

**Class: 12**  
**Subject: Biology**  
**Topic: Organisms and populations**  
**No. of Questions: 25**

Q1. How is diapause different from hibernation?

Sol. Hibernation is the phenomenon commonly depicted by ectothermal (cold-blooded) animals which escape cold by hiding them in shelters such as caves, burrows, crevices, hollow tree trunks, mud etc. revealing minimum physiological activity. This phenomenon is also shown by some warm-blooded mammals.

Diapause. It is the phenomenon of spending unfavorable climatic conditions by insects during their development.

Q2. Define phenotypic adaptations. Give one example.

Sol. Phenotypic adaptation involves nongenetic changes in individuals such as physiological modifications such as acclimatization or behavioural changes.

Q3. List the attributes that populations possess but not the individuals.

Sol.

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

Q4. Name important defence mechanisms in plants against herbivory.

Sol.

- (i) Modification of leaves into thorns.
- (ii) Development of spiny margins on leaves.
- (iii) Development of sharp silicated edges in leaves.

Q5. Distinguish between the following:

- a. Hibernation and aestivation
- b. Ectotherms and endotherms.

Sol.

- a. The phenomenon of spending cold period in an inactive stage by an animal is called hibernation. On the other hand, the phenomenon of spending dry-hot period in an inactive stage is called aestivation.
- b. Ectotherms are the cold-blooded animals having body temperature matching with the environmental temperature. They are affected by temperature variations. Endotherms are warm-blooded animals who can regulate their body temperature by physiological means and maintain more or less constant internal temperature.

Q6. Define population and community.

- a. Commensalism
- b. Parasitism
- c. Camouflage
- d. Mutualism
- e. Interspecific Competition

Sol.

- a. Commensalism is an interspecific interaction between individuals of two species where one species is benefitted and other is not affected, e.g., orchid and mango tree.
- b. Parasitism is an interspecific interaction between individuals of two species where generally small species is benefitted (parasite) and the large species (host) is affected, e.g., malarial parasite and human beings.
- c. Camouflage. It is the ability of the animals to blend with the surroundings or background. In this way, animals remain unnoticed for protection or aggression. Example is stick insect.
- d. Mutualism is an interspecific interaction between individuals of two species where both the interacting species are benefitted in an obligatory way. Example. Pollination in plants by animals.
- e. Interspecific Competition. It is an interaction between individuals of two species where both the interacting species are affected, e.g., Monarch butterfly and Queen Monarch.

Q7. In a pond there were 20 Hydrilla plants. Through reproduction 10 new Hydrilla plants were added in a year. Calculate the birth rate of the population.

Sol. Hydrilla plants in pond = 20  
New plants by reproduction = 10  
Total plants = 30

$$\text{Birth rate of population} = \frac{\text{New plants}}{\text{Total plants}} \times 100 = \frac{10}{30} \times 100 = 33.3\%.$$

Q8. Define the following terms:

- a. Migration
- b. Stratosphere
- c. Community
- d. Biosphere

Sol.

- a. Migration refers to movement of animal population from one place to another and their subsequent return to avoid unfavourable climatic conditions.
- b. It is the layer of atmosphere that extends between altitudes of about 16-50 kilometres. It has a ozone layer (ozonosphere) between altitudes 25-50 kilometres.
- c. Groups of organisms belonging to several different species that live together in the same area or habitat and interact through trophic and spatial relationship to form a self-sustained unit is called a biotic community.
- d. All the ecosystems of the world together form a biosphere.

Q9. Define the following terms

- a. Mimicry
- b. Acclimatization
- c. Ectotherms
- d. Endotherms

Sol.

- a. It can be defined as the superficial but close resemblance of one organism to another or to the natural objects among which it lives, that secures its concealment, protection or some other advantage.
- b. The gradual physiological adjustments to slow changing environmental conditions is called acclimatization.
- c. Cold-blooded animals are called ectotherms. Their body temperature tends to match with the environmental temperature in which they live.
- d. Warm-blooded animals are called endotherms as they can regulate their body temperature by physiological means.

Q10. Give the ecological adaptations of succulents.

Sol. Succulents are also called drought resistants. These have fleshy organs to store large amounts of water. Succulence results from the proliferation of parenchyma cells, enlargement of vacuoles in cells and due to reduction in intercellular spaces. These have

fleshy stems which are green and photosynthetic with leaf scales or leaf-spines. These also have thick cuticle and sunken stomata that open during night only.

Q11. Write characteristics of A-horizon of soil.

Sol. Horizon-A is the topsoil. It is darker and of a loose texture than the underlying horizon-B. Plants and animals matter collects at the surface of it, forming the litter. Below the litter is partially decomposed organic matter (humus). Rest of horizon is rich in organic and mineral contents.

Q12. How do the genus and community differ?

Sol. Species of a genus have a common ancestry and occur in different geographic regions. Species in a community do not have a common ancestry and inhabit common environment.

Q13. What is allelopathy? Cite one example.

Sol. Suppression of growth of other species by chemicals (called allelochemicals) released from a plant. A substance Juglone from walnut tree inhibits the growth of seedlings, including its own, under it.

Q14. The 'clown' fish lives among the tentacles of sea anemone. What is this interaction? Give a reason for this association.

Sol. Commensalism. It is so because clown fish derives benefit by taking shelter in tentacles of sea anemone but the latter species is not affected.

Q15. State Gause's competitive exclusion principle.

Sol. It states that two species having similar requirements cannot live at the same place (niche) permanently. One of the species will either be eliminated or leave the niche.

Q16. Define predation.

Sol. Predation may be defined as an interspecific interaction between two species one of which is benefitted by capturing, killing and eating the other species. The species which is

benefitted is called as predator or enemy and the one which is killed is called as prey.

Q17. Explain why very small animals are rarely found in polar region.

Sol. Since small animals have a larger surface area relative to their volume, they tend to lose body heat very fast when it is cold outside; then they have to expend much energy to generate body heat through metabolism. This is the main reason why very small animals are rarely found in polar regions.

Q18. What is the difference between climate and weather?

Sol. The short-term properties of the atmosphere such as temperature, humidity, rainfall, pressure, sunshine, cloud cover, wind etc. at a given place and time is called weather.

Q19. Why are coral reefs not found in the region from West Bengal to Andhra Pradesh but are found in Tamil Nadu and on the East coast of India?

Sol. For corals to colonise, low siltation, low fresh water inflow by rivers, high salinity and optimal temperature are essential. These conditions are not met in regions from West Bengal to Andhra Pradesh but are found in Tamil Nadu and on the East coast of India.

Q20. One day, Geeta a biology student, asked his teacher, "why scientists generally talk about presence of water on other planets"? He replied that water is one of the most important factors for supporting life on the earth as well as on other planets.

Read the above passage and answer the following questions:

- What is the importance of water?
- List important characteristic features of water?
- Why was Geeta curious to find answers to such queries?

Sol.

- Water is indispensable for life and it has been rightly described as the matrix of life.
- Water is colourless, odourless, tasteless liquid which freezes at  $0^{\circ}\text{C}$  and boils at  $100^{\circ}\text{C}$ . Water has the maxity density at  $4^{\circ}\text{C}$ . The denser water sinks and the lighter frozen water (ice) floats.
- Being a biology students, Geeta had keen observations, curiosity, and to understand the reasons for latest scientific findings.

- Q21. Community is
- a) Species structure and diversity index of an area
  - b) Biomass
  - c) Autotrophic and heterotrophic components
  - d) All of these

Sol. d)

- Q22. Which factor of ecosystem includes plants, animals and microorganisms?
- a) Biotic factors
  - b) Direct factors
  - c) Indirect factors
  - d) Abiotic factors

Sol. (a)

- Q23. A terrestrial animal must be able to
- a) Excrete large amounts of salts in urine
  - b) Actively pump salts out through the skin
  - c) Conserve water
  - d) Excrete large amount of water in urine

Sol. (c)

Q24. Competition is severe in a population that has a distribution which is

- a) Random
- b) Uniform
- c) Irregular
- d) Non-random

Sol. (c)

Q25. Individuals of a species which occur in a particular area constitute

- a) Population
- b) Fauna
- c) Flora
- d) Flora and Fauna

Sol. (a)