Session : 2025-26 **AS PER NEW NTA SYLLABUS**

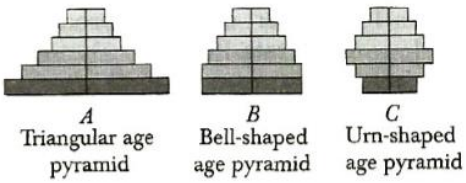
Total Questions : 384

BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

Single Correct Answer Type

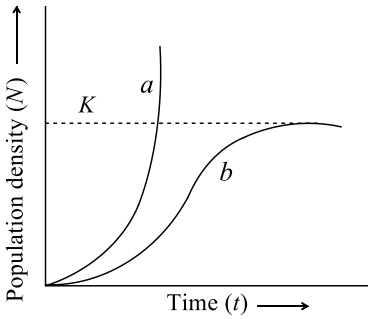
1. When two related populations occupy geographically or spatially separate areas, they are called
   a) Allopatric population b) Quantum population
   c) Saltational population d) Parapatric population
2. The maximum growth rate occurs in
   a) Stationary phase b) Senescent phase c) Lag phase d) Exponential phase
3. If $b = 65$ and d is $= 45$, $N = 100$ than find out dN/dt
   a) 2000 b) 1000 c) 200 d) 100
4. Interspecific interaction could be
   a) Beneficial b) Detrimental c) Neutral d) All of these
5. I. The human liverfluke, a nematode parasite, depends on two intermediate hosts (snail and pig) to complete its life cycle
   II. The malaria parasite needs a vector (mosquito) to spread to other hosts
   III. The female mosquito is not considered parasite, however it needs our blood for reproduction
   IV. In case of brood parasitism, the eggs of parasitic birds ($e.g.$,cuckoo) are not detected and ejected from the nest because of parasite's eggs resemble the hosts eggs in morphology and colour
   V. A population of frogs protected from all predators would increase indefinitely.
   Which statements are correct?
   a) I and II b) II and III c) III, IV and V d) I, II, III and IV
6. The relationship between the alga *Microcystis* and the surroundings fauna correspond to
   a) Amensalism b) Parasitism c) Predation d) Exploitation
7. The logistic population growth model $\frac{dN}{dt} = rN\left(\frac{K-N}{N}\right)$, describes a populations growth when an upper limit to growth is assumed. This upper limit of growth is known as population …A… and as $'N'$ gets larger, $\frac{dN}{dt}$ …B…
   a) A-carrying capacity; B-decrease b) A-carrying capacity; B-increases
   c) A-reproductive fitness; B-increases d) A-reproductive fitness; B-decreases
8. Climate is the
   a) Average weather b) Dynamic weather c) Static weather d) None of these
9. Basic unit of ecological hierarchy is
   a) Species b) genus c) Population d) Individual organism
10. Age pyramid A, B and C indicates



   a) A-Expanding population, B-Stable population, C-Declining population
   b) A-Expanding population, B-Declining population, C-Stable population
   c) A-Stable population, B-Declining population, C-Expanding population

d) A-Declining population, B-Stable population, C-Expanding population

11. Which option is correct for curve a and b?



	Equation for Curve (a)	equation for curve (b)	Type of curve (a)	Type of curve (b)
a)	$\frac{dN}{dt} = r - N$	$\frac{dN}{dt} = rN\left(\frac{N-K}{K}\right)$	Exponential curve	Logistic curve
b)	$\frac{dN}{dt} = rN$	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$	Exponential curve	Logistic curve
c)	$\frac{dN}{dt} = rN$	$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$	S-shaped curve	J-shaped curve
d)	Both (b) and (c)			

12. Population is the total number of
    a) Interbreeding individuals of a species found in particular place
    b) Interbreeding individuals of a species found in same geographical area
    c) Interbreeding individuals of a species found in different geographical area
    d) All of the above
13. Ecotype is
    a) Equivalent to the ecotone and niche
    b) Genetically distinct adapted population to a particular habitat of a species
    c) Phenotypically adapted population to a particular habitat
    d) All are correct statement regarding ecotype
14. American lakes visiting flamingoes and resident fishes compete for their common food …A… in the lake resources …B… limiting for competition to occur; in interference competition, the feeding efficiency of one species might be …C… due to the interfering and inhibitory presence of the other species, even if resources (food and space) are abundant
    Choose the correct option for A, B and C
    a) A-zooplankton, B-need to be, C-increased
    b) A-zooplankton, B-need not be, C-reduced
    c) A-phytoplankton, B-need to be, C-rReduced
    d) A-phytoplankton, B-need to be, C-increased
15. Mass of living matter at a trophic level in an area at any time is called
    a) Detritus b) Humus c) Standing state d) Standing crop
16. The term 'Niche' was first used by
    a) Elements b) Grinnel c) Warming d) Odum
17. Which competition is more intense?
    a) Intraspecific competition b) Interspecific competition
    c) Both (a) and (b) d) Predation
18. Newly developed pathogens are more damaging to host because host are called
    a) Distant pathogen b) Cronic pathogen
    c) Instant pathogen d) Genetic improved pathogens
19. Find dN/dt for exponential growth for previous question
    a) 3 b) 4 c) 5 d) 6
20. In the association between two organisms, if one organism is benefitted and the other is not benefitted, this relationship is known as

a) Symbiotism b) Mutualism c) Commensalism d) parasitism

21. Ephemerals are xerophytes that are
a) Drought resisting b) Drought enduring c) Drought escaping d) None of these

22. Resource partitioning includes
a) Temporal partitioning b) Spatial partitioning
c) Morphological partitioning d) All of the above

23. The size of the clay particle is less than
a) 0.02 mm b) 0.002 mm c) 0.2 mm d) 2.0 mm

24. Major biomes of India includes
I. tropical rainforest II. Alpine region
III. deciduous forest IV. Desert
V. Himalayan region
VI. sea coast
Choose the correct combination for given question
a) I, III, IV and V b) I, II, III and IV c) II, III, IV and VI d) I, III, IV and VI

25. Plats which behave as mesophytes in rainy season and as xerophytes in summers are called
a) Xerophytes b) Mesophytes c) Trophophytes d) Phreatophytes

26. A species inhabiting different geographical area is known as
a) Allopatric b) Sympatric c) Biospecies d) Sibling species

27. The integral form of the exponential growth equation as $N_t - N_0 e^{rt}$
A. Population density after time t
B. Population density at time zero
C. Intrinsic rate of natural increase
D. The base of natural logarithms (2.71828)
Identify A, B, C and D from the given equation
a) A-r, B-e, C-No, D-NE b) A-N_t, B-No, C-r, D-e c) A-No, B-NE, C-r, D-e d) A-No, B-NE, C-e, D-r

28. A female fig wasp enters the syconium of a fig, pollinates the flowers and lays eggs in the ovaries of some of the flowers. The young larvae grow up, eat (and kill) some, but not all of the seeds and complete their life cycle.
The fig is completely dependent on fig wasps to pollinate its flowers and the fig wasp requires figs to complete its life cycle
The interaction between figs and fig wasps has aspects of
I. mutualism
II. host-parasite interaction
III. competition
IV. ammensalism
V. protocooperation
Select the correct option
a) I and II b) I and III c) V and VI d) III and IV

29. Population growth curve in most animals, except humans is
a) S-shaped b) J-shaped c) J-shaped with tail d) S-shaped with tail

30. *Nosema notabilis* is an example for
a) Commensalism b) Symbiosis c) Ectoparasitism d) Hyperparasitism

31. Ecosystem is the interaction of
a) Species with environment b) Individual with environment
c) Biological community with environment d) All of the above

32. Populations evolve to maximise their reproductive fitness are also called
a) Mendel's fitness b) Darwinian fitness c) Lamarck's fitness d) Individual fitness

33. Ecologist say that niche is like a species …A…, while habitat is like a …B… there A and B indicate
a) A-education; B-occupation b) A-appearance; B-physiology

c) A-occupation; B-address
d) A-physiology; B-anatomy

34. Population interactions

Organism A	Organism B	Name of interaction
+	+	Mutualism
−	−	*A*
+	−	Predation
+	−	*B*
+	0	Commensalism
−	0	*C*

'+' sign for beneficial interaction
'−' sign for harmful (detrimental) interaction
'0' sing for neutral interaction
Find out what could be *A*, *B* and *C*

a) A-Amensalism, B-Parasitism, C-Competition
b) A-Competition, B-Parasitism, C-Amensalism
c) A-Competition, B-Amensalism, C-Parasitism
d) A-Amensalism, B-Competition, C-Competition

35. Individual alive at the beginning of 1 year to 2 year age interval is 800. During this interval 200 individual die. Then find out the death rate
a) 200
b) 800
c) 0.4
d) 0.25

36. Temperature is very significant to the living beings because of
a) Kinetics of locomotion depends on temperature
b) Kinetics of enzymes depends on temperature
c) High temperature facilitates digestion
d) Low temperature facilitates digestion

37. Mycorrhiza is a mutualistics association of plants root with fungi. The association occurs in
a) 83% dicots
b) 79% monocots
c) Nearly all gymnosperm
d) All of these

38. Autecology is the study of relationship between
a) Population and its environment
b) Communities and its geographical area
c) Ecosystem and its environment
d) None of the above

39. Soil has five components. The proportions of different components are

Mineral Matter	Organic Matter	Soil Moisture	Soil Atmosphere	Soil-Organism

a)

40%	10%	25%	25%	Variable

b)

40%	10%	25%	25%	10%

c)

40%	10%	35%	15%	10%

d)

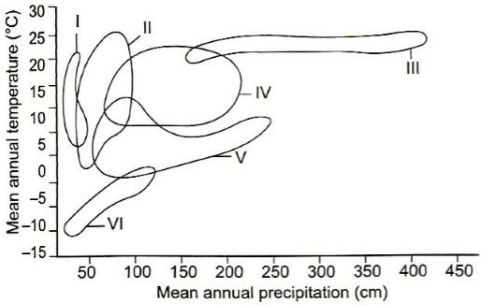
30%	20%	25%	25%	10%

40. 'Cryptically-coloured' (camouflaged) is a technique through which prey can
a) Feed abundantly
b) Lessen the impact of predator
c) Increase their number
d) Increase their reproductive fitness

41. Competition for light, nutrients and space is most severe between
a) Closely related plants growing in different area
b) Closely related plants growing in same area
c) Distantly related plants growing in same habitat
d) Distantly related plants growing in same habitat

42. Many parasites have evolved to be …A… in such a way that both host and the parasite tend to …B… that is, if the host evolves special mechanisms for rejecting or resisting the parasite, the parasite has to evolve mechanisms to …C… and neutralize them, in order to be successful with the same host species
Choose the correct option for A, B and C
a) A-host-specific, B-evolve, C-counteract
b) A-host-specific, B-coevolve, C-counteract
c) A-source specific, B-coevolve, C-counteract
d) A-source specific, B-evolve, C-counteract

43. In the given figure, identify coniferous forest, Arctic alpine tundra and tropical forest respectively



a) I, VI and III b) V, VI and III c) IV, III and I d) I, II and III

44. The change in population size at a given time interval *t*, is given by the expression
$N_t = N_0 + B + I - D - E$
I, B and D stand respectively for
a) rate of immigration, mortality rate, natality rate
b) rate of immigration, natality rate, rate of emigration
c) mortality rate, natality rate, rate of immigration
d) rate of immigration, natality rate, mortality rate

45. Which of the following is true regarding exponential growth?
a) No population can grow exponential for long
b) Exponential growth slows down as the population nears its log phase
c) Bacterial colonies have been observed to maintain exponential growth always
d) Exponential growth is a commonly observed in large, slow-growing species such as humans and elephants

46. Mycorrhizal represents an intimate mutualistic relationship between
a) Fungi and stem of higher plants b) Fungi and roots of higher plants
c) Fungi and leaves of higher plants d) Fungi and leaflets of higher plants

47. If in a pond there are 20 lotus plants of last year and through reproduction 8 new plants are added. Then the birth rate is
a) 0.8 offspring per lotus per year b) 0.2 offspring per lotus per year
c) 0.4 offspring per lotus per year d) 0.6 offspring per lotus per year

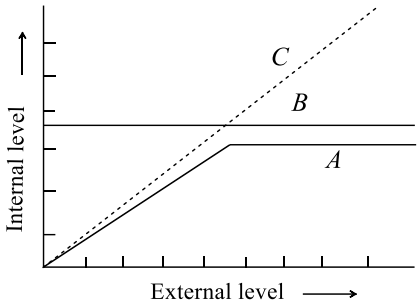
48. Any species growing …A… growing under unlimited resource conditions can reach enormous population densities in a short time. Darwin showed how even …B… growing animal like elephant could reach enormous numbers in absence of check and that characteristics of organism is called C
Choose the correct option for A, B or C respectively
a) A-logistically, B-fast, C-carrying capacity b) A-logistically, B-slow, C-biotic potential
c) A-exponential, B-slow, C-biotic potential d) A-exponential, B-fast, C-biotic potential

49. July 11^{th} is observed as
a) World population day b) No tobacco day
c) World environment day d) World health day

50. Light is
a) Visible part of electromagnetic spectrum
b) Non- visible part of electromagnetic spectrum
c) IR part of electromagnetic spectrum
d) UV part of electromagnetic spectrum

51. Pedology refers to study of
a) Soil b) Water c) Population d) Fossils

52. Identify the lines present in the given graph *A*, *B* and *C*



a) A-Partial regulators, B-Regulators, C-Endotherms
b) A-Partial regulators, B-Ectotherms, C-Endotherms
c) A-Partial regulators, B-Regulators, C-Conformes
d) A-Conformers, B-Ectotherms, C-Partial regulators

53. Submerged hydrophytes show
a) stomata
b) Abundant air sacs
c) Well developed mechanical tissue
d) Secondary growth

54. Under a particular set of selection pressure, organisms evolve towards the most …A… reproductive strategy. Some organisms breed only …B… in lifetime while others breed …C… in life time
Choose the correct option for A, B and C
a) A-efficient, B-once, C-many
b) A-efficient, B-many, C-once
c) A-deficient, B-many, C-once
d) A-deficient, B-once, C-many

55. Weather is the
a) Long term property of the atmosphere
b) Short term property of the atmosphere
c) Unchanged property of climate
d) Unknown property of climate

56. Sea plants are an example of
a) Xerophyte
b) mesophyte
c) hydrophyte
d) Submerged plant

57. Halophytes are
a) Fire-resistant
b) Cold-resistant
c) Salt-resistant
d) Sand-loving

58. Adaptation may be
a) Morphological
b) Physiological
c) Behavioural
d) All of these

59. …A… regulators are able to maintain homeostasis by means which ensures constant body temperature, constant osmotic concentration, etc. All …B… and …C…. and is very few lower vertebrate and invertebrate species are indeed capable of such regulation (thermoregulation and osmoregulation)
Evolutionary biologists believe that the 'success' of mammals is largely due to their ability to maintain a constant body …D… and thrive whether they live in Antarctica or in the Sahara desert
Choose the correct option for A, B, C and D
a) A-Behavioural, B-vertebrates, C-invertebrates, D-temperature
b) A-Behavioural, B-bird, C-mammals, D-temperature
c) A-Physiological, B-bird, C-mammals, D-temperature
d) A-Behavioural, B-vertebrates, C-invertebrates, D-morphology

60. The physiological capacity to produce offsprings is called
a) Birth rate
b) Biotic potential
c) Crude natality
d) Mortality

61. How many horizons are present in the soil profile?
a) Two zones
b) Only one zone
c) Three zone
d) Four zone

62. In … phase population adopt itself to new environment and starts to increase its number
a) Log phase
b) Lag phase
c) Decline phase
d) Stationary phase

63. The association of animals when both partners are benefitted is
a) Commensalism
b) Amensalism
c) Mutualism
d) parasitism

64. Factors which determine to the large extent the vegetation of any area are
I. pH of soil
II. mineral composition of the soil

III. water holding capacity of soil
IV. weather condition
Choose the correct option
a) I and II b) II and III c) I, II and III d) I, II, III and IV

65. The most ecologically relevant environmental factor
a) Soil b) Water c) Temperature d) Light

66. The closely related morphologically similar sympatric population, but reproductively isolated are designated as
a) Demes b) Clones c) Sibling species d) clines

67. Term 'ecology' was given by
a) Reiter b) Cuvier c) Haeckel d) Malthus

68. Regulators are also called
a) Endotherms b) Exotherms c) Ectotherms d) Either (b) or (c)

69. Diapause is
a) Stage of development
b) Stage of suspended development
c) Stage of delayed morphology
d) Rapid developmental stage

70. 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) S-shaped or sigmoid growth of this insect
b) The food plants mature and die at the end of rainy season
c) Its population growth curve is of J-type
d) The population of its predators increases enormously

71. Which of the following is categorised as a parasite in true sense?
a) Koel (cuckoo) b) Housefly c) Human foetus d) Head louse

72. Ratio between mortality and natality is called
a) Population ratio b) Vitla index c) Density coefficient d) Census ratio

73. Behavioural adaptation to environment in desert lizards are
I. Burrowing soil
II. Losing heat during high temperature
III. Active during morning and evening
IV. Insulating body due to thick fatty dermis
Select the correct pair
a) I and III b) III and IV c) I and II d) II and IV

74. Commensalism is the interaction in which
a) One species benefits and other is neither harmed nor benefitted
b) One species do not benefits and other is harmed
c) One species do not benefits and other is not harmed
d) One species benefits and other is also benefitted

75. Why a population fluctuate when it reaches to carrying capacity?
a) Due to limiting factors
b) Due to exponential growth
c) Due to unlimited natural resources
d) Due to increased reproductive rate

76. Niche overlap indicates
a) Active cooperation 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

77. Small fish get stuck near the bottom of a shark and derives its nutrition from it. This kind of association is called as
a) Antibiosis b) Commensalism c) Predation d) parasitism

78. Find out the population density when N is 1000 and S is 100 m^2

a) 10 b) 100 c) 1 d) 1000

79. Temperature decreases progressively from the
    a) Equator towards the poles
    b) Poles towards the equator
    c) Plain towards mountain
    d) Both (a) and (c)
80. A population growing in a habitat with limited resources shows four phases of growth in the following sequence
    a) Acceleration-Deceleration -Lag phase-Asymptote
    b) Asymptote- Acceleration-Deceleration -Lag phase
    c) Lag phase- Acceleration-Deceleration- Asymptote
    d) Acceleration- Lag phase- Deceleration- Asymptote
81. Photosynthetically Active Region (PAR) have the electromagnetic region of
    a) 300-700 nm b) 400-700 nm c) 200-700 nm d) 300-600 nm
82. Population density is the population per unit
    a) Area b) Land area c) Water area d) Desert area
83. Which of the following is inappropriately defined?
    I. Host is an organism which provides only food, shelter to another organism
    II. Amensalism is a relationship in which one species is benefitted, whereas the other is unaffected
    III. Predator is an organism that catches and kills other organism for food of same species
    IV. Parasite is an organism which always lives inside the body of other organism and may kill it
    Select the correct option
    a) I and II b) III and IV c) I, II, III and IV d) I, III and IV
84. 5th June is celebrated as
    a) Water day
    b) World environment day
    c) Conservation day
    d) World earth day
85. Radiation below the visible range are called
    a) UV b) IR c) Both (a) and (b) d) Radiowaves
86. Characters of a population
    I. Proportion of reproductive age group is higher than the individuals in pre-reproductive age group
    II. Number of post-reproductive individuals are moderate
    III. Declining or diminishing population
    Above characters shown indicates which type of age pyramid?
    a) Bell-shaped age pyramid
    b) Triangular age pyramid
    c) Sphere-shaped age pyramid
    d) Urn-shaped age pyramid
87. Competition of species leads to
    a) extinction
    b) Mutation
    c) Greater number of niches are formed
    d) symbiosis
88. Model is
    a) The species which mimic
    b) Object to which mimic resemble
    c) Both (a) and (b)
    d) Neither (a) nor (b)
89. Census is
    a) Official counting of population
    b) Individual counting of population
    c) Individual counting of males only
    d) Individual counting of females only
90. In bacteria, fungi and lower plants, various of thick-walled …A… are formed, which help them to survive …B… conditions-these germinate on availability of suitable environment. In higher plants …C… and some other vegetative reproductive structures serve as means to tide over periods of stress besides helping in dispersal-they germinate to form new plants under favourable moisture and temperate conditions
    Choose the correct option for A, B and C
    a) A-Spores, B-Unfavourable, C-Seeds
    b) A-Seeds, B-Unfavourable, C-Spores
    c) A-Seeds, B-Favorable, C-Spores
    d) A-Spore, B-Favourable, C-Seeds
91. Biotic community is the assemblage of populations of

a) Same species which live in particular area
b) Different species which live in particular area
c) Different species which live in different area
d) Same species which live in different area

92. Ecology is the branch of biology which deals with interaction between
a) Organisms and their environment b) Organisms only
c) Human and other organisms d) Human and their environment

93. Life history traits of organisms have evolved in relation to the constraints imposed by which components of habitat
a) Organic components b) Abiotic components c) Biotic components d) Both (b) and (c)

94. I. Salt concentration (parts par thousand) in sea water is …A…
II. Salt concentration (parts per thousand) in hypersaline water is …B…
Choose the correct option for A and B
a) A–30-35%; B–>1000% b) A–>100%; B–30-35%
c) A–>100%; B–<10% d) A–<10%; B–<10%

95. B-horizon is also called
a) Top soil region b) Below soil region c) Sub-soil region d) Upper soil region

96. 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 / 1000
M	15	5
N	25	10
O	35	18
P	48	41

a) P b) O c) N d) M

97. Plant grows best in the
I. acidic soil
II. basic soil
III. neutral soil
IV. slightly acidic soil
Choose the correct combination
a) I and II b) II and III c) III and IV d) I and III

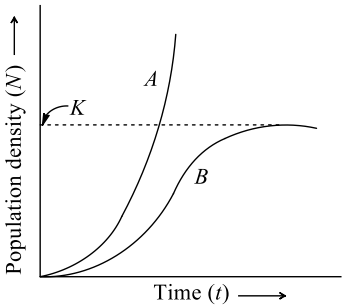
98. When food and space for a population are unlimited?
I. Each species has the ability to realize fully its inherited potential to grow
II. Then it is equal to $dN/dt = dN$
III. It is described by J-shaped curve
IV. It is described by S-shaped curve
V. Than it has greater intrinsic rate for resources
VI. There are more competition among themself
Choose the incorrect statements
a) I, II and III b) II, IIII and IV c) IV and VI d) IV, V and VI

99. Photosynthesis in *Opuntia* is done by
a) Leaves b) Stem c) Roots d) Shoot

100. Choose the incorrect statements
a) Parasite might render the host more vulnerable to predation by making it physically weak
b) Majority of the parasites harm the host and reduce the population density
c) Ideal parasite should be able to thrive with in host without harming it
d) Malarial parasite does not need a vector (mosquito) to spread to other host

101. Pollination is an example of
a) Mutualism b) Protocooperation c) Synergism d) Commensalism

102. Root cap is not found in
a) Mesophytes b) Xerophytes c) Hydrophytes d) Halophytes
103. Which model is considered a more realistic one?
a) Logistic model b) Exponential model c) Geometric model d) J-shaped model
104. Salt concentration (parts par thousand) is less than 5% in
a) Sea water b) Inland water c) Hypersaline water d) Freshwater
105. An interaction favourable to both population, but no obligatory to either is
a) Proto-cooperation b) Mutualism c) Commensalism d) Parasite
106. Phenomenal and rapid increase of population in a short period is called
a) Natural increase b) Population growth c) Population explosion d) None of these
107. Life on earth originated in
a) Air b) Water c) Soil d) All of these
108. The soil with poorest water holding capacity is
a) Clay b) Loam c) Sandy d) None of these
109. Differentiation of various tissue and organs in response to light is called
a) Morphogenesis b) Photomorphogenesis
c) Organogenesis d) Embryogenesis
110. In a population, unrestricted reproductive capacity is called
a) Biotic potential b) Fertility c) Carrying capacity d) Birth rate
111. Level of competition between species depends on
I. availability of resources
II. population density
III. group interaction of organism
Choose the correct combination
a) I and II b) I and III c) II and III d) I, II and III
112. Concept of mimicry was given by …A…
Father of Indian Plant Ecology …B…
Term 'ecology' coined by …C…
Here A, B and C refers to
a) A-Haeckel, B-Ramdev Mishra, C-Reiter
b) A-HW Bates, B-Ramdev Mishra, C-Ernst Haeckel
c) A-HW Bates, B-Birbal Sahani, C-Ernst Haeckel
d) A-HW Bates, B-Birbal Sahani, C-Reiter
113. Partial regulators are the organism which
a) Can regulate body temperature to larger extent of environmental condition
b) Can regulate body temperature to limited extent of environmental condition
c) Can regulate body temperature only over a limited range of environmental condition
d) None of above
114. Which is the characteristics of desert plant adaptation?
a) Thick cuticle on their leaf surface b) Stomata arranged in deep pits
c) Stomata remain closed during day d) All of the above
115. A population growing in a habitat with …A… resources show initially a …B… phase, followed by phase of acceleration and deceleration and finally an asymptote, when the population density reaches the …C… .
Choose the correct option for A, B and C
a) A-limited, B-lag phase, C-carrying capacity
b) A-limited, B-stationary phase, C-carrying capacity
c) A-unlimited, B-lag phase, C-carrying capacity
d) A-unlimited, B-log phase, C-carrying capacity
116. Graph *A* and *B* indicates



a) A-Logistic growth; B-Exponential growth
b) A-Exponential growth; B-Logistic growth
c) A-Geometric growth; B-Logistic growth
d) Either (b) or (c)

117. Altitude sickness is
a) Genotypic adaptation
b) Phenotypic adaptation
c) Physiological adaptation
d) Cold hardening

118. Plants grown on sandy soil, are grouped under
a) Lithophytes b) Psammophytes c) Hydrophytes d) Xerophytes

119. Ecology is basically concerned with how many levels?
a) One b) Three c) Four d) Five

120. An unrestricted reproductive capacity is called
a) Birth rate b) Biotic potential c) Carrying capacity d) Fertility

121. Asymptome stage of the population is the stage of population in which the population is
a) Changing b) Decreasing c) Increasing d) Stabilised

122. Conformers are inactive in adverse conditions due to
a) Inability to move
b) Inability to digest property
c) Inability to maintain homeostasis
d) Ability to maintain homeostasis

123. $dN/dt = rN\left(\frac{K-N}{K}\right)$
A – Population density at time t
B – Intrinsic rate of natural increase
C – Carrying capacity
Identify A, B and C from given equation
A B C
a) $N\ K\ r$ b) $N\ r\ K$ c) $K\ N\ r$ d) $K\ r\ N$

124. A secondary compound are the part of the plants
a) Normal metabolism
b) Secondary metabolism
c) Evolution
d) Genetic difference

125. The plants that grow on saline soils with high concentration of $NaCl_2$, $MgSO_4$ and $MgCl_2$ are called
a) Succulents b) Mesophytes c) Xerophytes d) Halophytes

126. Age structure of a population influences population growth because
a) Different ago group have different reproductive capabilities
b) Different age group have same reproductive capabilities
c) More young individual indicate decreasing population
d) All of the above

127. Choose the wrong statements
I. Two species may not live in same habitat
II. The more dissimilar the niches of two species the stronger is their competition
III. Two species can occupy the same niche in geographical area
IV. No two species may occupy the same ecosystem
The correct option is
a) I, II and III b) II, III and IV c) I, II, III and IV d) III and IV

128. For better survival of the human population, which of the following steps is most important?

a) Reduction in the use of various resources b) Afforestation
c) Conservation of wild life d) Ban on mining activity

129. Photosynthetic yield is maximum at the
a) Equator region b) Polar region c) Both (a) and (b) d) Arid region

130. No population of any species in nature has its disposal …A… resources to permit exponential growth. This leads to competition between individuals for …B… resources. Eventually, the …C… individual will survive and reproduce.
Choose the correct option for A, B and C
a) A-limited, B-limited, C-fittest b) A-limited, B-unlimited, C-fittest
c) A-unlimited, B-limited, C-fittest d) A-unlimited, B-unlimited, C-fittest

131. Schimper's second low related to
a) Local distribution of plants
b) Geographical distribution of plants
c) Geographical distribution of animals
d) Geographical distribution of animals and plants

132. Which of the following statements regarding species interdependence are true?
I. An Association of two species where one is benefitted and other remains unaffected is called mutualism.
II. An interspecific association where both partners derive benefit from each other is called commensalism.
III. A direct food relation between two species of animals in which one animal kills and feeds on another is referred as predation.
IV. A relationship between two species of organisms where both are partners are benefitted from each other is called symbiosis.
a) I and II only b) III and IV only c) I and III only d) II and III only

133. Organisms which breed only once in their lifetime
a) Pacific salmon fish b) Bamboo c) Both (a) and (b) d) None of these

134. In a population, the condition at which the rate of addition of new members is more than the rate of individuals lost indicates
a) Zero population growth b) Exponential growth
c) Fluctuating growth d) Declining growth

135. In the absence of an external source of water, Kangaroo rat in North American desert is capable of meeting all its water requirements through
a) Internal fat oxidation b) Taking liquid food
c) Reducing his activities d) Hibernation

136. Even a plant species, which makes its own food, cannot survive alone; it needs soil microbes to breakdown the …A… matter in soil and return the …B…. 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 cannot live in …C… but interact in various ways to form a biological community
Choose the correct option for A, B and C
a) A-inorganic, B-organic, C-isolation b) A-organic, B-inorganic, C-isolation
c) A-organic, B-inorganic, C-community d) A-inorganic, B-organic, C-community

137. The growth of a population without limit at its maximal rate and also that, rates of immigration and emigration are equal, then it is called
a) Carrying capacity b) Biotic potential c) Positive growth d) Negative growth

138. Which of the following characters explain the bell-shaped curve?
a) The number of pre-reproductive individual equal to the number of reproductive individual
b) Past reproductive individual are comparatively few
c) Growth is zero
d) All of the above

139. Carrying capacity is the capacity of
    a) Habitat that has resources to sustain certain number of individuals
    b) Population to reproduce and competitiveness
    c) Population to reproduce
    d) Individuals to fit among the natural environment
140. In which regions of the world are hot deserts located?
    a) Equator and Tropic of cancer
    b) Equator and tropic of Capricorn
    c) Polar region
    d) Tropic of cancer and Tropic of Capricorn
141. Population density of a population in a given habitat during a given period fluctuates due to change in
    a) Natality and mortality
    b) Immigration
    c) Emigration
    d) All of these
142. Statements
    I. Recent studies support competition as suggested in 'Gauses's Competitive Exclusion Principle'
    II. Gause's hypothesis says if two species compete for same resources then one will be eliminated by another species
    III. More recent studies point out that species facing competition might evolve mechanisms that promote co-existence rather than exclusion
    IV. Gause's competitive exclusion principle is effective when resources are in excess
    V. Unlimited resources give better opportunity for adaptation
    Choose the correct combination of statements
    a) I, II and III
    b) II, III and IV
    c) III, IV and V
    d) I, IV and V
143. Different organism are adapted to their environment in terms of not only survival but also reproduction. This statement belongs to
    a) Physiological ecology
    b) Species ecology
    c) Population ecology
    d) All of these
144. Which determines the flora and fauna of a place?
    a) Weather
    b) Climate
    c) Both (a) and (b)
    d) Habitat
145. Eurythermals are the organism which
    a) Can tolerate wide range of temperature
    b) Can tolerate low range of temperature
    c) Cannot tolerate low range of temperature
    d) Cannot tolerate wide range of temperature
146. Plants growing on sand and gravel are called
    a) Eremophytes
    b) Psammophytes
    c) Psilophytes
    d) Oxylophytes
147. In aquatic environment the types of benthic animals are determined by
    a) Type of water
    b) Type of sediment characteristics
    c) Light availability
    d) Nutrient availability
148. The growth rate of a population stabilizes after
    a) Logarithmic phase
    b) Stationary phase
    c) Carrying capacity
    d) Negative acceleration phase
149. Why exotic species become invasive sometime and starts spreading fast because of
    a) Natural predators
    b) Abundant natural competitor
    c) Invaded land does not have its natural predators
    d) Mutation in their genome
150. In commensalism
    a) Both partners are harmed
    b) Weaker partner is benefitted
    c) Both partners are benefitted
    d) None of the partners is benefitted
151. Bell-shaped age pyramid indicates that
    a) Number of pre-reproductive and reproductive individual is almost equal
    b) Post-reproductive individuals are comparatively fewer
    c) The population size remains stable
    d) All of the above

152. There are two optional ways of exploitation. One way is parasitism. Which is the other one?
a) Antibiosis b) Competition c) Predation d) Commensalism
153. Population size of Siberian cranes at Bharatpur wetlands in any year is
a) 1000 b) <10 c) >100 d) = 1000
154. Prickly pear cactus species introduced into Australia in
a) 1920 b) 1930 c) 1925 d) 1929
155. Pattern of population results in a J-shaped curve obtained in
a) Logistic growth b) Exponential growth c) Sigmoid growth d) All of these
156. If non-limiting conditions are provided then what will happen?
a) Natality increases and mortality decreases b) mortality decreases
c) Natality increases d) Mortality increases
157. In which one of the following habitats does the diurnal temperature of soil surface vary most?
a) Shrub land b) Forest c) Desert d) Grassland
158. Ectothermic animals are also called
a) Poikilothermal b) Cold-blooded c) Both (a) and (b) d) Isothermic
159. Highest level of biological hierarchy in the given options is
a) Biome b) Ecosystem c) Individual d) Species
160. Character displacement take place when there is
a) Geographic displacement b) Geographic overlapping
c) Geographic non-overlapping d) Habitat displacement
161. Climate is the
a) Short term property of atmosphere b) Long term property of atmosphere
c) Unchanged property of atmosphere d) All of the above
162. Gloger's rule related to the
a) Colour b) Extremities c) Narrow wing d) Size
163. Positive growth or rapid increase in the population is indicated by
a) Less number of young ones b) Large number of young ones
c) Large number of old ones d) Large number of child birth
164. The soil which is transported by wind is known as
a) Colluvial b) Eolian c) Alluvial d) glacial
165. When there are large number of post-reproductive or older individuals and lesser number of pre-reproductive individuals then that population is
a) Growing b) Decline c) Stable d) None of the above
166. Human liverfluke (a trematode parasite) depends on which two intermediate hosts
I. Snail
II. Fish
III. Pig
IV. Mosquito
Choose the correct combination
a) I and III b) II and III c) III and IV d) IV and V
167. Prickly pear cactus (an exotic species) can brought under control (in Australia) by using
a) Babul eating predators b) Kikar eating predators
c) Cactus feeding predators d) Intensive herbicides
168. Which of the following is correct range of latitudes for temperate region?
a) 45° to 66° b) 0° to 20° c) 20° to 40° d) 60° to 80°
169. Population is
a) Group of similar interbreeding individuals in a particular area which complete for similar resources
b) Group of dissimilar individuals in a particular area
c) Group of slightly similar individuals in a particular area
d) Intrabreeding species together make population

170. Ecological hierarchy comprises, which of the following sequence
    a) Population → Species → Community → Ecosystem → Biosphere
    b) Species → Population → Community → Ecosystem → Biosphere
    c) Species → Population → Biosphere → Community → Ecosystem
    d) Species → Population → Biosphere → Ecosystem → Community
171. In India, human population is heavily weighed towards the younger age group as a result of
    a) Short life span of many individuals and low birth rate
    b) Short life span of many individuals and high birth rate
    c) long life span of many individuals and high birth rate
    d) long life span of many individuals and low birth rate
172. Aerenchyma is the characteristics feature of
    a) Mesophytes b) Hydrophytes c) Xerophytes d) Aesophytes
173. Many fishes of freshwater can't live in sea water and *vice-versa* because of
    a) Nutrient b) Osmotic problems c) Breathing problems d) Excretion problems
174. If b is represented → Birth rate
    If d is represented → Death rate
    If dN is represented → Increase or decrease in population size
    Then exponential growth is represented by
    a) $dN/dt = (b + d) \times N$ b) $dN/dt = (b - d) \times N$
    c) $dN/dt = (d - b) \times N$ d) $dN/dt = (d - b)^N$
175. Predator helps to create checks on
    a) Prey population b) Biological control of weeds and pests
    c) Species diversity d) All of the above
176. Animals eating plants are categorised separately as …A…, they are in a broad ecological context, not very different from …B…
    Choose the correct option A and B
    a) A-herbivores; B-predator b) A-herbivores; B-omnivore
    c) A-omnivores; B-herbivores d) A-omnivores; B-predator
177. Logistic growth occurs when there is
    a) No resistance from increasing population b) Unlimited food
    c) Fixed carrying capacity d) All of the above
178. The niche of a population is defined as
    a) Set of condition that interacts b) Place where it lives
    c) Set of conditions and resources it uses d) Geographical area that it covers
179. Geometric representation of age structure is characteristic of
    a) Biotic community b) Population c) Landscape d) Ecosystem
180. When Darwin spoke of the struggle for existence and survival of the fittest in the nature, he was conveinced that
    a) Intraspecific competition is a potent force in organic evolution
    b) Interspecific competition is a potent force in organic evolution
    c) Intensive reproduction is the potent force in organic evolution
    d) Intensive predation is the potent force in organic evolution
181. Genetic drift operates in
    a) Small isolated population b) Large isolated population
    c) Fast reproductive population d) Slow reproductive population
182. Which of the following is not true for a species?
    a) Members of a species can interbreed
    b) Variations occur among members of a species
    c) Each species is reproductively isolated from every other species
    d) Gene flow does not occur between the populations of a species

183. Zero growth means
a) Natality balance mortality
b) Natality is more than mortality
c) Natality is less than mortality
d) Natality is zero

184. Ecological age groups of a population are
I. pre-reproductive
II. reproductive
III. post-reproductive
IV. old-age group
V. adolescent age group
VI. infertile age group
Choose the correct option for given statements
a) I, II and III
b) III, IV and V
c) IV, V and VI
d) I, V and VI

185. Sigmoid growth curve is represented by
a) $dN/dt = rN$
b) $dN/dt = rN(1 - N/K)$
c) $Nt = N_O + B + I - D - K$
d) $dN/dt = 1 - N/K$

186. In which one of the following pairs is the specific characteristic of soil not correctly matched?
a) Laterite - Contains aluminium compound
b) Terra - Most suitable for roses
c) Chernozems - Richest soil in the world
d) Black Soil - Rich in calcium carbonate

187. All aquatic vertebrates and most molluscs and cry fishes are
a) Thermoconformers
b) Osmoconformers
c) Oxyregulators
d) All of these

188. Average temperature of thermal springs and deep sea hydrothermal vents exceeds
a) 50°C
b) 60°C
c) 70°C
d) 100°C

189. In the oceans, the environment is perpetually dark at
a) More than 100 m
b) More than 500 m
c) Less than 100 m
d) Less than 500 m

190. Regulators are the their animals which
a) Does not maintain their body homeostasis
b) Can maintains their body homeostasis
c) Can regulate their heart beat
d) Can regulate their circulation

191. Population A-Have the intrinsic rate of natural increase is 0.2
Population B-Have the intrinsic rate of natural increase is 0.3
Population C-Have the intrinsic rate of natural increase is 0.4
Population D-Have the intrinsic rate of natural increase is 0.5
Which population will increase fastest among all of the given population?
a) D
b) C
c) B
d) A

192. Humus is present in
a) Horizon-A
b) Horizon-O
c) Horizon-B
d) Horizon-C

193. Ecosystem components includes
a) Biotic
b) Abiotic
c) Both (a) and (b)
d) Species

194. Monarch butterflies are highly distasteful to predator due to
a) Its ugly look
b) A special chemical present in his body
c) Both (a) and (b)
d) A poison secreted by their special glands

195. Species living in a restricted geographical area is
a) Sympatric
b) Allopatric
c) Sibling
d) keystone

196. Pneumatophores have lenticels for
a) Excretion
b) Gaseous exchange
c) Reproduction
d) All of these

197. Temperature gradient over earth surface is
a) 6.4 to 6.5°C per 1000 m altitude
b) 6.4 to 6.5°C per 1000 m latitude
c) 7.5 to 9.5°C per 1000 m latitude
d) 7.5 to 9.5°C per 1000 m altitude

198. Abiotic factors affects the
I. Structure of organisms
II. Physiology of organisms

III. Behaviour of organisms

a) I and II b) II and III c) I, II and III d) I and III

199. Which one of the following is a matching pair of certain organism(s) and the kind of association?

a) Shark and sucker fish - Commensalism

b) Red algae and fungi in liches - Mutualism

c) Orchids growing on trees - Parasitism

d) *Cuscuta* (dodder) growing on other flowering plants - Epiphysis

200. Nature and properties of soil in different places vary due to

a) Climate b) Weathering process c) Topography d) All of these

201. Zero growth of population is indicated by

a) Less number of child birth

b) Less number of reproductive females

c) Reproductive individual are equal to pre-reproductive individuals

d) Less number of male then females

202. Why mammals of the colder region generally have shorter ears and limbs?

I. To minimize their surface volume ratio

II. To minimize heat loss

III. To maximize their surface volume ratio

IV. To maximize heat loss

Choose the correct combination from the given option

a) I and II b) II and III c) III and IV d) I and IV

203. The productivity and distribution of plants mainly depends on

a) Soil b) Temperature c) Water d) Light

204. Which one is the edaphic factor in biosphere?

a) Light b) Temperature c) Water d) Soil

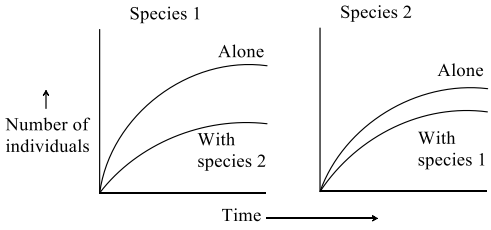
205. The most important factor which determined the increase in human population in India during the 20^{th} century.

a) Natality b) Mortality c) Immigration d) Emigration

206. Population density of terrestrial organisms is measured in terms of individuals per

a) m^3 b) m^4 c) m d) m^2

207. In laboratory experiments, two species of the protest *Paramecium* were grown alone and in the presence of the other species. The following graphs show growth of species 1 (left) and species 2 (right), both alone and when in mixed culture



Interpretation of these graphs shows that

a) Competitive exclusion occurred in these experiments

b) Both species are affected by interspecific competition but species 1 is affected less

c) Both species are affected by interspecific competition but species 2 is affected less

d) Both species are affected equally by interspecific competition

208. I. Population evolve to maximise their reproductive fitness, also called Darwinian reproductive fitness (higher r value), in the habitat in which they live

II. The population growth rate r is inversely related to generation time

III. The housefly, which has a short life span and produces a large number of eggs, could be considered as a 'K' selected species

IV. Under a particular set of selection pressures, organisms evolve towards the most efficient reproductive strategies

V. Life history traits of organisms have evolved in relation to the constraints imposed by biotic and abiotic factors in their habitat

Select the combination of correct statements

a) I, II and III b) I, III and IV c) III, IV and V d) All except III

209. 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 is called

a) Biotic potential b) Environmental resistance

c) Morbidity d) Fecundity

210. When the value of 'r' is significantly low as compared to other. It is better known by

a) Competition exclusion b) Resource partition

c) Interference competition d) Competition release

211. Which one is the example of sexual parasite?

a) An male agler fish (*Photocorynus*) b) Male *Bonellia*

c) Male *Schistosoma* d) All of the above

212. An overwhelming majority …A… of animals and nearly all plants cannot maintain a constant internal environment. Their body temperature …B… with the ambient temperature. In aquatic animals, the osmotic concentration of the body fluids …C… with that of the ambient water osmotic concentration. These animals and plants are simply conformers

Choose the correct option for A , B and C

a) A-98%, B-Changes, C-Constant b) A-97%, B-Constant, C-Changes

c) A-96%, B-Changes, C-Constant d) A-99%, B-Changes, C-Changes

213. Good soil is that which

a) Holds whole of the water that enters into it b) Allows percolating the water slowly from it

c) Allows water to pass very quickly from it d) Allows limited amount of water to retain into it

214. Living in same habitat, organisms of same species of form

a) Biosphere b) Community c) Population d) niche

215. Which of the following factors increase, the size of a population?

a) Natality and immigration b) Natality and mortality

c) Mortality and immigration d) Natality and emigration

216. Population size is more technically called

a) Population density b) Demography

c) Population growth d) Population dynamics

217. If natality is represented by – B

If mortality is represented by – D

If immigration is represented by – I

If emigration is represented by – E

If population density is represented by – N

Then population density at time t+1 is represented by

a) $N_{t+1} = N_t - [(B + I)] - [(D + E)]$ b) $N_{t+1} = N_t + [(B + I)] - [(D + E)]$

c) $N_{t+1} = N_t + [(B + I)] + [(D + E)]$ d) $N_{t+1} = N_t - [(B + I)] + [(D + E)]$

218. How seals can survive in polar climate where the temperature prevails below 0°C?

a) They have long hairs on their body surface

b) They have thick layer of fat below their skin

c) Both (a) and (b)

d) They have genetic regulation for avoiding cold climate

219. Identify the basic levels of ecology

I. Organisms II. Populations

III. Communities IV. Biomes

V. Human VI. Vertebrates

Choose the correct option

a) I, II and III b) II, III and IV c) I, II, III and IV d) I, II, III and V

220. What is true about the isolated small tribal populations?
   a) There is a decline in population as boys marry girls only from their own tribe
   b) Hereditary diseases like colour blindness do not spread in the isolated population
   c) Wrestlers who develop strong body muscle in their life time pass this this character on to their progency
   d) There is no change in population size as they have a large gene pool
221. Reproductive isolation between segments of a single population is termed as
   a) Sympatry b) Allopatry
   c) Population divergence d) Disruptive divergence
222. Predators also help in …A… species diversity in a community, by …B… the intensity of competition among competing prey species. Here *A* and *B* can be
   a) A-exceeding; B-increasing b) A-maintaining; B-reducing
   c) A-reducing; B-maintaining d) A-maintaining; B-increasing
223. Humus is formed by
   a) Partial degradation of organic matter
   b) Complete degradation of organic matter
   c) Complete degradation of inorganic matter
   d) Partial degradation of organic matter
224. An indirect competition for shared resources such as a particular nutrient is called
   a) Mutualism b) Exploitation c) Advantageous d) Symbiosis
225. Population size more technically called …A… (designated as N) need not necessarily to be measured in …B… only

   Choose the correct option for A and B
   a) A-population natality; B-numbers b) A-population mortality; B-numbers
   c) A-population density; B-numbers d) A-population density; B-pyramid
226. Phenotypic variants formed in a population due to change in environment are called
   a) Ecophenes b) Ecotypes c) Sciophytes d) Heliophytes
227. Certain characteristic demographic features of developing countries are
   a) High fertility, low or rapidly falling mortality rate, rapid population growth and a very young age distribution
   b) High fertility, high density, rapidly rising mortality rate and a very young age distribution
   c) High infant mortality, low fertility, uneven population growth and a very young age distribution
   d) High mortality, high density, uneven population growth and a very old age distribution
228. The permanent decrease in population number occurs due to
   a) Migration b) Natality c) Emigration d) Mortality
229. Exotic species are also called

   I. introduced species

   II. alien species

   III. non-indigenous species

   IV. non-native species

   Choose the correct combination
   a) I, II and III b) II, III and IV c) I, III and IV d) I, II, III and IV
230. Keystone species deserve protection because these
   a) Are capable of surviving in harsh environmental condition
   b) Indicate presence of certain minerals in the soil
   c) Have become rate due to over exploitation
   d) Play an important role in supporting other species
231. There is more competition for survival between

a) Different animals of same niche
b) Same animals of same niche
c) Different animals of different niche
d) Same animals of different nche

232. Find odd one out, according to parasitism.
a) Lice
b) *Plasmodium*
c) Bedbug
d) Mite

233. They are dominant plants of the cold desert
a) Shrub and small trees
b) Low stature shrub and perennial grass
c) Tall trees and herbaceous plants
d) Low stature shrub and herbaceous plants.

234. Study of environmental and animal relation is
a) Ecosystem
b) Phytosociology
c) Biotic community
d) Ecology

235. Sunlight is available as a source of energy. The sunlight is very much important in
a) Chemosynthesis
b) Photosynthesis
c) Heterotrophic mode of nutrition
d) All of the above

236. Which of the following is correct
I. In a population, birth rate and death rate refer to per capita births and death respectively
II. In nature, we rarely find isolated single individuals of any species
III. The size of population for any species is stable phenomena
IV. Ecological effects of any factors on a population growth are generally reflected in its size/population density
a) I and II
b) II and III
c) I, II and III
d) I, II and IV

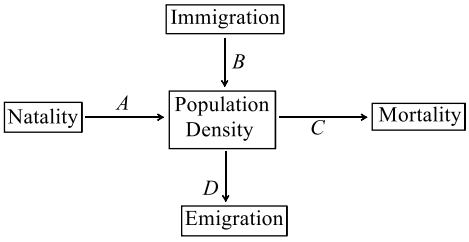
237. Organism which are restricted to low range of temperature are called
a) Eurythermals
b) Stenothermals
c) Amphithermals
d) Coanothermals

238. Which one is incorrect regarding parasitism?
a) Parasite show special adaptation
b) Ectoparasite show more complex life cycle
c) Endoparasite show more complex life cycle
d) Koel is the example of brood parasite

239. The interaction of species with the environment is called as
a) Community
b) Environment
c) Ecosystem
d) autecplogy

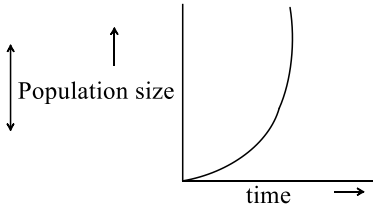
240. Diapause is stage of suspended development in lakes and ponds. Find out the season in which it occurs
a) Summer
b) Winter
c) Autumn
d) Spring

241. Study the figure and identify *A* and *B*



a) A-Increase, B-Decrease, C-Increase, D-Decrease
b) A-Decrease, B-Increase, C-Decrease, D-Increase
c) A-Increase, B-Increase, C-Decrease, D-Decrease
d) A-Decrease, B-Decrease, C-Increase, D-Increase

242. Below diagram indicates



a) Exponential growth curve
b) Logistic growth pattern
c) J-shaped curve
d) Both (a) and (c)

243. Examples of chemicals produced by plants as a defense against grazers and browsers
I. Nicotine

II. Caffeine
III. Quinine
IV. Strychnine
V. Opium
Choose the correct combination
a) I and II b) I, II, III and IV c) I, II and III d) I, II, III, IV and V

244. Maximum survival and reproductive capacity shown by a population under optimal environmental conditions is called
a) Carrying capacity b) Natality c) Biotic potential d) vitality

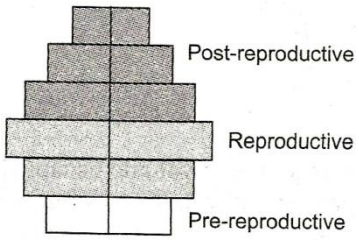
245. I. Birds II. Family – Asteraceae
III. Polar bear IV. Human
V. Lizards VI. Amphibians
VII. Coconut
Identify stenothermals from the given examples
a) III, V, VI and VII b) II, III, IV and VI c) I, II, III and IV d) VII, VI, V and I

246. Pseudo copulation occurs in
a) Maize b) Ophrys c) Mango d) Papaya

247. The age of pyramid with broad base indicates
a) High percentage of young individuals b) Low percentage of young individuals
c) High percentage of old individuals d) Low percentage of old individuals

248. A high density of tiger population in an area can result in
a) Predation b) Interspecific competition
c) Intraspecific competition d) Proto cooperation

249. What type of human population is reprented by the following age pyramid?



a) Stable population b) Declining population
c) Expanding population d) Vanishing population

250. Which horizon in soil profile is known as top soil?
a) O-horizon b) A-horizon c) B-horizon d) C-horizon

251. $A \xrightarrow{\oplus}$ Population density (N) $\xleftarrow{\ominus} B$
If *A* increases the population density and *B* decreases then identify *A* and *B*
a) A-Natality; B-Mortality b) A-Immigration; B-Emigration
c) Both (a) and (b) d) A-Emigration; B-Immigration

252. I. Salmon II. Shark III. Sting ray
Which of them is/are stenohaline and euryhaline?

	Stenohaline	**Euryhaline**
a)	I, III	II
b)	I, II	III
c)	II, III	I
d)	I	II, III

253. Plants developing in dry condition are
a) Xerophytes b) Mesophytes c) Lithophytes d) Hydrophytes

254. Natality refers to the number of
a) Births during a given period b) Death during a given period
c) Living individuals during a given period d) Living individuals during their life span

255. I. Species level II. Population level

III. Individual level IV. Community level

Out of the levels given at a which level selection operates

a) I and II b) Only II c) III and IV d) Only IV

256. Association of animals belonging to different species, where both partners are benefitted, is called

a) Commensalism b) Mutualism c) Colony d) sympathy

257. In which condition the logistic and exponential growth of population have zero growth rate

a) When r is 0 b) When $b = d$ c) When $K = N$ d) All of these

258. Why no predator become proficient in acquiring prey?

a) Prey populations evolve antipredatory traits
b) Prey populations reproduce fastly
c) Predator populations reproduce fastly
d) Predators are to large to be fast enough

259. Hierarchy is

a) Categorisation of a group of living beings b) Series of ordered groupings within system
c) Either (a) or (b) d) None of the above

260. The percentage of soil volume occupied by pore space is called porosity of soil. It is minimum in

a) Sandy soil b) Clay soil c) Loamy soil d) silt

261. The inherent maximum capacity of an organism to reproduce or increase in number is called as

a) Biotic potential b) Ecosystem c) Population d) Ecology

262. The basic unit of study in ecology is

a) Population b) Organism c) Community d) species

263. Body compensates low oxygen availability at high altitudes by

I. increasing RBC
II. decreasing binding affinity of haemoglobin
III. increasing binding affinity of haemoglobin
IV. increasing breathing rate
V. decreasing breathing rate

Choose the correct option for given statement

a) I, II and III b) II, III and IV c) I, III and IV d) I, II and IV

264. The species of plants that play a vital role in controlling the relative abundance of other species in a community are called

a) Edge species b) Keystone species c) Pioneer species d) Seral species

265. If birth rate is 100, death rate is 10 and number of individuals in population group is 1000, then what will be the percentage of natural growth rate?

a) 0.09% b) 9.0% c) 0.9% d) 90%

266. A_0 layer is rich in

a) Minerals b) Humus c) Litter d) None of these

267. In most animals, the metabolic reactions proceed in a …A… temperature range (in humans, it is 37°C). But there are microbes (archaebacteria) that flourish in hot springs and deep sea hydrothermal vents where temperature far exceed …B…

Choose the correct option for A and B

a) A-narrow; B-100°C b) A-broad; B-100°C c) A-median; B-100°C d) A-broad; B-40°C

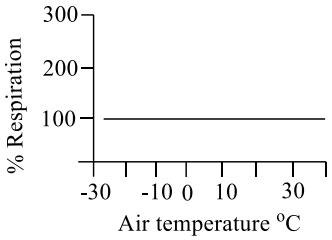
268. How many types of age pyramid are there?

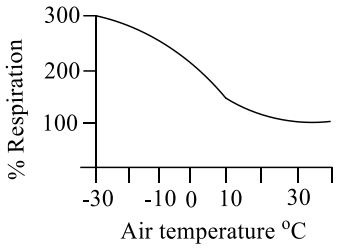
a) Two types b) Three types c) Four types d) Five types

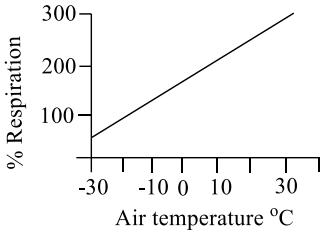
269. Competition occurs when

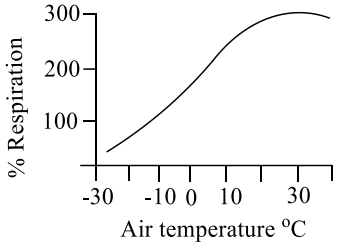
a) Closely related species compete for same resources
b) Unrelated species compete for same resources
c) Both (a) and (b)
d) Natural resources are unlimited

270. Which of the following graphs correctly depicts the rate of respiration of a non-hibernating mammal living in cold climate?

a) 

b) 

c) 

d) 

271. I. Some species of insects and frogs are critically coloured (camouflaged)
II. Some animals are poisonous
III. Monarch butterfly are distasteful
The above adaptations are against
a) Predation b) Mimicry c) Symbiosis d) Protection

272. Humus layer in soil composed of dead fresh organic matter called
a) Litter b) Duff c) Real humus d) Compost

273. I. Basking by desert lizards in sun
I. Hiding in burrow by some animals
II. Thermal gaping
Above are the examples of
a) Cursorial adaptation b) Behavioural adaptation
c) Fossorial adaptation d) Scansorial adaptation

274. I. Biochemical adaptation are seen in organisms living in great depth of the ocean to face crushing pressure
II. Allen's rule is explain mammals living in colder climates
III. Altitude sickness is caused because of body not getting enough oxygen due to low atmospheric pressure at high altitude
IV. Desert lizards lack behavioural means to manage to their body temperature
Choose the correct option for above adaptations
a) I, II and III b) I, II and IV c) II, III and IV d) I, III and IV

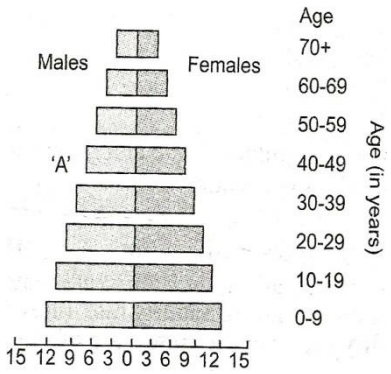
275. Lichens represents an intimate mutualistic relationship between
a) Fungus and bacteria b) Fungus and photosynthetic algae
c) Fungus and archaebacteria d) Fungus and plants

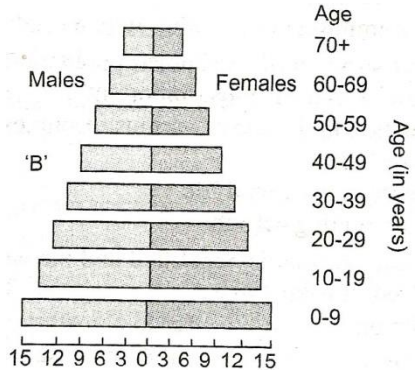
276. The science dealing with soil is
a) Edaphology b) Paedology c) Pedology d) All of these

277. Biological control methods adopted in agriculture pest control are based on the
a) Predator-prey interaction b) Prey feeding habitat
c) Prey interaction with other predators d) Predator-predator interaction

278. Exponential growth occurs when
a) There is only sexual reproduction b) There is only asexual reproduction
c) There is a fixed carrying capacity d) No inhibition from crowding

279. A country with a high rate of population growth took measures to reduce it. The figure below shows age sex pyramids of populations A and B twenty years apart. Select the correct interpretation about them.





a) 'A' is more recent and shows slight reduction in the growth rate
b) 'B' is earlier pyramid and shows stabilised growth rate
c) 'B' is more recent showing that population is very young
d) 'A' is the earlier pyramid and no change has occurred in the growth rate

280. *Viscum album* grows on trees. This is an example of
a) symbiosis b) Parasitism c) Commensalism d) predation

281. *Trichonympha campanular* is the example of
a) Protocooperation b) Mutualism c) Commensalism d) All of these

282. 'Two closely related species competing for same resources cannot co-exist indefinately'. This law is also called
a) Gause's law b) Competitive exclusion principle
c) Both (a) and (b) d) Competition release principle

283. Chi-square test is
a) Calculated on percentage b) Calculated on frequency
c) Both (a) and (b) d) Calculated on original data

284. Which one of the following expressions is associated with a 'mangrove plant'?
a) Capable of absorbing water rapidly and retaining it
b) Capable of minimizing water loss and facilitating aeration to underground parts
c) Capable of reducing transpiration and able to store absorbed water
d) Presence of well organized leaves that are adapted to absorb nitrogenous matter

285. Epiphyte is an example of
a) Predation b) Competition c) Parasitism d) Commensalism

286. Barnacles growing on the back of whale is an example for
a) Mutualism b) Commensalism c) Parasitism d) Amensalism

287. How much percentage of animals on this earth are regulators?
a) 2% b) 3% c) 4% d) 1%

288. Plants of aquatic habitat is called
a) Hydrophytes b) Halophytes c) Mesophytes d) Megaphytes

289. Which of the following is an example of a defence used by plants against herbivores?
I. Production of caffeine, tannin quinine
II. More production of non-woody tissues

III. Productions of hairs, thorns, spines
IV. Production of hormone-like chemicals that interfere with insect metamorphosis
Select the correct pair
a) I and II b) II, III and IV c) I, II and III d) I, III and IV

290. Which type of age pyramid obtained when the population is growing?
a) Bell-shaped age pyramid b) Urn-shaped age pyramid
c) Triangular age pyramid d) Square-shaped pyramid

291. The formula of growth rate for population in a given time is
a) $dt/DN = rN$ b) $dt/rN = dN$ c) $rN/dN = dt$ d) $dN/dt = rN$

292. Genetically adapted population to a particular habitat is called
a) Ecotone b) Ecotype c) Biome d) Niche

293. Conformers are also called
a) Endotherms b) Ectotherms c) Both (a) or (b) d) Isotherms

294. The organism which tolerate wide range of salinity called …A…
II. The organism which tolerate narrow range of salinity called …B…
Choose the correct option for A and B
a) A–stenohaline; B–euryhaline b) A–euryhaline; B–stenohaline
c) A–isohaline; B–euryhaline d) A–heterohaline; B–isohaline

295. Hydrophytes are characterised by
a) Presence of sclerenchyma b) Presence of aerenchyma
c) Absence of aerenchyma d) Presence of root nodules

296. Interspecific interactions arise from the interaction of
a) Population of two different species b) Population of same species
c) Two individuals of same species d) Two individuals of different species

297. Gause's law is true only when
a) Resources are limited b) Resources are unlimited
c) Predator are limited d) Prey are unlimited

298. If natality rate is parallel to mortality rate then population
a) Slowly increases b) Remains stationary
c) Shows J-shaped curve d) Slowly decreases

299. Sex ratio is the
a) Ratio of females to males b) Ratio of males to females
c) Both (a) and (b) d) Ratio of infant girl to infant boy

300. Community is
I. Group of independent, interacting populations of same species
II. Group of independent and interacting populations of same species in specific area
III. Group of independent interacting populations of different species in a specific area
IV. Group of independent and interacting populations of different species in different area
Select the correct option
a) I, II and IV b) I, III and IV c) I, II and III d) Only III

301. r value for human population in 1981. In India was
a) 0.205 b) 0.0205 c) 0.00205 d) 2.05

302. Statements
I. Mutualistic relationship evolve when benefit of both species out weight the lost
II. Mutualism relationship evolve when benefits of both species under weight the lost
III. Human caused ecological balance by eradicating common parasite
IV. Human caused altering competition between species
Select the wrong pair from statements
a) I and III b) II and III c) I and IV d) II and IV

303. Biotic potential or potential natality means

a) Natural increase of population under ideal/optimum conditions
b) Potential of organism in a biome
c) Number of organisms in in a biome
d) Species of maximum number in a population

304. I. Many xerophytic plants have thick cuticle on leaf epidermis and sunken stomata
II. Some xerophytic plants have special photosynthetic pathway (CAM) that enables their stomata close during day
III. *Opuntia* has spines (modified leaves), photosynthetic phylloclade (stem)
IV. All adaptations are genetically fixed in all organisms
Choose the combinations of correct option
a) I, II, III and IV b) II, III, IV and V c) III, IV, V and I d) I, II, III and V

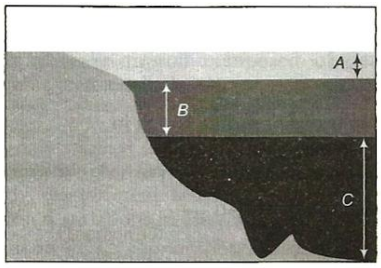
305. Formation of wide variety of habitats takes place by
a) Types of species inhibiting that area
b) Types of predation
c) Regional and local variation of environment conditions
d) All of the above

306. Population of any species is
a) A static phenomena b) A dynamic phenomena
c) Neither (a) nor (b) d) Both (a) and (b)

307. Smallest unit of ecology is
a) Organism b) Species c) Population d) Ecosystem

308. What is a keystone species?
a) A species which adds upto only a small proportion of the total biomass of a community, yet has a huge impact on the community's organization and survival.
b) A common species that has plenty of biomass, yet has a fairly low impact on the community's organization
c) A rare species that has minimal impact on the biomass and on other species in the community
d) A dominant species that constitutes a large proportion of the biomass and which affects many other species.

309. Identify A, B and C



a) A–Aphotic zone, B–Euphotic zone, C–Disphotic zone
b) A–Euphotic zone, B–Disphotic, C–Aphotic zone
c) A–Euphotic zone, B–Aphotic zone, C–Disphotic zone
d) A–Aphotic zone, B–Disphotic zone, C–Euphotic zone

310. Find out the correct ones
I. Mammals of colder climate generally have shorter ears and limbs to minimize heat loss
II. All organisms have behavioural adaptations that allow them to respond quickly to a stressful situation
III. Some organisms possess behavioural adaptations which allow them migrating temporarily to a less stressful situation
IV. Invertebrates and fishes live at great depths in the ocean have biochemical adaptation to cope with high pressure
a) I and II b) II and III c) I, III and IV d) I, II and IV

311. At high altitude we feels the sickness. The reason for sickness may be due to
a) Low atmospheric pressure b) High atmospheric pressure

c) High temperature d) Low temperature

312. What is probiosis?
a) Similar to antibiosis b) Similar to amensalism
c) Opposite to antibiosis d) Opposite to amensalism

313. A lake near a village suffered heavy mortality of fishes within a few days. Consider the following reasons for this
I. Lots of urea and phosphate fertilizers were used in the crops in the vicinity.
II. The area was sprayed with DDT by an aircraft.
III. The lake water turned green and stinky.
IV. Phytoplankton populations in the lake declined initially thereby greatly reducing photosynthesis.
Which two of the above were the main causes of fish mortality in the lake?
a) II and III b) III and IV c) I and III d) I and II

314. Logistic growth is represented by which equation
a) $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$ b) $\frac{dN}{dt} = rN\left(\frac{K-N}{N}\right)$ c) $\frac{dN}{dt} = rN\left(\frac{K+N}{K}\right)$ d) $\frac{dN}{dt} = rN\left(\frac{K}{K+N}\right)$

315. Desert lizards lack the …A… ability that mammals have to deal with the …B… temperatures of their habitat, but manage to keep their body temperature fairly constant by …C… means
Choose the correct option for A, B and C
a) A-morphological; B-high, C-behavioural b) A-physiological; B-high, C-behavioural
c) A-behavioural; B-high, C-physiological d) A-physiological; B-high, C-morphological

316. Plants growing in dry and saline soil are called
a) Xerophyte b) Hydrophyte c) Halophyte d) Heliophyte

317. Adaptation of parasite may be
I. loss of unnecessary organs
II. presence of adhesive organs
III. origin of suckers to cling to host
IV. loss of digestive system
V. high reproductive capacity
Choose the correct combination
a) I, III and IV b) II, IV and V c) I, IV and V d) I, II, III, IV and V

318. 5th June is celebrated as
a) Water day b) World environment day
c) Conservation day d) World earth day

319. Exponential growth in plants can be expressed as
a) $L_t = L_0 + rt$ b) $L_e = L_t rt$ c) $W_1 = W_0\, e^{rt}$ d) $W_1 = W_0 e\, rt$

320. Homeostasis is
a) Maintaining a constant internal environment
b) Maintaining a content internal environment
c) Both (a) and (b)
d) Maintaining circulation of blood

321. Ecology at the organism level is also called
a) Anatomical ecology b) Physiological ecology
c) Habitat ecology d) Niche ecology

322. Synecology is the study of relationship between
a) Group of various types of organism along with their environment
b) Individual species and its environment
c) Between biotic and abiotic factor
d) All of the above

323. Starfish pisaster is the important predator in intertidal communities of
a) American pacific coast b) Indian pacific coast

c) Middle pacific coast d) East Indian lakes

324. Under normal condition …A… and ….B… are the most important factors influencing populations density …C… and …D… assuming importance only under special condition
Choose the correct option for A, B and C
a) A-mortality, B-natality, C-emigration, D-immigration
b) A-immigration, B-natality, C-emigration, D-mortality
c) A-emigration, B-natality, C-mortality, D-immigration
d) A-emigration, B-immigration, C-mortality, D-natality

325. If the strong partner is benefitted and the weak partner is damaged. It is known as
a) Predation b) Allelopathy c) Symbiosis d) Commensalism

326. Who stated that human population grows geometrically?
a) Malthus b) Darwin c) Cannon d) Lamarck

327. Attribute of the organisms (morphological, physiological and behavioural) that enables organism to survive and reproduce in its habitat is called
a) Phenotypic plasticity b) Adaptations c) Mimicry d) Surviving abilities

328. Altitude sickness occurs at high Mountains. This sickness have symptoms like
a) Nausea b) Fatigue c) Heart palpitations d) All of these

329. Heat loss or heat gain is a function of surface area. Since small animals have a …A… relative to their volume, they tend to lose body heat very fast, when it is cold outside; then they have to expend …B… to generate body heat through metabolism. This is the main reason why very small animals are …C… found in polar regions
Choose the correct options for A, B and C
a) A-larger surface area, B-much larger, C-rarely
b) A-larger surface area, B-low energy, C-rarely
c) A-smaller, B-less energy, C-rarely
d) A-smaller, B-much energy, C-rarely

330. The organism which are present in tropical regions called
a) Mesotherms b) Megatherms c) Microthermas d) Hekistotherms

331. You never see any cattle or goat browsing on *Calotropis* due to
a) Its appearance b) Production of foul odour
c) Formation of cardiac glycosides d) Distastefulness of its leaves

332. The desert plants in order to tolerate water stress, show
a) Sunken stomata b) Reduced leaves
c) Well developed root system d) All of the above

333. The type of population, where pre-reproductive animals occur in large numbers, is
a) Declining b) Fluctuating c) Stable d) Growing

334. Pollinator mutualism are special interactions involving …A…, which receive food or a place to lay eggs and …B…, which receive pollen from other of their kind.
Choose of correct option for A and B
a) A-insects; B-plants b) A-plants; B-insects
c) A-prey; B-plants d) A-predators; B-plants

335. Competition is best defined as a process in which the fitness of one species (measured in terms of its '*r*' the intrinsic rate of increase) is significantly
a) Lower in presence of another superior species
b) Higher in presence of another superior species
c) Equal in presence of another superior species
d) Equal in presence of their own species

336. Which characteristics determine the percolation and water holding capacity of soils?
a) Soil composition b) Grain size c) Aggregation d) All of these

337. During the course of million of years of their existence most species should have evolved a relatively …A… internal environment (within the body of organisms). This internal environment would permit all biochemical reactions and physiological functions to proceed with …B… efficiency and therefore, increase the overall fitness of the species
The ability of an organism to keep the internal environment constant despite drastic changes in external conditions is called …C…
Choose the correct option for A, B and C
a) A-constant, B-mineral, C-thermoregulation
b) A-constant, B-maximal, C-homeostasis
c) A-variable, B-mineral, C-osmoregulation
d) A-constant, B-versatile, C-homeostasis

338. To avoid the competive exclusion principle two similar species live in same area, they may evolve to become more different in order to
a) Reduce competition
b) Increase competition
c) Use other species resources
d) Drive the other species to extinction

339. Which one is right for logistic model for population growth?
I. Population growth rate increases as the size of population approaches the carrying capacity
II. All individual have same effect on population growth
III. There are unlimited natural resources
IV. As population increases the competition goes on increasing
Select the correct combination
a) I and II
b) Only IV
c) IV and III
d) I and III

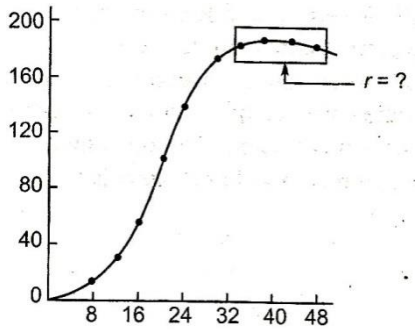
340. Choose the wrong statement
a) Natality and immigration increases the population density
b) Mortality and emigration decreases the population density
c) Adverse condition does not effect the population density
d) Food availability and predation pressure affect population density

341. Periodic departure and return of an individual in a population is known as
a) Immigration
b) Migration
c) Emigration
d) Mutation

342. Which of the following supports a dense population of plankton and littoral vegetation?
a) Oligotrophic
b) Eutrophic
c) Lithotrophic
d) Agroecotrophic

343. Reproductive value of an individual is greatest just before
a) First reproduction
b) Death
c) Birth
d) Marriage

344. From the given graph of population growth select the correct option having correct value of 'r' and bar graph



a) $R = -ve \rightarrow$ 
b) $r = -ve \rightarrow$ 
c) $r = -ve \rightarrow$ 
d) $r = 0 \rightarrow$ 

345. Parasite lives on the other parasite called
a) Fittest parasite
b) Parasite on parasite
c) Hyperparasite
d) Hypoparasite

346. In an area there are 200 *Parthenium* and is single banyan tree. Which of the conculsion (s) is/are correct?
I. Population density of banyan is low
II. Population cover area of banyan is high
III. In above cases the percentage of cover of biomass is more meaningful than population size
a) Only I
b) I and II
c) II and III
d) All of these

347. Populations termed r-strategists
a) Have J-shaped growth curves
b) Have type-III survivorship curve
c) Are usually pioneer species
d) All of the above

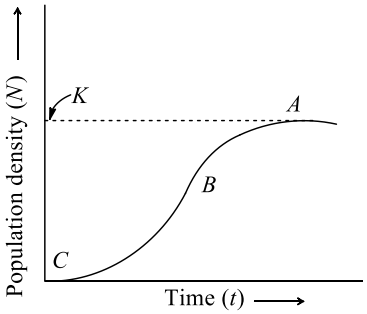
348. If the mean and the madian pertaining to a certain character of a population are of the same value, the following is most likely to occur
a) A normal distribution
b) A bi-modal distribution
c) A T-shaped curve
d) A skewed curve

349. Hibernation is
a) Winter sleep under ground
b) Summer sleep under ground
c) Spring sleep under the water
d) Winter sleep under the water

350. Environment factor (s) that characterize the habitat of ecosystem is/are
a) Abiotic components
b) Biotic components
c) Both (a) and (b)
d) Temperature

351. Two species occupying same or overlapping area are called as
a) Sympatric
b) Allopatric
c) Parapatric
d) Ring species

352. Given population growth curve represents the logistic growth curve. In this curve find out what does A, B and C indicates



a) A-Log phase, B-Log phase, C-Stationary phase
b) A-Log phase, B-Lag phase, C-Stationary phase
c) A-Stationary phase, B-Log phase, C-Lag phase
d) A-Stationary phase, B-Lag phase, C-Log phase

353. Positively photoblastic seeds germinate only in presence of
a) Soil
b) Air
c) Light
d) All of these

354. UV radiation and IR radiation have the range of

	UV Radiation	IR Radiation
a)	More than 100 nm	Less than 400 nm
b)	Less than 400 nm	More than 700 nm
c)	Equal to 400 nm	Equal to 700 nm
d)	Less than 100 nm	More than 100 nm

355. Find out dN/dt, when carrying capacity is 400, population size is 300 and r is $= 0.01$
a) 0.01
b) 0.8
c) 0.75
d) 0.45

356. Predation is
a) A unnatural way of transferring of energy to higher trophic level
b) A natural way of transferring of energy to higher tropic level
c) Harmful to the natural balance
d) All of the above

357. In previous question $b - d$ represented by r, then $'r'$ may be called as
a) Intrinsic rate of natural increase
b) Extrinsic rate of natural increase
c) Morphological rate of natural increase
d) Phenotypical rate of natural increase

358. The organisms inhabiting a common environment belong to the same
a) Species
b) Genus
c) Population
d) Community

359. NEERI is
a) National Ethological and Ecological Research Institute
b) National Eugenics and Ecological Research Institute
c) National Ecological and environment Research Institute

d) National Environmental Engineering Research Institute

360. Formation of major biomes such as desert, rainforest takes place by

a) Rotation of our planet around the sun
b) Tilting of our planet to its axis
c) Both (a) and (b)
d) Seasonal periodicity

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Total Questions : 384

BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: ANSWER KEY :

1)	a	2)	d	3)	a	4)	d	145)	a	146)	b	147)	b	148)	c
5)	d	6)	a	7)	a	8)	a	149)	c	150)	b	151)	d	152)	c
9)	d	10)	a	11)	b	12)	a	153)	b	154)	a	155)	b	156)	a
13)	b	14)	b	15)	d	16)	b	157)	c	158)	c	159)	a	160)	b
17)	a	18)	c	19)	a	20)	c	161)	b	162)	a	163)	b	164)	b
21)	c	22)	d	23)	b	24)	d	165)	b	166)	a	167)	c	168)	a
25)	c	26)	a	27)	b	28)	a	169)	a	170)	b	171)	b	172)	b
29)	a	30)	d	31)	c	32)	b	173)	b	174)	b	175)	d	176)	a
33)	c	34)	b	35)	d	36)	b	177)	c	178)	c	179)	b	180)	b
37)	d	38)	a	39)	a	40)	b	181)	a	182)	d	183)	a	184)	a
41)	b	42)	b	43)	b	44)	d	185)	b	186)	d	187)	d	188)	d
45)	a	46)	b	47)	c	48)	d	189)	b	190)	b	191)	a	192)	a
49)	a	50)	a	51)	a	52)	c	193)	c	194)	b	195)	a	196)	b
53)	b	54)	a	55)	b	56)	c	197)	a	198)	c	199)	a	200)	d
57)	c	58)	d	59)	c	60)	b	201)	c	202)	a	203)	c	204)	d
61)	c	62)	b	63)	b	64)	c	205)	a	206)	d	207)	c	208)	d
65)	c	66)	d	67)	a	68)	a	209)	b	210)	c	211)	d	212)	d
69)	b	70)	c	71)	d	72)	b	213)	b	214)	c	215)	d	216)	a
73)	a	74)	a	75)	a	76)	b	217)	b	218)	b	219)	c	220)	b
77)	b	78)	a	79)	d	80)	c	221)	a	222)	b	223)	a	224)	b
81)	b	82)	a	83)	b	84)	b	225)	d	226)	a	227)	a	228)	d
85)	a	86)	d	87)	a	88)	b	229)	d	230)	d	231)	b	232)	b
89)	a	90)	a	91)	b	92)	a	233)	d	234)	d	235)	b	236)	d
93)	d	94)	a	95)	c	96)	a	237)	b	238)	b	239)	d	240)	b
97)	c	98)	c	99)	b	100)	d	241)	c	242)	d	243)	d	244)	c
101)	a	102)	c	103)	a	104)	b	245)	a	246)	b	247)	a	248)	c
105)	a	106)	c	107)	b	108)	c	249)	b	250)	b	251)	a	252)	c
109)	b	110)	a	111)	d	112)	b	253)	a	254)	a	255)	b	256)	b
113)	b	114)	d	115)	a	116)	d	257)	d	258)	a	259)	c	260)	a
117)	c	118)	b	119)	c	120)	b	261)	a	262)	b	263)	c	264)	b
121)	d	122)	c	123)	b	124)	b	265)	b	266)	b	267)	a	268)	c
125)	d	126)	a	127)	b	128)	a	269)	c	270)	d	271)	a	272)	a
129)	a	130)	c	131)	a	132)	b	273)	b	274)	a	275)	b	276)	d
133)	c	134)	b	135)	b	136)	b	277)	a	278)	d	279)	a	280)	b
137)	b	138)	d	139)	a	140)	d	281)	b	282)	c	283)	d	284)	b
141)	d	142)	a	143)	a	144)	b	285)	d	286)	b	287)	d	288)	a

289)	d	290)	c	291)	d	292)	b	329)	a	330)	b	331)	c	332)	d
293)	b	294)	b	295)	b	296)	a	333)	d	334)	a	335)	a	336)	d
297)	a	298)	b	299)	b	300)	d	337)	b	338)	a	339)	b	340)	c
301)	b	302)	b	303)	a	304)	d	341)	b	342)	b	343)	a	344)	d
305)	c	306)	b	307)	a	308)	a	345)	c	346)	d	347)	d	348)	a
309)	b	310)	c	311)	a	312)	c	349)	a	350)	d	351)	a	352)	c
313)	d	314)	a	315)	b	316)	c	353)	c	354)	b	355)	c	356)	b
317)	d	318)	b	319)	c	320)	a	357)	a	358)	d	359)	d	360)	c
321)	b	322)	a	323)	a	324)	a								
325)	a	326)	a	327)	b	328)	d								

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BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: HINTS AND SOLUTIONS :

1 **(a)**
When two related populations occupy geographically or spatially separate areas, they are called **allopatric population**.

2 **(d)**
Exponential phase or log phase is characterised by rapid growth in population, which continues till enough food is available.

3 **(a)**
$\frac{dN}{dt} = (b - d)N$
$\frac{dN}{dt} = (65 - 45)100$
$\frac{dN}{dt} = (20 \times 100)$
$\frac{dN}{dt} = 2000$

4 **(d)**
All of these.
The interspecific interaction arise from the interaction of population of two different species. They could be beneficial, detrimental or neutral to one of the species or both

5 **(d)**
A population of frog protected from all predator would not increase indefinitely because nature's resources are limited. Beyond a carrying capacity the population would not increase because it is the maximum number of population which can be sustained by the habitat

6 **(a)**
In amensalism, one component (population) is harmed and the other remains unaffected. The alga *Microcystis* release hydroxyl amine that kills the surrounding fauna but the alga itself remains unaffected.

7 **(a)**
A-Carrying capacity; B-Decreases

8 **(a)**
Average weather.
Differences between weather and climate

Weather	Climate
It is a short term property of the atmosphere.	It is the long term property of the atmosphere. It is average weather.
Weather changes from place to place.	Climate is same over larger area.
Weather changes have little impact on flora and fauna of a place.	Climate determines the flora and fauna of a place.
Changes in weather occur from time to time	Climate remains the same over a long period of time

9 **(d)**
Individual (organisms) It is a distinct living entity having all life processes in its body separate from those in other individuals. Individual organism is the basic unit of ecological hierarchy as it continuously exchange material and information with its environment

10 **(a)**
A-Expanding, B-Stable, C-Declining.
Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.
Age pyramid have three kinds
(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-

reproductive are fewer. Population size is growing

(ii) **Bell-shaped Age Pyramid** The number of prereproductive and reproductive individuals is almost equal. Post-reproductive individuals are comparatively fewer. Population size is stable

(iii) **Urn-shaped Age Pyramid** Proportion of reproductive age group is higher than the individuals in pre-reproductive age group. Number of post-reproductive individuals is also sizable. It is declining population with negative growth

11 **(b)**

Exponential growth curve is also called J-shaped curve or geometric growth curve.

Logistic curve is also called sigmoid growth curve J-shaped curve.

Exponential Growth Model When the resources availability is unlimited in the habitat, the population grows in an exponential or geometric fashion. As resources are unlimited than there is no inhibition from crowding.

The equation is; $dN/dt = (b - d) \times N$ [b = Birth rate, d = Death rate

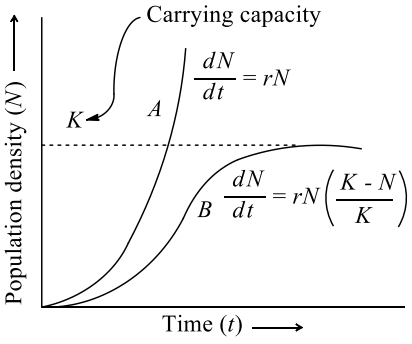
N = Population density, $\frac{dn}{dt}$= Rate of change of population

Let (b-d) = r; then the equation is, $dN/dt = Rn$

r = Intrinsic rate of natural increase

When a population shows exponential growth, the curve plotted with N in relation to time, assume J shape

In this there is no fix carrying capacity



Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity

It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

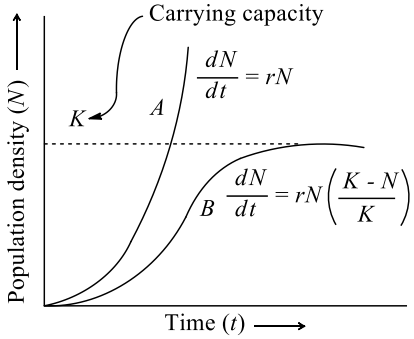
Rate of change of population density

N = Population density at time

N = Population density

r = Intrinsic rate of natural increase

K = Carrying capacity



Population growth curve A when resources are not limiting. Plot is exponential or geometrical curve B. When resources are limiting the growth, plot is logistic

'K' is carrying capacity

12 **(a)**

Population is the total number of interbreeding individuals of a species found in a particular area who share and compete for similar resources

13 **(b)**

Ecotype is the genetically distinct adapted population to a particular habitat of a species in different geographical area shows some difference in morphological but can interbreed

14 **(b)**

A-Zooplankton, B-Need not be, C-Reduced

15 **(d)**

The amount of living matter present in an ecosystem in its different topics level is called standing crop. It is expressed in the form of number or biomass is measured as either fresh weight or dry weight.

16 **(b)**

The term niche was used in ecology by Grinnel for the role of species/population plays in its ecosystem. Ecological niche means the total interaction of a species with environment.

17 **(a)**

Competition Rivalary between two or more organisms for obtaining the same resources. Competition is of two types $e.g.$, intraspecific and interspecific

Differences between Intraspecific and Interspecific Competition

Intraspecific Competition	Interspecific Competition
It is competition among individuals	The competition is amongst the

of the same species.	members of different species.
The competition is for all the requirements	The competition is for one or a few requirements.
The competing individuals have similar type of adaptation.	The competing individuals have different types of adaptations.
It is more severe due to similar needs and adaptations.	It is less severe as the similar needs are a few and the adaptations are different.

18 **(c)**

Instant Pathogens Newly developed pathogens are more damaging as the host have not yet developed adaptation to negative interaction, *e. g.*, SARS

19 **(a)**

$\frac{dN}{dt} = rN$

$\frac{dN}{dt} = 0.01 \times 300$

$\frac{dN}{dt} = 3$

20 **(c)**

Commensalism is an association or relationship between two different organisms, in which one is always benefitted. While the other is neither benefitted nor harmed, e.g., small sucker fish with large shark.

21 **(c)**

Ephemerals are xerophytes that are drought escaping. These plants live only for a brief period during the rains and rest of the period is passed in the form of seeds, e.g., *Euphorbia prostrata, Tribulus terrestris.*

22 **(d)**

Gause's exclusion principle does not always leads to the species exclusion. The competiting species may co-exist due to different partitioning like temporal portioning, spatial partitioning, morphological patitioning.

Darwin found fourteen species of finches to co-exist in Galapagos islands due to development of different feeding habits. Similarly, in Serengeti plains over 20 species of antelopes graze in the same area. Several plants can grow together by sending their roots to various lengths. Therefore, competition does not always result in extinction of species but causes development of larger number of niches

23 **(b)**

The size of clay particle is less than 0.002 mm. The size of silt particle varies from 0.002-0.02 mm.

24 **(d)**

There are four major biomes in India

I. Tropical rainforest II. Deciduous forest

III. Desert IV. Sea cost

According to the climate condition there are four major forest types of India

Forest Types	**Mean Annual Temperature**
Tropical rainforest	$23 - 27°C$
Tropical deciduous forest	$22 - 32°C$
Temperate broad leaved forest	$6 - 20°C$
Temperate needle leaved forest	$6 - 15°C$`

25 **(c)**

Plants which behave as mesophytes in rainy season and as xerophytes in summers are called **trophophytes**.

26 **(a)**

A species population having discontinuous distribution due to geographical barrier is called allopatric species. Addition of certain more variations in their gen pool leads to reproductive isolation.

27 **(b)**

$A - Nt, B = \text{No}, C - r, D - e$

$Nt = N_o e^{rt}$ is the integral form of exponential growth equation. It is also called verhulst-pearl logistic growth curve

28 **(a)**

The given example should two types of interaction

(i) **Mutualism** The fig plant is completely dependent on fig wasp to pollinate its flower and fig wasp requires figs to complete its life cycle

(ii) **Host parasite interaction** Fig wasp completely dependent over the fig plant for its food shelter, development, etc. Fig wasp act as a parasite and fig plant act as a host

29 **(a)**

Population growth curve in most animals except humans is S-shaped, while in humans, it is J-shaped.

30 **(d)**

A hyperparasite is an organism, which parasitizes on another parasite. *Nosema notabilis* is a hyperparasite of *Spherospora polymorpha*, which in turn is a parasite of urinary bladder of toad fish.

31 **(c)**

Ecosystem It a self regulated and self sustaining structural and functional unit of nature (biosphere) consisting community of living beings and its physical environment both interacting and exchanging material as well as energy, *e*. *g*., pond ecosystem

32 **(b)**

When food and space for population are unlimited. Each species has the ability to realise fully inherited potential to grow, as Darwin observed while developing his theory of natural selection. He called this the reproductive fitness

33 **(c)**

A-Occupation; B-Address

34 **(b)**

Both the species benefit in mutualism and both lose in competition in their interaction with each other.

In both parasitism and predation only one species benefits (parasite and predator) and the interaction where one species is benefitted and other is neither benefitted nor harmed is called commensalism. In ammensalism one species is harmed, whereas other is unaffected

35 **(d)**

Death rate

$$\frac{\text{Dead individual}}{\text{Total individual}} = \frac{200}{800} = \frac{1}{4} = 0.25$$

36 **(b)**

Enzymes are very sensitive towards the temperature. A slight decrease or increase in temperature can cause denaturation or Inactivation of enzymes. That way temperature is very significant to living beings

37 **(d)**

A major adaptation of tropical plants is the presence of mycorrhiza. Mycorrhiza is a mutualistic association of plant root with fungi. The association occurs in 83% dicots, 79% monocots and nearly all in gymnosperms (Willox, 1991)

38 **(a)**

Autecology is also called the species ecology. It is the study of reciprocal relationships between every stage of development of a population/species and its environment

39 **(a)**

Soil has five components

The proportions of different components are as follows

I. Mineral matter – 40%
II. Organic matter – 10%
III. Soil moisture – 5%
IV. Soil atmosphere – 25%
V. Soil organisms – Variable

40 **(b)**

Prey species have evolved various defences to lessen the impact of predation. Some species of insect and frogs are cryptically-coloured (camouflaged) to avoid being detected easily by predator

41 **(b)**

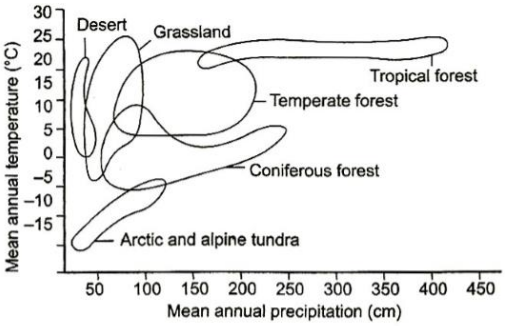
Competition for light, nutrients and space is more severe when closely related or intraspecific plants grow in same area.

Gause's hypothesis (Principle of Competitive Exclusion) Gause (1934) found that out of two species of *Paramecium* grown together one is eliminated. This phenomenon is called Gause's hypothesis or principle of competitive exclusion. This principle operates when the resources are limited and two species competetes for same resources

42 **(b)**

A-Host specific, B-Coevolve, C-Counteract

43 **(b)**



Rotation of our planet and tilt of its axis cause annual variations in the intensity and duration of temperature, resulting in distinct seasons. These variations together with annual variation in precipitation account for the formation of major biomes such as desert, rainforest and tundra

44 **(d)**

Population growth is the number of individuals added per unit population per unit population per

unit time due to higher rate of births and immigration over the rate of deaths and emigration.

The change in population size at a given time interval t, is given by the expression.

$$N_t = N_0 + B + I - D - E$$

Where N_0 = initial population, N_t = population after a time interval t, B = total births (natality rate, I = immigration rate, D = total deaths (mortality rate), E = emigration rate.

45 **(a)**

No population can grow exponentially long because

(i) limiting resources

(ii) carrying capacity

(iii) interspecies competition

(iv) natural resistance

46 **(b)**

Like lichens, mycorrhiza are associations between fungi and roots of higher plants. The fungi helped the plant in the absorption of essential nutrients from soil, while the plant in turn provide carbohydrates and shelter to fungi

47 **(c)**

Last year lotus plants = 20

New plants added = 8

Birth Rate = $\frac{8}{20}$ = 0.4 offspring per lotus per year

48 **(d)**

A-Exponential, B-Fast, C-Biotic potential

49 **(a)**

World population day - 11th July

No tobacco day - 31st May

World environment day - 5th June

World health day - 7th April

50 **(a)**

Light is the visible part of electromagnetic spectrum (390-700 nm). Solar radiations have a wavelength of 300-2600 nm. Photosynthetically Active Radiations (PAR) have a large of 400-700 nm

51 **(a)**

Pedology (GK. *Pedon* = soil; *logos* = study) is the study of soil in their natural environment. It deals with pedogenesis (formation of soil), soil morphology and soil classification.

52 **(c)**

Conformers Their body temperature changes with the surrounding temperature they are also called ectothermers. 99% of animals are conforms

Regulators Some organisms are able to maintain a constant body temperature and constant osmotic concentration despite change in external environment. They are called regulators

Partial regulators Some organisms have the ability to regulate their body functions to a limited extent called partial regulators. Beyond that limit they become conformers

53 **(b)**

The plants, which live in abundance of water are called hydrophytes. The hydrophytic plants, which remain under water are called submerged hydrophytes. The **air spaces** are extensively developed in root, stem and leaves of these plants. *e.g., Hydrilla, Vallisneria, Ceratophyllum, Utricularia*, etc.

54 **(a)**

A-Efficient, B-Once, C-Many

55 **(b)**

Short term property of atmosphere

Differences between weather and climate

Weather	Climate
It is a short term property of the atmosphere.	It is the long term property of the atmosphere. It is average weather.
Weather changes from place to place.	Climate is same over larger area.
Weather changes have little impact on flora and fauna of a place.	Climate determines the flora and fauna of a place.
Changes in weather occur from time to time	Climate remains the same over a long period of time

56 **(c)**

The hydrophytes grow on extremely wet soil where water is available to plants in abundance. Submerged plants are those hydrophytes, which remain completely submerged in water and not rooted in mud, or remain completely submerged in water and rooted in soil.

57 **(c)**

Warming divided plants, on the basis of soil in which they are found, into the following groups.

(i) **Halophytes** plants growing in saline soil, i.e. these plants are salt resistant.

(ii) **Psammophytes** plants growing on sand, i.e., these are adapted to grow into sandy

soil. Thus, these are also known as sand loving plants.

(iii)**Oxalophytes** plants growing in acidic soil.

(iv)**Lithophytes** plants growing on the surface of rocks.

(v) **Chasmophytes** plants growing in the crevices of rocks.

58 **(d)**

Adaptation may be morphological physiological and behavioural

59 **(c)**

A-Physiological, B-Bird, C-Mammals, D-Temperature

60 **(b)**

The value of growth rate under unlimited favourable conditions is called **biotic potential** or reproductive potential. It is characteristic of a particular population age structure.

61 **(c)**

Soil profile maximum have three horizon, *i.e.,* A, B and C.

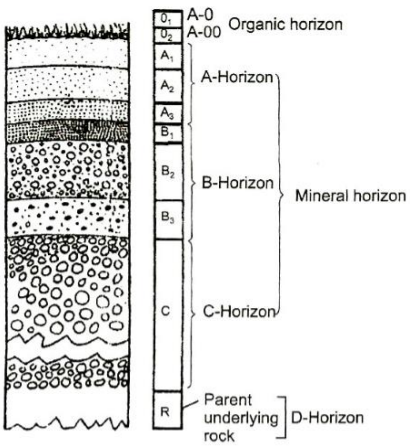
B-Horizon It is also called sub-soil. The thickness can be up to 1.0 m. The sub-soil receives various material reached from top soil. This horizon is poor in aeration and biological activity. It is rich in plant humus and nutrients

The appearance of different layers superposed one above the other in a vertical section of the soil from survive downward to present rock is called soil profile.

Soil Horizones Soil layers running roughly parallel to the surface, which have distinct feature from other layer

A soil contains maximum three horizon, *i.e.,* A, B and C

The surface litter yield is called O-horizon



Soil profile A-0 freshly fallen litter (partly decomposed)

A-00 organic matter (fermentation level and humus level)

A_1-organic debris + mineral. A_2-light colour due to leaching

A_3-may be present or absent

B-Horizon-iron and aluminium compounds. B_1-transitional layer. B_2-dark coloured, maximum amount of leached material. B_3-large chunk of parent rock material + leached material

C-thick, large masses of weathered mineral material

D-Unweathered parent rock material

62 **(b)**

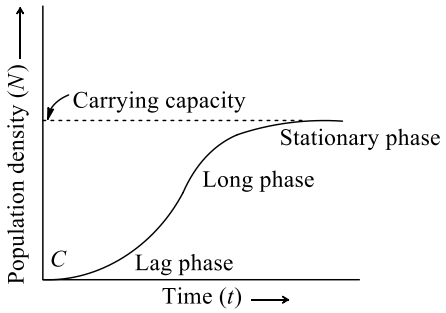
Lag phase Represents when population is adjusting new environment.

A population growing in a habitat with limited resources shows three phases.

(i) **Lag phase** It is the initial phase in which a population adapt themself according to the environment and starts to increase their number

(ii) **Log phase** It is the second phase in which a population use its resources maximally and increases their number exponentially. Number of birth >> Number of death

(iii) **Stationary phase** It is the 3rd phase in which the population reached the carrying capacity level and population get stationary position. No of death = No of death



63 **(b)**

In **mutualism**, both the interacting species are benefitted.

64 **(c)**

Weather changes have little impact of flora and fauna of place because it is the short term property of the atmosphere and it changes from place to place. pH, mineral, water holding capacity of soil determine flora and fauna of any area

65 **(c)**

Temperature is the degree of hotness of coldness, which is the most relevant environmental factor. The temperature varies seasonally. It ranges from

sub zero levels in polar area to the high altitudes having temperature more than 50°C

66 **(d)**
Clines are formed by continuous gradation of form or gene differences in population of a species, correlated with its geographical or ecological distribution.

67 **(a)**
German biologist Reiter used the term Ecology for first time in 1868.

68 **(a)**
Regulators are also called endotherms.
Evolutionary biological believe that the success of mammals is mainly due to their ability to maintain a constant body temperature (endotherms) and live comfortably whether they are in Antarctica or Sahara Desert

69 **(b)**
Under favourable conditions many zooplanktons in lakes and ponds are known to enter as diapause, *i.e.,* a stage in suspended development. Infact diapause is stage in the development of certain animals, during which developmental growth is suspended during winter when days are short

70 **(c)**
Its population growth curve is J-shaped in which density increases rapidly in exponential fashion and then stops abruptly as environmental resistance or another limiting factor becomes effective more or less suddenly.

71 **(d)**
Parasitism It is a relationship between two living organism of different species in which one organism called parasite obtains food directly from another living organism called host. In given options only louse fulfil all the parameters of parasitism

72 **(b)**
Vital index represents the ratio between natality (birth rate) and mortality (death rate). It determines the normal rate of growth of population and can be calculated by the following formula:

$$\text{Vital index} = \frac{\text{Natality}}{\text{Mortality}} \times 100$$

73 **(a)**
Desert lizards keep their body temperature fairly constant by behavioural means. Burrowing soil and active during morning and evening when the temperature is not so high are two main behavioural adaptation of a desert lizard

74 **(a)**
Commensalism This is the interaction in which one species benefits and other is neither harm nor benefitted
e. *g*., an orchid growing as an epiphytes on mango branch for taking sunlight in tropics

75 **(a)**
Due to limited sources, increased competition and environmental resistance the population fluctuate when it reaches to carrying capacity

76 **(b)**
Niche overlap is a measure of the association of two or more species. This indicates their similar habitat requirement and may also indicate competition if tropic niche/spatial niche is same and food/space is limiting, e.g., two different parasites on the same host.

77 **(b)**
In **commensalism,** association between members of different species is made in the way that one is benefitted and neither is harmed, e. g., small fish (sucker fish) gets stuck near the bottom of a shark with the help of its holdfast (modified dorsal fin) vand is dispersed to distant areas. It also gets protection (due to association with shark) and derives its nutrition also. However, the shark does not get any benefit or harm from the sucker fish.

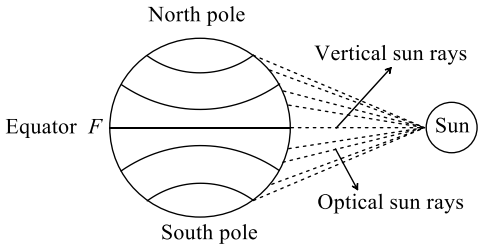
78 **(a)**

$$\text{Population density} = \frac{\text{Number of Population}}{\text{Area}}$$

$$= \frac{1000}{100} = 10$$

Population density = 10 individuals per unit square area

79 **(d)**



Sun rays falling vertically overhead to the equator so at equator there is high temperature. Sun rays falling obliquely at the two poles, so poles have low temperature

80 **(c)**

When a population is growing in a limited resource, the population growth consists of five phases.

(i)**Lag phases** No or very little growth.

(ii)**Accelerantial** Growth in the beginning.

(iii)**Exponential phase** Number of individual increases at an logarithmic rate.

(iv)**Deceleration phase** Rate of population increase slow down.

(v)**Stationary phase** Essentially no net change.

81 **(b)**

400-700 nm.

Light is the visible part of electromagnetic spectrum (390-700 nm). Solar radiations have a wavelength of 300-2600 nm. Photosynthetically Active Radiations (PAR) have a large of 400-700 nm

82 **(a)**

Population density (in agriculture standing stock and standing crop) is a measurement of population per unit area or unit volume. It is frequently applied to living organisms and particularly to humans. It is a key geographic term. It is expressed in m/cm/mm per square as appropriate for the population size

83 **(b)**

Predation It is an interaction between members of two species in which member of one species capture, kill and eat up the members of other species. The former are called predators, while latter we spoken as preys

Parasitism It is a relationship between two living organisms of different species in which organism called parasite obtains its food directly from another living organism called host. The parasite is similar as compared to its host. It spends a part of whole of its life on or in the body of the host

84 **(b)**

5th June-world environment day

22nd April-world earth day

85 **(a)**

Radiation below the visible light (less than 400 nm) are ultraviolet (UV) radiations, while those above (more than 700 nm) the visible light are infra-red or heat waves. Amount of light and its intensity vary with latitude and season. Light intensity, light duration and light quality influence a number of life processes of organisms

86 **(d)**

Urn-shaped age pyramid

A bell-shaped polygon indicates a moderate proportion of young to old. As the rate of growth becomes slow and stable, the pre-reproductively and reproductive age group become more or less equal in size and post-reproductive group remaining as the smallest. In stable population 'r' is zero. And bell-shaped curve only possible when $r = 0$ means growth of population is zero

Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.

Age pyramid have three kinds

(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-reproductive are fewer. Population size is growing

(ii) **Bell-shaped Age Pyramid** The number of prereproductive and reproductive individuals is almost equal. Post-reproductive individuals are comparatively fewer. Population size is stable

(iii) **Urn-shaped Age Pyramid** Proportion of reproductive age group is higher than the individuals in pre-reproductive age group. Number of post-reproductive individuals is also sizable. It is declining population with negative growth

87 **(a)**

Extinction is the result of competition of species.

88 **(b)**

Mimicry It is resemblance of one species with another in order to obtain advantage especially against predator. The species which is imitated or mimic is called model, while animal which imitates is known as mimic or mimictic is either ferocious or distasteful to predator

89 **(a)**

Census is an official counting of population and preparing data about age groups, birth, death, sex ratio, education, etc.

In India first census was carried out in 1872 and since, than it has been conducted regularly in interval of ten years. Detail of India's 15th census 2011.

India's population as on March, 2011 = 1,210,193,422

Males = 623, 724, 248

Females = 586, 469, 174

Sex ratio = 940.27 females per 1,000 male

90 **(a)**

A-Spores, B-Unfavourable, C-Seeds

91 **(b)**

Biotic community is also called biological community. It is an association of different species of plants, animals, bacteria, fungi, etc., live in a particular geographical area with interaction among themself

92 **(a)**

Ecology (*Gk. Oikos* = home; *logos* = study) is the branch of biology that deals with the inter-relationship among organisms and interactions between organism and their environments

93 **(d)**

Life history traits of organism have evolved to the constraints imposed by biotic and abiotic components of habitat in which they live

94 **(a)**

A–30-35%; *B* – 100%.

Salt Concentration	**Salinity in Parts per Thousand**
Less than 5% 30-35% > 100%	Inland water Sea water Hypersaline water

95 **(c)**

B-Horizon It is also called sub-soil. The thickness can be up to 1.0 m. The sub-soil receives various material reached from top soil. This horizon is poor in aeration and biological activity. It is rich in plant humus and nutrients

96 **(a)**

As we can see from the table that the birth rate and death rate of population country '*P* 'is almost same so there is very little change in the population of country. 'P' then others

97 **(c)**

Most of the plant grow in the neutral or slightly acidic soil pH = 6.5. Some plants like chili grow in acidic soil (pH = 5)

98 **(c)**

When food and space are unlimited than population.

(i) Increased by using its maximum biotic potential

(ii) Shows exponential growth

$\frac{dN}{dt} = rN$

(iii) Shows exponential growth curve also called 'J-shaped curve

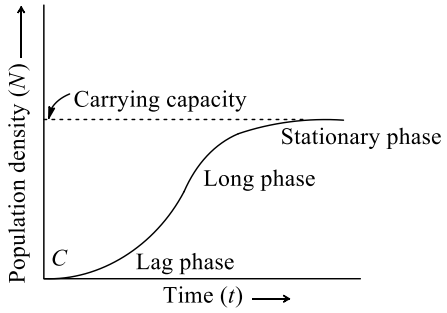
(iv) Show greater intrinsic rate

A population growing in a habitat with limited resources shows three phases.

(i) **Lag phase** It is the initial phase in which a population adapt themself according to the environment and starts to increase their number

(ii) **Log phase** It is the second phase in which a population use its resources maximally and increases their number exponentially. Number of birth >> Number of death

(iii) **Stationary phase** It is the 3rd phase in which the population reached the carrying capacity level and population get stationary position. No of death = No of death



99 **(b)**

Opuntia's leaves changes into spine to reduce the transpiration during course of evolution and the working of leaves takes over by stem. *Opuntia's* stem have green colour and perform photosynthesis

100 **(d)**

The malarial parasite needs a vector *Anopheles* female mosquito to spread to other host. Majority of the parasites harm the host

They may reduce the survival growth and reproductive of the host and reduce its population density

101 **(a)**

Pollination is an example of mutualism in which pollinator gets nector, pollen grain, etc., and by giving that products to pollinators host gets pollinated

102 **(c)**

Root cap is not found in hydrophytes. In **hydrophytes**, the root is either absent or poorly developed. In floating aquatic plants, root pockets are found, e.g., *Lemna*, *pistia*, *Eichhornia*.

103 **(a)**

No population have the unlimited resources to survive and reproduction. Every population in nature has given a certain amount of natural resources that is limited.

Keeping this point of view logistic growth is the more realistic than the exponential growth curve

104 **(b)**

Salt Concentration	Salinity in Parts per Thousand
Less than 5% 30-35% > 100%	Inland water Sea water Hypersaline water

105 **(a)**

Proto-cooperation is the interaction between two living organisms of different species in which both are mutually benefied but they can live without each other.

106 **(c)**

The tremendous increase in the size and growth of a population in a short period is known as population explosion.

107 **(b)**

Next to temperature water is most important factor, which influences the life. Life originated in water. Even now life is unsustainable without water

108 **(c)**

Water holding capacity is the extent to which a soil can hold capillary water against gravity. It is defined as the amount of water retained by unit weight of dry soil, when immersed in water under standardised condition. Sandy soil has poorest water holding capacity.

109 **(b)**

In plants growth is favoured by increased availability of food, moderate light intensity and red light. Maximum photosynthesis occurs in red light Blue light favours moderate but normal growth. Differentiation of various tissue and organs in response to light is called photomorphogenesis. Aphids develops wings in response to alternate light and darkness

110 **(a)**

Chapman (1928) proposed the term biotic potential to designate maximum reproductive power. He defined it as the inherent power of an organism to reproduce, to survive, i.e., to increase in number. But there is a natural check called environment resistance.

111 **(d)**

Level of competition depend upon the many factors like

(i) Resources availability

(ii) Population density

(iii) Group interaction of organisms

112 **(b)**

(i) The concept of mimicry was first given by HW Bates in 1862

(ii) Father of Indian plant Ecology is Ramdev Mishra. Ecological studies were initiated in India by W Dudgeon

(iii) The term 'ecology' was coined by Ernst Haeckel in 1861

113 **(b)**

Some species are partial regulators. They have the ability to regulate their body temperature up to certain limit. Beyond that limit they become conformers. Further it is not essential that regulators of one attribute would be regulator in other attributes as well

114 **(d)**

Plant Adaptation to Water and Heat (xerophytes) They are plants of dry habitats where the environment favours higher rate of transpiration than the absorption. Xerophytes plants normally have thick cuticle on their leaf surface, stomata arranged in deep pits, stomata of xerophyte plant remain closed during day to reduce the high transpiration

Xerophytes are four types

(i) **Ephemerals** (Drought escapers) The plant live for a brief period during rain. The rest of year is passed in the form of seed

e. g., *Euphorbia prostrate, Boerhaavia*

(ii) **Annuals or Drought Evaders** They live even after the few weeks of rain. Their, size are small, leaves have thick waxy, hairy coating with or without prickles, *e. g.*, *Echinops, Solanum*

(iii) **Succulents or Drought Resistants** The plants have fleshy organs where water and mucilage are stored. *e. g.*, *Opuntia, Aloe, Agave*

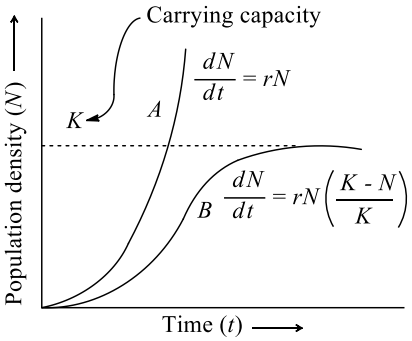
(iv) **Non-succulents or Drought Endurers** They are true xerophytes which actually tolerate drought conditions. They have smaller shoot system. The root system is very extensive. Many tropical plants of hot and arid regions perform C_4-

photosynthesis. They uses less water even at high temperature

115 **(a)**

A-Limited, B-Lag phase, C-Carrying capacity

116 **(d)**



Population growth curve *A* when resources are not limiting. Plot is exponential or geometrical curve *B*. When resources are limiting the growth, plot is logistic.

'*K*' is carrying capacity

117 **(c)**

Physiological adaptation.

Nausea, fatigue, heart palpitations is due to unavailability of proper oxygen in the body. At high mountain the atmospheric pressure is low. So, O_2 is not easily available for Respiration. So for improve efficiency of respiration is increased by increasing RBC increasing the binding efficiency of haemoglobin

118 **(b)**

Sammophytes are grown on sandy soils. Lithophytes are grown on bare soils. Hydrophytes are grown on aquatic habitat.

Xerophytes are grown on dry habitat.

119 **(c)**

Ecology is basically concerned with four levels of biological organisation. *They are*

(i) organisms (ii) populations

(iii) communities (iv) biomes

120 **(b)**

Biotic potential is a rate at which a population of a given species will increase when no limits are placed on its rate of growth.

121 **(d)**

Asymptome stage of the population is the stage of population in which population birth rate is equal to the death rate in other words population is stabilised

122 **(c)**

Inability to maintain homeostasis.

Conformers Their body temperature changes with the surrounding temperature they are also called ectothermers. 99% of animals are conforms

Regulators Some organisms are able to maintain a constant body temperature and constant osmotic concentration despite change in external environment. They are called regulators

Partial regulators Some organisms have the ability to regulate their body functions to a limited extent called partial regulators. Beyond that limit they become conformers

123 **(b)**

$A-N, B-r, C-K$

Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity

It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

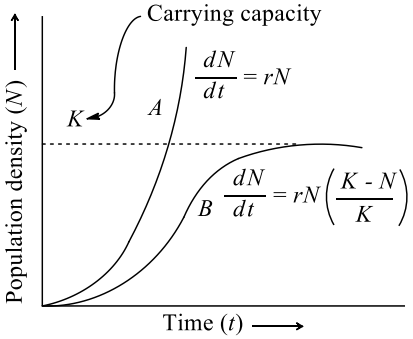
Rate of change of population density

N= Population density at time

N= Population density

r= Intrinsic rate of natural increase

K= Carrying capacity



Population growth curve *A* when resources are not limiting. Plot is exponential or geometrical curve *B*. When resources are limiting the growth, plot is logistic

'*K*' is carrying capacity

124 **(b)**

Secondary compound or metabolites are the compound which are not the resultant of normal metabolism. They are formed due to special need of a organism like in *Calotropis*. (production of poisonous cardiac glycosides). Some examples of secondary compounds or metabolites are nicotine, caffeine, quinine etc. They are formed by the resultant of secondary metabolism

125 **(d)**

Halophytes are the plants growing in and tolerating very salty soil typical off shores of tidal

river estuaries, salt marshes or alkali desert flats. Generally, these soils (saline) have very high concentration of salts like $NaCl_2$, $MgSO_4$ and $MgCl_2$.

126 **(a)**
Different age group have different reproductive capabilities due to that population growth influences. For example when pre-reproductive age group is more than the reproductive and post-reproductive. Then this type of population is expanding population

127 **(b)**
The more the dissimilar the niches of two species the lesser is competition between them.
Two closely, related species competiting for same resource can't co-exist. Indefinitely and competitatively inferior one will be eliminated out (Gause's principle)

128 **(a)**
Natural resources are limited and necessary for survival of mankind. Thus, these should be used in limited quantity for better survival with increase in the population.

129 **(a)**
In tropical areas (equator) there are more sun light than the other areas. So, tropical areas have more photosynthetic yield than other areas

130 **(c)**
A-Unlimited, B-Limited, C-Fittest

131 **(a)**
Schimper's Second Law The local distribution of plants (and hence, the occurrence of animals) is determined by soil. In an aquatic habitat, the sediment characteristics determined not only the submerged anchored hydrophytes, but also the benthic animals

132 **(b)**
Predation is a direct food relation between two species of animals, in which one animal (the predator) captures and feeds on another (the prey).
In **symbiosis**, two organisms live together in close physical association from which one or both derive benefit.

133 **(c)**
The organism which breed only once in their life time is called monocarpic. *e*. *g*., salmon fish, bamboo

134 **(b)**
If more individuals are added and only some are lost, then the population will show positive growth, i.e., exponential growth.

135 **(b)**
Many adaptation have evolved over a long evolutionary time in Kangaroo rat. In the absence of an external source of water, the kangaroo rat in North America deserts capable of meeting all its water requirements through internal fat oxidation (in which water is by product). It also has the ability to concentrate its urine, so that minimal volume of water is used to remove excretory the products

136 **(b)**
A-organic, B-inorganic, C-isolation

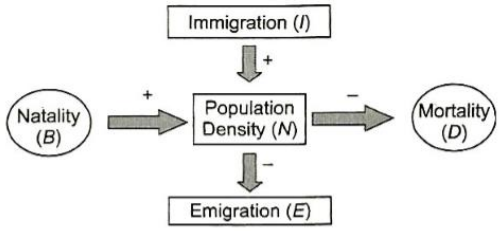
137 **(b)**
Biotic potential is the inherent capacity of an organism to increase in numbers under ideal conditions, i.e., maximum reproductive capacity when environment resources are non limiting, conditions favour minimum mortality (absence of competition, predation, parasitism, etc.) and rates of immigration and emigration are equal.

138 **(d)**
When the number of pre-reproductive individual equal to no. of reproductive non-individual is obtained a bell-shaped curve

139 **(a)**
Carrying Capacity (K) A given habitat has limited resources to support a certain number of individuals of a population beyond which no further growth is possible. This limit is called as nature's carrying capacity (K) for that species

140 **(d)**
Desert is an area in which the vegetation is sparse and the ground surface in thus, exposed to atmosphere and the associated physical force. The hot deserts of world are located in the region of **tropic of Cancer** and **tropic of Capricorn**

141 **(d)**



(−) Sign indicates factors decreasing population density

(+) Sign indicates factors increasing population density

142 **(a)**

Gause's competitive exclusion principal is effective when resources are limited. Limited resources gives better opportunity for adaptation

143 **(a)**

Physiological ecology.

Ecology at the organismic level is essentially called physiological ecology which tries to understand how different organisms are adapted to their environments in terms of not only survival but also reproduction

144 **(b)**

Climate.

Differences between weather and climate

Weather	Climate
It is a short term property of the atmosphere.	It is the long term property of the atmosphere. It is average weather.
Weather changes from place to place.	Climate is same over larger area.
Weather changes have little impact on flora and fauna of a place.	Climate determines the flora and fauna of a place.
Changes in weather occur from time to time	Climate remains the same over a long period of time

145 **(a)**

Eurythermal organisms are those organisms, which can tolerate wide range of temperature variations. Most mammals and birds can live at very wide temperature variation

146 **(b)**

Psammophytes grow on sand and gravel.

147 **(b)**

Benthic animals are animals which lives at the bottom of water. Their diversity and distribution determined by type of sediment characteristics like rocky or soil surface

148 **(c)**

Carrying capacity can be defined as the level beyond, which no major increase can occur. This limit is constant and represented by K. When a population reaches the carrying capacity of its environment, the population has zero growth rate so, the growing rate of a population stabilizes around the carrying capacity.

149 **(c)**

When there is no natural predator of a species than it goes on increasing until on unless, nature does not resist that species

150 **(b)**

Commensalism is an association in which two or more populations live together without entering into any kind of physiological exchange. Here only one species is benefitted.

151 **(d)**

All of above.

A bell-shaped polygon indicates a moderate proportion of young to old. As the rate of growth becomes slow and stable, the pre-reproductively and reproductive age group become more or less equal in size and post-reproductive group remaining as the smallest. In stable population 'r' is zero. And bell-shaped curve only possible when $r = 0$ means growth of population is zero

Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.

Age pyramid have three kinds

(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-reproductive are fewer. Population size is growing

(ii) **Bell-shaped Age Pyramid** The number of prereproductive and reproductive individuals is almost equal. Post-reproductive individuals are comparatively fewer. Population size is stable

(iii) **Urn-shaped Age Pyramid** Proportion of reproductive age group is higher than the individuals in pre-reproductive age group. Number of post-reproductive individuals is also sizable. It is declining population with negative growth

152 **(c)**

In exploitation, one species harms the other by making its direct or indirect use for support, shelter or food. In contrast with parasite which derives nourishment form its host without killing, a predator is free living which catches and kills another species for food.

153 **(b)**

Population size of Siberian cranes at Bharatpur wetlands in any year is less than 10.

Population size The size of a population depends upon several factors like mortality, natality, etc. The size in nature could be as low as less than 10 (Siberian cranes at Bharatpur wetlands in any year) or go in million (*Chlamydomonas* in a pond).

Population size, more technically called population density (designated as N) need not necessarily be measured in numbers only. Although the total number is the most appropriate measure of population density. But in some cases in is different to determine

For example

In a forest area suppose there are 200 *Parthenium* plants but only a single banyan tree will huge canopy

The following inference could be made

(i) Population density of banyan is low

(ii) Population cover area of banyan to high

In this example percentage of cover of biomass is more meaningful than population size

154 **(a)**

The prickly pear cactus introduced into Australia in 1920's caused Havoc by spreading rapidly into million of hactares of range land. Finally invasive cactus was brought under control only after a cactus-feeding predator (a moth) from its natural habitat was introduced into the country

155 **(b)**

Exponential growth curve.

As we can see clearly in the given diagram that the growth of the population is unlimited and increasing. That is the distinguish feature of exponential growth model or curve. As it has the J-shaped appearance so, it is also called J-shaped curve

156 **(a)**

Due to non-limiting condition, natality (birth rate) will increase and mortality (death rate) will decrease, that will cause population explosion.

157 **(c)**

Deserts have a very hot days and very cold nights. Due to bare plant cover, the soil of desert is much more exposed to these fluctuations as compared to that of other areas. During day time, the soil becomes hot and in night it frequently, becomes cool.

158 **(c)**

Poikilothermic or cold-blooded or ectotherms are those animals (*e*. *g*., reptiles, fish, amphibians) in which the body temperature fluctuate with change in environment temperature

159 **(a)**

Bioma is a large regional unit delimited by a specific climatic zone having a particular major vegetation zone associated with fauna, *e*. *g*., ocean, tropical rainforest

160 **(b)**

Character displacement was first explicitly explained by William L Brown and EO Wilson (1956); Two closely related species have overlapping ranges. In the parts of the ranges where one species occurs alone, the population of that species are similar to the other species and may even by very difficult to distinguish from it. In the area of overlap, where the two species occur together, the populations are more divergent and easily distinguished, *i.e.,* they 'displace' one another in one or more characters. The characters involved can be morphological, ecological, behavioral or physiological; they are assumed to be genetically based

Competitive release (Grant; 1972), defined as the expansion of an ecological niche in the absence of a competitor, is essentially the mirror image of character displacement. It too was described by Brown and Wilson (1956). Two closely related species are distinct where they occur together, but where one member of the pair occurs alone it converges toward the second, even to the extent of being nearly identical with it in some characters

161 **(b)**

Differences between weather and climate

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162 **(a)**

Gloger's Rule In warm-blooded animals, including, humans, pigmentation is little in colder areas, yellow brown to red in arid climates and black in humid hot areas

163 **(b)**

A population having large number of young individuals will show rapid increase in population. It is called positive growth

164 **(b)**

Depending on the nature of transporting agents, the transported soil may be

(i) **Glacial** Transported by glaciers (large mass of snow ice.)

(ii) **Eolian** Transported by wind

(iii) **Alluvial** Transported by running water

(iv) **Colluvial** Transported by gravity.

165 **(b)**

A population with large number of post-reproductive or older individuals and lesser number of pre-reproductive individuals will show a negative growth rate or decline growth.

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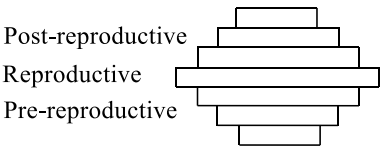


166 **(a)**

Human liver fluke depend upon two intermediate host-a snail and pig to complete its life cycle

167 **(c)**

Cactus feeding predator.

The prickly pear cactus introduced into Australia in 1920's caused Havoc by spreading rapidly into million of hactares of range land. Finally invasive cactus was brought under control only after a cactus-feeding predator (a moth) from its natural habitat was introduced into the country

168 **(a)**

The zone extends between 45° to 66° in northern and 45° to 66° in southern hemisphere is called **temprate zone**.

169 **(a)**

Population is group of similar individuals in a particular geographical area which share or complete for similar resources, potentially interbreed. Different populations of the same organism present in a particular geographical areas are called local population or domes

170 **(b)**

Ecological hierarchy or ecological levels or organisation.

Organisation is the arrangement and coordination of small components into larger components in a hierarchy, where each level is formed of components of lower level and itself becomes constituent of still higher level

Hierarchy in a organisation from the level of biomolecules to organismic level is called biological hierarchy or biological organisation.

The hierarchy in the levels of organisation connected with ecological grouping of organism is called ecological hierarchy or ecological level of organisation

There are no sharp lines or breeks in the functional sense amongst various level of ecological hierarchy as the same individual is a components of population, biological community as well as ecosystem

171 **(b)**

In India, population is heavily weighed towards the younger age groups due to short life span and high birth rate.

172 **(b)**

Hydrophytes.

Plants of aquatic habitat is called the hydrophytes. Hydrophytes possess aerenchyma or air storing parenchyma to support themself in water

173 **(b)**

Osmotic problems.

Some organisms are tolerant to wide range of salinities called euryhaline, *e. g.*, salmon fish but others are restricted to narrow range called stenohaline like shark and string rays. Many freshwater animals cannot live for long in sea water and *vice-versa* because of the osmotic problems they would face

174 **(b)**

$dN/dt = (b - d) \times N$.

Exponential Growth Model When the resources availability is unlimited in the habitat, the population grows in an exponential or geometric fashion. As resources are unlimited than there is no inhibition from crowding.

The equation is; $dN/dt = (b - d) \times N$ [b = Birth rate, d = Death rate

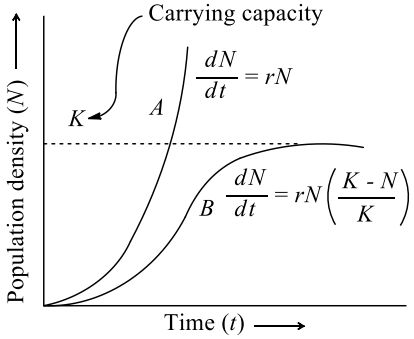
N = Population density, $\frac{dn}{dt}$= Rate of change of population

Let (b-d) = r, then the equation is, $dN/dt = Rn$

r = Intrinsic rate of natural increase

When a population shows exponential growth, the curve plotted with N in relation to time, assume J shape

In this there is no fix carrying capacity



175 **(d)**

Predators also help in maintaining species diversity in a community by reducing the intensity of competition among competing prey species. Predator can also be used for biological control of weeds and pests

176 **(a)**

A-Herbivores, B-Predators

177 **(c)**

Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity

It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

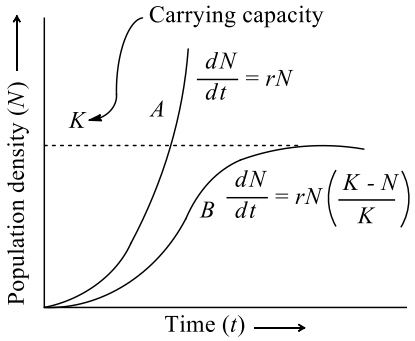
Rate of change of population density

N = Population density at time

N = Population density

r = Intrinsic rate of natural increase

K = Carrying capacity



Population growth curve A when resources are not limiting. Plot is exponential or geometrical curve B. When resources are limiting the growth, plot is logistic

'K' is carrying capacity

178 **(c)**

Niche is the specific physical space occupied by an organism and the functional role of organism in the ecosystem. Thus, an organism's niche is defined by the types of food it consumes, its predators, temperature, tolerance, etc.

179 **(b)**

Geometric representation of age structure is a characteristic of population. In most populations, individuals are of different ages. The proportion of individuals in each age group is called age structure of that population.

180 **(b)**

It is generally believed that competition occurs when closely related species compete for same resources that are limiting. But this is not true unrelated species also compete for same resources. This is called interspecific competition which proves to be the potent force in organic evolution

181 **(a)**

Genetic drift operates in small isolated population.

182 **(d)**

Gene flow means the spread of genes through population as affected by movements of individuals and their propagules, e.g., spores, seeds etc. Gene flow ensures that all population of a given species share a common gene pool, i.e., it reduces difference between populations.

183 **(a)**

Zero growth rate means natality (*i.e.,* birth rate) balances the mortality (*i.e.,* death rate)

184 **(a)**

A population has three ecological age groups
(i) Pre-reproductive
(ii) Reproductive
(iii) Post-reproductive
This division of population given by Bodenheimer in 1958

185 **(b)**
Sigmoid growth curve is represented by
$dN/dt = rN\left(\frac{1-N}{K}\right)$
Most populations do not show exponential increase because their environment prevents this.

186 **(d)**
Black soil is dark black or dark brown in colour. It is formed from basaltic rock under semi-arid condition. Black soil is deficient in nitrogen and phosphorus and rich in potash and lime and not in calcium carbonate.

187 **(d)**
All vertebrates most molluscs and cry fishes are oxyregulators but with the exception of birds and mammals, they are thermoconformers and osmoconformers

188 **(d)**
There are unique habitats such as thermal springs and deep sea hydrothermal vent where average temperature exceeds 100°C

189 **(b)**
Deep (>500 m) in the oceans the environment is perpetually dark and its inhabitants are not aware of the existence of celestial source of light

190 **(b)**
Regulators Some organisms are able to maintain a constant body temperature and constant osmotic concentration despite change in external environment. They are called as regulators. Only bird, mammals belong to category of regulators

191 **(a)**
Population having highest intrinsic rate will increase fastest among all of the given populations

192 **(a)**
In soil profile, **A-horizon** is present under the litter zone and is called as top-soil. It is the the zone of eluviations that contains a relatively high content of **organic matter** but mixed with mineral water. It is further divided into three sub-zones :
(i)**A_1 region** : It is dark and rich in organic matter. Finely divided organic matter here, becomes mixed with the mineral matter and is known as **humus**. It is dark brown or black coloured.
(ii)**A_2-region** : It contains less humus and is called as the zone of maximum leaching.
(iii) **A_3-region** : It is transitional to B-zone but is more like the A-zone than B.
Sometimes, it is totally absent.

193 **(c)**
Components of ecosystems are
Biotic Living members of an ecosystem
Abiotic Non-living members of an ecosystem

194 **(b)**
Monarch butterfly is highly distasteful to its predator because of special chemical present in their body. Interestingly the butterfly acquires this chemical during its caterpillar stage by feeding on poisonous weeds

195 **(a)**
The species living in a restricted or overlapping area of geographical distribution, are called **sympatric species**.

196 **(b)**
A number of mangroove plants possess small negatively geotrophic vertical roots called pneumatophores. Pneumatophores have lenticels for gaseous exchange. They are connected with internal arenchymatous tissue. It is a plant adaptation to saline environment

197 **(a)**
Temperature gradient over the earth's surface is 6.4-6.5°C per 1000m altitude or 10° latitude. Therefore, there is lowering of mean temperature from equator to poles. Tropical, sub-tropical, temperate and arctic organisms living in these zones are respectively called Megatherms, mesotherms, microtherms and hekistotherms

198 **(c)**
All of the above.
The most important elements that lead to so much variation are temperature, water, light, soil. Physio-chemical components alone do not characterize the habitat of an organism completely. It includes biotic factors also. So for characterization of habitat both abiotic and biotic components are needed

199 **(a)**
Shark and sucker fish (*Echenis*) association is an example of commensalism (without continuous contact).

200 **(d)**

Soil Nature and properties of soil depends on climate, weathering process or breathring of rocks into fine powder can occur due to atmospheric changes, mechanical forces, chemical changes and biological breakdown.

The physical and chemical properties of soil determine the type of plants that can grow in particular habitat and the characteristics of the bottom sediments of aquatic environment determine type of benthic animals

201 **(c)**

Zero growth of population indicated when various age groups are evenly balanced.

Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.

Age pyramid have three kinds

(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-reproductive are fewer. Population size is growing

(ii) **Bell-shaped Age Pyramid** The number of prereproductive and reproductive individuals is almost equal. Post-reproductive individuals are comparatively fewer. Population size is stable

(iii) **Urn-shaped Age Pyramid** Proportion of reproductive age group is higher than the individuals in pre-reproductive age group. Number of post-reproductive individuals is also sizable. It is declining population with negative growth

202 **(a)**

Allen's Rule According to Allen's rule, in endothermal animals of colder areas, the extremities like feet, tail, ears, etc. tend to get smaller as compared to their relatives in warmer region due to minimise the surface volume ratio so that the heat loss could be minimize

203 **(c)**

Rain or precipitation is the source of water over land. Therefore, it determines the vegetation of an area. The productivity and distribution of land plants dependant on availability of water

204 **(d)**

An abiotic factor relating to the physical or chemical composition of the soil found in a particular area is called edaphic factor , while temperature , light and water precipitation (rainfall) are climatic factors.

205 **(a)**

Populations means a group or assemblage of organisms of the same species live at a given time in a given time in a particular area. Population growth can be determined by the number of individuals added to the population. The addition of individuals may take place through natality (by birth) or through immigration (i.e. entry of individual from outside). The human population of India increased in 20th century by **natality**.

206 **(d)**

Population density means the number of individuals of a species per unit area or volume. Space or area for terrestrial habitat is measured in two dimensions (m^2) while for aquatic habitats, it is measured in three dimensions (m^3).

207 **(c)**

As we can see from graph 1 that there is more gap between lines of species 1 and 2 than the graph 2. So it is clearly interference out that both species are affected by interspecific competition but species two is less affected

208 **(d)**

The housefly which has a short life span and produces a large number of eggs could be considered as 'r' selected species

Depend upon the giving birth their are two type of species

'r' selected species organism of this type give more young ones during their life cycle. Parent care their children less and their size are also little

'K' **Selected Species** Organisms of this kind gives less birth during their life cycle. They care more their children. Their size and life span are more than *r* selected species, *e*. *g*., man, mammal, bird, etc.

209 **(b)**

The environmental check on biotic potential is called **environmental resistance.**

Biotic potential – overall reproductive output.

Fecundity – reproductive output, usually of an individual.

210 **(c)**

In the interference competition two species interfere in each other's natural resources for living hood. Naturally they effect on each other's

intrinsic growth rate (r). The volume of 'r' *is low significantly in interference competition*

211 **(d)**
Sexual parasite is type of parasitism in which a parasite live on the particular sex of the organism An angler fish (*Photocorynus*) male lives as a small parasite over the head of the female. In *Bonellia* the male is an internal parasite while in *Schistosoma* male lives in gynecophoral canal of the female

212 **(d)**
A-99%, B-Changes, C-Changes

213 **(b)**
The good soil is that which allows percolating the water slowly from it, e.g., alluvial soil (i.e., soil carried by water).

214 **(c)**
A **population** is group of individuals of a species (same species) growing in a given area (same habitat).

215 **(d)**
The size of a population for any species are not a static parameter. It keeps changing in time depending on various factors including food availability, predation pressure and adverse weather, water, space, accumulated waste, etc.

216 **(a)**
Population size The size of a population depends upon several factors like mortality, natality, etc. The size in nature could be as low as less than 10 (Siberian cranes at Bharatpur wetlands in any year) or go in million (*Chlamydomonas* in a pond).
Population size, more technically called population density (designated as N) need not necessarily be measured in numbers only.
Although the total number is the most appropriate measure of population density. But in some cases in is different to determine
For example
In a forest area suppose there are 200 *Parthenium* plants but only a single banyan tree will huge canopy
The following inference could be made
(i) Population density of banyan is low
(ii) Population cover area of banyan to high
In this example percentage of cover of biomass is more meaningful than population size

217 **(b)**
'N' is the population density of time t then its density at time $t + 1$ is
$Nt + 1 = Nt + [(B + I) - (D + E)]$
We can see from the above equation that population density increases if the number of birth plus number of immigrants $(B + I)$ is more than the number of death plus the number of emigrants $(D + E)$

218 **(b)**
Animals of colder areas possess thick fur, subcutaneous fat and small extremities so that they can tolerate very low temperature (below 0°C)

219 **(c)**
Organisms, populations, communities, biomes.
Ecology is basically concerned with four levels of biological organisation. *They are*
(i) organisms (ii) populations
(iii) communities (iv) biomes

220 **(b)**
As the isolated populations do not have any hereditary diseases like colourblindness, so, they do not spread accordingly.

221 **(a)**
Sympatry is the condition when selection may produce ecotypes living in adjacent habitats in the same geographic area and gives rise to sympatric speciation, i.e., formation of species within a single population by reproductive isolation or without geographical isolation.

222 **(b)**
A-Maintaining; B-Reducing

223 **(a)**
Humus it is a dark brown amorphous gummy substances formed by partial decomposition of plant and animal matter that constitute organic component of soil

224 **(b)**
An indirect competition for shared resources such as particular nutrient is called exploitation

225 **(d)**
A-Population density; B-Pyramid

226 **(a)**
Ecotype Genetically distinct adapted population to a particular habitat of species in different geographical area
Ecophene Phenotypic variants of a single genotypes in a particular area or habitat

Phenotypic Plasticity Shift in an organism body physiology behavior. When shifted to different environment condition

e. *g*., When a man living an plane are a went to hill area or mountain. Three extra R.B.C cells are produced seems to help transport available oxygen around the body is called phenotypic plasticity

227 **(a)**

Developing countries show expanding population pyramid with maximum age distribution in pre-reproductive phase, i.e., a very young age distribution, high fertility and low mortality rate.

228 **(d)**

Mortality is the death rate per thousand individuals per year. Mortality rate decreases population size and population density.

229 **(d)**

An introduced, alien, exotic, non-indigenous or non-native species. Is a species living outside its native distributional range, which has arrived there by human activity, either deliberate or accidental.

Some introduced species are damaging to the ecosystem they are introduced into, others have no negative effect and can, in fact, be beneficial as an alternative to pesticides in agriculture. In some instances the potential for being beneficial or detrimental in the long run remains unknown

230 **(d)**

Keystone species deserve protection because these have a significant and disproportionately large impact on the other species living in community. The number of keystone species is often low as compared to other species but they limit the population of other species. Removal or decreases in number of these species in a community causes serious disruption in structure and function of that community.

231 **(b)**

Since, same animals of a niche have the similar requirements of food, light, water, space, shelter and mate, etc, so intraspecific competition (between animals of same species) is more acute than interspecific, when different animals have different requirements and adaptations (i.e., different niche).In same niche, there will always a competition but it is more severe, when similar animal species are present and less, when different animals are there with a few similar needs.

232 **(b)**

Plasmodium is odd one as it is a digenetic endoparasite with man as the primary host and female *Anopheles* mosquito as the vector, while lice, bedbug and mites all are blood sucking ectoparasites.

233 **(d)**

The vegetarian of cold deserts includes lichens, mosses, herbaceous plants and small shrubs, e.g., Gobi desert and Tibet desert.

234 **(d)**

Ecology is the study of reciprocal relationship between organisms and their environment.

235 **(b)**

Light is essential for photosynthesis. The amount of photosynthesis depends upon the quality, intensity and duration of light. Photosynthetic yield is maximum on equator and tropical areas

236 **(d)**

Size of population keeps on changing due to various factors or phenomena like birth rate, death rate, emigration or immigration. So, it is a dynamic phenomena rather than stable

237 **(b)**

Stenothermal organisms are those organism, which can't tolerate wide range of temperature. They live within narrow range of temperature because of their requirement of nearly constant temperature throughout the year. *e*. *g*., amphibians, reptiles

238 **(b)**

Ectoparasite show simple life cycle as compared to the endoparasite

239 **(d)**

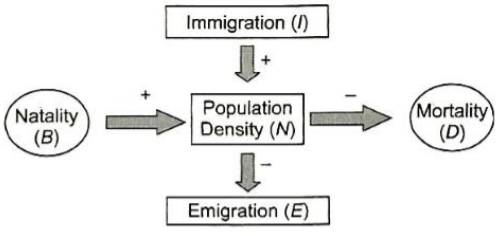
Autecology deals with the interaction of species with environment.

240 **(b)**

Diapause occurs during the unfavourable conditions. Mostly it takes place in winter when temperature is too low to survive

241 **(c)**

A-Increases, B-Increases, C-Decreases, D-Decreases



(−) Sign indicates factors decreasing population density

(+) Sign indicates factors increasing population density

242 **(d)**

As we can see clearly in the given diagram that the growth of the population is unlimited and increasing. That is the distinguish feature of exponential growth model or curve. As it has the J-shaped appearance so, it is also called J-shaped curve

243 **(d)**

A wide variety of chemical substances that we extract from plants on a commercial scale (nicotine, caffeine, quinine, strychnine, opium etc); are produced by them actually as defences against grazers and browsers

244 **(c)**

Chapman (1928) proposed the term 'biotic potential' to defined maximum reproductive power. He defined it as the inherent power of a population or organism to survive or increase in number under optimal environmental conditions is called **biotic potential**.

245 **(a)**

Stenothermal organisms are those organism, which live with in narrow range of temperature because of their requirement of nearly constant temperature through out the year, *e*. *g*., polar bear, lizards, amphibians, coconut (warm tropical areas)

246 **(b)**

In Orchids (*Ophrys*), there is strange relationship with pollinator insects. The Mediterranean Orchid (*Ophrys*) employs sexual deceit to get pollination done by a species of bee. One petal of its flower bears an uncanny resemblance to the female of the bee in size, colour and markings. The male bee is attracted to what it perceives as a female. Pseudocopulates with the flower and in that process pollinates the flower

247 **(a)**

The age pyramid is a model representing geometrically the proportion of different age group in the population of any organism. A pyramid with broad base indicates a high percentage of young individuals.

An unshaped age pyramid indicates a low percentage of young individuals.

248 **(c)**

A high density of tiger population in an area can result in intraspecific competition.

249 **(b)**

An age pyramid is a graphic representation of proportion of various age groups of a population with pre-reproductive at the base, reproductive in the middle and post reproductive at the top. For human population, the age pyramids show age distribution of males and females in a combined diagram. The shape of the age pyramids reflects the growth status of the population. In a declining population the shape of pyramid is urn-shaped.

250 **(b)**

A horizon It is the upper most horizon of the soil, which is also called the top soil. This horizon contains mineral matter mixed with humus

251 **(a)**

(i) Natality and immigration both increases the population density

(ii) Mortality and emigration both decreases the population density

252 **(c)**

Stenohaline (shark and string rays) and euryhaline (salmon).

Some organisms are tolerant to wide range of salinities called euryhaline, *e*. *g*., salmon fish but others are restricted to narrow range called stenohaline like shark and string rays. Many freshwater animals cannot live for long in sea water and *vice-versa* because of the osmotic problems they would face

253 **(a)**

The plants developing in dry habitat are called xerophytes. It is difficult to decide whether a xerophytes is really xerophilous and occur only in dry habitats or deserts or is merely drought-resistant. The xerophytes have well developed root-system, stunted, woody, hard stem and reduced leaves.

254 **(a)**

Natality It refers to the number of birth during given period in a population that are added to the initial density. It increases the population density

255 **(b)**

Land of selection operates on the population level.

Population It is a grouping of similar individuals in a particular geographical area or space. The different populations of the same organism present in particular geographical areas are called local population/demes. Selection operates only

at the population level. A local population adapted genetically to its particular environment is called ecotype

256 **(b)**
Mutualism is called (+) and (+) interaction, where both partners are benefitted.

257 **(d)**
In the stationary phase of logistic growth $K = N$ than the population growth becomes zero
In exponential phase when $b = d$ or r (increase rate) $= 0$ then population increase becomes zero (stable)

258 **(a)**
No predator become proficient in acquiring prey because pray population also evolve anti predatory traits to protect themself

259 **(c)**
Organisation is the arrangement and coordination of small components into larger components in a hierarchy, where each level is formed of components of lower level and itself becomes constituent of still higher level
Hierarchy in a organisation from the level of biomolecules to organismic level is called biological hierarchy or biological organisation.
The hierarchy in the levels of organisation connected with ecological grouping of organism is called ecological hierarchy or ecological level of organisation
There are no sharp lines or breeks in the functional sense amongst various level of ecological hierarchy as the same individual is a components of population, biological community as well as ecosystem

260 **(a)**
Porosity is 30% in sandy soil, 45% in loam and 50% in clay soil.

261 **(a)**
Biotic potential is the inherent capability of an organism to reproduce and increase in number under ideal conditions.

262 **(b)**
Ecology is the study of interaction between living organisms and their environment. The basic unit of study in ecology is organism.

263 **(c)**
Body compensates low oxygen availability at high altitude by increasing RBC production, increasing binding capacity of haemoglobin (through increasing 2, 3-biphosphoglyceric acid) and increasing breathing rate

264 **(b)**
Within biological communities, some species may be important in determining the ability of large number of other species to persist in the community. These crucial species have been termed keystone species. These have often considerably low abundance and biomass as compared to dominant species but their removal or decrease in number causes serious disruption in the functions of community, e.g., top predators, grey wolves in grasslands, etc.

265 **(b)**
The increase in number of individuals in particular time period is termed as 'birth rate' or 'natality', while the individuals dying over a time period is known as 'mortality' or 'death rate'.
Birth rate = 100
Death rate = 10
Number of individuals in a population = 1000
Natural growth rate = 100 – 10 = 90
So, percentage of growth rate $= \frac{90}{1000} \times 100 = 9\%$.

266 **(b)**
A_0 region is just below the O_1 region in soil, in which decomposition has begun. Thus, organic matter is found under different stages of decomposition and microorganisms like bacteria, fungi, Actinomycetes are frequently found. The decomposed matter is called **humus**.

267 **(a)**
A-Narrow; B-100°C

268 **(c)**
Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.
Age pyramid have three kinds
(i) **Triangular Age Pyramid** The number of pre-reproductive is very large. Number of reproductive individual is moderate and post-reproductive are fewer. Population size is growing
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269 **(c)**

Competition occurs for same limited resources between closely related or unrelated species. It is generally believed that competition occurs when closely related species compete for same resources that are limiting. But this is not true unrelated species also compete for same resources. This is called interspecific competition which proves to be the potent force in organic evolution

270 **(d)**

Non-hibernating mammal living in cold climatic would have the high respiration rate. As the temperature goes on increasing the respiration also goes on increasing but up to the certain limit. Beyond that limit the respiration goes on decreasing

271 **(a)**

Given statement are the adaptation through which prey can avoid their predators. Mimicry, camouflage and poisonous are the different strategies to avoid predators

272 **(a)**

The organic matter in soil is humus which is rich in N, P, K. Three distinct layers of humus in soil are litter (dead fresh organic matter), duff (partially decomposed litter) and real humus.

273 **(b)**

Some organisms show behavioural adaptation to cope with variation in environment. Desert lizards lack the physiological ability to deal with high temperature. They keep their body temperature fairly constant by behavioural means. They enjoy in sun and absorb heat when their body temperature is low. When their body temperature starts increasing it moves into shades

274 **(a)**

Desert lizard lack the physiological condition to deal with high temperature of their habitat, but manage to keep their body temperature fairly constant by behavioural means

275 **(b)**

Lichens represents an intimate mutualistic relation between a fungus and photosynthetic algae or cyanobacteria. It is the interaction confers benefit for both the interacting species called mutualism

276 **(d)**

The science dealing with study of soil is called edaphology or Paedology or Pedology

277 **(a)**

Biological control method in agriculture pest control based on the predator prey relationship. The prickly pear cactus introduced into Australia in 1920's caused Havoc by spreading rapidly into million of hactares of range land. Finally invasive cactus was brought under control only after a cactus-feeding predator (a moth) from its natural habitat was introduced into the country

278 **(d)**

Exponential Growth Model When the resources availability is unlimited in the habitat, the population grows in an exponential or geometric fashion. As resources are unlimited than there is no inhibition from crowding.

The equation is; $dN/dt = (b - d) \times N$ [b = Birth rate, d = Death rate

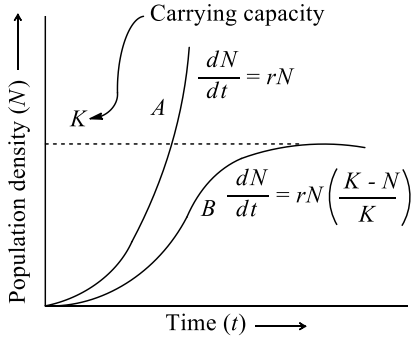
N = Population density, $\frac{dn}{dt}$= Rate of change of population

Let (b-d) = r, then the equation is, $dN/dt = Rn$

r = Intrinsic rate of natural increase

When a population shows exponential growth, the curve plotted with N in relation to time, assume J shape

In this there is no fix carrying capacity



279 **(a)**

Interpretation (a) is correct.

280 **(b)**

Viscum album is a partial stem parasite that grows on , poplar, apple, walnut, oak, etc. The parasite sends primary haustorium into the host for sucking food.

281 **(b)**

In mutualism two species can't live idependently Termite feed on wood through they don't possess enzymes for digesting the same. Termites herbour cellulose digesting flagellates (*Trichonympha companula*) for this purpose. Flagellates are unable are live independently. Termites would die of starvation in the absence of flagellates

282 **(c)**

Gause's hypothesis (Principle of Competitive Exclusion) Gause (1934) found that out of two species of *Paramecium* grown together one is eliminated. This phenomenon is called Gause's hypothesis or principle of competitive exclusion. This principle operates when the resources are limited and two species competetes for same resources

283 **(d)**

Chi-square test is used for testing the goodness of fit to an expected ratio and for the detection of linkage in some of them. It is always calculated on original data and never on percentage or frequencies.

284 **(b)**

Mangrove plants are capable to minimize water loss and facilitate aeration to underground parts.

285 **(d)**

Epiphytes (*Epic*–upper; *phytes* – plants) is an example of commensalism in which plant takes the shelter on the upper branches of their host for taking sunlight

286 **(b)**

Barnacles growing on the back of whale is an example for commensalism.

287 **(d)**

About 99% of animals and nearly all plants do not have a mechanism to maintain a constant internal body environment. Their body temperature changes with the surrounding temperature (ectotherms)

288 **(a)**

Plants of aquatic habitat is called the hydrophytes. Hydrophytes possess aerenchyma or air storing parenchyma to support themself in water

289 **(d)**

Production of caffeine, tannin, quinine are the examples of secondary metabolites, which are secreted by plant against herbivores. Production of hormone like chemicals throns, spines also the strategy of plant to avoid grazing or herbivores. Production of non-woody is not the adaptation for plant from predation

290 **(c)**

Triangular age pyramid.

Age pyramid Graphic representation of different age groups found in a population with pre-reproductive group at the base. Reproductive ones in the middle and post-reproductive group at the top is called age pyramid.

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291 **(d)**

The growth rate for population in a given time is calculated by

$$\frac{dN}{dt} = rN$$

292 **(b)**

An ecotype is a population of individuals of species, which are genetically different. Variations in ecotypes are permanent, irreversible and genetically fixed. If different ecotypes are grown in identical habitat, their differences (variations) will not change, however they will be adapted according to their habitat.

293 **(b)**

The animals and plants in which the osmotic concentration and temperature of the body change according to ambient conditions of water are called conformers (ectotherm)

294 **(b)**

Some organisms are tolerant to wide range of salinities called euryhaline, $e.g.$, salmon fish but others are restricted to narrow range called stenohaline like shark and string rays. Many freshwater animals cannot live for long in sea

water and *vice-versa* because of the osmotic problems they would face

295 **(b)**
The plants which grow in watered areas are called hydrophytes. They are characterised by presence of aerenchyma, poor vascular tissue, poorly developed cuticle, and absence of mechanical tissue.

296 **(a)**
The interspecific interaction arise from the interaction of population of two different species. They could be beneficial, detrimental or neutral to one of the species or both

297 **(a)**
Resources are limited.
Gause's hypothesis (Principle of Competitive Exclusion) Gause (1934) found that out of two species of *Paramecium* grown together one is eliminated. This phenomenon is called Gause's hypothesis or principle of competitive exclusion. This principle operates when the resources are limited and two species competetes for same resources

298 **(b)**
If natality (i.e. birth rate) is equal to mortality i.e., (death rate) then population will remain stationary.

299 **(b)**
Sex ratio is the ratio of males to females in a population
Types of Sex Ratio
In most species, sex ratio varies according to the age profile of the population
It is generally divided into four sub-divisions
(i) Primary sex ratio – Ratio at fertilisation
(ii) Secondary sex ratio – Ratio of birth
(iii) Tertiary sex ratio – Ratio of sexually active organisms. Also called adult sex ratio and abbreviated to ASR. ASR is defined as the proportion of adults in a population that are male
(iv) Quaternary sex ratio – Ratio in post-reproductive organisms

300 **(d)**
Community in a assemblage of population of different. Species of plants, animals, bacteria, fungi, etc. which live in a particular area and interact with one another through competition predation, mutualism, etc.

301 **(b)**
In 1981, the r value for human population in India was 0.0205. To find out the value of r we need to know the birth and death rates

302 **(b)**
Mutualistic relationship evolve when benefit is more than the cost. Human caused ecological imbalance by eradicating common parasite and anthropogenic pollution is causing extinction of many species

303 **(a)**
Biotic potential is natality under optimum condition. The actual birth rate under existing condition is called realized natality.

304 **(d)**
All adaptations are not genetically fixed, like behavioural adaptation. Hibernation and aestivation adaptations for avoiding extreme temperature also not genetically fixed

305 **(c)**
Regional and local variation of environment conditions with in biome lead to the formation of a wide variety of habitats

306 **(b)**
Population keeps on changing due to various factors like immigration, emigration, natality and mortality. So, it is dynamic rather than stable phenomena

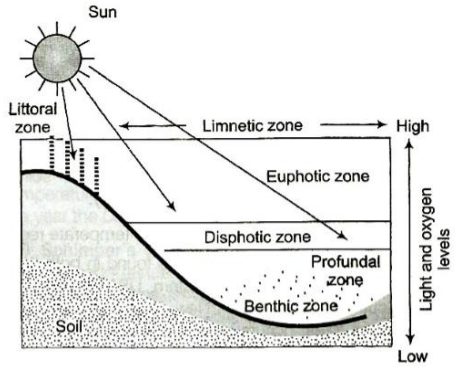
307 **(a)**
Organism is the smallest unit of ecological study.
Organisation is the arrangement and coordination of small components into larger components in a hierarchy, where each level is formed of components of lower level and itself becomes constituent of still higher level
Hierarchy in a organisation from the level of biomolecules to organismic level is called biological hierarchy or biological organisation.
The hierarchy in the levels of organisation connected with ecological grouping of organism is called ecological hierarchy or ecological level of organisation
There are no sharp lines or breeks in the functional sense amongst various level of ecological hierarchy as the same individual is a components of population, biological community as well as ecosystem

308 **(a)**
Species having much greater influence on community characteristics, relative to their low

abundance or biomass are called keystone species, e. g., in tropical forests, figs are
Keystone species. Removal of these species causes serious disruption in the functioning of community.

309 **(b)**

Light Zones in Aquatic Habitats There is a light zonation in deep lakes and oceans



(i) **Littoral Zone** It is shallow coastal region. Light is able to pass through shallow water and reach the bottom. Therefore, producers occur throughout from surface to bottom

(ii) **Limnetic Zone** It is open water zone where water is very deep. Amount of oxygen and light decreases with depth.

Limnetic zone has following three parts

Photic Zone It is upper part of limetic zone to which light can penetrate. Depth is up to 200 m. The upper part of photic zone, called **euphotic zone**, receives light more than the compensation point. Its depth is 20-80 m. The lower part of the photic zone, called **disphotic zone** (twilight zone), receives light at or below the compensation point. Blue light being made of short wave radiations can reach the deepest. Red light has poor penetrability. In sea the green algae remain near the surface, brown algae in intermediate depths, while red algae flourish the deepest in the photic zone

Aphotic/Profundal Zone It is zone of deep water below the photic zone and above the bottom to which light does not penetrate. The zone is, therefore, in perpetual darkness. Producer to not occur in this part. Instead only consumers are found

Benthic Zone It is the bottom zone. In deep lakes and seas, the bottom is also in perpetual darkness but in shallow waters, light does penetrate

310 **(c)**

I, III and IV.

Some organisms show behavioural adaptation to cope with variation in environment. Desert lizards lack the physiological ability to deal with high temperature. They keep their body temperature fairly constant by behavioural means. They enjoy in sun and absorb heat when their body temperature is low. When their body temperature starts increasing it moves into shades

311 **(a)**

At the high altitude there is low atmospheric pressure and due to that body does not get enough oxygen, which leads to altitude sickness

312 **(c)**

Probiosis It is opposite to the antibiotic. Probiosis is the phenomena in which organism secretes chemicals which are useful to the growth of other organism. Generally, it is found in intestinal flora

313 **(d)**

A lake near a village suffered heavy mortality of fishes within a few days, because lots of urea and phosphate fertilizers were used in the crops in the vicinity and the area was sprayed with DDT by an aircraft.

314 **(a)**

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

Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity

It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$

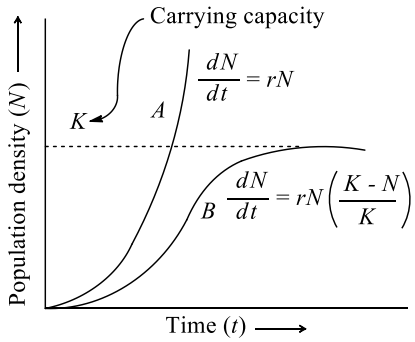
Rate of change of population density

N = Population density at time

N = Population density

r = Intrinsic rate of natural increase

K = Carrying capacity



Population growth curve A when resources are not limiting. Plot is exponential or geometrical curve B. When resources are limiting the growth, plot is logistic

'K' is carrying capacity

315 **(b)**
A-Physiological; B-High, C-Behavioural

316 **(c)**
Halophytes are special types of xerophilous plants, which grow on saline soils with high concentration of salts like NaCl, $MgCl_2$, and $MgSO_4$.

317 **(d)**
In accordance to their life style parasite evolved special adaptation such as loss of digestive systems, loss of unnecessary organs, presence of adhesive organs, origin of suckers and high reproductive capacity accordance to their host

318 **(b)**
5th June-world environment day
22nd April-world earth day

319 **(c)**
The exponential growth can be expressed as

$$W_1 = W_0\, e^{rt}$$

Where,
W_1 = Final size(weight, height, number, etc.)
W_0 = initial size of the beginning of trhe period
r = Growth rate
t = Time of growth
e= base of natural logarithms
Here, r is the relative growth rate and is also the measure of the ability of the plant to produce plant material, referred to as efficiency index. Hence, the final size of W_1 depends on the initial size W_0.

320 **(a)**
Homeostasis is the phenomenon of maintaining a constant internal environment despite changes in external temperature. Endothermal animal show temperature homeostasis

321 **(b)**
Ecology at the organismic level is essentially called physiological ecology which tries to understand how different organisms are adapted to their environments in terms of not only survival but also reproduction

322 **(a)**
Synecology is the study of reciprocal relationships between composition organisation and development of communities and their environment

323 **(a)**
Predator help in maintaining species diversity. In the rocky intertidal communities of American pacific coast starfish pisaster is important predator. In an field experiment when all the starfish were removed from an enclosed intertidal area more than 10 species of invertebrates becomes extinct with in a year, because of interspecific competition

324 **(a)**
A-Mortality, B-Natality, C-Emigration, D-Immigration

325 **(a)**
Predation is non-symbiotic consertism with damage to one for the benefit of the other. In this phenomenon consertism includes both harmful and beneficial coactions and may occur between two animals, two plants, or plant and animal. A strong partner kills or damages the weaker one for food.

326 **(a)**
Malthus calculated that though the number of organisms can increase geometrically (1, 2, 4, 8, 16…….), their food supply increases arithmetically (1, 2, 3, 4…..).

327 **(b)**
Adaptation develop due to natural selection of suitable variations appearing in living beings through mutation and recombination. It enables organism to survive and reproduce in its habitat

328 **(d)**
Nausea, fatigue, heart palpitations is due to unavailability of proper oxygen in the body. At high mountain the atmospheric pressure is low. So, O_2 is not easily available for Respiration. So for improve efficiency of respiration is increased by increasing RBC increasing the binding efficiency of haemoglobin

329 **(a)**
A-Larger surface area, B-Much larger, C-Rarely

330 **(b)**
Organism, which present in tropical regions are called megatherms.
Temperature gradient over the earth's surface is 6.4-6.5°C per 1000m altitude or 10° latitude. Therefore, there is lowering of mean temperature from equator to poles. Tropical, sub-tropical, temperate and arctic organisms living in these zones are respectively called Megatherms, mesotherms, microtherms and hekistotherms

Zone	Latitude	Mean Annual Temperature	Winter	Vegetation
Tropical	0° – 20°	Above-24°C	Nil	Tropical forests
Sub-tropical	20° – 40°	17° – 24°C	Mild winter	Sub-tropical deciduous forest
Temperature	40° – 60°	7° – 17°C	Winter with occasional show	Mixed coniferous forest
Arctic and Antarctic	60 – 80°	Below-7°C	Severe prolonged winter with abundant show	Arctic forest

331 **(c)**
The *Calotropis* produces highly poisonous cardiac glycosides and that's way. It is rare to see any cattle browsing on this plant

332 **(d)**
Plants growing in desert are called xerophytes. These have well developed root system, reduced leaves and sunken stomata to reduce transpiration.

333 **(d)**
In a growing population, the pre-reproductive, i.e., immature animals occur in large number.

334 **(a)**
A-Insects; B-plants

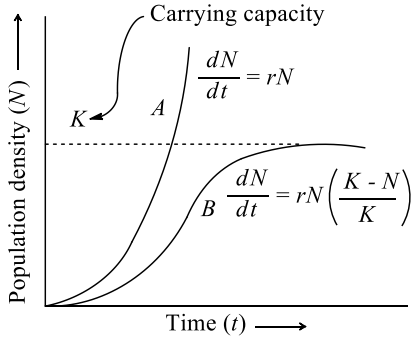
335 **(a)**
Competition is best defined by the fitness of one species as compared to the other competitive species. It is lower in case of other superior competiting species

336 **(d)**
Various characteristics of the soil such as soil composition, grain size and aggregation determine the percolation and water holding capacity of the soil. These characteristics along with parameters such as pH, mineral composition and topography determine the large extent vegetation in any area

337 **(b)**
A-Constant, B-Maximal, C-Homoeostasis

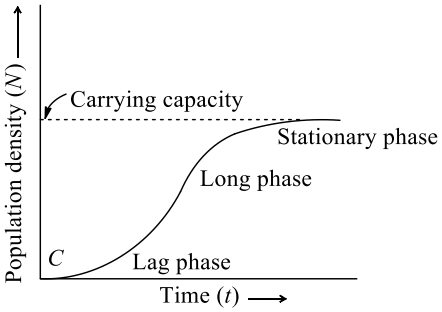
338 **(a)**
To avoid the competitive exclusion principle two similar species adapt differently to reduce the competition. So that two species can live in same area. Therefore competition does not always result in extinction of species

339 **(b)**
Logistic model shows that
As population increases the competition goes on increasing.
Logistic Growth Model No population can continue to grow exponentially, as the resource availability become limiting at certain point of time. Logistic growth model have fixed carrying capacity
It is described by the equation $\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$
Rate of change of population density
N = Population density at time
N = Population density
r = Intrinsic rate of natural increase
K = Carrying capacity



Population growth curve *A* when resources are not limiting. Plot is exponential or geometrical curve *B*. When resources are limiting the growth, plot is logistic
'*K*' is carrying capacity
A population growing in a habitat with limited resources shows three phases.

(i) **Lag phase** It is the initial phase in which a population adapt themself according to the environment and starts to increase their number
(ii) **Log phase** It is the second phase in which a population use its resources maximally and increases their number exponentially. Number of birth >> Number of death
(iii) **Stationary phase** It is the 3rd phase in which the population reached the carrying capacity level and population get stationary position. No of death = No of death



340 **(c)**
Adverse condition affect the population by influencing on natality and mortality of the population. It also effects the immigration and emigration

341 **(b)**
Migration It is the temporary departure and return of organism due to unfavourable condition of the environment *e*. *g*., bird migration from Siberia and other extremely cold Northern region Whereas, immigration and emigration are the permanent phenomena

342 **(b)**
Eutrophication means nutrient enrichment. The main factor that causes eutrophication is the release of large amount of phosphate into water body.

343 **(a)**
Reproductive value *Reproductive value may refer to several ideas*
Reproductive value (social psychology), the attributes of a potential partner in male selection.
Reproductive value (population genetics), the contribution of an individual to the future generations and it is maximum when individual is just about to reproduce

344 **(d)**
A bell-shaped polygon indicates a moderate proportion of young to old. As the rate of growth becomes slow and stable, the pre-reproductive age group become more or less equal in size and post reproductive group remaining as the smallest.

345 **(c)**
Hyperparasite It is the parasite which lives on another parasite, *e*. *g*., some bacteriophage (bacterial, viruses), *Bacterium Parteurella pestis* in *Xenopsylla chaeopsis* (rat flea) which is hyperparasite on rat

346 **(d)**
All of these.
Population size The size of a population depends upon several factors like mortality, natality, etc. The size in nature could be as low as less than 10 (Siberian cranes at Bharatpur wetlands in any year) or go in million (*Chlamydomonas* in a pond).
Population size, more technically called population density (designated as N) need not necessarily be measured in numbers only. Although the total number is the most appropriate measure of population density. But in some cases in is different to determine
For example
In a forest area suppose there are 200 *Parthenium* plants but only a single banyan tree will huge canopy
The following inference could be made
(i) Population density of banyan is low
(ii) Population cover area of banyan to high
In this example percentage of cover of biomass is more meaningful than population size

347 **(d)**
During short period of time, some population produce many offsprings, which require little care. Therefore, these populations usually have a survivorship curve similar to type-III. These tend to have J-shaped growth curves until some environmental changes causes them to deceive usually with in a short time. These are generally opportunist species and represent the pioneer species of new and distributed habitat

348 **(a)**
For a normal distribution, the mean, median and mode are actually equivalent.

349 **(a)**
When the external temperature is lower, some ectochermal animal become inactive to cope temperature *e*. *g*., frog, shake. However, very low temperature can kill such animals due to inactivation of enzymes. Therefore, the animal

goes hibernation. It is the winter sleep under ground

350 **(d)**

The most important elements that lead to so much variation are temperature, water, light, soil. Physio-chemical components alone do not characterize the habitat of an organism completely. It includes biotic factors also. So for characterization of habitat both abiotic and biotic components are needed

351 **(a)**

Population of two or more species whose geographical ranges or distribution coincide or overlaped are known as **sympatric species**.

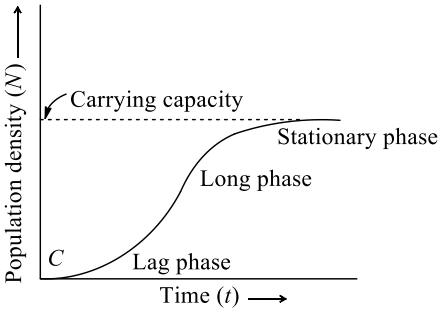
352 **(c)**

A population growing in a habitat with limited resources shows three phases.

(i) **Lag phase** It is the initial phase in which a population adapt themself according to the environment and starts to increase their number

(ii) **Log phase** It is the second phase in which a population use its resources maximally and increases their number exponentially. Number of birth >> Number of death

(iii) **Stationary phase** It is the 3rd phase in which the population reached the carrying capacity level and population get stationary position. No of death = No of death



353 **(c)**

A number of seeds are sensitive to light. They are called photoblastic seeds. Positively photoblastic seeds germinate only in presence of light *e*. *g*., *Viscum, Lacturca Rumex*. Negatively photoblastic seeds do not germinate in presence of light, *e*. *g*., onion, tomato

354 **(b)**

Less than 400 nm, more than 700 nm.

Radiation below the visible light (less than 400 nm) are ultraviolet (UV) radiations, while those above (more than 700 nm) the visible light are infra-red or heat waves. Amount of light and its intensity vary with latitude and season. Light intensity, light duration and light quality influence a number of life processes of organisms

355 **(c)**

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

$$\frac{dN}{dt} = 0.01 \times 300\left(\frac{400-300}{400}\right)$$

$$\frac{dN}{dt} = 3 \times \left(\frac{100}{400}\right)$$

$$\frac{dN}{dt} = \frac{3}{4}$$

$$\frac{dN}{dt} = 0.75$$

356 **(b)**

Predation is a natural way of transferring of energy to higher trophic level. Predation is an interaction between members of two species in which members of one species capture, kill and eat up members of other species. The former is called predators, while later the spoken as prays

357 **(a)**

'*r*' is the intrinsic rate of natural increase and is very important parameter chosen for assessing impacts of any biotic or abiotic factor on population growth

358 **(d)**

A **community** is any assemblage of populations of living organisms in a prescribed area of habitat. All the organisms of a community live together, share same habitat and influence each other's life directly or indirectly.

359 **(d)**

NEERI is National Environmental Engineering Research Institute at Nagpur, which monitors the environmental pollutions.

360 **(c)**

Rotation of our planet around sun and tilt of its axis cause annual variations in the intensity and duration of temperature, which leads to the formation of major biomes

Session : 2025-26 **AS PER NEW NTA SYLLABUS**

Total Questions : 384

BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

Assertion - Reasoning Type

This section contain(s) 0 questions numbered 1 to 0. Each question contains STATEMENT 1(Assertion) and STATEMENT 2(Reason). Each question has the 4 choices (a), (b), (c) and (d) out of which **ONLY ONE** is correct.

a) Statement 1 is True, Statement 2 is True; Statement 2 **is** correct explanation for Statement 1

b) Statement 1 is True, Statement 2 is True; Statement 2 **is not** correct explanation for Statement 1

c) Statement 1 is True, Statement 2 is False

d) Statement 1 is False, Statement 2 is True

1

Statement 1: Desert can be cold , *e*. *g*., Tibet, Gobi

Statement 2: Desert can be hot, *e*. *g*., Thar, Sahara

2

Statement 1: *Daphnia* populations in a water body, at different seasons of an year showed marked variations in their body morphology.

Statement 2: Cyclomorphosis in some planktonic organisms is influenced by the variations in temperatures prevailing in their water bodies at different seasons.

3

Statement 1: Predation is an interspecific interaction with a feeding strategy.

Statement 2: Predator and their prey maintain fairly stable population through time and rarely one population become abundant or scarce

4

Statement 1: Species are groups of potentially interbreeding natural populations that are isolated from other such groups.

Statement 2: Reproductive isolation brings about distinctive morphological characters.

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BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: ANSWER KEY :

1) d 2) a 3) b 4) b

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BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: HINTS AND SOLUTIONS :

1 **(d)**
Desert can be cold (*e*. *g*., Tibet, Gobi) and hot (*e*. *g*., Thar, Sahara). In true desert rainfall is less than 12 cm/yr while in extreme desert is less than 7cm/yr

2 **(a)**
Cyclomorphosis is some planktonic organisms is influenced by the variations in temperature prevailing in their water bodies at different seasons, e. g., *Daphnia*.

3 **(b)**
Predation is an interspecific interaction with a feeding strategy, i.e., one species (prey)

Is eaten up by another (predator). The number of predator usually depends upon the population of prey, but the latter is also controlled by predators. Thus, predatory and their prey maintain fairly stable population through time and rarely one population becomes abundant or scarce.

4 **(b)**
A species is a group of individuals, which resemble with each other in morphological , physiological, biochemical and behavioural characters. These individuals are capable of breeding, feeding in between themselves under natural conditions but are incapable of breeding with members of other species. Reproductive isolation is mainly responsible for the formation of new species.

Session : 2025-26 **AS PER NEW NTA SYLLABUS**

Total Questions : 384

BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

Matrix-Match Type

This section contain(s) 0 question(s). Each question contains Statements given in 2 columns which have to be matched. Statements (A, B, C, D) in **columns I** have to be matched with Statements (p, q, r, s) in **columns II**.

1. Match the column I with column II and choose the correct option

Column-I	Column- II
(A) Mutualism	(1) Tiger and deer
(B) Commensalism	(2) Cuscutta on circus
(C) Parasitism	(3) Sucker fish and shark
(D) predation	(4) Hermit Crab and sea anemone

CODES :

	A	B	C	D
a)	1	2	3	4
b)	4	3	2	1
c)	1	3	2	4
d)	2	3	1	4

2. Column I represents the size of the soil particles and column II represents type of soil components. Which of the following is correct match for the column I and II?

Column-I	Column- II
(A) 0.2 to 2.00 mm	(1) Silt
(B) Less than 0.002 mm	(2) Clay
(C) 0.02 to 0.2 mm	(3) Coarse sand particle
(D) 0.002 to 0.02 mm	(4) Fine sand particle

CODES :

	A	B	C	D
a)	2	3	4	1
b)	4	1	3	2
c)	3	2	4	1
d)	3	1	2	4

3. Match the following columns

Column-I	Column- II
(A) O-horizon	(1) Surface layer of organism matter
(B) A-horizon	(2) Upper most soil called top soil
(C) B-horizon	(3) Sub-soil
(D) C-horizon	(4) Irregular rock fragments

CODES :

	A	B	C	D
a)	4	3	2	1
b)	4	3	1	2
c)	1	2	3	4
d)	1	2	4	3

4. Match the following columns

Column-I	Column- II
(A) Mesotherms	(1) Arctic region
(B) Microtherms	(2) Temperate region
(C) Hekistotherms	(3) Sub-tropical region

CODES :

	A	B	C	D
a)	1	2	3	
b)	1	3	2	
c)	3	2	1	
d)	3	1	2	

5. Match the following columns

Column-I	Column- II
(A) Hydrophytes	(1) Dry habitat
(B) Mesophytes	(2) Wet habitat
(C) Xerophytes	(3) Moist habitat

CODES :

	A	B	C	D
a)	2	3	1	
b)	1	2	3	
c)	3	2	1	
d)	2	1	3	

6. Match the following columns

Column-I	Column- II
(A) Bergmann's rule	(1) Vertebrae of fish
(B) Allen's rule	(2) Narrow wings of bird
(C) Ransch's rule	(3) Extremities of mammals
(D) Jordon's rule	(4) Size of bird mammal

CODES :

	A	B	C	D
a)	4	2	3	1
b)	1	4	3	2
c)	4	3	2	1
d)	1	2	4	3

7. Match the following columns

Column-I	Column- II
(A) *Rafflesia*	(1) Endoparasite
(B) Hyperparasite	(2) Ectoparasite
(C) Lice	(3) Rat flea
(D) *Taenia*	(4) Phytoparasite

CODES :

	A	B	C	D
a)	4	3	2	1
b)	4	2	3	1
c)	4	1	2	3
d)	1	2	3	4

8. Match the following columns

Column-I	Column- II
(A) Diurnal	(1) Active during dusk
(B) Nocturnal	(2) Active at dawn
(C) Arboral	(3) Active during night
(D) Vespersal	(4) Active during day time

CODES :

	A	B	C	D
a)	4	3	2	1
b)	4	3	1	2
c)	4	2	1	3
d)	1	2	3	4

9. Match the following columns and choose the correct combination from the given option.

Column-I	Column- II
(A) Mutualism	(1) Ticks on dogs
(B) Commensalism	(2) *Balanus* and *Chathamalus*
(C) Parasitism	(3) Sparrow and any seed
(D) Competition	(4) Epiphyte on a mango branch
(E) predation	(5) Orchid, *Ophrys* and bee

CODES :

	A	B	C	D	E
a)	1	5	4	3	2
b)	2	1	5	4	2
c)	3	2	1	5	2

d)	4	3	2	1	2
e)	5	4	1	2	2

10. Match the following columns

Column-I	**Column- II**
(A) Ectoparasite	(1) Cuckoo
(B) Endoparasite	(2) Lice
(C) Brood parasite	(3) *Cuscuta*
	(4) *Ascaris*
	(5) *Plasmodium vivax*

CODES :

	A	**B**	**C**	**D**
a)	1	1	2,3	
b)	1,4	2,3	1	
c)	1,2	3,4	5	
d)	2,3	4,5	1	

11. Match the following columns

Column-I	**Column- II**
(A) Phototropism	(1) Opening or closing of flower due to light
(B) Photonasty	(2) Movement of plant shoot toward light source
(C) Nyctinasty	(3) Folding of leaves in response to darkness

CODES :

	A	**B**	**C**	**D**
a)	1	2	3	
b)	1	3	2	
c)	3	2	1	
d)	2	1	3	

12. Match the following columns

Column-I	**Column- II**
(A) Pink cotton bollworm	(1) Diapause

(B) Zooplankton

(C) Snail

(D) Polar bears

(2) Hibernation

(3) Aestivation

(4)

CODES :

	A	**B**	**C**	**D**
a)	1	1	3	2
b)	1	3	1	2
c)	3	2	1	1
d)	2	3	1	2

13. Match the following columns

Column-I	**Column- II**
(A) Hibernation	(1) Monarch butterfly
(B) Aestivation	(2) Leaf like grasshopper
(C) Cryptic appearance	(3) Northern ground squirrel
(D) Mimicry	(4) Ground squirrel

CODES :

	A	**B**	**C**	**D**
a)	3	4	2	1
b)	3	4	1	2
c)	4	3	1	2
d)	4	3	2	1

14. Match the following columns

Column-I	**Column- II**
(A) Hygrophytes	(1) Problems of water loss
(B) Mesophytes	(2) Excess water in guttation
(C) Xerophytes	(3) Luxujient vegetative growth

CODES :

	A	**B**	**C**	**D**
a)	2	3	1	

b) 2 1 3

c) 1 2 3

d) 1 3 2

15. Match the following column

Column-I	Column- II
(A) Mortality	(1) Individuals of same species going out from population
(B) Immigration	(2) Individuals of same species coming in population
(C) Emigration	(3) Numbers of deaths in population during given period
	(4) Numbers of birth in population during given period

CODES :

	A	**B**	**C**	**D**
a)	4	3	2	
b)	4	2	1	
c)	3	2	1	
d)	2	1	4	

16. Different types of interactions and the nature of interactions between species 'A' and 'B' are given in column I and II respectively. Choose the correct answer key where they are matched

Column-I	Column- II
(A) Mutualism	(1) Beneficial to 'A' and no effect on 'B'
(B) Competition	(2) Beneficial to both 'A' and 'B'
(C) Parasitism	(3) Beneficial to 'A' and inhibitory for 'B'
(D) Predation	(4) Beneficial to 'A' and harmful to 'B'
(E) Commensalism	(5) Harmful to both 'A' and 'B'

CODES :

	A	**B**	**C**	**D**	**E**
a)	5	4	1	2	3
b)	1	3	2	5	3
c)	2	5	4	3	3
d)	3	1	2	4	3

e) 4 2 5 1 3

17. Match the following columns

Column-I	**Column- II**
(A) Sandy soil	(1) 50%
(B) Loam soil	(2) 40%
(C) Clay soil	(3) 30%

CODES :

	A	**B**	**C**	**D**
a)	1	2	3	
b)	1	3	2	
c)	3	2	1	
d)	3	1	2	

18. Match the following columns

Column-I	**Column- II**
(A) Tropical rainforest	(1) 200-300 cm
(B) Tropical deciduous forest	(2) 100-250 cm
(C) Temperate broad leaved forest	(3) 90-100 cm
(D) Temperate needle forest	(4) 50-170 cm

CODES :

	A	**B**	**C**	**D**
a)	4	2	1	3
b)	4	3	1	2
c)	1	3	2	4
d)	1	2	3	4

19. Match the following columns

Column-I	**Column- II**
(A) Logistic growth	(1) Sigmoid growth
(B) Exponential growth	(2) Verhulst-pearl logistic growth
	(3) *Geometric growth*

(4) J-shaped growth

CODES :

	A	B	C	D
a)	1,2	3, 4		
b)	3,4	1,2		
c)	1,3,4	2		
d)	1	2,3,4		

20. Match the following columns

Column-I	Column- II
(A) Epiphytes	(1) Cattle egret
(B) Grazing cattle	(2) *Orchid* on mango tree
(C) Sea anemone	(3) Clown fish

CODES :

	A	B	C	D
a)	1	2	3	
b)	1	3	2	
c)	2	1	3	
d)	2	3	1	

Session : 2025-26 **AS PER NEW NTA SYLLABUS**

Total Questions : 384

BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: ANSWER KEY :

1)	b	2)	c	3)	c	4)	c	17)	c	18)	c	19)	a	20)	c
5)	a	6)	c	7)	a	8)	a								
9)	c	10)	d	11)	d	12)	a								
13)	a	14)	a	15)	c	16)	c								

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BIOLOGY (QUESTION BANK)

13.ORGANISMS AND POPULATIONS

: HINTS AND SOLUTIONS :

1 **(b)**

Column I	Column II
Mutualism	Hermit Crab and sea anemone
Commensalism	Sucker fish and shark
Parasitism	Cuscutta on circus
predation	Tiger and deer

2 **(c)**

Column I	Column II
0.2 to 2.00 mm	Coarse sand particle
Less than 0.002 mm	Clay
0.02 to 0.2 mm	Fine sand particle
0.002 to 0.02 mm	Silt

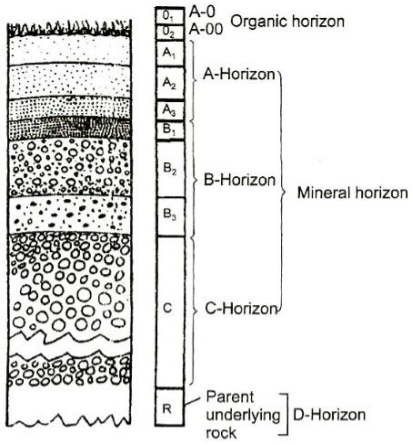
3 **(c)**

The appearance of different layers superposed one above the other in a vertical section of the soil from survive downward to present rock is called soil profile.

Soil Horizones Soil layers running roughly parallel to the surface, which have distinct feature from other layer

A soil contains maximum three horizon, *i.e.,* A, B and C

The surface litter yield is called O-horizon



Soil profile A-0 freshly fallen litter (partly decomposed)

A-00 organic matter (fermentation level and humus level)

A_1-organic debris + mineral. A_2-light colour due to leaching

A_3-may be present or absent

B-Horizon-iron and aluminium compounds. B_1-transitional layer. B_2-dark coloured, maximum amount of leached material. B_3-large chunk of parent rock material + leached material

C-thick, large masses of weathered mineral material

D-Unweathered parent rock material

4 **(c)**

Zone	Latitude	Mean Annual Temperature	Winter	Vegetation
Tropical	0° – 20°	Above-24°C	Nil	Tropical forests
Sub-tropical	20° – 40°	17° – 24°C	Mild winter	Sub-tropical

Temperature	40° – 60°	7° – 17°C	Winter with occasional show	deciduous forest Mixed coniferous forest
Arctic and Antarctic	60 – 80°	Below-7°C	Severe prolonged winter with abundant show	Arctic forest

5 **(a)**
Hydrophytes – Wet habitat
Mesophytes – Moist habitat
Xerophytes – Dry habitat

6 **(c)**
Bergmann's Rule Warm-blooded animals (birds and mammals) of colder areas are of large size as compared to those of warmer areas
Allen's Rule Extremities (ear, snout, tail and legs) of colder areas are shorter than those of warmer region
Ransch's Rule Birds have narrow wing in cold areas as compared to those of warmer areas
Jordan's Rule Fish of colder water tend to have more vertebrae than fish in warm water

7 **(a)**
Rafflesia – Phytoparasite (Root parasite)
Hyperparasite – Rat flea
Lice – Ectoparasite
Taenia – Endoparasite

8 **(a)**
(i) **Diurnal Animals** Active during day time, *e. g.*, butterflies, birds
(ii) **Nocturnal Animals** Active during night, *e. g.*, rat, owl, cockroach
(iii) **Arboral Animals** Active during dawn, *e. g.*, bubalcus
(iv) **Vesperal Animals** Active during dusk, *e. g.*, rabbit

9 **(c)**
Mutualism or symbiosis **(De Barry)** is a mutually beneficial relationship or interaction between individuals of two different species (+, +) with none of the two capable of living separately. One of the examples of this interaction is orchid ophrys and **bee.**
Parasites that feed on the external surface of the host organism are called ectoparasites. The most familiar examples of this group are the lice on humans and **ticks** on **dogs.**

Cornel's (1961) elegant field experiments showed that on the rocky sea coasts of Scotland, the larger and competitively superior barnacle *Balanus* dominated the intertidal area and excludes the smaller barnacle *Chathamalus* from the zone.

A **sparrow** eating any **seed** is a predator. Although animals eating plants are categorized separate herbivoves, they are, in a broad ecological context, not very different form predatores.

10 **(d)**
Ectoparasite which live on the outer surface of the host like ticks, mites, lice, etc. They have the special organs for attaching to their host
Endoparasite are the parasite which live on the inner surface of the host. They have very complex body organisation.
e. g., *Ascaris, Plasmodium vivax*
Brood parasite also called social parasite in which parasite bird lays eggs to nest of their host, *e. g.*, cuckoo (koel)

11 **(d)**
Different movements in plants are
Phototropism Plant shoot bend toward the source of light. This phenomenon is called phototropism
Photonasty Flowers of some plants open or close in response to light and darkness. This phenomenon is called photonasty
Nyctinasty The folding of leaves in response to darkness is called Nyctinasty. *Planaria* and earthworm generally show negative phototaxis

12 **(a)**
Pink cotton bollworm – Diapause

Zooplankton – Diapause
Snail – Aestivation
Polar bear – Hibernation

13 **(a)**
Hibernation – Northern ground squirrel
Aestivation – Ground squirrel
Cryptic appearance – Leaf-like grass hopper
Mimicry – Monarch butterfly

14 **(a)**
Hygrophytes are the plants of wet areas having soft stems of moderate height, large thin leaves, *e*. *g*., *Apluda, Rumuex,* etc.
Mesophytes are plants of moist habitats with luxuriant vegetative growth. Spines and thorns are absent, *e*. *g*., crops and fruit plants
Xerophytes are plants of dry habitats, which are faced with problems of more water loss through transpiration than is the water available from soil, *e*. *g*., *Acacia, Tamasix,* etc.

15 **(c)**
Mortality Numbers of deaths in population during given period
Immigraion Individuals of same species coming in population
Emigraion Individuals of same species going out from population

16 **(c)**

Term	Explanation
Commensalism	Beneficial to one but no effect on other
Mutualism	Beneficial to both
Parasitism	Beneficial to one and harmful to other
Predation	Beneficial to one and inhibitory to other
Competition	Harmful to both

17 **(c)**

Soil Type	Soil Porosity
Sandy soil	30%
Loam soil	40%
Clay soil	50%

Soil Porosity The percentage of soil volume occupied by pore space is called soil porosity

18 **(c)**
Climatic Conditions in Major Forest Types of India

Forest Type	Mean Annual Temperature	Mean Annual Rainfall	Dry Months
Tropical Rainforest	23 – 27°C	200-350 cm	2-3
Tropical Deciduous Forest	22 – 32°C	90-160 cm	6-8
Temperate Broad Leaved forest	6 – 20°C	100-250 cm	3-5
Temperate Needle Leaved (coniferous) forest	6 – 15°C	50-170 cm	3-5

19 **(a)**
Logistic growth is also called sigmoid or Ver huest-peart logistic growth. It shows S-shaped curve
Exponential growth is also called geometric growth. It shows J-shaped curve

20 **(c)**
Epiphytes – Orchid on mango tree
Grazing cattle – Cattle egret
Sea anemore – Chown fish