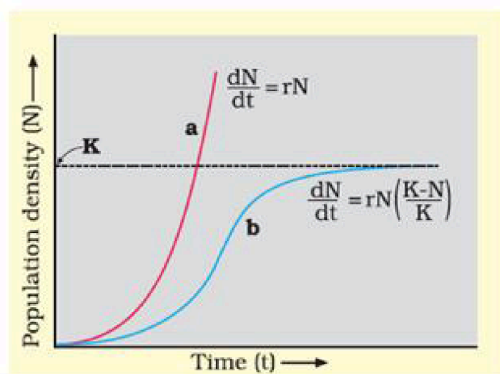**2 MARKS EACH**

1. Name the interaction in each of the following

   a. Cuscuta growing on a shoe-flower plant.

   b. Phytophagous insects feeding on plant sap.

2. List any two adaptive features evolved in parasite enabling them to live successfully on their hosts.

3. Mention the situation in which population growth curve a and b can be seen.

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

5. List two adaptations of Kangaroo rat in North American deserts.

6. Certain species of wasps are seen to frequently visit flowering fig trees. What type of interaction is seen between them and why?

12. The 'clown' fish lives among the tentacles of sea anemone. What is this interaction between them called and why?

3 MARKS EACH

1. Explain any three different ways the population density can be measured, with the help of an example of each.

2. Represent diagrammatically three kinds of age-pyramids for the human population.

3. Define the following terms

   a. Allen's rule   b. Brood parasitism   c. Resource portioning

4. Why predators are prudent in nature? Support your answer with an example.

5. State Gause's 'Competition Exclusion Principle'. Species facing competition might evolve a mechanism that promotes coexistence rather than exclusion. Justify this statement in light of Gause's competitive exclusion principle, by citing a suitable example.

6. (a) Write the importance of measuring the size of a population in a habitat or an ecosystem.

   (b) Explain with the help of an example how the percentage cover is a more meaningful measure of population size than mere numbers?

8. What is mutualism? Mention any two examples where the organisms involved are commercially exploited in agriculture.

9. "It is possible that a species may occupy more than one trophic level in the same ecosystem at the same time." Explain with the help of two examples.

3 MARKS EACH

1. . Complete the table

Species A	Species B	Name of the interaction
+	+	i……………………
-	–	ii…………………….
+	0	iii……………………..

2. Given below is representation of age pyramids of human population.

Representation of age pyramids for human population
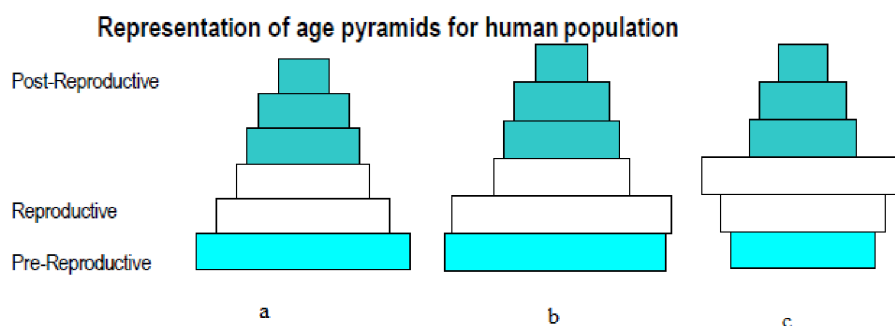
i. What are the age pyramids?

ii. What kind of population is represented by a and b age pyramids?

iii. Which of these age pyramid will have highest birth rate?

3. i. In the given flow chart what are A and B?

ii. Write the relation between all the components shown here with that of population density at time 't+1'

iii. Which of these contribute to temporary change in the population?
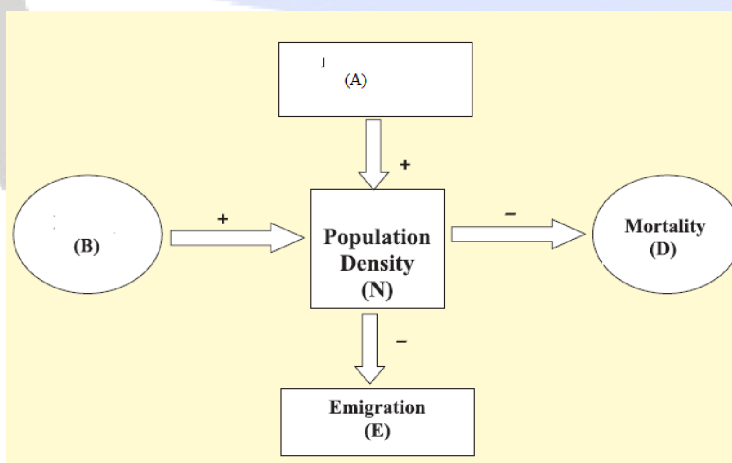
4. a. If in a pond there were 20 lotus plants last year and through reproduction 6 new plants are added, taking the current population to 26. Calculate the birth rate for plant population in this case.

b. If in a population of 44 fruit flies 6 died during a week. Find the death rate of the population during that week.

c. If in a population of rabbits initially there were 26 rabbits in their colony. 12 are born in a year and 5 killed by their predators during a season. Find their new population and growth rate of the population.

5. a. State the principle of biological control method adopted in agriculture.

b. When in a field experiment if all starfish Pisaster were removed from an enclosed intertidal area, more than 10 species of invertebrates became extinct. Why?

c. When exotic species are introduced into a geographical area, they become invasive and start spreading fast. Why?

5 MARKS EACH

1. Give the reason for the following situations.

a. Cattle do not browse on Calotropis.

b. The monarch butterfly is distasteful to its predator.

c. Very small animals are rarely found in Polar Regions.

d. In polar areas, aquatic mammals have a thick layer of blubber under their skin.

e. Some species of frogs and insects are cryptically coloured.

3. a. Certain species of wasps are seen to frequently visit flowering fig tree. What type of interaction is seen between them? Why?

b. What is the association between the bumble bee and its favourite orchid Ophyrus? How would extinction or change of one affect the other?

c. What do phytophagous insects feed on?

4. i. Differentiate between the following interspecific interactions in a population.

a. Mutualism and Competition

b. Commensalism and Amensalism

ii. What was Connell's elegant field experiment?

5. Differentiate between Exponential and Logistic growth. Draw graph and mathematical interpretations.

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