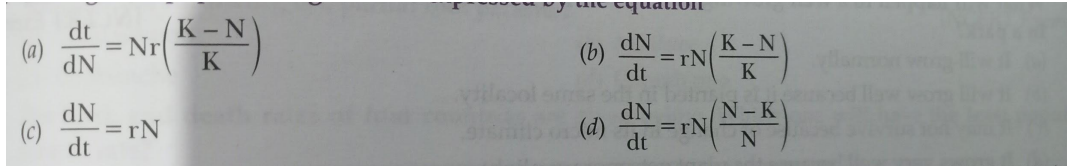


Organisms and Populations

1. Which of the following is a characteristic of biological community?

- (a) Stratification. (b) Natality. (c) Morality. (d) Sex-ratio

2. The logistics population growth is expressed by the equation



(a) $\frac{dt}{dN} = Nr \left(\frac{K - N}{K} \right)$

(b) $\frac{dN}{dt} = rN \left(\frac{K - N}{K} \right)$

(c) $\frac{dN}{dt} = rN$

(d) $\frac{dN}{dt} = rN \left(\frac{N - K}{N} \right)$

3. Cuscuta is an example of

- (a) ectoparasitism. (b) brood parasitism
(c) predation. (d) endoparasitism

4. A sedentary sea anemone gets attached to the shell lining of hermit crab. The association is

- (a) commensalism. (b) amensalism. (c) ectoparasitism. (d) symbiosis

5. Which of the following is the most accurate comment on Earth's carrying capacity (K)?

- (a) K is smaller now than it was a thousand years ago.
(b) The human population is still a long way from K.
(c) Our technology has allowed us to keep increasing K.
(d) When it comes to humans, the concept of K is irrelevant.

6. Which of the following would be true of a species with an opportunistic life history?

- (a) Members of the species take a relatively long time to reach reproductive age.
(b) They are regulated mostly by density-dependent factors.
(c) They produce large numbers of offspring.
(d) The population usually stabilizes near carrying capacity.

7. A particular species of tropical fish has only a few offspring and takes care of them for an extended period.

We might also expect the fish population to

- (a) be controlled mostly by density independent factors.
(b) show exponential growth.
(c) live in a harsh environment.
(d) be relatively stable near carrying capacity.

8. 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.

9. When birth rate equals death rate,
- (a) a population grows rapidly.
 - (b) the size of a population remains constant
 - (c) density-dependent limiting factors do not affect the population.
 - (d) a population is in danger of extinction.

10. If a population of 50 *Paramecium* 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

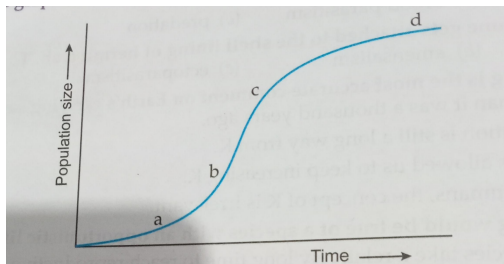
11. What would be the per cent growth or birth rate per individual per hour for the same population mentioned in the previous question (Question 14)?

- (a) 100.
- (b) 200.
- (c) 50.
- (d) 150

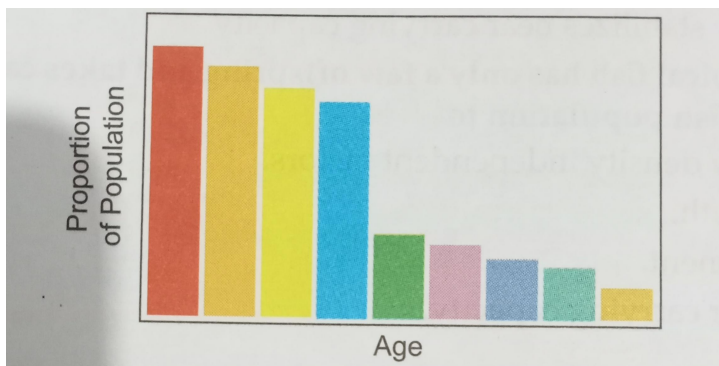
12. A population has more young individuals the population after some years? compared to the older individuals. What would be the status of

- (a) It will decline.
- (b) It will stabilise.
- (c) It will increase.
- (d) It will first decline and then stabilise.

13. At which point in the graph shown below would there be zero population growth ($dN/dt = 0$)?



14. For a population that is stable in size, the following age distribution indicates that



- (a) The population's birth and death rates are both high.
- (b) The population's birth and death rates are both low.
- (c) The population's birth rate is low but its death rate is high.
- (d) The population's birth rate is high but its death rate is low.

15. The birth and death rates of four countries are given below. Which one will have the least population growth rate?

Country	Birth rate/1000	Death rate/1000
M	15	5
N	25	10
O	35	18
P	48	41

- (a) M (b) N. (c) O. (d) P

ANSWER

- 1(a). 2(b). 3(a). 4(d). 5(c). 6(c). 7(d)
 8(c). 9(b). 10(d). 11(b). 12(c)
 13(d). 14(a). 15(d)

Assertion-Reason Questions

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

- (a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
 (b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
 (c) Assertion is correct statement but reason is wrong statement.
 (d) Assertion is wrong statement but reason is correct statement.

1. Assertion :Species are groups of potentially interbreeding natural populations which are isolated from other such groups.

Reason :Distinctive morphological features are displayed due to reproductive isolation.

2 . Assertion:Leaf butterfly and stick insect show mimicry to dodge their enemies.

Reason: Mimicry is a method to acquire body colour blending with the surroundings.

3. Assertion: A stable population is depicted by bell-shaped age pyramid.

Reason: The proportion of individuals in reproductive age group is higher than those in pre reproductive age group.

4. Assertion :Plant-animal interactions do not generally involve co-evolution of the mutualist organisms.

Reason : Evolution of plants and animals go side by side.

5 . Assertion :Predators are organisms which feed on other individuals.

Reason :Prey species have evolved various defences to lessen the impact of predation.

6. Assertion:Population pyramid (graphically) depicts the rate at which population will grow in future.

Reason: A triangular population pyramid depicts population size is stable.

7. Assertion:Epiphytes growing on branches of the tree exhibit commensalism.

Reason :In commensalism on organism benefits from the association while the other has no effect.

8. Assertion:Coral reefs are found in regions of West Bengal and Andhra Pradesh.

Reason: Coral reef require low fresh water inflow, high salinity and optimal temperature to propagate.

9. Assertion: Verhulst-Pearl Logistic growth curve is sigmoid in nature.

Reason : A population growing in habitat with limited resources shows an initial lag phase, followed by acceleration and deceleration and finally an asymptote.

10. Assertion:The Mediterranean orchid Ophrys uses sexual deceit to get pollinated by a species of bee.

Reason: The female bee changes its colour depending on the temperature of the area.

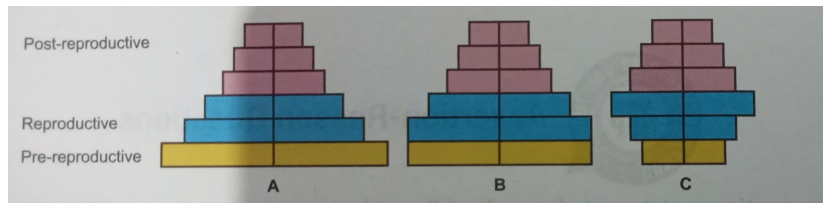
Answers

1. (b). 2. (a). 3. © 4. (d). 5. (b)

6. © 7. (a). 8. (d). 9. (b). 10. ©

PASSAGE-1

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.
- (ii) Mention the one which is ideal for human population and why.
- (iii) What would be the growth rate pattern when the resources are unlimited?
OR
- (iii) Which growth curve is obtained, when resources are limiting?

Answers

- (1) A-Expanding pyramid
- B-Stable pyramid
- C-Declining pyramid

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

(iii) Exponential.

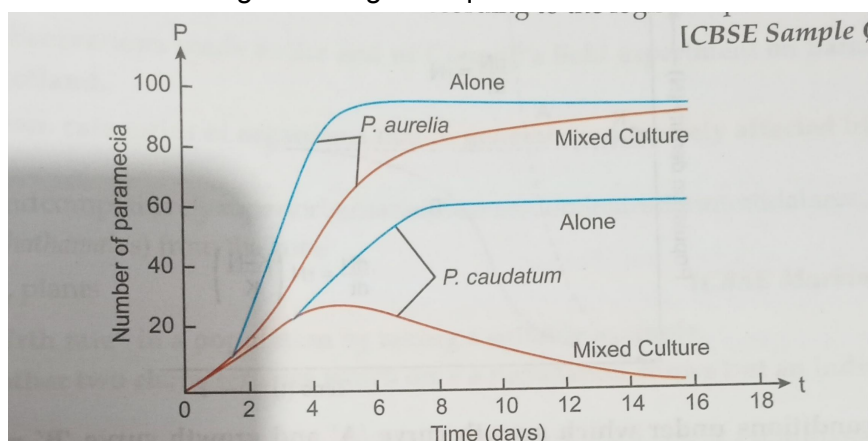
OR

(iii) Signoid-Growth curve.

PASSAGE-2

Observe the graph given below.

The graph represents inter-specific interaction between two species of *Paramecia* competing for the same resource in a culture medium. *Paramecium caudatum* and *Paramecium aurelia* were grown in separate cultures as well as in mixed cultures. It was found that each species grew in numbers according to the logistic equation.



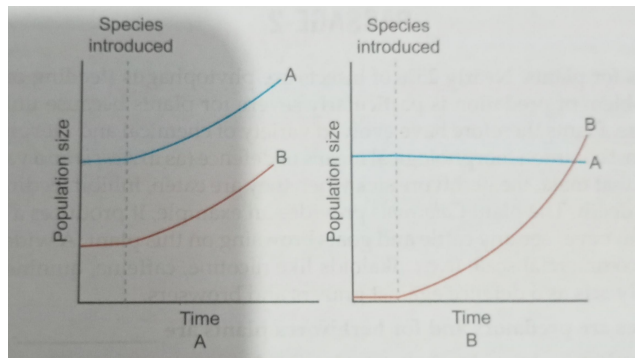
- (i) Which species is competitively superior? Support it with the data provided in the graph.

(ii) State the underlying principle for the above result and name the scientist associated with this principle.

(iii) Explain the mechanism in which two or more species competing with each other can co-exist.

OR

(iii) Graphs A and B shown below depict interaction of two species. Which graph indicates Mutualism? Give reason.



(i) *P. aurelia* species is competitively superior *P. aurelia* grows in numbers more quickly than *P. caudatum* and shows more individuals in the same volume of culture/ 100 *Paramecia aurelia* in 6 days whereas 60 *P. caudatum* in 8 days.

(ii) 'Competitive Exclusion Principle' which states that two closely related species competing for the same resources cannot co-exist indefinitely and the competitively inferior one will be eliminated. G. F. Gause.

(iii) One such mechanism is 'resource partitioning'. If two species compete for the same resource, they could avoid competition by choosing different times for feeding or different foraging patterns, to avoid competition and co-exist due to behavioural differences in their foraging activities.

OR

(iii) Graph A - As both species grow simultaneously.