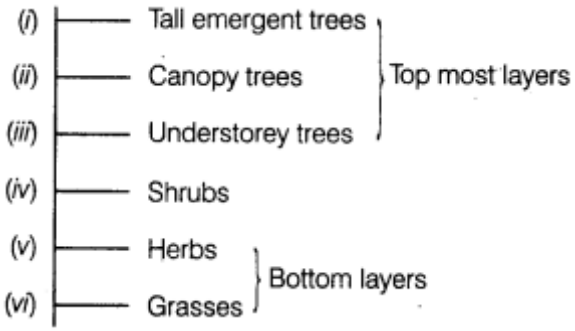
Chapter 13. Ecosystem

Ecosystem-Structure and Function, Productivity and Decomposition

1 Mark Questions

1. How is 'stratification' represented in a forest ecosystem? [Delhi 2014]

Ans. The stratification, i.e. the vertical distribution of species at different levels, in a forest ecosystem can be represented as:



2. What does 'R' represent in the given equation for productivity in an ecosystem? GPP – R = NPP [All India 2014C]

Ans. In the given equation for productivity in an ecosystem GPP-R= NPP. 'R' represents the energy utilised by plants or producers in respiration. It is also referred to as respiration losses**.**

3. Mention any two reasons why the primary productivity varies in different types of ecosystems? [All India 2014c].

Ans. The primary productivity varies in different types of ecosystems as:

(i) It depends upon plant species (producers) of a given ecosystem and their photosynthetic capacity.

(ii) It is dependent on various environmental factors like availability of nutrients.

4. Why are green algae not likely to be found in the deepest strata of the ocean? [All India 2013]

Ans. Green algae survive by utilisation of food synthesised by themselves through photosynthesis. At deepest layer in ocean, light is absent. So, photosynthesis does not take place and hence, green algae are not found in deep strata.

5. Write a difference between net primary productivity and gross primary productivity. [All India 2011]

Ans

Difference between GPP and NPP is:

Gross Primary Productivity (GPP)	**Net Primary Productivity** (NPP)
It is the rate of production of biomass/organic matter by producers during photosynthesis.	It refers to the biomass/organic matter available for the consumption to heterotrophs, left after some respiration losses.

6. What is secondary productivity? [Delhi 2009]

Ans. Secondary productivity is defined as the rate of formation of new organic matter by the consumers.

7. All the primary productivity is not available to a herbivore, give one reason. [Delhi 2009C]

Ans. All the primary productivity is not available to a herbivore because a considerable amount is utilised by the plants in respiration, while some is lost as heat into the environment.

8. What is net primary productivity of an ecosystem? [Delhi 2008C]

Ans. The amount of remaining energy or biomass in a producer after meeting the cost of its respiration is called net primary productivity of an ecosystem.

2 Marks Question

9. Differentiate between a detritivore and a decomposer giving an example of each. [Delhi 2008]

Ans

Difference between detritivore and decomposer is:

Detritivore	**Decomposer**
Detritivore is an organism that breaks down the detritus into smaller particles, i.e. fragments.	Decomposer is an organism, which does enzymatic degradation of detritus into simpler inorganic substances.
e.g. earthworm.	e.g. some bacteria and some fungi.

3 Marks Question

10.(i) What is primary productivity? Why does it vary in different types of ecosystems?

(ii) State the relation between gross and net primary productivity. [Delhi 2014]

Ans. The amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis is called primary productivity. It is expressed in terms of $g_{-}^{2}yr\sim^{1}$.

The primary productivity varies in different types of ecosystem as it depends upon different plant species present in a given ecosystem and each of their photosynthetic efficiency. Also, the environmental factors, availability of various nutrients vary in different ecosystems, leading to variations in primary productivity.

(ii) The relationship between gross and net primary productivity can be explained by equation:

GPP- R= NPP

While, GPP is total amount of organic matter produced during photosynthesis and NPP is same amount of organic matter (biomass) for the consumption of heterotrophs, except for some respiratory losses, i.e. energy utilised by plants during respiration.

5 Marks Questions

11. How is detritus decomposed step-by-step by different agents and made available as nutrients to the plants? Explain. [Delhi 2013c]

or

Describe the process of decomposition of detritiis under the following heads fragmentation, leaching, catabolism, humification and mineralisation. [All India 2008C]

Ans. **Detritus** is the raw material for decomposition. It includes dead remains of plants (leaves, bark and flowers) and of animals including faecal matter. It is largely an aerobic process, i.e. requires oxygen for its processing.

Different steps involved in the process of decomposition are:

(i) **Fragmentation** is the process of breaking down of detritus into smaller particles.

(ii) **Leaching** is the process by which water soluble inorganic nutrients go down into the soil horizons and gets precipitated as unavailable salts.

(iii) **Catabolism** is the process of degradation of detritus into simple organic material by the action of bacterial and fungal enzymes and their further conversion into inorganic compounds.

(iv) **Humification** is a process that leads to an accumulation of a dark coloured, amorphous and colloidal substance called humus which is highly resistant to microbial action and decompose at a very slow rate. It serves as a reservoir of nutrients.

(v) **Mineralisation** is the process by which humus is further degraded by microbial action and release inorganic nutrients.

12. (i) Explain primary productivity and the factors that influence it.(ii) Describe how do oxygen and chemical composition of detritus control decomposition? [Delhi 20U]

(i) Primary productivity can be defined as the amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis. It is expressed in terms of weight (gm^{-2}) or energy (kcal cm^2).

It can be divided as:

(a) **Gross Primary Productivity** (GPP) It is the rate of production of biomass/organic matter by the producers during photosynthesis.

(b) **Net Primary Productivity (NPP)**

It is. the biomass/organic matter available at the producer level to the primary consumers, i.e. GPP respiratory losses.

Factors affecting primary productivity:

- Availability of nutrients.
- Quality and duration of sunlight.
- Water availability.
- Temperature of given place.
- Type of plant species.
- Photosynthetic capacity of plants.

(ii) (a) **Oxygen composition of detritus**

- Decomposition is an oxygen consuming process. Anaerobic conditions inhibit decomposition.

(b) **Chemical composition of detritus**

- Decomposition is fast when detritus is rich in nitrogen and water soluble substances like sugars.
- It is slow, when detritus is rich in lignin and chitin.

Energy Flow and Ecological Succession

1 Mark Questions

1.State what does standing crop of a trophic level represent. [Delhi 2013]

Ans.Standing crop represents the total mass of living material or energy content of all the organisms of a trophic level at a particular time and location

2.What is a detritus food chain made up of? How do they meet their energy and nutritional requirements? [All India 2013]

Ans. It is made up of decomposers, i.e. some bacteria and fungi. They meet their energy and nutrient requirements by degrading the dead organic matter of detritus

3.Mention the role of pioneer species in primary succession on rocks. [Foreign 2012]

Ans.Lichens are the pioneer species in the succession on rocks. They secrete acids to dissolve the rock and help in weathering and soil formation and pave way to small plant like bryophytes.

4.List any two ways of measuring the standing crop of a trophic level.[Foreign 2010]

Ans. Standing crop can be measured as:
(i) Biomass of living organism in a unit area.
(ii)Number in a unit area

2 Marks Questions

5.A part from being a part of food chain, predators play other important roles. Mention any two such roles supported by examples.[Delhi 2014]

Ans. Apart from being a part of food chain, predators play important role in:
(i) **Maintaining the prey population** and also regulates intraspecies competition.
(ii)**Indicating ecological disturbances** as predators are small in number and highly sensitive to ecological changes owing to their excessive adaptation.

6.It is possible that a species may occupy more than one trophic level in the same ecosystem at the same time. Explain with the help of one example.[All India 2013,2008 C]

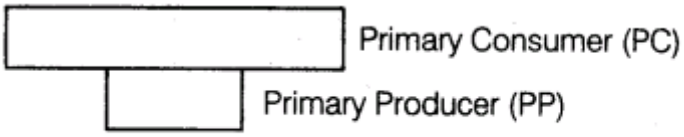
Ans. Yes, the trophic level of species represents the functional level of species in the energy ^ flow. The preference of food habit depends on the available food and worms. A single species may occupy more than one trophic level at the same time in ecosystem. For example, sparrow is primary consumer when it eats seeds and secondary consumer when feeds on insects and worms.

7.Name the type of food chains responsible for the flow of larger fraction of energy in an aquatic and a terrestrial ecosystem respectively. Mention one difference between the two food chains. [Delhi 2010]
Ans.Food chain in aquatic ecosystem is the grazing food chain. In terrestrial ecosystem, it is detritus food chain. Differences between grazing and detritus food chain are:

Grazing food chain	Detritus food chain
Transfer of energy starts from producers.	Transfer of energy starts from detritus/decomposing organic matter.
Less energy flows through this.	More energy flows through this.
In aquatic ecosystem, it is the major conduit for energy transfer.	In terrestrial ecosystem, it is the major conduit for energy transfer.

8.Explain standing crop in an ecosystem. Draw a pyramid of biomass when a small standing crop of phytoplanktons supports a large standing crop of zooplankton in the sea. [Delhi 2010]

Ans.Standing crop represents the total mass of living material or energy content of all the organisms of a trophic level at a particular time and location



Pyramid of biomass (standing crop)

Inverted pyramid of biomass small standing crop of phytoplankton supports large standing crop of zooplankton

9.Construct a grazing food chain and detritus food chain using the following five links each. Earthworm, bird, snake, vulture, grass, grasshopper, frog, decaying plant matter. [Foreign 2008]

Ans.Grazir ood chain
Grass — >Grasshopper— > Bird— >Snake -> Vulture

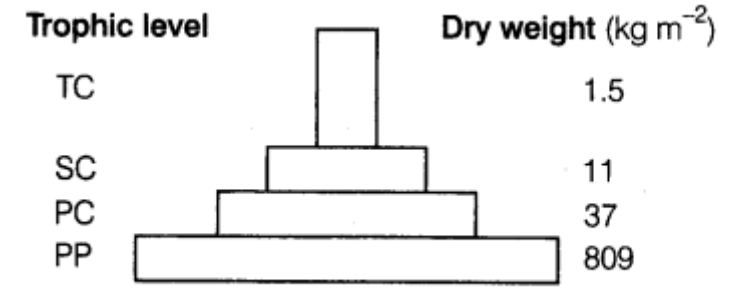
Detritus food chain
Dead and decaying plant matter— >Earthworm— >Bird — >Snake Vulture

3 Marks Questions

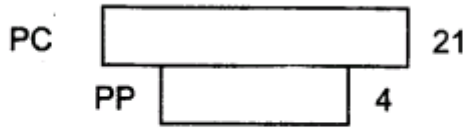
10.Differentiate between two different types of pyramids of biomass with the help of an example. [Delhi 2013]

Ans.Pyramid of' biomass refers to the relationship between producers and consumers in terms of biomass.It can be:

- Upright, e.g. in grasslands ecosystem
- Inverted, e.g. in pond ecosystem



Pyramid of biomass shows a sharp decrease in biomass at higher trophic levels



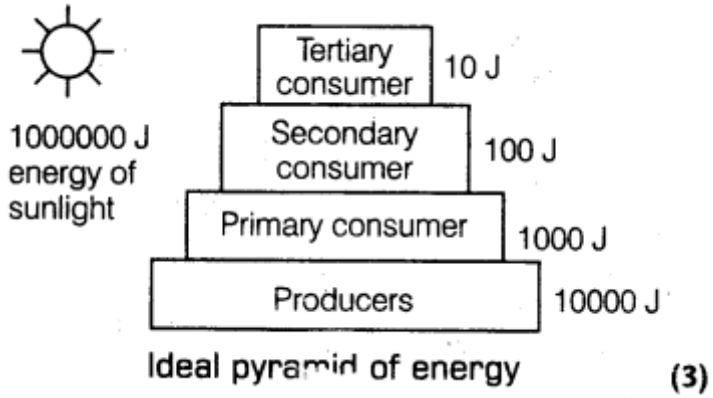
Inverted pyramid of biomass. Small standing crop of phytoplankton supports large standing crop of zooplankton

(1)

11.Name the pioneer species on a bare rock. How do they help in establishing the next type of vegetation? Mention the type of climax community that will ultimately get established.[Delhi 2009]

Ans.(i)Lichens are the pioneer species on a bare rock.
(ii) The lichens secrete some acid to dissolve rock and help in weathering and soil formation.
(iii) Later, some small bryophytes invade and hold the small amount of soil.
(iv)The bryophytes are succeeded by herbs, shrubs and ultimately big trees.
(v)At last, a stable climax forest is formed.
(vi)Mesophytic climax community will be established from xerophytic habitat.

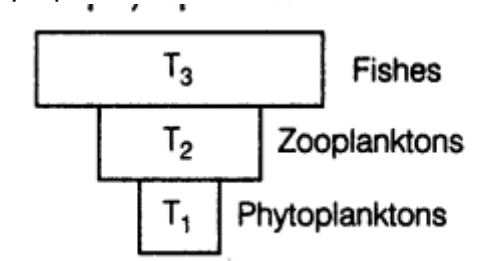
12.Construct an ideal pyramid of energy, when 1000000 J of sunlight is available. Label all its levels.[Delhi 2009]
Ans.



Ideal pyramid of energy (3)

13.Construct a pyramid of biomass starting with phytoplanktons, label three trophic levels. Is this upright or inverted? Why? [All India 2009]

Ans. The pyramid is inverted because the biomass of fishes is much more than that of the phytoplanktons.



Pyramid of biomass (inverted)

14.Define a climax community. How does a sere differ from a serai community? [Delhi 2008 C]

Ans.Climax community can be defined as a community which gets established at the terminal stage of succession and remains in equilibrium with the environment,

Difference between sere and serai community

Sere	Seral community
An entire sequence of communities that successively change in a given area.	Each of the community that gets established between the pioneer and climax communities.

5 Marks Questions

15.(i) Differentiate between primary and secondary ecological successions.
(ii)Explain the different steps of xerarch succession occurring in nature. [Foreign 2014]

Ans.(i)The differences between primary and secondary ecological succession can be summarised as:

Primary succession	Secondary succession
Initiates in area where organisms never existed, i.e. bare areas.	Initiate in areas where communities are recently destroyed.
The absence of the soil, humus and reproductive structures of organisms.	The presence of the soil, humus and reproductive structures from organisms of previous communities.
Takes a long time, i.e. several hundred to thousands of years to reach climax stage.	Takes comparatively lesstime (50-200 years) to reach climax or stable stage.

(ii)The different succession in occurring in xerarch re can be summarised as:

- The pioneer species lichens grows on hare rocks
- They secrete some acids that dissolve rock, help in weathering and soil formation.
- Allows small plants, e.g. bryophytes to invade and hold some soil.
- These are succeeded by bigger plants in order as herbs, shrubs and finally big trees.

16.(i) With suitable examples, explain the energy flow through different trophic levels. What does each bar in this pyramid represent?
(ii) Write any two limitations of ecological pyramids. [Delhi 2014 c]

Ans.(i)The energy flows unidirectionally from the first trophic level (producers) to last trophic level (consumers), and as the energy flows from one trophic level to another, some energy is

always lost as heat into the surrounding environment. So, the amount of energy flowing decreases at each successive trophic levels.
This can be explained with the help of a diagram of a grazing food chain.
The pyramid of energy is always upright and each bar in the pyramid indicates the amount of energy the present at each trophic level in a given time or per unit area:
(ii) The limitations of ecological pyramids are:

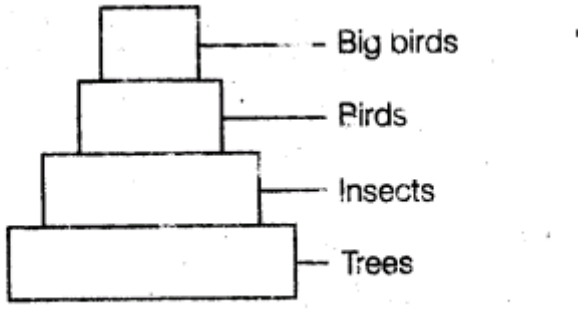
- It does not consider the same single species operating at two or more trophic levels.
- It assumes simple food chains that do not exist in nature and do not accomodate food web.
- Saprophytes, detritivores and decomposers are not given any place in pyramids, despite their vital role in ecosystem (any two).

17.Explain how does a primary succession start on a bare rock and reach a climax community?[Delhi 2012]

Ans.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.

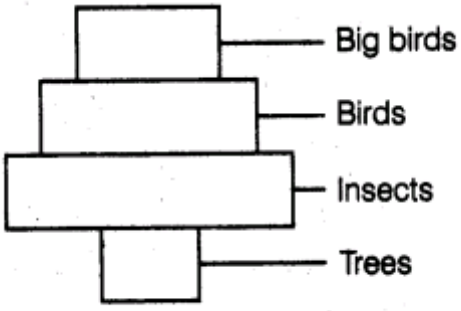
18.(i) Draw a pyramid of numbers of a situation, where a large population of insects feed upon a very big tree. The insects in turn, are eaten by small birds which in turn are fed upon by big birds.
(ii) Differentiate giving reasons, between the pyramid of biomass of the above situation and the pyramid of numbers that you have drawn. [Delhi 2012]

Ans.(i) Pyramid of numbers showing interaction between trees, insects., birds and big birds.



Pyramid of number (interaction)

(ii) (a) Pyramid of number is spindle-shaped as the number of insects is maximum. The number of trees and birds are less than the insects. The number is gradually decreasing at each trophic level.



Pyramid of number (spindle-shaped)

(b)The pyramid of biomass in this ecosystem is erect because the biomass decreases at each trophic level.

19.(i) Explain the significance of ecological pyramids with the help of an example.
(ii) Why are the pyramids referred to as upright or inverted? Explain.[All India 2012]

Ans.(i)**Significance of ecological pyramids**

They graphically represent the relation between producers and consumers. To calculate energy. content, biomass or numbers, organisms of that trophic level needs to be calculated. A trophic level represents only a functional level not a species as such. A given species may occupy more than one trophic level in the same ecosystem at the same time. The ecological pyramids provide an over all idea of the trophic levels occupied by an organism in an ecosystem.
Example A sparrow is a .primary consumer, when it eats seeds, fruits, peas and a secondary consumer when it eats insects and worms.

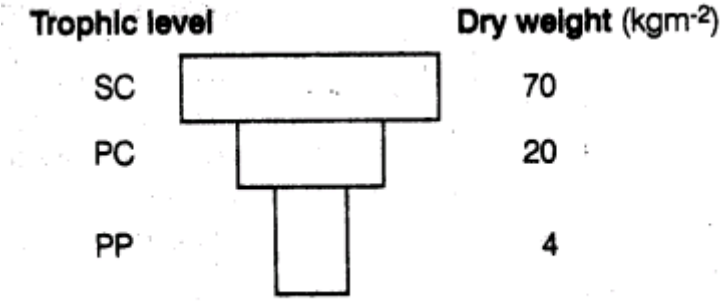
(ii)**Upright pyramids**

When producers are more in number ar d biomass than the herbivo-es and herbivores are more in number and bionrss than the carnivores. Energy at a lower trophic level is always more than at a higher trophic level. Pyramid of energy is ah rays upright.

Inverted pyramids When the numbers of producers are less and consumers increase and become largest in top consumer level.Pyramid pf number and biomass may be inverted

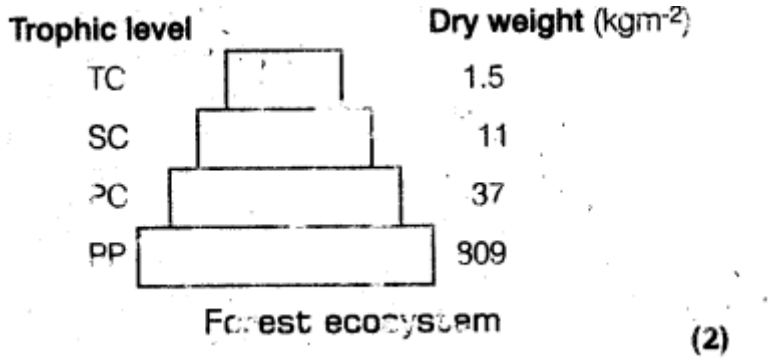
20.(i) Draw the pyramids of biomass in a sea and in a forest. Explain giving reason, why the two pyramids different.
(ii) Pyramid of energy is always upright. Explain.[HOTS; Foreign 2010]

Ans.(i) (a) The pyramid of biomass in a ;ea ecosystem is inverted. Because, the sum total of the weight of phytoplankton (producer) is far less than a few fishes feeding at higher trophic levels.



(1)

(b)Pyramid of biomass in a forest ecosystem is upright because producers are more in biomass than primary consumers. Primary consumers are more than secondary consumers and secondary consumers are more than tertiary consumers (top).



(2)

(ii)Pyramid of energy is neve- inverted. Because, .when energy flows from a particular trophic level to the nex. trophic level, some energy is a I wry s lost as heat at each step. Each bar in the energy pyramid indicates the amount of energy present at each trophic level in a given time.

21.(i) Explain how a hydrarch succession progresses from hydric to mesic condition from a stable community?
(ii) Why is the rate of secondary succession faster than that of primary succession? [Delhi 2010c]

Ans.(i) Hydrarch succession occurs in wet areas,or water, leading to successional series that progress from hydric to the mesic condition.In hydrarch succession, pioneers are phytoplanktons. These phytoplanktons with time are replaced by free floating angiosperms, followed by rooted hydrophytes, sedges, grasses and finally the trees, leading to mesic condition.
(ii) The secondary succession is faster than primary succession because it begins in areas where natural biotic communities have been destroyed such as abondaned farm lands, burned or cut forests. Since, some soil is present succession is faster than primary succession. At any time during primary or secondary succession, natural and human induced disturbance can convert a particular serai stage of succession to an earlier stage.

22.Explain how xerarch succession progresses from xeric to mesic condition and form a stable climax community. You may use a flow Chart.[All India 2010 C]

Ans. Xerarch succession occurs in dry areas and the series progress from xeric to mesic condition. The climax community remains stable as long as environment remains unchanged. With time the xerophytic habitat gets converted into a mesophytic one.

Stages of xerarch succession are:

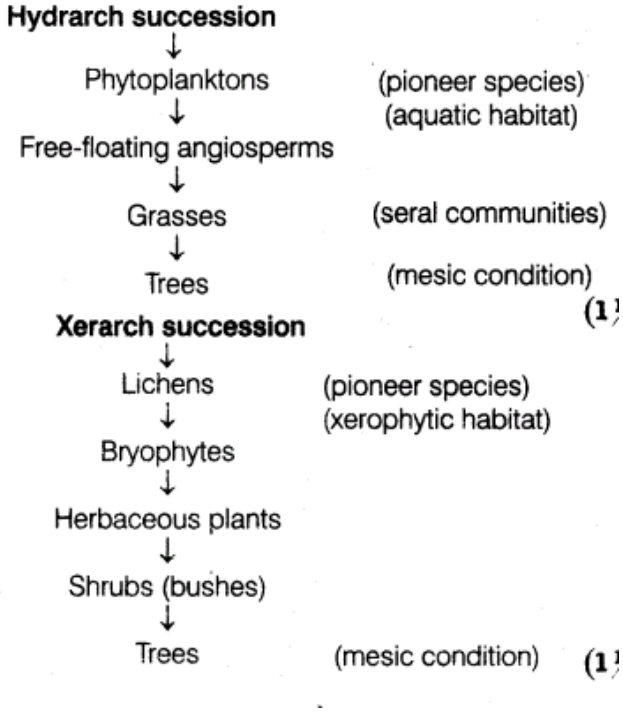
Lichens (pioneer community dry condition)
↓
Bryophytes
↓
Herbaceous plants (seral communities)
↓
Shrubs (bushes)
↓
Trees (climax community mesic condition) **(1)**

It occurs in following steps as shown in flow chart:
(i) Lichens secrete some acids which dissolve rocks and help in weathering and soil formation,
(ii) Bryophytes invade and hold some soil.
(iii) Bryophytes are succeeded by herbs, shrubs and ultimately big trees.

(iv) At last, a stable climax forest is formed.
(v) Finally, a xerarch condition is converted into a mesic one.

23.All successions proceed to a similar climax community, the mesic. Explain. [HOTS; All India 2008]

Ans.All succession proceed to a similar climax community, i.e. the mesic.
(i) Succession of plants occurs as hydrarch or xerarch.
(ii) Hydrarch succession occurs in water bodies and the successional series progress from hydric to mesic conditions.
(iii) Xerarch succession takes place in dry areas and the series progress from xeric to mesic conditions.
(iv) Hence, both xerarch and hydrarch conditions lead to medium water conditions (mesic).
So, it can be said that all successions proceed to a similar complex community.



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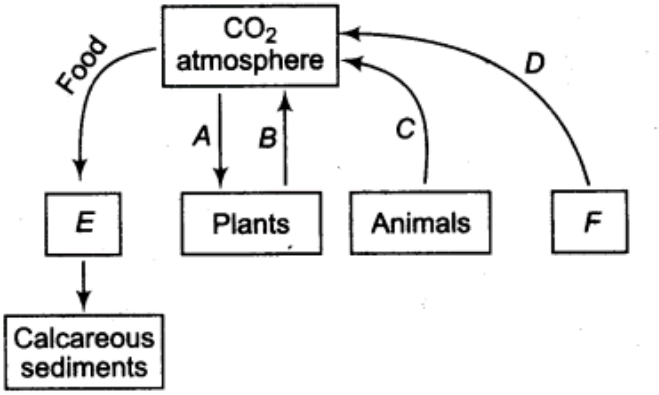
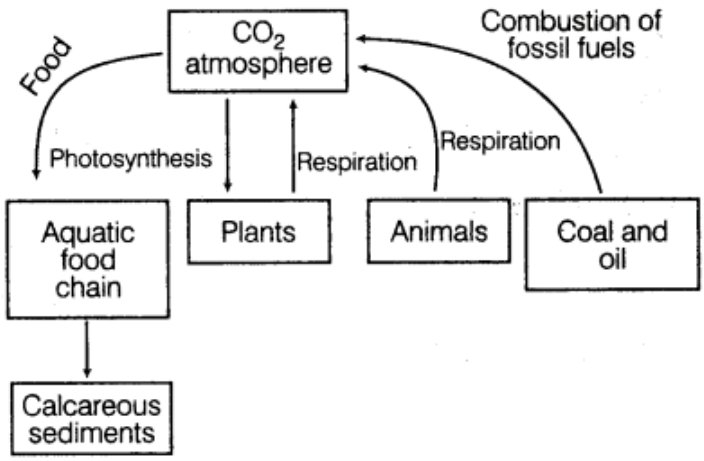
Function of Reservoir It meets the deficit which occurs due to the imbalance in the state of influx and efflux of nutrients

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



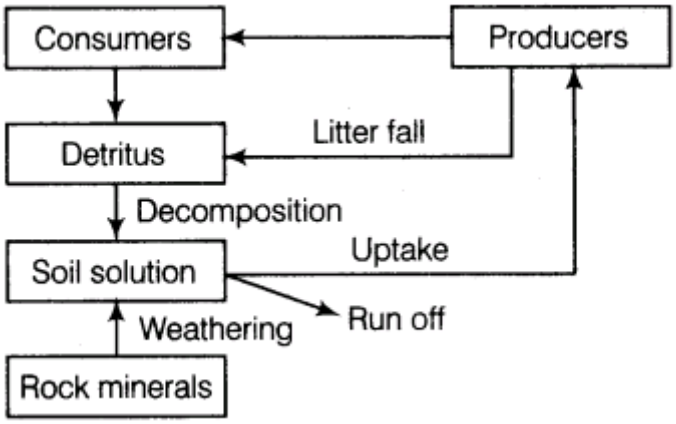
Ans.Carbon cycle in



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]

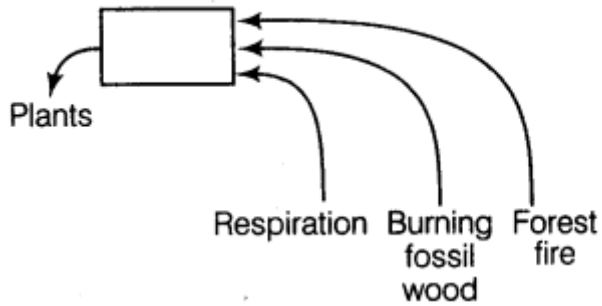
Ans. (i) Simplified model of phosphorus cycling in a terrestrial ecosystem.



(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 x 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.

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 x 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.

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.