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NEET ORGANISMS AND POPULATIONS — POPULATION GROWTH (EXPONENTIAL AND LOGISTIC MODELS) — PYQS

Max. Marks: 72 **Questions:** 18

Section A (MCQ) — 18 questions

Q.1 Which of the following equations depicts Verhulst-Pearl logistic population growth ?

[NEET (UG) 2026]

(1) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ (2) $\frac{dN}{dt} = rN\left(\frac{K}{K-N}\right)$

(3) $\frac{dN}{dt} = rN\left(\frac{K-N}{N}\right)$ (4) $\frac{dN}{dt} = rN\left(\frac{K+N}{K}\right)$

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Q.2 Consider a population of 10 million cells. Given the per-capita birth rate of 0.002 (per unit time) and the per-capita death rate of 0.002 (per unit time), the expected number of cells after 10 generations is _____.

[RE-NEET (UG) 2026]

(1) 100 million (2) 1 million

(3) 5 million (4) 10 million

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Q.3 Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): The logistic growth model of populations is considered more realistic than the exponential growth model.

Reason (R): Resources are finite.

In the light of the above statements, choose the most appropriate answer from the options given below:

[RE-NEET (UG) 2026]

(1) A is not correct but R is correct

(2) Both A and R are correct and R is the correct explanation of A

(3) Both A and R are correct but R is not the correct explanation of A

(4) A is correct but R is not correct

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Q.4 Which one of the following equations represents the Verhulst-Pearl Logistic Growth of population?

[NEET (UG) 2025]

(1) $\frac{dN}{dt} = rN\left(\frac{N-K}{N}\right)$ (2) $\frac{dN}{dt} = N\left(\frac{r-K}{K}\right)$

(3) $\frac{dN}{dt} = r\left(\frac{K-N}{K}\right)$ (4) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

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Q.5 The equation of Verhulst-Pearl logistic growth is $\frac{dN}{dt} = rN\left[\frac{K-N}{K}\right]$. From this equation, K indicates:

[NEET (UG) 2024]

(1) Intrinsic rate of natural increase

(2) Biotic potential

(3) Carrying capacity

(4) Population density

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Q.6 When will the population density increase, under special conditions? When the number of :

[RE-NEET (UG) 2024]

(1) Deaths exceeds number of births and also number of emigrants equals number of immigrants.

(2) Births plus number of immigrants equals number of deaths plus number of emigrants.

(3) Births plus number of emigrants is more than the number of deaths plus number of immigrants.

(4) Births plus number of immigrants is more than the sum of number of deaths and number of emigrants.

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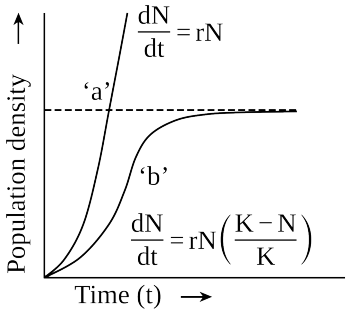
Q.7 What do 'a' and 'b' represent in the following population growth curve? [RE-NEET (UG) 2024]



(1) 'a' represents exponential growth when resources are not limiting the growth; and 'b' represents logistic growth when resources are limiting the growth.

(2) 'a' represents logistic growth when resources are not limiting the growth; 'b' represents exponential growth when resources are limiting the growth.

(3) 'a' represents carrying capacity and 'b' shows logistic growth when resources are limiting the growth.

(4) 'a' represents exponential growth when resources are not limiting the growth and 'b' shows carrying capacity.

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Q.8 Match **List I** with **List II**.

List I		List II	
A.	Logistic growth	I.	Unlimited resource availability condition
B.	Exponential growth	II.	Limited resource availability condition
C.	Expanding age pyramid	III.	The percent individuals of pre-reproductive age is largest followed by reproductive and post reproductive age groups
D.	Stable age pyramid	IV.	The percent individuals of pre-reproductive and reproductive age group are same

Choose the correct answer from the options given below: [NEET (UG) 2023]

(1) A-II, B-III, C-I, D-IV

(2) A-II, B-IV, C-I, D-III

(3) A-II, B-IV, C-III, D-I

(4) A-II, B-I, C-III, D-IV

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Q.9 In the exponential growth equation $N_t = N_0e^{rt}$, e represents [NEET (UG) 2021]

(1) The base of geometric logarithms

(2) The base of number logarithms

(3) The base of exponential logarithms

(4) The base of natural logarithms

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Q.10 Asymptote in a logistic growth curve is obtained when : [NEET 2017]

(1) K > N

(2) The value of 'r' approaches zero

(3) K < N

(4) K = N

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Q.11 When does the growth rate of a population following the logistic model equal zero?
The logistic model is given as dN/dt = rN(1–N/K) [NEET 2016 (Phase 1)]

(1) When death rate is greater than birth rate.

(2) When N/K equals zero.

(3) When N/K is exactly one.

(4) When N nears the carrying capacity of the habitat.

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Q.12 The logistic population growth is expressed by the equation: [AIPMT 2011 (Mains)]

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

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

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

(4) dN/dt = rN

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Q.13 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 ? [AIPMT 2007]

(1) The food plants mature and die at the end of the rainy season

(2) The population of its predators increases enormously

(3) Its population growth curve is of J-type

(4) S-shaped or sigmoid growth of this insect

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Q.14 The formula for exponential population growth is- [AIPMT 2006]

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

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

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Q.15 Two opposite forces operate in the growth and development of every population. One of them relates to the ability to reproduce at a given rate. The force opposing it is called: [AIPMT 2003]

(1) Biotic potential
(2) Environmental resistance
(3) Morbidity
(4) Fecundity

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Q.16 The growth curve of bacterial population in lab is plotted against time. What will be the shape of graph? [AIPMT 2002]
(1) Sigmoid
(2) Hyperbolic
(3) Ascending straight line
(4) Descending straight line

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Q.17 Choose the correct sequence of stages of growth curve for bacteria. [AIPMT 2002]
(1) Lag, log, stationary, decline phase
(2) Lag, log, decline, stationary phase
(3) Stationary, lag, log, decline phase
(4) Decline, lag, log phase, stationary

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Q.18 In a population, unrestricted reproductive capacity is called as - [AIPMT 2002]
(1) Biotic potential (2) Birth rate
(3) Carrying capacity (4) Fertility

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	1	4	2	4	3	4	1	4	4	4	3
Ques.	12	13	14	15	16	17	18				
Ans.	2	3	1	2	2	1	1				