



1. How is diapause different from hibernation?

Ans: Diapause is a period of suspended growth or development occurring in many insects and other invertebrates during which metabolic activities are greatly reduced. On the other hand, hibernation is a sleep like state in which a few animals, such as fishes and amphibians, pass the winter season as a way of surviving food scarcity and cold weather.

2. If a marine fish is placed in a fresh water aquarium, will the fish be able to survive? Why or why not?

Ans: When a marine fish is placed in a fresh water aquarium, the fish will not be able to survive because marine fish is adapted to live in saline seawater. In fresh water, it will not be able to cope with the outside hypotonic environment because of osmoregulation problem. In fresh water, the concentration of water, the difference between the concentration of the water and inside of the fish are increased and therefore, the osmotic pressure is also increased. The fish has to take more water into the body to be able to survive and to get rid of the excess salt present in its body.

3. Define phenotypic adaptation. Give one example.

Ans: Phenotypic adaptations are non-genetic changes occurring in living organisms due to various extreme environmental conditions, such as stress, extreme temperature, change of habitat. These includes acclimatization, behavioural changes, etc.

4. Most living organisms cannot survive at temperature above 45°C. How are some microbes able to live in habitats with temperatures exceeding 100°C?

Ans: Micro-organisms of hot springs and vents (mouth of sea bed volcanoes) are able to survive at the high temperature due to (i) occurrence of branched chain lipids in their cell membrane that reduce fluidity of cell membranes.

(ii) having minimum amount of free water in their bodies. Removal of water provides resistance to high temperature.

5. List the attributes that populations but not individuals possess.

Ans: Some significant attributes that populations but not individual possess are -

- (i) Natality
- (ii) Mortality
- (iii) Growth forms
- (iv) Population density
- (v) Population dispersion
- (vi) Population age distribution
- (vii) Sex ratio

6. If a population growing exponentially double in size in 3 years, what is the intrinsic rate of increase ( $r$ ) of the population?

Ans: If the population growing exponentially double in size in 3 years, the intrinsic rate of increase of this population will be towards maximum.

7. Name important defence mechanisms in plants against herbivory.

Ans: There are various defence measures for animals against

predators. But plants, as they cannot move away, have certain defence mechanisms against herbivory. Their main defences are chemical toxins, such as strychnine, a poison produced by tropical vine, morphine by opium poppy, nicotine produced by tobacco plant. Apart from these chemicals, the common defence measure is presence of spines (modified leaves) on the leaves, stems of the plant, modifications of leaves into thorns, development of sharp silicated edges in leaves which prevent them against damage caused by herbivores.

8. An orchid plant is growing on the branch of mango tree. How do you describe this interaction between the orchid and the mango tree?

Ans: An orchid plant is growing on the branch of a mango tree is called epiphyte, i.e., plants growing on other plants or trees. This type of interaction is known as commensalism, where in orchid / derives benefit of interaction whereas mango tree is not affected. The orchid growing on the branch of mango tree get more light to grow and also, the mango is not harmed in any way. Commensalism can be defined as an interaction between two animal or plant species that habitually live together in which one species benefits from the association while the other is not significantly affected.

9. What is the ecological principle behind the biological control method of managing with pest insects?

Ans: The ecological principle behind the biological control method of managing with pest insects is predator - prey relationship. It is based on the ability of the predator to regulate prey population.

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