CBSE Test Paper 03 Ch-14 Ecosystem

- 1. Correct decreasing order for rate of primary productivity on land will be
 - a. Savannah > Temperate forests > Tropical rainforests > Arid regions
 - b. Tropical rainforests >Savannah > Arid regions>Temperate forests
 - c. Tropical rainforests > Temperate forests > Savannah > Arid regions
 - d. Temperate forests > Tropical rainforests > Savannah > Arid regions
- 2. The ten percent law for energy transfer through trophic levels was proposed by
 - a. Tansley
 - b. Charles Elton
 - c. Lindemann
 - d. Ramdeo Misra
- 3. Coral reefs in aquatic ecosystem hold the same position as held by:
 - a. northern coniferous forests in terrestrial ecosystem
 - b. tropical deciduous forests in terrestrial ecosystem
 - c. tropical rainforests in terrestrial ecosystem
 - d. mediterranian scrub forests in terrestrial ecosystem
- 4. Organism/s living as both producer as well as consumer is/are
 - a. Algae & fungi
 - b. Cuscuta
 - c. Nepenthes & Drocera
 - d. Phytoplankton
- 5. Examples of local and global nutrient cycles will be
 - a. Carbon and phosphorus cycles respectively
 - b. Phosphorus and calcium cycles respectively
 - c. Carbon and nitrogen cycles respectively
 - d. Phosphorus and carbon cycles respectively
- 6. What is a detritus food chain made up of? How do they meet their energy and nutritional requirements?
- 7. In the following food chain, 5 J of energy is available to man. How much energy was available at the producer level?

 $Plants \!\rightarrow\! Sheep \!\rightarrow\! Man$

- 8. The pyramid of energy is always inverted. It can never be upright. (True/False)
- 9. Due to uncontrolled excessive hunting the population of tigers in a forest becomes zero. Discuss the long term effects of this situation on the population of deer in that forest.
- 10. Why the pyramid of energy is always upright?
- 11. Distinguish between: Food chain and food web
- 12. What do you understand by climax community?
- 13. What are ecological pyramids? Mention its limitations.
- 14. How does phosphorus cycle differ from carbon cycle?
- 15. Give an account of energy flow in an ecosystem

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Answer

- c. Tropical rainforests > Temperate forests > Savannah > Arid regions,
 Explanation: Primary productivity is maximum in tropical rain forests due to availability of sufficient food and water followed by temperate forests.
 Savannah grasslands have comparatively less productivity and arid regions have limited biotic component and water.
- 2. c. Lindemann, Explanation: The Ten percent law of transfer of energy from one trophic level to the next was introduced by Raymond Lindeman (1942).
 According to this law, during the transfer of energy from organic food from one trophic level to the next, only about ten percent of the energy from organic matter is stored as flesh. The remaining is lost during transfer, broken down in respiration, or lost to incomplete digestion by higher trophic level.
- c. tropical rainforests in terrestrial ecosystem, Explanation: Coral reefs in aquatic ecosystem hold the same position as held by tropical rainforest in terrestrial ecosystem. Both coral reefs and tropical rainforest have large numbers of diversity.
- c. Nepenthes & Drocera, Explanation: Nepenthes (pitcher plant) and Drocera are insectivores plants to compensate their protein requirement. They have green leaves that perform photosynthesis process. So, they act as both producer as well as consumer.
- 5. d. Phosphorus and carbon cycles respectively, Explanation: The nutrient cycle describes the use, movement, and recycling of nutrients in the environment. Nutrient cycles are inclusive of both living and non-living components and involve biological, geological, and chemical processes. For this reason, these nutrient circuits are known as biogeochemical cycles. Biogeochemical cycles can be broken down into two types: local cycles such as the phosphorus cycle, which involve elements with no mechanisms for long distance transfer; and global cycles, which involve an interchange between the atmosphere and the ecosystem. It is these global nutrient cycles, such as the

nitrogen cycle and carbon cycle, that unite the Earth and its living organisms into one giant interconnected ecosystem called the biosphere.

- 6. Detritus food chain 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.
- 7. 500 J because only 10% of the energy is transferred from one trophic level to another.
- 8. False, Pyramid of energy is upright because when energy flows from a trophic level to next trophic level, some energy is always lost as heat at each step. Finally, it is lost to atmosphere and never goes back to Sun.
- 9. The reduction in predator population may result in the increase of prey population (deer), since they are not prayed upon. Increase in the number of deer will lead to overgrazing hence, shortage of herbs and eventually reduction in the number of deer.
- 10. Pyramid of energy is upright because when energy flows from a trophic level to next trophic level, some energy is always lost as heat at each step. Finally it is lost to atmosphere and never goes back to Sun.

Food chain	Food web
1. It is the single straight pathway	1. It consists of number of interconnected
through which food energy travels in the	food chains through which food energy
ecosystem	travels in an ecosystem
2. Each food chain is distinct from other	2. A food web consists of a number of
food chains.	interconnected food chains
3. Isolated or separate food chains	3. Presence of complex food webs
increases the instability of the ecosystem	increases the stability of the ecosystem
4. It does not have any effect on	4. More complex food webs improves the
improving the adaptability and	adaptability and competitiveness of the
competitiveness of the organisms	organisms
5. Usually members of higher trophic	5. Usually members of higher trophic level
level* feed upon a single type of	feed upon many organisms of lower
organisms of lower trophic level	trophic level

12. It is also called climatic climax community which is the stable, self perpetuating and

11.

final biotic community that develops at the end of biotic succession and is in perfect harmony with the physical environment.

13. An ecological pyramid is a graphic representation of an ecological parameter like number of individuals present in various trophic levels of a food chain with producers forming the base and top carnivores forming the tip. There are three types of ecological pyramids: (1) Pyramid of numbers (2) Pyramid of biomass

(3) Pyramid of energy. Limitations:

(i) It assumes that food chains are simple. Simple food chains do not occur in nature. Instead food webs are present.

(ii) A simple species may operate at two or more trophic levels. Ecological pyramids have no method of accommodating such cases.

Carbon cycle	Phosphorus cycle
1. Cycling pool is air and water.	1. Cycling pool is soil and water (for aquatic habital).
2. It is gaseous cycle of matter.	2. It is sedimentary cycle of matter.
3. It is released to cycling pool by respiration of all organisms.	3. There is no such release.
4. Rainfall brings a lot of dissolved carbon.	4. There is no such dissolution as atmospheric content of phosphorus is negligible.

14.

15. Only 50% of the incident solar radiation is photosynthetically active radiation. Out of this plants capture about 2 to 10% of the energy. This small fraction of energy is what sustains life on the earth. The energy flows from produces (green plants) to consumers or to detritus. The flow of energy follows 10% rule. As per this rule 90% of the energy is spent in metabolic activities by an organism and only 10% is available for the next component of the food chain.

$\textbf{Producers} \rightarrow \textbf{Primary consumers} \rightarrow \textbf{Secondary consumers} \rightarrow \textbf{Tertiary consumers}$

Because of this 10% rule a food chain can have limited number of levels. Numerically also the number of organisms in a particular level will be less than that in the previous level