosphere through photosynthesis \ annually.
(v)Carbon is returned to atmosphere as $C0_2$ released by the animals and plants during respiration and by the activities of decomposers.
(vi) Some amount of fixed carbon is lost to sediments and removed from circulation.
(vii) The additional sources of carbon for the release in atmosphere are burning of wood, forest fire and combustion of organic matter, fossil fuel, volcanic activity.
(viii)Human activities like deforestation, massive burning of fossil fuel for energy and transport have increased the rate of release of carbon dioxide into the atmosphere.

8.What does the term standing state of soil signify? How are the nutrients recycled in the ecosystem? Write a cyclic account of carbon movement imnature. [All India 2009 c]
Ans.Standing state of soil The amount of nutrients, such as carbon, nitrogen, phosphorus, calcium, etc.,the present in the soil at any given time, is referred to as standing state of soil. It varies in different kind of ecosystem and also on a seasonal basis.
Nutrient cycling The movement of nutrients through various components of an ecosystem is called nutrient cycling or biogeochemical cycles. These are of two types, i.e. gaseous and sedimentary.
The cyclic account of carbon movement in nature.
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Miscellaneous Questions

1 Mark Question

1.Differentiate between standing state and standing crop in an ecosystem.[Foreign 2010]

Ans.Differences between standing state and standing crop are

Standing state	Standing crop
Amount of nutrients such as nitrogen, phosphorus, calcium, etc., present in the soil of an ecosystem at a given time.	Amount of living biomass available at a given trophic level at a given time.
It is an abiotic component.	It is a biotic component.

3 Marks Questions

2.(i) Healthy ecosystems are the base of wide range of (ecosystem) services. Justify.
(ii) Explain the differences and the similarities between hydrarch and xerarch successions of plants. [Delhi 2011]

Ans.(i) Healthy ecosystem provides following ecological services:

- Purification of air and maintenance of gaseous composition.
- Mitigation of droughts and floods. Cycling of nutrients.
- Store house of carbon.
- Maintenance of biodiversity.
- Habitat for a number of wildlife.
- Influence on hydrological cycle.

(ii)Differences between hydrarch and xerarch succession are:

Hydrarch succession	Xerarch succession
Ecological succession that starts in water bodies and proceeds to mesic condition.	Ecological succession that starts with bare rocks, xeric condition and proceeds to mesic conditions.
Phytoplanktons form the pioneer community.	Lichens form the pioneer community.

Similarities Both hydrarch and xerarch succession lead to mesic conditions.

3.(i) Trace the succession of plants on a dry bare rock,
(ii) How does phosphorus cycle differ from carbon cycle?

Ans.(i)Primary succession rocks The species of organisms that first invade a bare area are called pioneer species. The pioneer species on a bare rock are usually lichens. Lichens secrete acids which dissolve rocks, thereby leading to weathering and soil formation. This paves the way for small plants or bryophytes which hold the soil. They are succeeded by bigger plants and ultimately an entire forest gets established. Forests represent the climax community in this succession

(ii)Differences between phosphorus cycle and carbon cycle are

Phosphorus cycle	Carbon cycle
It is a sedimentary cycle.	It is a gaseous cycle.
Inputs provided by rainfall are very small.	Inputs provided by rainfall are higher.
Gaseous exchange between organisms and their environment is negligible.	Gaseous exchange between organisms and environment is high.