

Organisms and Populations — NEET Biology PYQ (2005-2021)

Class 12 Biology · 30 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. In spite of interspecific competition in nature, which mechanism the competing species might have evolved for their survival ?

- (A) Resource partitioning
- (B) Competitive release
- (C) Mutualism
- (D) Predation

NEET 2021

2. Amensalism can be represented as :

- (A) Species A (–) ; Species B (0)
- (B) Species A (+) ; Species B (+)
- (C) Species A (–) ; Species B (–)
- (D) Species A (+) ; Species B (0)

NEET 2021

3. In the exponential growth equation $N_t = N_0 e^{rt}$, e represents :

- (A) The base of number logarithms
- (B) The base of exponential logarithms
- (C) The base of natural logarithms
- (D) The base of geometric logarithms

NEET 2020 · Q1

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

- (A) Sex ratio
- (B) Natality
- (C) Mortality
- (D) Species interaction

NEET 2018 · Q111

5. Natality refers to

- (A) Number of individuals leaving the habitat
- (B) Birth rate
- (C) Death rate
- (D) Number of individuals entering a habitat

NEET 2018 · Q114

6. Niche is

- (A) the range of temperature that the organism needs to live
- (B) the physical space where an organism lives
- (C) all the biological factors in the organism's environment
- (D) the functional role played by the organism where it lives

NEET 2018 · Q156

7. In a growing population of a country,

- (A) reproductive and pre-reproductive individuals are equal in number.
- (B) reproductive individuals are less than the post-reproductive individuals.
- (C) pre-reproductive individuals are more than the reproductive individuals.
- (D) pre-reproductive individuals are less than the reproductive individuals.

NEET 2017 · Q72

8. Mycorrhizae are the example of:

- (A) Fungistasis
- (B) Amensalism
- (C) Antibiosis
- (D) Mutualism

NEET 2017 · Q82

9. Asymptote in a logistic growth curve is obtained when:

- (A) The value of 'r' approaches zero
- (B) $K = N$
- (C) $K > N$
- (D) $K < N$

NEET 2017 (Gujarati paper) · Q88

10. In a hypothetical population of 100 individual having 'r' = 0.5/female/year, what will be the population size in 6 years (with $e = 2.72$) showing exponential rate of growth?

- (A) 1218
- (B) 739
- (C) 2012
- (D) 448

NEET 2016 Phase 2 · Q132

11. Which of the following is correct for r-selected species?

- (A) Large number of progeny with small size
- (B) Large number of progeny with large size
- (C) Small number of progeny with small size
- (D) Small number of progeny with large size

NEET 2016 Phase 2 · Q133

12. If '+' sign is assigned to beneficial interaction, '-' sign to detrimental and '0' sign to neutral interaction, then the population interaction represented by '+' '-' refers to

- (A) mutualism
- (B) amensalism
- (C) commensalism
- (D) parasitism

NEET 2016 Phase 1 · Q91

13. Gause's principle of competitive exclusion states that:

- (A) More abundant species will exclude the less abundant species through competition.
- (B) Competition for the same resources excludes species having different food preferences.
- (C) No two species can occupy the same niche indefinitely for the same limiting resources.
- (D) Larger organisms exclude smaller ones through competition.

AIPMT 2014

14. A location with luxuriant growth of lichens on the trees indicates that the:

- (A) trees are heavily infested
- (B) location is highly polluted
- (C) location is not polluted
- (D) trees are very healthy

NEET 2013

15. A biologist studied the population of rats in a barn. He found that the average natality was 250, average mortality 240, immigration 20 and emigration 30. The net increase in population is

- (A) 10
- (B) 15
- (C) 5
- (D) zero

AIPMT 2012 Mains

16. Cuscuta is an example of

- (A) Ectoparasitism
- (B) Brood parasitism
- (C) Predation
- (D) Endoparasitism

AIPMT 2011 Mains

17. The logistic population growth is expressed by the equation

- (A) $dN/dt = rN$
- (B) $dN/dt = rN[(N - K)/N]$
- (C) $dt/dN = Nr[(K - N)/K]$
- (D) $dN/dt = rN[(K - N)/K]$

AIPMT 2011 Mains

18. Consider the following statements (A)-(D) each with one or two blanks.

(A) Bears go into ___(1)___ during winter to ___(2)___ cold weather

(B) A conical age pyramid with a broad base represents ___(3)___ human population

(C) A wasp pollinating a fig flower is an example of ___(4)___

(D) An area with high levels of species richness is known as ___(5)___

Which one of the following options gives the correct fill ups for the respective blank numbers from (1) to (5) in the statements?

- (A) (3) - expanding, (4) - commensalism, (5) - biodiversity park
- (B) (1) - hibernation, (2) - escape, (3) - expanding, (5) - hot spot
- (C) (3) - stable, (4) - commensalism, (5) - marsh
- (D) (1) - aestivation, (2) - escape, (3) - stable, (4) - mutualism

AIPMT 2011 Prelims

19. Which one of the following is categorised as a parasite in true sense?

- (A) The cuckoo (koel) lays its egg in crow's nest
- (B) The female Anopheles bites and sucks blood from humans
- (C) Human foetus developing inside the uterus draws nourishment from the mother
- (D) Head louse living on the human scalp as well as laying eggs on human hair

AIPMT 2010 Mains · Q19

20. Which one of the following is most appropriately defined?

- (A) Host is an organism which provides food to another organism
- (B) Amensalism is a relationship in which one species is benefited whereas the other is unaffected
- (C) Predator is an organism that catches and kills other organism for food
- (D) Parasite is an organism which always lives inside the body of other organism and may kill it

21. Study the four statements (a-d) given below and select the two correct ones out of them

- (a) A lion eating a deer and a sparrow feeding on grain are ecologically similar in being consumers**
- (b) Predator star fish *Pisaster* helps in maintaining species diversity of some invertebrates**
- (c) Predators ultimately lead to the extinction of prey species**
- (d) Production of chemicals such as nicotine, strychnine by the plants are metabolic disorders**

The two correct statements are:

- (A) (a) and (b)
- (B) (b) and (c)
- (C) (c) and (d)
- (D) (a) and (d)

22. Geometric representation of age structure is a characteristic of

- (A) population
- (B) landscape
- (C) ecosystem
- (D) biotic community

23. The population of an insect species shows an explosive increase in numbers during rainy season followed by its disappearance at the end of the season. What does this show?

- (A) the food plants mature and die at the end of the rainy season
- (B) its population growth curve is of J-type
- (C) the population of its predators increases enormously
- (D) S-shaped or sigmoid growth of this insect

24. A high density of elephant population in an area can result in

- (A) intra specific competition
- (B) inter specific competition
- (C) predation on one another
- (D) mutualism

25. Praying mantis is a good example of :

- (A) mullerian mimicry
- (B) warning colouration
- (C) social insects
- (D) camouflage

26. The formula for exponential population growth is :

- (A) $\frac{dt}{dN} = rN$
- (B) $\frac{dN}{rN} = dt$
- (C) $\frac{rN}{dN} = dt$
- (D) $\frac{dN}{dt} = rN$

27. Niche overlap indicates :

- (A) active co-operation between two species
- (B) two different parasites on the same host
- (C) sharing of one or more resources between the two species
- (D) mutualism between two species

28. Annual migration does not occur in the case of :

- (A) salmon
- (B) Siberian crane
- (C) salamander
- (D) arctic tern

29. Animals have the innate ability to escape from predation. Examples for the same are given below. Select the incorrect example :

- (A) enlargement of body size by swallowing air in puffer fish
- (B) melanism in moths
- (C) poison fangs in snakes
- (D) colour change in chameleon

30. Which one of the following pairs is mismatched ?

- (A) Savanna — Acacia trees
- (B) Prairie — epiphytes
- (C) Tundra — permafrost
- (D) Coniferous forest — evergreen trees

Answer key and explanations

1. Answer: (A) Resource partitioning

Competing species can coexist by resource partitioning, using the same resource in different ways, places or times, as MacArthur showed for warblers feeding in different parts of the same tree. Competitive release is the expansion of a species once its competitor is removed, not a coexistence mechanism.

2. Answer: (A) Species A (–) ; Species B (0)

In amensalism one species is harmed while the other is neither benefited nor harmed, giving the (–, 0) pattern. The (+, 0) pattern is commensalism and (+, +) is mutualism.

3. Answer: (C) The base of natural logarithms

In the exponential growth equation $N_t = N_0 e^{rt}$, e is the base of natural logarithms, about 2.71828. The other phrases are not standard names of a logarithm base.

4. Answer: (D) Species interaction

Sex ratio, natality and mortality are attributes of a population as a group, not of single individuals. Species interaction (predation, competition, mutualism) describes how different species affect each other, so it is a feature of the community, not an attribute of one population.

5. Answer: (B) Birth rate

Natality is the number of births in a population during a given period, i.e. the birth rate, and it adds to population density. Individuals leaving the habitat is emigration, individuals entering is immigration, and the death rate is mortality.

6. Answer: (D) the functional role played by the organism where it lives

An ecological niche is the functional role of an organism in its habitat, including the range of conditions it tolerates and the resources it uses. The physical space where it lives is its habitat, and a temperature range alone is only one dimension of the niche.

7. Answer: (C) pre-reproductive individuals are more than the reproductive individuals.

A growing (expanding) population has a broad-based, triangular age pyramid, meaning pre-reproductive individuals outnumber reproductive ones. Roughly equal numbers give a bell-shaped, stable pyramid, and fewer pre-reproductive individuals give an urn-shaped, declining one.

8. Answer: (D) Mutualism

In mycorrhiza the fungus absorbs mineral nutrients such as phosphorus for the plant, and the plant supplies the fungus with carbohydrates, so both partners benefit: mutualism. Amensalism harms one partner without affecting the other.

9. Answer: (B) $K = N$

In logistic growth $dN/dt = rN(K - N)/K$, so growth stops and the curve flattens into the asymptote when population density N reaches the carrying capacity K . The intrinsic rate r stays the same; it is the $(K - N)/K$ term that falls to zero.

10. Answer: (C) 2012

Exponential growth gives $N_t = N_0 e^{(rt)} = 100 \times e^{(0.5 \times 6)} = 100 \times e^3 = 100 \times (2.72)^3 \approx 100 \times 20.12 \approx 2012$. Using $rt = 2$ instead ($100 \times 2.72^2 \approx 739$) is the common slip.

11. Answer: (A) Large number of progeny with small size

r-selected species such as oysters and many insects produce very many small offspring with little parental care. Producing few, large, well-cared-for offspring is the K-selected strategy.

12. Answer: (D) parasitism

In parasitism the parasite benefits (+) while the host is harmed (-). Mutualism is +/+, commensalism is +/0 and amensalism is -/0; predation is also +/- but is not offered.

13. Answer: (C) No two species can occupy the same niche indefinitely for the same limiting resources.

Gause's principle says two closely related species competing for the same limiting resource cannot coexist indefinitely in the same niche; the competitively inferior one is eventually eliminated. It is not about abundance or body size, and species with different food preferences do not compete for the same resource at all.

14. Answer: (C) location is not polluted

Lichens are very sensitive to sulphur dioxide and do not grow in polluted air, so luxuriant lichen growth on trees indicates that the location is not polluted. Their presence says nothing about infestation or health of the trees.

15. Answer: (D) zero

Change in population = (natality + immigration) - (mortality + emigration) = (250 + 20) - (240 + 30) = 270 - 270 = 0. Taking only natality minus mortality gives the trap answer 10.

16. Answer: (A) Ectoparasitism

Cuscuta (dodder) grows on the outer surface of its host plant and draws nutrients through haustoria, which makes it an ectoparasite. Brood parasitism is egg-laying in another bird's nest, as the cuckoo does.

17. Answer: (D) $dN/dt = rN[(K - N)/K]$

Logistic (Verhulst-Pearl) growth is $dN/dt = rN[(K - N)/K]$: growth slows as N approaches the carrying capacity K . $dN/dt = rN$ is exponential growth, and the other forms invert either the derivative or the term $(N - K)$.

18. Answer: (B) (1) - hibernation, (2) - escape, (3) - expanding, (5) - hot spot

Bears hibernate to escape the cold winter, a broad-based conical age pyramid indicates an expanding population, and an area with very high species richness is a hotspot. Fig and wasp is mutualism, not commensalism, and a broad base means growth, not stability, so only the choice with hibernation, escape, expanding and hot spot fills its blanks correctly.

19. Answer: (D) Head louse living on the human scalp as well as laying eggs on human hair

The head louse lives on the host's scalp, lays its eggs on the hair and feeds on the host throughout its life, a true ectoparasite. The cuckoo is a brood parasite, the female Anopheles only visits to feed, and the foetus is not a separate parasitic organism.

20. Answer: (C) Predator is an organism that catches and kills other organism for food

A predator catches and kills its prey for food, which is the standard definition. One species benefiting while the other is unaffected is commensalism, not amensalism (one harmed, other unaffected). Parasites may be external (lice, ticks) and generally do not kill the host, and 'host' refers to the organism a parasite lives on, not any food provider.

21. Answer: (A) (a) and (b)

The lion and the sparrow both eat other organisms, so both are consumers. When the predatory starfish *Pisaster* was removed from rocky shores, more than 10 invertebrate species disappeared, which shows it maintains diversity. Predators usually keep prey numbers in check rather than wiping them out, and nicotine and strychnine are defensive chemicals, not metabolic disorders.

22. Answer: (A) population

Age pyramids show the proportion of pre-reproductive, reproductive and post-reproductive individuals, and age distribution is an attribute of a population. A community or ecosystem contains many species, so a single age structure cannot describe it.

23. Answer: (B) its population growth curve is of J-type

A population that grows explosively and then crashes suddenly, without levelling off at a carrying capacity, follows a J-shaped (exponential) growth curve. A sigmoid curve would slow down and plateau instead of disappearing.

24. Answer: (A) intra specific competition

When many individuals of the same species crowd an area they compete for the same food, water and space, which is intraspecific competition. Interspecific competition involves different species, and elephants do not prey on each other.

25. Answer: (D) camouflage

The praying mantis is green or brown like the leaves and twigs it sits on, so it is hidden from both prey and predators; this is camouflage (cryptic colouration). It is a solitary insect, so 'social insects' is wrong, and it shows no warning colours.

26. Answer: (D) $dN/dt = rN$

In exponential growth the rate of change of population size with time is proportional to its size: $dN/dt = rN$, where r is the intrinsic rate of natural increase. The other options put the variables in the wrong positions.

27. Answer: (C) sharing of one or more resources between the two species

A niche overlap means two species use one or more of the same resources (food, space, etc.), which can lead to competition. Two parasites on the same host is just one possible case and is not what the term means.

28. Answer: (C) salamander

Salmon, Siberian crane and arctic tern all make long annual migrations. Salamanders are amphibians that stay in a small local area and do not make annual migrations.

29. Answer: (C) poison fangs in snakes

Poison fangs are mainly used by snakes to kill prey (offence), not to escape predators. Puffing up (puffer fish), dark camouflage (melanic moths) and colour change (chameleon) all help avoid predation.

30. Answer: (B) Prairie — epiphytes

Prairies are temperate grasslands with few trees, so epiphytes (plants growing on other plants, typical of tropical rain forests) do not fit there. Acacia in savanna, permafrost in tundra and evergreen conifers in coniferous forest are all correct pairs.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.