**CBSE Class 12 Biology**
**NCERT Exemplar Solutions**
**CHAPTER 13**
**ORGANISMS AND POPULATIONS**

## Multiple Choice Questions (MCQs)

**1. Autecology is the:**

**(a) Relation of a population to its environment**

**(b) Relation of an individual to its environment**

**(c) Relation of a community to its environment**

**(d) Relation of a biome to its environment**

**Ans.** (b) Relation of an individual to its environment

**Explanation:** Relation of an individual to its environment is called autoecology. An individual is closest to the species hence 'b' is the correct answer.

**2. Ecotone is:**

**(a) A polluted area**

**(b) The bottom of a lake**

**(c) A zone of transition between two communities**

**(d) A zone of developing community**

**Ans.** (c) A zone of transition between two communities

**Explanation:** (c) A zone of transition between two communities

**3. Biosphere is:**

**(a) a component in the ecosystem**

**(b) composed of the plants present in the soil**

**(c) life in the outer space**

**(d) composed of all living organisms present on earth which interact with the physical environment**

**ans.** (d) composed of all living organisms present on earth which interact with the physical environment

**explanation:** The thin zone of interaction of hydrosphere, atmosphere and troposphere; where living beings are found; is called biosphere.

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**4. Ecological niche is:**

**(a) the surface area of the ocean**

**(b) an ecologically adapted zone**

**(c) the physical position and functional role of a species within the community**

**(d) formed of all plants and animals living at the bottom of a lake**

**Ans.** (c) the physical position and functional role of a species within the community

**Explanation:** (c) the physical position and functional role of a species within the community

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**5. According to Allen's Rule, the mammals from colder climates have:**

**(a) shorter ears and longer limbs**

**(b) longer ears and shorter limbs**

**(c) longer ears and longer limbs**

**(d) shorter ears and shorter limbs**

**Ans.** (d) shorter ears and shorter limbs

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**Explanation:** Joel Asaph and Allen proposed this rule in 1877. According to this rule; the body shape and proportions of endotherms vary according to climatic temperature. In colder climate, the surface area is minimized to prevent heat loss and it is maximized in warm climate to promote heat loss. Endotherms in cold climate usually have small ears and small legs.

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**6. Salt concentration (Salinity) of the sea measured in parts per thousand is:**

**(a) 10– 15**

**(b) 30– 70**

**(c) 0 – 5**

**(d) 30– 35**

**Ans.** (d) 30– 35

**Explanation:** (d) 30– 35

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**7. Formation of tropical forests needs mean annual temperature and mean annual precipitation as:**

**(a) 18– 25°C and 150– 400 cm**

**(b) 5 – 15°C and 50 – 100 cm**

**(c) 30– 50°C and 100– 150 cm**

**(d) 5 – 15°C and 100– 200 cm**

**Ans.** (a) 18– 25°C and 150– 400 cm

**Explanation:** (a) 18– 25°C and 150– 400 cm

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**8. Which of the following forest plants controls the light conditions at the ground?**

**(a) Lianas and climbers**

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**(b) Shrubs**

**(c) Tall trees**

**(d) Herbs**

**Ans.** (c) Tall trees

**Explanation:** Tall trees form dense canopy and thus control the amount of light which reaches the ground.

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**9. What will happen to a well growing herbaceous plant in the forest if it is transplanted outside the forest in a park?**

**(a) It will grow normally**

**(b) It will grow well because it is planted in the same locality**

**(c) It may not survive because of change in its micro climate**

**(d) It grows very well because the plant gets more sunlight**

**Ans.** (c) It may not survive because of change in its micro climate

**Explanation:** (c) It may not survive because of change in its micro climate

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**10. If a population of 50 Paramoecium present in a pool increases to 150 after an hour, what would be the growth rate of population?**

**(a) 50 per hour**

**(b) 200 per hour**

**(c) 5 per hour**

**(d) 100 per hour**

**Ans.** (d) 100 per hour

**Explanation:** (d) 100 per hour

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**11. What would be the per cent growth or birth rate per individual per hour for the same population mentioned in the previous question (Question 10)?**

**(a) 100**

**(b) 200**

**(c) 50**

**(d) 150**

**Ans.** (b) 200

**Explanation:** New population – Old population = 150 – 50 = 100

Percentage growth = (100/50) × 100 = 200%

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**12. A population has more young individuals compared to the older individuals. What would be the status of the population after some years?**

**(a) It will decline**

**(b) It will stabilise**

**(c) It will increase**

**(d) It will first decline and then stabilise**

**Ans.** (c) It will increase

**Explanation:** A higher portion of young population means birth rate is higher than mortality and hence population will grow.

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**13. What parameters are used for tiger census in our country's national parks and sanctuaries?**

**(a) Pug marks only**

**(b) Pug marks and faecal pellets**

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**(c) Faecal pellets only**

**(d) Actual head counts**

**Ans.** (b) Pug marks and faecal pellets

**Explanation:** (b) Pug marks and faecal pellets

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**14. Which of the following would necessarily decrease the density of a population in a given habitat?**

**(a) Natality ? mortality**

**(b) Immigration ? emigration**

**(c) Mortality and emigration**

**(d) Natality and immigration**

**Ans.** (c) Mortality and emigration

**Explanation:** (c) Mortality and emigration

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**15. A protozoan reproduces by binary fission. What will be the number of protozoans in its population after six generations?**

**(a) 128**

**(b) 24**

**(c) 64**

**(d) 32**

**Ans.** (c) 64

**Explanation:** After six generations, population = $2^6$= 64

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**16. In 2005, for each of the 14 million people present in a country, 0.028 were born and**

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**0.008 died during the year. Using exponential equation, the number of people present in 2015 is predicted as:**

**(a) 25 millions**

**(b) 17 millions**

**(c) 20 millions**

**(d) 18 millions**

**Ans.** (b) 17 millions

**Explanation:** Use the formula for compound interest.

Here; P = 14 million, r = 2% and time = 10 years

Population after 10 years = $10\left(\frac{102}{100}\right)^{10} = 17.06\ million$

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**17. Amensalism is an association between two species where:**

**(a) one species is harmed and other is benefitted**

**(b) one species is harmed and other is unaffected**

**(c) one species is benefitted and other is unaffected**

**(d) both the species are harmed.**

**Ans.** (b) one species is harmed and other is unaffected

**Explanation:** (b) one species is harmed and other is unaffected

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**18. Lichens are the associations of:**

**(a) bacteria and fungus**

**(b) algae and bacterium**

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**(c) fungus and algae**

**(d) fungus and virus**

**Ans.** (c) fungus and algae

**Explanation:** This is a kind of mutualism. Fungus provides water and minerals, while algae prepare the food.

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**19. Which of the following is a partial root parasite?**

**(a) Sandal wood**

**(b) Mistletoe**

**(c) Orobanche**

**(d) Ganoderma**

**Ans.** (a) Sandal wood

**Explanation:** Orobanche is an obligate parasitic herbaceous plant and is found in temperate climate in the Northern hemisphere. But Sandal wood is a partial root parasite.

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**20. Which one of the following organisms reproduces sexually only once in its life time?**

**(a) Banana plant**

**(b) Mango**

**(c) Tomato**

**(d) Eucalyptus**

**Ans.** (d) Eucalyptus

**Explanation: (d) Eucalyptus**

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**ORGANISMS AND POPULATIONS**

**Very Short Answer Type Questions**

**1. Species that can tolerate narrow range of temperature are called _____.**

**Ans.** Stenothermic

**2. What are Eurythermic species?**

**Ans.** Species which can tolerate and thrive in a wide range of temperatures is called eurythermic species.

**3. Species that can tolerate wide range of salinity are called _____.**

**Ans.** Euryhaline

**4. Define stenohaline species.**

**Ans.** Species which thrive in a narrow range of salinity are called stenohaline species.

**5. What is the interaction between two species called?**

**Ans.** The interaction between two species is called interspecific interaction.

**6. What is commensalism?**

**Ans.** Relationship between two organisms in which one organism is benefitted and there is neutral effect on another organism; is called commensalism. Many commensals live in the alimentary canal of humans to get shelter and food but they have neither positive nor negative impact on humans.

**7. Name the association in which one species produces poisonous substance or a change in environmental conditions that is harmful to another species.**

**Ans.** Amensalism

**8. What is Mycorrhiza?**

**Ans.** Mycorrhiza is a mutualistic association between the fungus and the roots of higher plants. The fungi get shelter and food and lieu of that helps the plant in absorption of phosphorous from the soil. It also provide resistance to the pant from root-borne pathogens.

**9. Emergent land plants that can tolerate the salinities of the sea are called.**

**Ans.** Euryhaline

**10. Why do high altitude areas have brighter sunlight and lower temperatures as compared to the plains?**

**Ans.** When sunlight reaches us; it undergoes refraction through several layers of atmosphere. Relative degree of refraction at higher altitude is less than at lower altitude. Due to this, sunlight appears brighter at high altitudes than in plains. Temperature reduces with increase in altitude. Due to this, higher altitudes have lower temperature compared to the plains.

**11. What is homeostasis?**

**Ans.** The process by which an organism maintains constancy in its internal environment is called homeostasis. Osmoregulation and thermoregulation are parts of homeostasis.

**12. Define aestivation.**

**Ans.** When an organism goes into summer sleep to avoid unfavourable environment; this process is called aestivation.

**13. What is diapause and its significance?**

**Ans.** The period of suspended development in order to tide over the unfavourable conditions is called diapause.

**14. What would be the growth rate pattern, when the resources are unlimited?**

**Ans.** When resources are unlimited, growth rate of population is exponential. This gives a J-shaped curve on graph.

**15. What are the organisms that feed on plant sap and other plant parts called?**

**Ans.** Organisms that feed on plant sap and other plant parts are called phytophagus.

**16. What is high altitude sickness? Write its symptoms.**

**Ans.** A range of symptoms due to low atmospheric pressure of high altitudes, the body does not get enough oxygen is called high altitude sickness. The symptoms of altitude sickness are nausea, fatigue and heart palpitations.

**17. Give a suitable example for commensalism.**

**Ans.** Egrets ride on the back of cattle. When cattle forage for grass, insects fly away abruptly. This gives the egrets a chance to feed on those insects. In this relationship, cattle get no benefit from egrets.

**18. Define ectoparasite and endoparasite and give suitable examples.**

**Ans. Ectoparasite:** Parasites which live on the body of hosts are called ectoparasites, e.g. leech and ticks.

**Endoparasites:** Parasites which live inside the body of hosts are called endoparasites, e.g. roundworms and hookworms.

**19. What is brood parasitism? Explain with the help of an example.**

**Ans.** In this type of parasitism, a bird lays its eggs in the nest of another bird. The eggs

resemble those of the host bird. The host bird incubates the eggs; unaware of its actual identity. This is seen in koyal (cuckoo) which lays its eggs in a crow’s nest.

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**Short Answer Type Questions**

**1. Why are coral reefs not found in the regions from west Bengal to Andhra Pradesh but are found in Tamil Nadu and on the east coast of India?**

**Ans.** In West Bengal and Andhra Pradesh, freshwater is released from the Ganges and some other rivers. Due to this, coral reefs are not found in regions from West Bengal to Andhra Pradesh. From Tamil Nadu to the southern tip of the east coast, coral reefs are present because of no interference from freshwater.

**2. If a fresh water fish is placed in an aquarium containing sea water, will the fish be able to survive? Explain giving reasons.**

**Ans.** A fresh water is adapted to maintain its homeostatis in freshwater. It is unable to do so in saline water. Hence, the fish will not survive in an aquarium which contains sea water.

**3. Why do all the fresh water organisms have contractile vacuoles whereas majority of marine organisms lack them?**

**Ans.** In fresh water organisms, the concentration of solute inside the cell is higher than that in external environment. This means that the external environment is hypotonic. This leads to movement of water inside the cells because of osmosis. Contractile vacuoles work like safety devices and prevent lysis of cell. In marine organisms, the concentration of solute inside the cell is lower than that in external environment. This means that the external environment is hypertonic. Hence, the cell does not have to face the risk of lysis. This explains the absence of contractile vacuoles in marine organisms.

**4. Define heliophytes and sciophytes. Name a plant from your locality that is either heliophyte or sciophyte.**

**Ans. Heliophyte:** Plants which are adapted to live under plenty of sunlight are celled heliophytes, e.g. banyan. Heliophytes form the roof of a forest.

**Sciophyte:** Plants which are adapted to live under low light conditions are called sciophtyes, e.g. herbs. Sciophytes form the understory of a forest.

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**5. Why do submerged plants receive weaker illumination than exposed floating plants in a lake?**

**Ans.** Most of the colours from the visible spectrum fail to reach deep into a water body. This happens because of refraction of light through different layers of water. Due to this, floating plants get plenty of sunlight but submerged plants get weaker illumination.

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**6. In a sea shore, the benthic animals live in sandy, muddy and rocky substrata and accordingly developed the following adaptations. Find the suitable substratum against each adaptation.**

**(a) Burrowing**

**(b) Building cubes**

**(c) Holdfasts / peduncle**

**Find the suitable substratum against each adaptation.**

**Ans.** (a) These animals live in sandy substratum and make burrows, e.g. lobsters, crabs, etc.

(b) These animals live in muddy substratum as cube-like aggregates. Small size of cube helps in passive feeding mechanisms, e.g. zooplanktons.

(c) These animals live in rocky substratum and attach to the substratum with the help of holdfast, e.g. sponges.

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**7. Categorise the following plants into hydrophytes, halophytes, mesophytes and xerophytes. Give reasons for your answers.**

**(a) Salvinia**

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**(b) Opuntia**

**(c) Rhizophora**

**(d) Mangifera**

**Ans.**

| Plants | Adaptation | Reason |
|---|---|---|
| Salvinia | Hydrophyte | Lives in water and is a floating plant. |
| Opuntia | Xerophytes | Lives in desert. |
| Rhizophora | Halophyte | Lives in mangrove forests and is adapted to saline marshes. |
| Mangifera | Mesophyte | It is the scientific name of mango. Mango plants are found in moderate climate |

**8. In a pond, we see plants which are free-floating; rooted–submerged; rooted emergent; rooted with floating leaves. Write the type of plants against each of them.**

| Plant Name | Type |
|---|---|
| (a) Hydrilla | _____ |
| (b) Typha | _____ |
| (c) Nymphaea | _____ |
| (d) Lemna | _____ |

| | |
|---|---|
| (e) Vallisnaria | _____ |

**Ans.**

| Plant Name | Type |
|---|---|
| (a) Hydrilla | (a) Rooted submerged |
| (b) Typha | (b) Rooted emergent |
| (c) Nymphaea | (c) Rooted with floating leaves |
| (d) Lemna | (d) Free-floating |
| (e) Vallisnaria | (e) Rooted emergent |

**9. The density of a population in a habitat per unit area is measured in different units. Write the unit of measurement against the following:**

**(a) Bacteria _____**

**(b) Banyan _____**

**(c) Deer _____**

**(d) Fish _____**

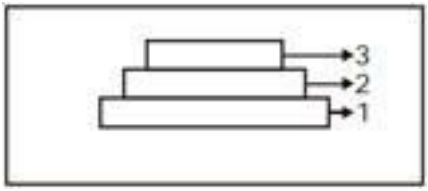
**Ans.** (a) Number unit volume

(b) Biomass/ square kilometer (Area)

(c) Number/of square kilometer (Area)

(d) Weight/square kilometer (Area)

**10. Observe the following figure:**




**(a) Label the three tiers 1, 2, 3 given in the above age pyramid.**

**(b) What type of population growth is represented by the above age pyramid?**

**Ans.** (a) 1: Pre-reproductive, 2: Reproductive, 3: Post-reproductive

(b) This age pyramid shows expanding population.

**11. In an association of two animal species, one is a termite which feeds on wood and the other is a protozoan Trichonympha present in the gut of the termite. What type of association they establish?**

**Ans.** Termite and Trichonympha show mutualism; a relationship in which both the organisms are benefited from each other. T richonympha breaks down cellulose in the wood and thus help the termite in digestion of wood. Trichonympha also feeds on fragments of wood.

**12. Lianas are vascular plants rooted in the ground and maintain erectness of their stem by making use of other trees for support. They do not maintain direct relation with those trees. Discuss the type of association the lianas have with the trees.**

**Ans.** Lianas are in competition with other trees. While taking support from other trees, lianas usually strangulate the other tree. They also compete for sunlight and water and in the process, harm the host tree.

**13. Give the scientific names of any two microorganisms inhabiting the human intestine.**

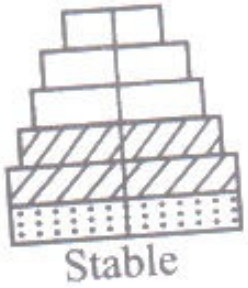
**Ans.** Propionibacterium and E. coli

**14. What is a tree line?**

**Ans. T**he edge of the habitat at which trees are capable of growing is called tree line. Trees show stunted growth at the tree line. They cannot grow beyond the tree line because of unfavourable environmental conditions. Tree line shows gradual transition from dense cover to sparse cover.

**15. Define 'zero population growth rate'. Draw an age pyramid for the same.**

**Ans.** When the population of a location neither grows, nor declines, this shows zero population growth rate. The following pyramid shows a population with zero growth rate.




**16. List any four characters that are employed in human population census.**

**Ans.** Following are the four characters that are employed in human population census:

- Sex-ratio
- Age group
- Occupation
- Income

**17. Give one example for each of the following types.**

**(a) Migratory animal**

**(b) Camouflaged animal**

**(c) Predator animal**

**(d) Biological control agent**

**(e) Phytophagous animal**

**(f) Chemical defense agent**

**Ans.** (a) Siberian crane

(b) Chameleon

(c) Lion

(d) Dragonfly

(e) Honey bee

(f) Capsaicin produced by bell pepper

**18. Fill in the blanks:**

| Species A | Species B | Type of Interaction | Example |
|---|---|---|---|
| + | - | _____ | _____ |
| + | + | _____ | _____ |
| + | _____ | Commensalism | _____ |

**Ans.**

| Species A | Species B | Type of Interaction | Example |
|---|---|---|---|
| + | - | Predation | Rabbit and lion |
| + | + | Mutualism | Lichen |

| | | | |
|---|---|---|---|
| + | 0 | Commensalism | Egrets and cattle |

**19. Observe the set of 4 figures A, B, C and D and, answer the following questions:**

Fig. (A)

Fig. (B)

Fig. (C)

Fig. (D)

**(i) Which one of the figures shows mutualism?**

**(ii) What kind of association is shown in D?**

**(iii) Name the organisms and the association in C.**

**(iv) What role is the insect performing in B?**

**Ans.** (a) Figure 'A' shows mutualism because the butterfly gets the food from plant and helps the plant in pollination.

(b) This shows predation in which a carnivore is eating herbivore.

(c) This shows the association of egrets and buffaloes. This shows commensalism.

(d) Insect is performing the role ectoparasite.

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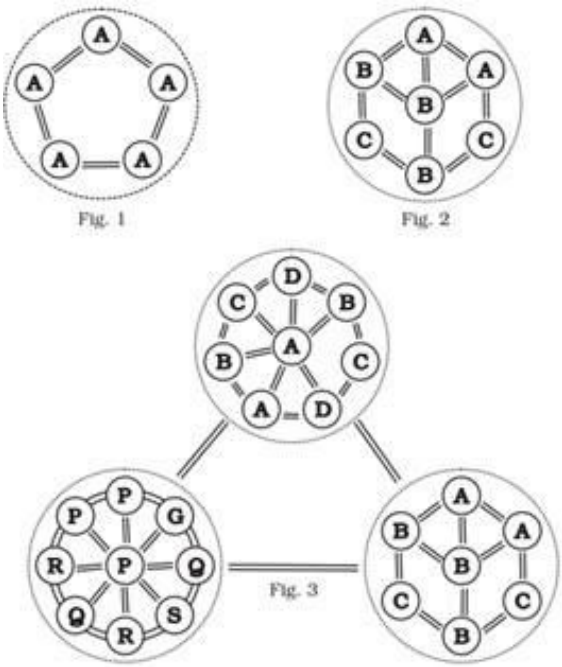
**Long Answer Type Questions**

**1. Comment on the following figures: 1, 2 and 3: A, B, C, D, G, P, Q, R, S are species.**




**Ans.** Figure 1 shows a population of species A. All the individuals are interacting among themselves.

Figure 2 shows a community with three populations of A, B and C. They are interacting with each other and their environment.

Figure 3 shows a biome with three communities. One of the communities is in climax and other two are at different stages of development. All the three communities are in the same environment and they interacts with each other and with the environment.

**2. An individual and a population has certain characteristics. Name these attributes with definitions.**

**Ans.** A population has certain characteristics that and individual does not have. Following are the main attributes of population:

(i) **Birth Rate:** An individual is born but a population shows birth rate. Birth rate is usually expressed in terms of number of births per thousand population.

(ii) **Death Rate:** An individual dies but a population shows death rate. Death rate is usually expressed in terms of number of deaths per thousand population.

(iii) **Sex Ratio:** An individual is either a male or female but a population shows sex ratio. Ratio of number of males to number of females is called sex ratio. For example; the sex ratio in India is 934 females to 1000 males.

(iv) **Age Distribution:** An individual can be of a certain age but a population has people from different ages. For convenience, age groups are taken into consideration. Age group is normally categorized as pre-reproduction, reproduction and post-reproduction age groups.

(v) **Population Density:** Population density is usually taken in terms of number of individuals per square km. Population density depends on various abiotic factors. The plains usually have very high population density while mountains have very low population density.

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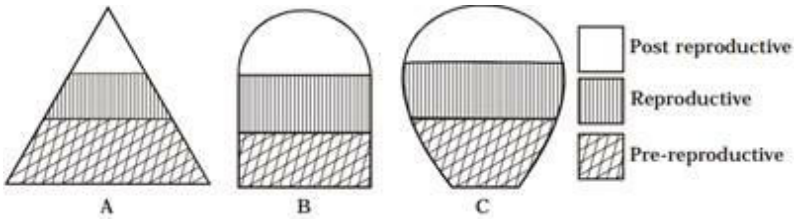
**3. The following diagrams are the age pyramids of different populations. Comment on the status of these populations.**




**Ans.** Figure A shows a population, in which ratio of individuals in pre-reproductive age is highest; following by reproductive age and post-reproductive age. This pyramid shows a growing population.

Figure B shows a population in which the number of individuals in pre-reproductive and reproductive age is equal. Number of individuals in post-reproductive age is less. This pyramid shows a stable population, i.e. population growth is negligible.

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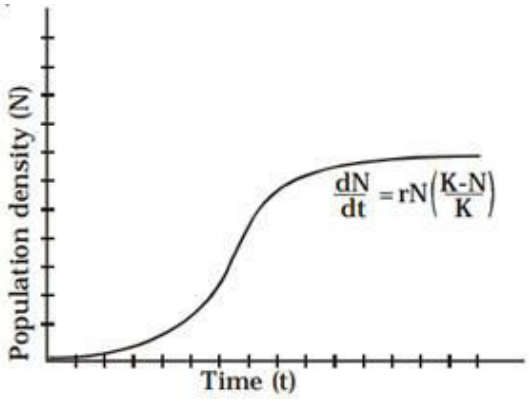
Figure C shows a population in which number of individuals in pre-reproductive age is the least. Number of individuals in reproductive age is the highest. Less number of individuals in pre-reproductive age shows a negative growth rate in population. This pyramid shows a population in de-growth.

**4. Comment on the growth curve given below.**




**Ans.** The growth curve in this figure shows logistic growth of population. We know that resources are limited in nature and they cannot support unlimited growth in population. Limited resources mean a tough competition for resources among individuals. Only those survive which are fit to survive in such a condition. This is what happens in real life situation.

- In the initial phase, population shows a lag phase, i.e. it grows at a slow pace.
- The lag phase is followed by a phase of acceleration, during which population growth is rapid.
- The acceleration phase is followed by a phase of deceleration, during which population growth slows down.

Finally, a phase comes when population density reaches the carrying capacity. Carrying capacity defines the load limit of nature; in terms of sustaining a particular population density. Once the population density reaches the carrying capacity, it reaches the phase of asymptote. This is the phase when population beings to show negative growth.

**5. A population of Paramoecium caudatum was grown in a culture medium. After 5 days the culture medium became overcrowed with Paramoecium and had depleted nutrients. What will happen to the population and what type of growth curve will the**

**population attain? Draw the growth curve.**

**Ans.** The population of Paramoecium will show logistic growth which can be shown by a sigmoid curve. The population growth will show following phases:

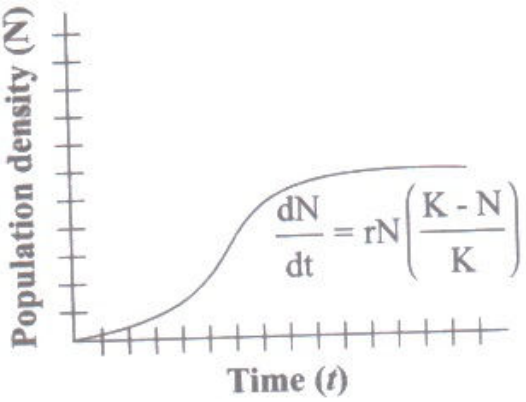
(a) Lag phase

(b) Acceleration phase

(c) Deceleration phase

(d) Asymptote phase

The asymptote phase shall be reached on fifth day. The following figure shows the growth curve:




**6. Discuss the various types of positive interactions between species.**

**Ans.** Following are the positive interactions between species:

(a) **Mutualism:** This is a relationship between two organisms in which both the organisms are benefitted. Lichen is a very good example of mutualism. Lichen is an association of fungi and algae. The fungal part attaches to the substratum and gets water and minerals for the algal part. The algal part carries out photosynthesis and provides food to the fungal part.

(b) **Commensalism:** This is a relationship between two organisms in which one organism is benefitted, while another organism is neither at gain nor at loss. Egrets keep on sitting on the back of herbivore animals; like buffalo, cow, etc. when the cattle forage for grass, the insects under the grass fly away haphazardly. This gives a chance to the egrets to feed on insects.

Without the help of cattle, it will be difficult for egrets to find insects in the grass. In this relationship, there is no benefit to the cattle.

**7. In an aquarium two herbivorous species of fish are living together and feeding on phytoplanktons. As per the Gause's Principle, one of the species is to be eliminated in due course of time, but both are surviving well in the aquarium. Give possible reasons.**

**Ans.** Gause proposed that when resources are limited then out of the two competing species, one of the species will eventually become extinct. The species with superior predatory skills will survive in the long run. But evidence for such conclusive extinction is rare in nature. Many recent studies do not support Gause's Principle of competitive exclusion. One of the means to survive is called resource partitioning. For example; if two species compete for the same resource; they partition their time of foraging or different foraging patterns. MacArthur showed that five species of warblers living on the same tree effectively change their feeding patterns to survive in limited resources.

The same thing can happen in the given aquarium. Either the resources are unlimited or two herbivorous species of fish may have changed their feeding times or feeding pattern to survive in the aquarium.

**8. While living in and on the host species, the animal parasite has evolved certain adaptations. Describe these adaptations with examples.**

**Ans.** Parasites show following types of adaptations:

(a) **Morphological Adaptations:** Many parasites are bigger in size than their free-living counterparts. This helps in producing more eggs; necessary for survival. Endoparasites lose unnecessary sense organs to conserve resources. Endoparasites lose their gut or gut is reduced in size. They absorb nutrients through skin. Special organs for attachment are present, e.g. suckers.

(b) **Life Cycle Adaptations:** An endoparasite needs some way to enter another host. Many parasites use a secondary host for this purpose. For example; plasmodium uses mosquitoes as secondary hosts so that they can easily infect another primary host. Some parasites lay their eggs in the lower portion of alimentary canal of the host so that eggs or cysts can go out

along with stool. Later on, the cysts get transmitted to another host through contaminated food and water, e.g. Entamoeba histolytica.

(c) **Immunological Adaptations:** Some parasites engulf antigens from the host. Some parasites disturb the immunological function of the host. These mechanisms help the parasite survive immunological response of the host.

(d) **Biochemical Adaptations:** Many endoparasites do not produce digestive enzymes. They rely on host's digestive enzymes and absorb the simple nutrients. Endoparasites do not carry out synthetic reaction. This is possible because their energy need is very low which is fulfilled from host's resources.

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**9. Do you agree that regional and local variations exist within each biome? Substantiate your answer with suitable example.**

**Ans.** A biome is a climatically and geographically contiguous area with similar climatic conditions. Both organic and inorganic components are similar in a particular type of biome. However, regional and local variations exist within each biome. To understand this, let us consider following examples.

Coniferous forest is a type of biome which mainly contains trees which bear cones with sees inside. In all the coniferous forests around the world, coniferous trees are the main plant species. But regional variations exist in coniferous forests. The coniferous forests of North America are dominated by black spruce. On the other hand, the coniferous forests of north east Europe are dominated by Norway spruce. Forests of Siberia are dominated by pine. This shows regional variations in a particular type of biome.

In case of coniferous forests, the canopy is so thick that negligible sunlight reaches the ground. This results in sparse vegetation on the ground. Dense canopy on top and sparse vegetation at ground shows local variations in a particular type of biome.

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**10. Which element is responsible for causing soil salinity? At what concentration does the soil become saline?**

**Ans.** Minerals are responsible for causing soil salinity. Following are some of the cause for

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increase in soil salinity:

- High level of salt in soil.
- Water table movement because of landscape features.
- Human activities; like clearing of land and excess use of synthetic fertilizers.
- Salt runoff from streets can happen in cold climates because salt is applied on road to prevent snow accumulation.

**Measurement of Soil salinity:** Soil salinity is measured in terms of gram per litre of soil solution or electrical conductivity in dS/m. Soil salinity is usually determined from an extract of saturated paste of soil and then EC is termed as ECe. When $4 < ECe < 8$, soil is termed as slightly saline. When $8 < ECe < 16$, soil is termed as moderately saline. When $ECe > 16$, soil is termed as highly saline.

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**11. Does light factor affect the distribution of organisms? Write a brief note giving suitable examples of either plants or animals.**

**Ans.** Light is an important factor in determining the distribution of organisms. We know that green plants need sunlight to carry out photosynthesis and hence distribution of green plants is highly dependent on the amount of illumination. This is the reason, tropics are having dense plant cover but poles have negligible plants. Moreover, plants also need sunlight for flowering. This phenomenon is called photoperiodism. Hence, on the basis of photoperiodism plants are categorised as short day plants, long day plants and day neutral plants. The area near equator get long duration of light as compared to area near poles. Thus, this affect distribution of plants on earth.

Animals too depend on light and show certain behavioural pattern on the basis of diurnal and seasonal variations in light. Many animals get up early in the morning and start foraging. The nocturnal animals remain active during night only, e.g. owl. Reproductive and migratory activities are also governed by the amount period of illumination in many animals.

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**12. Give one example for each of the following:**

**(a) Eurythermal plant species _____**

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**(b) A hot water spring organism _____**

**(c) An organism seen in deep ocean trenches _____**

**(d) An organism seen in compost pit _____**

**(e) A parasitic angiosperm _____**

**(f) A stenothermal plant species _____**

**(g) Soil organism _____**

**(h) A benthic animal _____**

**(i) Antifreeze compound seen in antarctic fish _____**

**(j) An organism which can conform _____**

**Ans.** (a) Gracilaria

(b) Alycyclobacillus

(c) Giant tube worms

(d) Earthworm

(e) Misteltoe

(f) Pine

(g) Earthworm

(h) Sponge

(i) Antifreeze glycoproteins

(j) Mangifera