QB365

Important Questions - Ecosystem

12th Standard CBSE

Biology

Reg.No. : | | | | | | |

Time : 01:00:00 Hrs

Total Marks : 50

Section - A

1) What is the percentage of photosynthetically active radiation (PAR), if incident solar radiation is considered 100%? **1**

(a) 100% (b) 50% (c) 1-5% (d) 2-10%

2) Which of the following is expected to have the highest value ($gm/m^2/yr$) in a grassland ecosystem? **1**

(a) Tertiary production (b) Gross production (c) Net production (d) Secondary production

3) Which one of the following pairs is mismatched? **1**

(a) Tundra : permafrost (b) Savannah : acacia trees (c) Prairie: epiphytes

(d) Coniferous forest : evergreen trees

4) Decomposers are **1**

(a) autotrophs (b) autoheterotrophs (c) organotrophs (d) heterotrophs

5) Which ecosystem has the highest primary productivity? **1**

(a) pond (b) ocean (c) desert (d) forest

6) Term ecosystem was given by **1**

(a) Odum (b) Haeckel (c) Tansley (d) Mobius and Forbes

7) Pyramid of energy in aquatic ecosystem is **1**

(a) always straight (b) always inverted (c) bell shaped (d) none of these

8) Which one of the following is considered as pioneer community in xerarch? **1**

(a) annual herb (b) perennial herb (c) scrub stage (d) forest stage (e) lichen

9) In a grassland ecosystem, if the number of primary producers is approximately 6 million plants, the number of top carnivore (in million) which may be suported by it may be **1**

(a) 3 (b) 30 (c) 6 (d) 60

10) Nutrient enrichment of a lake will cause **1**

(a) eutrophication (b) stratification (c) biomagnification (d) bioaccumulation

Section - B

11) 'It is possible that a species may occupy more than one trophic level in the same ecosystem time'.Explain with the help of an example. **2**

12) State the difference between the first trophic levels of detritus food chain and grazing food chain. **2**

13) What is stratification in an ecosystem?Explain with an example. **2**

14) What are saprotrophs?How do they obtain their nutrition? **2**

15) How do seeds get dispersed in an ecosystem? **2**

16) What is an incomplete ecosystem? Explain with the help of suitable example. **2**

17) The rate of decomposition of detritus is affected by the abiotic factors like availability of oxygen, pH of soil substratum, temperature, etc. Discuss. **2**

18) "In a food-chain a trophic level represents a functional level, not a species." Explain. **2**

19) Differentiate between a detritivore and a decomposer giving an example of each. **2**

20) Climax stage is achieved quickly in secondary succession as compared to primary succession? Why? **2**

Section - C

21) Describe the process of decomposition of detritus under the following heads: Fragments, Leaching, Catabolism, Humification and Mineralisation. **5**

22) (a)Explain primary productivity and the factors that influence it. **5**
(b)Describe how do oxygen and chemical composition of detritus control decomposition.

23) (a)Draw an ideal pyramid of energy upto four trophic levels,where 10,00,00 J are available from sunlight to the primary producer.Indicate the amount of energy available at each trophic level. (b)Why is pyramid of energy always upright?Explain (c)Mention the limitation of an ecological pyramid. **5**

24) Describe a pond as an ecosystem. **5**

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Section - A

1) (b) 50% **1**

2) (b) Gross production **1**

3) (c) Prairie: epiphytes **1**

4) (d) heterotrophs **1**

5) (d) forest **1**

6) (c) Tansley **1**

7) (a) always straight **1**

8) (e) lichen **1**

9) (a) 3 **1**

10) (a) eutrophication **1**

Section - B

11) **2**

- Man can occupy two different trophic levels.
- When he depends only on vegetarian food (plants), he occupies second trophic level and is a primary consumer.Plants $\rightarrow$ Man
- When he eats the flesh of some animals (non-vegetarian food), he occupies third trophic level, as he is secondary consumer.Plant $\rightarrow$ Goat $\rightarrow$ Man

12) **2**

First trophic level of detritus food chain	**First trophic level of grazing food chain**
- It is occupied by decomposers. - They degrade the organic molecules by secreting enzymes into simpler inorganic substances. - Certain fungi and bacteria are decomposers.	- It is occupied by producers. - They manufacture complex organic molecules with the help of sunlight. - All green plants, photosynthetic bacteria and cyanobacteria are producers.

13) **2**

Stratification refers to the vertical distribution of different species occupying different levels in the ecosystem. - Trees occupy the topmost vertical layer of a forest, shrubs occupy the second layer and herbs and grasses occupy the bottom layers.

14) **2**

Saprotrophs are those organisms, which meet their energy requirements by degrading the organic molecules. - They release enzymes which degrade/decompose the organic matter outside their body and absorb the digested nutrients.

15) **2**

(i)Some fruits are eaten by birds and their seeds come out with the excreta. (ii)Some seeds stick to the skin of the animals and get dispersed. (iii)Some seeds have adaptations to be carried away by wind. (iv)Seeds of certain aquatic plants are dispersed by water.

16) **2**

An ecosystem comprises with biotic and abiotic component. A biotic component include light, air, water, temperature, humidity etc, while biotic factor comprises all living organism. Absence or limited availability of any component (either abiotic or biotic) makes an ecosystem incomplete like the profundal and benthic zone in an aquatic ecosystem.

17) **2**

Decomposition of detritus is carried out by microorganisms. It is basically oxygen-requiring process. Type and rate of growth as well as activity of microorganisms are affected by availability of aeration, chemical composition of delritus, pH and temperature. 1. Availability of oxygen will determine aerobic and anaerobic type of decomposers carry out partial or incomplete decomposition. Aerobic decomposers do so completely. 2. pH of the medium soil substratum shall decide the acidophilic, neutrophilic or basophilic nature of microorganisms and the type of their activity. 3. Temperature determines the rate of decomposition as both microorganisms and their exoenzymes released for decomposition show temperature related activity. 4. Chemical Composition of detritus. The decomposition rate is slow if detritus is rich in lignin and chitin, and quicker, if detritus is rich in nitrogen and water soluble substances like sugar.

18) **2**

1. Trophic level is a step or division of food chain. It is characterized by the method of obtaining food. 2. The number of trophic level is equal to number of steps in the food chain. 3. The two fundamental trophic levels are producers and consumers. 4. Producers are autotrophic organisms found in ecosystem which synthesise food from raw materials. 5.Consumers are heterotrophic organisms. Herbivores are primary consumers. In a pond ecosystem many crustaceaus, larvae of insects constitute this trophic leve.

19) **2**

Detritivore breaks down detritus into smaller particles and this process is called fragmentation. Example earthworm.

Decomposer breaks down complex organic matter into inorganic substances and the process is called decomposition. Example is bacteria.

20) **2**

It is so because the substratum has rich organic matter, therefore, secondary succession achieves climax stage quickly.

Section - C

21) 5

Process of decomposition

(i) Fragmentation:

- It is the process of breaking of the detritus into smaller particles by detritivores like earthworm.

(ii) Leaching:

- It is the process in which water-soluble inorganic substances run down into soil horizon and get precipitated as unavailable salts.

(iii)Catabolism:

- The enzymatic conversion of the detritus into simple organic compounds and then into inorganic compounds, is called catabolism.
- The enzymes are secreted by the decomposers like bacteria and fungi.

(iv) Humification:

- Humification during decomposition leads to the accumulation of a dark coloured, amorphous substance, called humus.

(v)Mineralisation:

- It is the process in which the humus is degraded by certain microbes and the inorganic nutrients are released.

22) 5

(a)Primary productivity refers to the amount of biomass or organic matter produced per unit area over a time period by plants by photosynthesis.

- It is expressed in terms of weight (g^{-2}) or energy (kcal m^{-2}).

-It can be considered in terms of gross primary productivity (GPP) or net primary productivity (NPP).

-Gross primary productivity is the rate of production of biomass/organic matter by producers during photosynthesis.

-Net primary productivity refers to the biomass/organic matter available at the producer level to the primary consumers,i.e. GPP -Respiratory losses.

Factors affecting primary productivity include:

(i)The availability of nutrients.

(ii)Water availability.

(iii)Temperature of the given place.

(iv)The type of plant species.

(v)The photosynthetic capacity of plants.

(b) (i)Chemical composition of detritus:

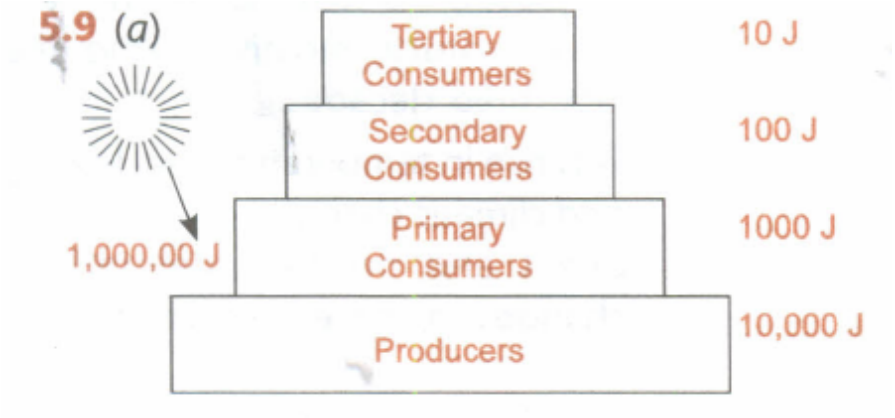
- Decomposition is faster when detritus is rich in nitrogen and water-soluble substance like sugars.
- Decomposition is an oxygen-consuming process.

(ii)Oxygen

- Decomposition is an oxygen-consuming process.

-Anaerobic conditions inhibit decomposition.

23) 5.9 (a) 5



(b) Pyramid of energy is always upright, because only 10% of energy flows from a particular trophic level to the next trophic level and some of it is always lost as heat at each step.

(c) Limitations of ecological pyramids:

(i) They do not take into account the same species belonging to two or more trophic levels.

(ii) It assumes a simple food chain whereas in nature it does not exist.

(iii) Saprophytes/decomposers are, not given any place in ecological pyramids.

24) 5

Pond --- an Ecosystem - Pond is a fairly self-sustainable unit that shows even complex interactions of an aquatic ecosystem. _ It is a shallow water body in which all the major/basic components of an ecosystem are well exhibited. _ The abiotic components ar: (i)Water with all the dissolved inorganic substance. (ii)The rich soil deposit at the bottom. (iii)The solar input. (iv)The cycle of temperature. (v)day length. (vi)Climatic factor. - The producers or autotrophic components include phytoplanktons, some algae, floating and submerged and marginal plants. - The consumers are represented by (i)zooplanktons, (ii)free-swimming animals, (iii)bottom dwelling animals. -The decomposers are the bacteria and fungi that are found at the bottom. -This system performs all the function of an ecosystem. (i) Conversion of inorganic materials into organic compounds with the help of radiant energy of sun. (ii) Consumption of autotrophs by heterotrophs, (food chain/food web), decomposition and mineralisation (nutrient cycling), etc.