CHAPTER 11

ORGANISMS AND POPULATIONS



(A) NCERT QUESTIONS & SOLUTIONS

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

Ans. The attributes that populations but not individuals possess are:

1. Population density
2. Mortality or death rate
3. Population growth
4. Natality or birth rate
5. Age distribution
6. Sex ratio

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

Ans. $N_t = N_0e^n$

Since, $N_t = 2i$; $N_0e^n = 1$,

$e = 2.71828$, $t = 3$

$2 = (1 \times 2.71829)^{3r}$

$\log 2 = 3r\log (2.71828)$

$0.3010 = 3r \times 0.4343$

$r = 0.2310$

Interinsic rate of increase of $= 0.2310 \times 100 = 23.10\%$

3. Name important defense mechanisms in plants against herbivory.

Ans.

Morphological traits	**Chemical defenses**
Thorn, Spines	Poisonous cardiac glycosides
Sticky glandular hair	Offensive smell
Hairy coating	Tannins
Latex	Bitter taste
Harboring ants	Alkaloids (nicotine, caffeine, quinine, opium)

4. 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. The interaction between an orchid and the mango tree is commensalism, because orchid is benefited by getting shelter from mango tree whereas the mango tree is neither harmed nor benefited.

5. What is the ecological principle behind the biological control method of m t insects?

Ans. The ecological principle operating in the biological control method of managing with pest insect is checking their population through predators and parasites.

6. Define population and community.

Ans. Population: Groups of individuals of same species, which can reproduce among themselves and occupy a particular area in a given time.

Community: Groups of organisms of different species that live in common area, which are interrelated and interdependent. It is a natural aggregation of plants and animals in the same environment.

7. Define the following terms and give one example for each: [IMP.]

(A) Commensalism **(B) Parasitism**

(C) Camouflage **(D) Mutualism**

(E) Interspecific competition

Ans. (A) Commensalism: It is an interaction between two different species where one is benefited and other remains unaffected.

Example : Clown fish and sea anemone. Here, the clown fish gets protection from predators which stay away from stinging tentacles of anemone but sea anemone does not derive any benefit from fish.

(B) Parasitism: It is an interaction between two organisms in which one is benefited and the other is harmed, i.e. one organism lives at the cost of other organism.

Example : *Cuscuta*, a parasitic plant that is found growing on hedge plants, do not have chlorophyll and thus derives its nutrition from the host.

(C) Camouflage: It is a phenomenon of blending of an organism with the surrounding due to similar colour, marking and shape so as to avoid the predators.

Example : Common tree frog, Giant leaf insect.

(D) Mutualism: Positive inter specific interaction in which members of two different species completely depend on each other for growth and survival.

Example : Lichen (association between algae and fungi). Here, fungi helps in absorption of nutrients and water while the algal partner manufactures food.

(E) Interspecific competition: It is the competition among the members of different species for limited natural resources.

Example : The Abingdon tortoise in Galapagos Islands became extinct within a decade after goats were introduced on the Island, apparently due to the greater browsing efficiency of the goats.

8. With the help of suitable diagram describe the logistic population growth curve. [IMP.]

Ans. Logistic growth :

☛ The resources become limited at certain point of time, so no population can grow exponentially.

- This growth is more realistic.
- Maximum number of individuals of a particular species in a habitat that is allowed by nature is called **carrying capacity (K)**.
- When N is plotted in relation to time t, the logistic growth show sigmoid curve and also called **Verhulst-Pearl logistic growth**.

It is given by the following equation:

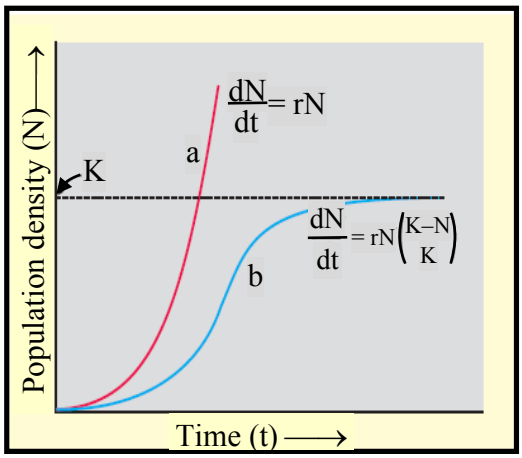
$$\frac{dN}{dt} = rN\left[\frac{K-N}{N}\right]$$

Where

N = population density at time t

r = intrinsic rate of natural increase

K = carrying capacity



Graph show lag phase, followed by phases of acceleration and deceleration and finally an asymptote when population density reaches the carrying capacity.

9. Select the statement which explains best parasitism.

(a) One organism is benefited.

(b) Both the organisms are benefited.

(c) One organism is benefited, other is not affected.

(d) One organism is benefited, other is affected.

Ans. (d) One organism is benefited, other is affected.

10. List any three important characteristics of a population and explain.

Ans. The three important characteristics of a population are as follows:

(i) Population density: Population density of a species is the number of individuals of a species per unit area or volume.

$$PD = \frac{N}{S}$$ Where – PD = Population density

N = Number of individuals in a region

S = Number of unit area in a region.

(ii) Birth rate: It is expressed as the number of births per 1,000 individuals of a pollution per year.

(iii) Death rate: It is expressed as the number of deaths per 1,000 individuals of a pollution per year.

(B) PREVIOUS YEAR QUESTIONS

1. Important attributes belonging to a population but not to an individual are : **[CBSE 2023]**

(i) Birth rate and death rate (ii) Male and female

(iii) Birth and death (iv) Sex-ratio

Select the correct option from the given options :

(a) (i) only (b) (ii) only

(c) (ii) and (iii) (d) (i) and (iv)

Ans. (d) (i) Birth rate and death rate and (iv) Sex-ratio

2. Many copepods live on the body surface of marine fish. This relationship is an example of: **[CBSE 2023]**

(a) Commensalism (b) Parasitism

(c) Amensalism (d) Mutualism

Ans. (b) Parasitism

3. A Tight one - to - one relationship between many species of fig tree and certain wasps is an example of - **[CBSE 2023]**

(a) Commensalism (b) Parasitism

(c) Amensalism (d) Mutualism

Ans. (d) Mutualism

4. Interaction between clown fish living among the stinging tentacles tentacles of sea anemone is an example of - **[CBSE 2023]**

(a) Amensalism (b) Parasitism (c) Mutualism (d) Commensalism

Ans. (d) Commensalism

5. **Assertion (A) :** Decomposition process is slower if detritus is rich in lignin and cutin.

Reason (R) : Decomposition is largely an oxygen requiring process. **[CBSE 2023]**

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Ans. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

6. "Some species of insects and frogs have evolved with various specific features that help them from being detected."

(a) Justify the statement giving reasons.

(b) Mention any two such features. **[CBSE 2023]**

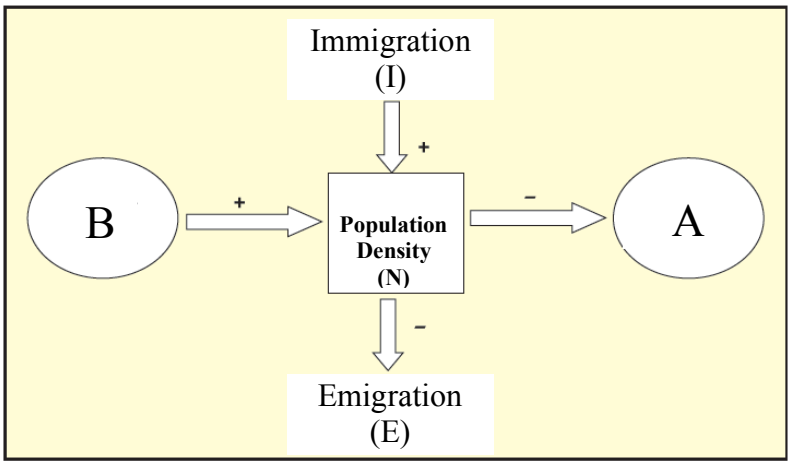
Ans. (a) Camouflage

(b) (i) Detected easily by the predator.

(ii) Which they get blended with their surrounding.

7. (a) Observe the schematic representation given above and answer the follo

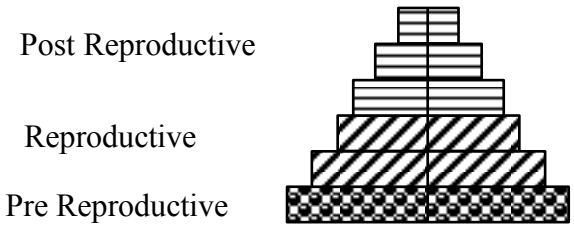
(i) Identify A and B.



(ii) Calculate the growth rate of bacteria in a curd sample, where 1 million bacteria increased to two million, within a period of one hour. [CBSE Term-II 2022]

OR

(b)



Identify the type of pyramid given above. Write the identifying feature on the basis of which of you identified it.

Ans. (a) (i) A- Mortality B-Natality

(ii) The per cent growth or birth per individual per hour

$$= \frac{\text{Final population} - \text{Initial population}}{\text{Initial population}} \times 100$$

$$= \frac{2 \text{ million} - 1 \text{ million}}{1 \text{ million}} \times 100$$

$$= \frac{1}{1} \times 100$$

$$= 100\ \%$$

OR

(b) The given pyramid is expanding. The population of pre- reproductive is higher than the post reproductive population , which make the expanding pyramid of population.

8. Define interference competition. Give one example that supports competitive exclusion occurring in nature. [CBSE IMP. Question]

Ans. Interference competition is the feeding efficiency of one species which might be reduced due to the interfering and inhibitory presence of the other species, even if resources (food and space) are abundant. Examples that support competitive exclusion occurring in nature are:

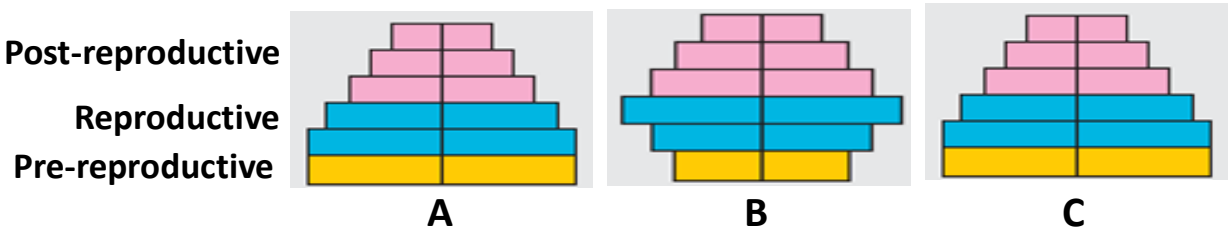
- The Abingdon tortoise in galapagos Islands became extinct within a deca e introduced on the island, apparently due to the greater browsing efficiency of the goats.
- The larger and competitively superior barnacle Balanus dominates the intertidal area and excludes the smaller barnacle Chathamalus from that zone.

9. Explain the difference between commensalism and mutualism types of interactions, with the help of a suitable example of each. [CBSE 2020]

Ans.

S. No.	Commensalism	Mutualism
(i)	Interaction where one organism of a species is benefitted whereas the other is neither benefitted nor harmed.	Interaction where organisms of two species benefit from each other.
(ii)	For example clown fish and sea anemone.	Lichens are an example of mutualism.
(iii)	Clown fish gets protection from predators which stays away from stinging tentacles.	Algae is a source of nutrition for the fungi & the fungi provides shelter for the algae.

10. Study the age pyramids 'A', 'B' and 'C' of the human population given below and answer the questions that follow: [CBSE 2020]



(a) Identify pyramids 'B' and 'C'

(b) Write the basis on which the above pyramids are plotted.

Ans. (a) Pyramid B is declining and Pyramid C is stable.

(b) The above pyramids are plotted based on the number of organisms in different age groups.

- The human population are categorized into three age groups namely pre-reproductive, reproductive and post-reproductive.
- **Pre-reproductive** phase includes young children, **reproductive** phase includes adults capable of reproduction and **post-reproductive** includes people who are in their senescent or old age and have lost their reproductive ability.

11. Mention the term used to describe a population interaction between an or chid growing on a forest tree. [CBSE 2019]

Ans. Commensalism.

12. (a) What is "population" according to you as a biology student?

(b) "The size of a population for any species is not a static parameter." Justify the statement with specific reference to fluctuations in the population density of a region in a given period of time. [CBSE 2019]

Ans. (a) Total number of organisms of a species in a particular area at a particular t

(b) The size of a population for any species is not a static parameter because of the factors like:-

- **Birth rate** or Natality is the number of births during a given period.
- **Death rate** or Mortality is the number of deaths during a given period.
- **Immigration** is the number of individuals of the same species that have come into the habitat from elsewhere during the time period under consideration.
- **Emigration** is the number of individuals of the population who left the habitat and gone elsewhere during the time period under consideration.

13. Give reason as to why a weed such as *Calotropis* flourishes in abandoned fields.

[CBSE 2019]

Ans. It is not grazed by animals as it produces poisonous substances i.e. cardiac glycosides.

14. If in a population of size 'N' the birth rate is represented as 'b' and the death rate as 'd', the increase or decrease in 'N' during a unit time period 't' will be : [CBSE 2019]

$$\frac{dN}{dt} = (b - d) \times N$$

The equation given above can also be represented as

$$\frac{dN}{dt} = (r \times N; \text{ where } r = (b - d)$$

What does 'r' represent? Write any one significance of calculating 'r' for any population.

Ans. r = intrinsic rate of natural increase. It is an important parameter for assessing impacts of any biotic or abiotic factor on population growth.

15. Compare, giving reasons, the J-shaped and S-shaped models of population growth of a species. [CBSE 2018]

Ans.

S. No.	J shaped –growth curve	S shaped –growth curve
(i)	Resources are unlimited.	Limited resources.
(ii)	Growth is exponentially.	It is logistic.
(iii)	As resources are unlimited all individuals survive and reproduce.	Fittest individual will survive and reproduce.
(iv)	Growth equation dN/dt = rN.	Growth equation dN/dt = rN(K–N/K).

(C) MULTIPLE CHOICE QUESTIONS

1. Ecology is a subject which studies the interactions among organisms and _____.

(1) amongst the organism and its chemical environment.
(2) between the organism and its physical environment.
(3) amongst the organism and its habitat.
(4) between the organism and its biosphere.

Ans. (2) between the organism and its physical environment.

2. Which of the following is not an attribute of a population?

(1) species interaction (2) Sex ratio (3) Natality (4) Mortality

Ans. (1) Species interaction

3. Natality refers to -

(1) Death rate
(2) Number of individuals leaving the habitat
(3) Birth rate
(4) Number of individuals entering a habitat.

Ans. (3) Birth rate

4. In the exponential growth equation $Nt = N_0e^{rt}$, e represents:-

(1) The base of number logarithms
(2) The base of exponential logarithms
(3) The base of natural logarithms
(4) The base of geometric logarithms

Ans. (3) The base of natural logarithms

5. The logistic population growth is expressed by equation?

(1) $dN/dt = rN\left(\frac{N-k}{N}\right)$
(2) $dt/dN = N_r\left(\frac{K-N}{K}\right)$
(3) $dN/dt = rN\left(\frac{K-N}{K}\right)$
(4) $dN/dt = rN$

Ans. (3) $dN/dt = rN\left(\frac{K-N}{K}\right)$

6. The formula for exponential population growth is :-

(1) dt/dN = rN (2) dN/rN = dt (3) rN/dN = dt (4) dN/dt = rN

Ans. (4) dN/dt = rN

7. Amensalism can be represented as :-

(1) Species A (–1); species B(O)
(2) Species A (+); species B(+)
(3) Species A(–); species B(–)
(4) Species A(+); species B(O)

Ans. (1) Species A (–1); species B(O)

8. Cuscuta is an example of :-

(1) Predation (2) Endoparasitism (3) Ecotoparasitism (4) Brood Parasitism

Ans. (3) Ecotoparasitism

9. Which one is example of ectoparasite?

(1) *Ticks* (2) *Plasmodium* (3) *Ascaris* (4) *Tania*

Ans. (1) *Ticks*

10. The factors which affect percolation and water holding capacity of soil are

(1) Soil composition (2) Grain size (3) Aggregation (4) All of these

Ans. (4) All of these

11. The process to maintain constancy of its internal environment is

(1) Equilibrium (2) Epimorphosis (3) Homeostasis (4) Apoptosis

Ans. (3) Homeostasis

12. Cuscuta is an example of :-

(1) Predation (2) Endoparasition

(3) Ecotoparasitism (4) Brood Parasitism

Ans. (3) Ecotoparasitism

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

(1) 50 per hour (2) 200 per hour

(3) 5 per hour (4) 10 per hour

Ans. (4) 10 per hour

14. Lichens are association of -

(1) bacteria and fungus (2) alga and bacterium

(3) fungus and alga (4) Fungas and Virus

Ans. (3) fungus and alga

15. According to population Scientists, one of the factors responsible for limiting population is the -

(1) Availability of food (2) Daily Variation of environmental temp.

(3) time required for ecological succession (4) Life span of members of the population

Ans. (1) Availability of food

16. Most successful parasite are those which do not -

(1) Grow free (2) Kill their host

(3) Reproduce sexually (4) Survive in soil

Ans. (2) Kill their host

17. A population has more young individual compared to the older individuals. what would be the status of the population after some years :-

(1) It will decline (2) It will stabilise

(3) It will increase (4) It will first decline and then stabilise

Ans. (3) It will increase

18. Mycorrhizae are the example of :-

(1) Amensalism (2) Antibiosis

(3) Mutualism (4) Fungistasis

Ans. (3) Mutualism

19. Which type of age pyramid obtained when the population is growing.

(1) Bell - shaped age pyramid (2) Urn - shaped age pyramid

(3) Triangular age pyramid (4) Square - shaped pyramid

Ans. (3) Triangular age pyramid

20. Cyptically - coloured (camoflaged) is a technique through which prey can.

(1) Feed abundantly (2) lessen the impact of predator

(3) Increase their number (4) Increase their reproductive fitness.

Ans. (2) lessen the impact of predator

(D) ASSERTION & REASON QUESTIONS

Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as:

(1) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(2) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(3) If Assertion is true but Reason is false.
(4) If both Assertion and Reason are false.

1. **Assertion :** Cattle or goat never graze on Calotropis.
Reason : Thorns are present as a morphological means of defence.
Ans. (3)

2. **Assertion :** Leaf butter and stick insect show mimicry to dodge their ememies.
Reason : Mimicry is a method to acquire body colour blending with the surroundings.
Ans. (1)

3. **Assertion :** A stable population is depicted by bell shaped age pyramid.
Reason : The proportion of individuals in reproductive age group in higher than those in per reproductive age group.
Ans. (3)

4. **Assertion :** Plant animal interaction do not generally involve co - evolution of the mutulist organisms.
Reason : Evolution of plants and animals go side by side.
Ans. (4)

5. **Assertion:** Desert lizards have physiological ability to main body temperature.
Reason: Desert lizards are warm blooded animals.
Ans. (4)

6. **Assertion:** Immigration contributes to decrease in population.
Reason: Emigration contributes to increase in population.
Ans (4)

7. **Assertion :** A triangular population pyramid depicts population size is stable.
Reason : Epiphytes growing on branches of the tree exhibit commensalism.
Ans. (1)

8. **Assertion :** Emigration increases the size of local population.
Reason : During emigration individuals from other population are added in the given population.
Ans. (4)

9. **Assertion:** Predation and parasitism are considered to be negative interactions.
Reason: Predators and parasitism limit the population of their host species.
Ans. (1)

10. **Assertion :** Carrying capacity limits the size of population.
Reason : Density independent population exceeds the carrying capacity.
Ans. (2)

(E) VERY SHORT ANSWER TYPE QUESTIONS

1. Name the interaction that exists between cuscuta and shoe-flower plant.

Ans. Parasitism.

2. Name the interaction between a whale and the barnacles growing on its back.

Ans. Commensalism

3. State the type of interaction that exists between ticks and dogs.

Ans. Ecto (Parasitism).

4. Name the interaction that exists between sucker fish and shark.

Ans. Commensalism.

5. Name the type of interaction seen between fig and wasps.

Ans. Mutualism.

6. Name two intermediate hosts which the human liver fluke depends on to complete its life cycle so as to facilitate parasitisation of its primary host.

Ans. Snail and Fish.

7. How are closely related species of warblers able to co-exist in a competitive environment ?

Ans. They can co–exist due to behavioural differences in their foraging activities.

8. Koel is clever enough to lay eggs in a crow's nest. Write the reason for this peculiar behaviour. Name the type of interaction

Ans. So that the crow can incubate the Koel's eggs.

Interaction – Brood parasitism.

9. What does J-shaped growth curve of a populations indicates?

Ans. The J-shaped growth curve indicates the minimum or absence of environmental resistance.

10. Define homeostasis.

Ans. The process to maintain the constancy of internal environment of the body, despite varying external environmental conditions is called homeostasis.

(F) SHORT ANSWER TYPE QUESTIONS

1. Name two basic types of competition found amongst organisms. Which one of them is more intense and why?

Ans. The two basic types of competitions are :

(i) Interspecific competition

(ii) Intraspecific competition

The intraspecific competition is more intense because the requirement of the individual of the species are similar.

2. (a) Explain "birth rate" in a population by taking a suitable example.

(b) Write the other two characteristics which only a population shows but an individual cannot.

Ans. (a) Birth rate is expressed as the number of births per 1,000 individuals of a population per year. For example, in a pond there were 200 frogs and 40 more were born in a year. Then, the birth rate of the population will be 40/200 = 0.5 frogs per year.

(b) Sex ratio, age distribution, population density, population growth. (Any two)

3. Explain Verhulst - Pearl Logistic Growth of a population.

Ans. According to Verhulst-Pearl Logistic growth, a population growing in a habitat with limited resources initially shows a lag phase, followed by phases of acceleration and deceleration and finally an asymptote when the population density reaches the carrying capacity. It is given by the following equation :

$$\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$$

where, N = population density at time t, r = intrinsic rate of natural increase, K = carrying capacity.

4. Co - evolution is a spectacular example of mutualism between an animal and a plant. Describe co - evolution with the help of an example.

OR

Describe the mutual relationship between fig tree and wasp and comment on the phenomenon that operates in their relationship.

Ans. Co - evolution can be observed in Fig (plant) and wasp (animal). The female wasp uses the fruit for oviposition or egg laying. It also uses developing seeds within the fruit for nourshing its larvae. The wasp in turn pollinates the fig inflorescence. The given Fig species can be pollinated by its 'partner wasp species and no other species.

5. Why do algae and fungi shift to sexual mode of reproduction just before the onset of adverse conditions?

Ans. For survival during unfavourable conditions / Fusion of gametes helps to pool their resources for survival (hunger theory of sex) / Zygote develops a thick wall that is resistant to dessication and damage, undergoes a period of rest before germination.

6. What is mutualism? Mention any two examples where the organis e commercially exploited in agriculture.

Ans. Interaction between two species in which both are benefited is called mutualism.

(i) Rhizobium in the roots (nodules) of legumes.

(ii) Mycorrhiza → Glomus living with the roots of higher plants.

7. Mention any two activities of animals, which get cues from diurnal and seasonal variations in light intensity.

Ans. The two activities of animals which get cues from diurnal and seasonal variations in light intensity are:

(i) Timing their foraging (ii) Migratory activities (iii) Reproduction (any two)

8. Egrets are often seen along the with grazing cattle. How do you refer to this interaction? Give a reason for this association.

Ans. The interaction between them can be referred to as commensalism. Egrets always forage close to where the cattle are grazing because the cattle, as they move stir up and flush out insects from the vegetation which otherwise might be difficult for the egrets to find and catch.

9. Explain brood parasitism with the help of an example.

Ans. Koel is a parasitic bird (which has lost the instinct to make its own nest to lay eggs), has evolved the tenchnique of laying eggs in the nest of a crow.

Its eggs bear resemblances to those of crow.

10. How does the Mediterranean orchid Ophrys ensure its pollination by bees?

Ans. The petalss of the Ophrys resembles the female of a bee species in size, colour and odour, etc

Male bee mistakes the Ophrys for female bee and tries to copulate. Few pollen grains adhered with the body of the male bee fall over stigma of the flower thereby leading to pollination.

11. (a) How is Cuscuta adapted to be a parasitic plant?

(b) Why do cattle avoid browsing on Calotropis plants.? Explain.

Ans. (a) Cuscata has lost its chlorophyll and leaves during evolution and thus it derives its nutrition from host plant, thus, it is a parasititc plant.

(b) Cattle avoid browsing on Calotropis plants beacuase it produces poisonous cardiac glycosides.

(G) LONG ANSWER TYPE QUESTIONS

1. (i) What is an age-pyramid?

(ii) Explain with the help of figures the three different types of age pyramids represented by a human population.

Ans. (i) If the age distribution (per cent individuals of a given age or age group) is plotted for the population, the resulting structure is called the age pyramid.

(ii) Expanding: Pre reproductive population is greater than reproductive or post reproductive population / growing with maximum no. of individuals in pre reproductive phase and least no. in post reproductive phase.

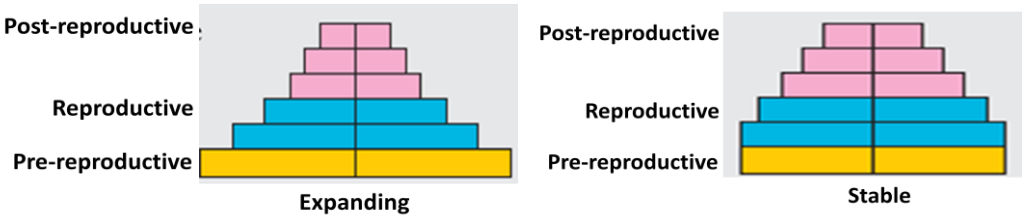
Stable: Pre-reproductive and reproductive population are almost similar / ideal for population / maintains balanced continuity / no. of individuals in reproductive phase is almost same, less no. of individuals in post reproductive phase.

Declining: Pre-reproductive population is less than reproductive population / less no. of individuals in pre- reproductive phase than reproductive phase.

2. Differentiate between an 'Expanding age pyramid' and a 'Stable age pyramid'. Substantiate your answer with diagrams.

Ans. Expanding age pyramid- Population of pre-reproductive age is greater than population of reproductive age.

Stable age pyramid- Population of pre-reproductive age equals to population of reproductive age.

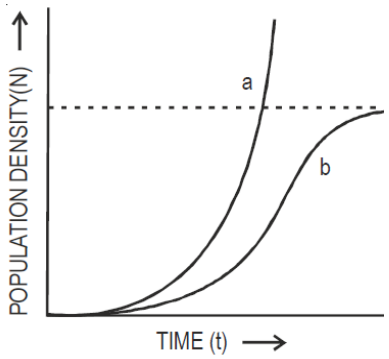


3. Study the graph given below and answer the questions that follow:

(i) The curve 'b' is described by the following equation:

$$\frac{dN}{dt} = rN\left[\frac{K-N}{N}\right]$$

What does 'K' stand for in this equation? Mention its significance.



(ii) Which one of the two curves is considered a more realistic one e animal populations?

(iii) Which curve would depict the population of a species of deer if there are no predators in the habitat? Why is it so?

Ans. (i) K-Carrying capacity

Any habitat in nature having enough resources can support a maximum number of organisms, beyond which no further growth is possible.

(ii) Curve 'b'

(iii) Curve 'a', deer population will reach enormous numbers.

4. (i) Why predators in nature are 'prudent'?

(ii) What is camouflaged ? Give examples.

(iii) How Monarch butterfly protect itself from predation?

(iv) How Acacia, Cactus plants are protect itself from predation

(v) Why you never see any cattle or goats browsing on *Calotropis* plant.

Ans. (i) If a predator is too efficient and overexploits its prey, then the prey might become extinct and following it, the predator will also become extinct for lack of food. This is the reason behind 'prudent' nature of predator.

(ii) It is a phenomenon of blending of an organism with the surrounding due to similar colour, marking and shape called as camouflaged. Some species of insects and frogs are cryptically-coloured (*camouflaged*) to avoid being detected easily by the predator.

(iii) The Monarch butterfly is highly distasteful to its predator (bird) because of a special chemical present in its body. Interestingly, the butterfly acquires this chemical during its caterpillar stage by feeding on a poisonous weed.

(iv) *Acacia*, *Cactus* plants have a thorn a common morphological means of defense.

(v) The *Calotropis* plant produces highly poisonous cardiac glycosides chemicals that make the herbivore sick when they are eaten, inhibit feeding or digestion, disrupt its reproduction or even kill it, the weed *Calotropis* growing in abandoned fields. that is the reason we never see any cattle or goats browsing on this plant.

(H) CASE BASED TYPE QUESTIONS

1. Read the following and answer the questions given below :

Can you think of any natural habitat on earth that is inhabited just by a single species? There is no such habitat and such a situation is even inconceivable. For any species, the minimal equirement is one more species on which it can feed. Even a plant species, which makes its own food, cannot survive alone; it needs soil microbes to break down the organic matter in soil and return the inorganic nutrients for absorption. And then, how will the plant manage pollination without an animal agent? It is obvious that in nature, animals, plants and microbes do not and cannot live in isolation but interact in various ways to form a biological community. Even in minimal communities, many interactive linkages exist, although all may not be readily apparent. Interspecific interactions arise from the interaction of populations of two different species. They could be beneficial, detrimental or neutral (neither harm nor benefit) to one of the species or both. Assigning a '+' sign for beneficial interaction, '-' sign for detrimental and 0 for neutral interaction, let us look at all the possible outcomes of interspecific interactions.

(i) What is mutualism?

Ans. (i) Mutualism is an interaction that confers benefits to both the interacting species.

(ii) Differentiate between the following interspecific interaction in a population.

"Mutualism and competition"

Ans.

Mutualism	Competition
It benifits both the interacting species.	Both the interacting species lose.

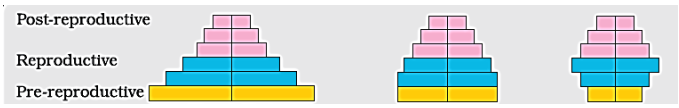
(iii) Name the interspecific interaction in which one is deterimental while other is neutral.

Ans. Amensalism

(iv) What is Interspecific interaction?

Ans. The interaction populations of two different species.

2. Study the three different age pyramids for human population given below and answer the questions that follow:



(i) Write the names given to each of these age pyramids.

Ans. (i) A - Expanding pyramid B - Stable pyramid

C - Declining pyramid

(ii) Mention the one which is ideal for human population and why.

Ans. (ii) Stable pyramid is ideal for human population because it maintains the stability in all population phases.

(iii) What would be the growth rate pattern when the resources are unlimited?

Ans. Exponential.

3. Read the following and answer the questions given below:

In many species of fig trees, there is a tight one-to-one relationship with the pollinator species of wasp. It means that a given fig species can be pollinated only by its 'partner' wasp species and no other species.

The female wasp uses the fruit not only as an oviposition (egg-laying) site but uses the developing seeds within the fruit for nourishing its larvae. The wasp pollinates the fig inflorescence while searching for suitable egg-laying sites. In return for the favour of pollination the fig offers the wasp some of its developing seeds, as food for the developing wasp larvae.





(i) 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 phosphorus from the soil. It also provides resistance to the pant from root-borne pathogens.

(ii) 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.

(iii) What is competition?

Ans. Competition is relationship in which both species members are at loss.

(iv) Name the bind of interaction present between the following:-

(i) Nodulated roots & rhizobium

(ii) Orchids & Mango tree

Ans. (i) Nodulated roots & rhizobium :- Mutualism

(ii) Orchids & Mango tree :- Commensalism.

(v) Egrets are often seen along with grazing cattle. How do you refer to this interaction?

Ans. Commensalism