ORGANISMS AND ENVIRONMENT

- 1. The correct sequence of levels of biological organisation is
 - (A) Macromolecules \rightarrow Cells \rightarrow Tissues \rightarrow Organs \rightarrow Individual organism \rightarrow Population \rightarrow Communities \rightarrow Ecosystem \rightarrow Biomes
 - (B) Macromolecules \rightarrow Tissues \rightarrow Cells \rightarrow Organs \rightarrow Population \rightarrow Ecosystem \rightarrow Communities \rightarrow Biomes
 - (C) Micromolecules \rightarrow Cells \rightarrow Tissues \rightarrow Organs \rightarrow Individual organism \rightarrow Communities \rightarrow Population \rightarrow Biomes \rightarrow Ecosystem
 - (D) Macromolecules \rightarrow Cells \rightarrow Tissues \rightarrow Organs \rightarrow Individual organism \rightarrow Biomes \rightarrow Ecosystem \rightarrow Population \rightarrow Communities
- 2. 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 VI
- (C) I, II, III and IV
- (D) I, II, III and V
- 3. Different organisms 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
- 4. 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
- 5. Environmental factor(s) that characterise the habitat of an organism is/are
 - (A) abiotic components

- (B) biotic components
- (C) Both(A) and(B)
- (D) temperature only
- 6. The key elements that lead to large variations in the physical and chemical conditions of different habitats are
 - (A) thephysico-chemical(abiotic) components
 - (B) the biotic components like pathogens, parasites, predators and competitors
 - (C) Both(A) and(B)
 - (D) None of the above
- 7. Temperature is very significant to the living beings because
 - (A) kinetics of locomotion depend on temperature
 - (B) kinetics of enzymes depend on temperature
 - (C) high temperature facilitates digestion
 - (D) low temperature facilitates digestion
- 8. The organism which tolerates wide range of salinity called...A...The organism which tolerates 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
- 9. Many fishes of freshwater cannot live in sea water and vice-versa because of
 - (A) nutrient
 - (B) osmotic problems
 - (C) breathing problems
 - (D) excretion problems
- 10. Sunlight is available as a source of energy and is important in
 - (A) chemosynthesis
 - (B) photosynthesis
 - (C) heterotrophic mode of nutrition
 - (D) All of the above
- 11. 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
- 12. 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-Conformers
- (D) A-Conformers, B-Ectotherms, C-Partial regulators
- 13. Regulators are also called
 - (A) endotherms
 - (B) exotherms
 - (C) ectotherms
 - (D) Either(B) or (C)
- 14. Partial regulators are the organisms 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 wide range of environmental condition
 - (D) None of the above
- 15. Conformers are inactive in adverse conditions due to
 - (A) inability to move
 - (B) inability to digest properly
 - (C) inability to maintain homeostasis
 - (D) ability to maintain homeostasis
- 16. Very small animals are rarely found in polar region because
 - (A) small animals have a larger surface area relative to their volume, so they lose body heat very fast when it is cold outside

- (B) small animals have a smaller surface area relative to their volume, so they lose body heat very fast when it is cold outside
- (C) small body volume makes internal heat production very difficult
- (D) None of the above
- 17. Diapause is a
 - (A) stage of development
 - (B) stage of suspended development
 - (C) stage of delayed morphology
 - (D) rapid developmental stage
- 18. 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
- 19. An adaptation in Opuntia is that, it performs photosynthesis by
 - (A) flower
 - (B) stem
 - (C) roots
 - (D) shoot
- 20. At high altitude, we feel sick and nauseated. The reason for this sickness may be
 - (A) low atmospheric pressure
 - (B) high atmospheric pressure
 - (C) high temperature
 - (D) low temperature
- 21. Which of the following problems does the frequent deep sea diving organisms like whales may face?
 - (A) Compression of tissues surrounding air-filled cavities
 - (B) High blood nitrogen levels
 - (C) Lack of oxygen
 - (D) All of the above
- 22. Population is the total number of
 - (A) interbreeding individuals of a species found in a geographical area
 - (B) interbreeding individuals of a species found in different geographical area

- (C) Both(A) and(B)
- (D) None of the above
- 23. 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%
- 24. 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
- 25. Zero growth of population is indicated by
 - (A) less number of childbirth
 - (B) less number of reproductive females
 - (C) reproductive individuals are equal to pre-reproductive individuals
 - (D) less number of males than females
- 26. Which of the following is not an example of using relative density to measure population density in a certain area?
 - (A) Counting pugmarks of tigers to find population density of tigers in a forest
 - (B) Counting the number of fishes caught in a trap to find population density of fishes in a lake
 - (C) Measuring biomass of bacterial culture to find out population density of bacteria in a petri dish
 - (D) Both(A) and(C)
- 27. Study the figure and identify A to D.



(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
- 28. 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) Nt + 1 = Nt [(B + I) (D + E)]
 - (B) Nt + 1 = Nt + [(B + I) (D + E)]
 - (C) Nt + 1 = Nt + [(B + I) + (D + E)]
 - (D) Nt + 1 = Nt [(B + I) + (D + E)]
- 29. Logistic growth is represented by which equation?
 - (A) dNdt = rN K N K æ è ç ö ø ÷
 - (B) dNdt = rN K N N æ è ç ö ø ÷
 - (C) dNdt = rN K N K æ + è ç ö ø ÷
 - (D) dNdt = rN K K N + æ è ç ö ø ÷
- 30. Which of the following is true regarding exponential growth?
 - (A) No population can grow exponentially 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
- 31. Given population growth curve represents the logistic growth curve. In this curve, find out what do A, B and C indicate.



- (A) A-Lag 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
- 32. 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 area
- 33. Interspecific interaction could be
 - (A) beneficial
 - (B) detrimental
 - (C) neutral
 - (D) All of these
- 34. The population interaction in which free-living organism that catches, kills and devours individuals of other species called prey is called
 - (A) parasitism
 - (B) predation
 - (C) amensalism
 - (D) commensalism
- 35. Exotic species sometimes become invasive and starts spreading fast because of
 - (A) natural predators
 - (B) abundant natural competitor
 - (C) invaded land not having its natural predators
 - (D) mutation in their genome
- 36. Which of the following is not an example of prey-predator relationship?
 - (A) Tiger eating deer
 - (B) Plant Nepenthes trapping an insect
 - (C) Bacteria decomposing organic matter
 - (D) Crocodile killing a man
- 37. Species facing competition might evolve mechanism that promotes coexistence rather than exclusion. One such mechanism is
 - (A) competitive release
 - (B) resource partitioning

- (C) coevolution
- (D) None of the above
- 38. Mycorrhiza 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
- 39. The interdependent evolution of the flowering plants and pollinating insects together is known as
 - (A) mutualism
 - (B) coevolution
 - (C) commensalism
 - (D) cooperation

Answer Key

1	(A)	2	(C)	3	(A)	4	(C)	5	(C)
6	(C)	7	(B)	8	(B)	9	(B)	10	(B)
11	(B)	12	(C)	13	(A)	14	(B)	15	(C)
16	(A)	17	(B)	18	(A)	19	(B)	20	(A)
21	(D)	22	(A)	23	(B)	24	(D)	25	(C)
26	(D)	27	(C)	28	(B)	29	(A)	30	(A)
31	(C)	32	(A)	33	(D)	34	(B)	35	(C)
36	(C)	37	(B)	38	(B)	39	(B)		

HINTS & EXPLANATIONS

- 2(C) Option(C) represents the group of basic levels of ecology. Ecology is mainly concerned with four levels of biological organisation, which are organisms(basic living unit) populations(individuals of a species) communities(different sets of population) biomes(several biological communities with their associated vegetation or flora).
- 3(A) Ecology at the organism level is essentially called physiological ecology, which tries to understand how different organisms are adapted to their environments in terms of both survival and reproduction.
- 4(C) Rotation of our planet around the sun and tilt of its axis cause annual variations in the intensity and duration of temperature, resulting in distinct seasons. These variations along with annual variation in precipitation lead to the formation of major biomes like deserts, rainforests and tundra.
- 5(C) Both biotic and abiotic components of an environment characterise the habitat of an organism. The most important abiotic components which influence the habitat of organisms are temperature, water, light and soil. Also, biotic components like pathogens, parasites, predators and competitors of the organisms of an ecosystem interact and influence their habitat.
- 7(B) Temperature is very significant to the living beings because the kinetics of enzymes depends on it. Enzymes are very sensitive towards the temperature. A slight decrease or increase in temperature can cause their inactivation or denaturation of enzymes and consequently alter the metabolic activity and physiological functions of an organism.
- 8(B) The organisms which are tolerant to wide range of salt concentration in their aquatic habitats called euryhaline. On the other hand, the organisms which tolerates a narrow range of salinity are called stenohalines.
- 9(B) Many freshwater animals cannot live for long in sea water and vice-versa because of the osmotic problems, they would face. Freshwater fishes will loose water because of the high salt concentration in water, because of hypertonic environment. Salt water fishes would swell up and die through bursting of cells due to water uptake in hypotonic environment.
- 10(B) Sunlight 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 as these regions have high light intensity.
- 11(B) Benthic animals are those animals which live at the bottom of water. Their diversity and distribution are determined by the type of sediment characteristics like rocky or soil surface.

- 14(B) Some organisms are partial regulators as they have the ability to regulate their body temperature up to a certain limit.
- 16(A) Small animals have a larger surface area relative to their volume, so they tend to lose body heat very fast when it is cold outside. Then they have to expended much energy to generate body heat through metabolism. This is the main reason why very small animals are rarely found in polar regions.
- 17(B) Diapause is the stage of suspended development in certain animals under unfavourable or adverse conditions of the environment such as harsh climate changes, reduced food supply, etc. During this phase, an organism is considered as physiologically dormant.
- 18(A) In the absence of an external source of water, the kangaroo rat in North America deserts meets all itswater requirements through internal fat oxidation(in which water is a byproduct). It also has the ability to concentrate its urine, so that minimal volume of water is used to remove excretory products.
- 19(B) In Opuntia, a desert plant an adaptation undertaken during the course of evolution is that leaves get modified into spines in order to reduce the rate of transpiration. Thus, they have no leaves and the photosynthetic function is performed by flattened green stems.
- 20(A) The low atmospheric pressure at high altitude makes us feel sick and nauseated. This occurs due to low oxygen availability at high altitudes. Sometimes people also experience fatigue and heart palpitations.
- 22(A) Population is the total number of interbreeding individuals of a species found in a geographical area who share and compete for similar resources. Both sexually reproducing and asexually reproducing individuals are included in a population.
- 23(B) The natural growth rate percentage would be 9%. It can be calculated as Birth rate = 100 Death rate = 10
 Number of individuals in population = 1000 Natural growth rate = [Birth rate Death rate]= 100 - 10 90
 So, percentage of growth rate = ´ 90 ÷ 1000× 100 = 9%
- 25.(C) Zero growth of population is indicated when reproductive individuals are not reproducing and are present in equal number to pre-reproductive individuals.
- 26.(D) Both options(A) and(C) are not examples of using relative density to measure population density in a certain area. Sometimes, for certain ecological investigations there is no need to know the absolute population densities. Relative densities serve the purpose equally well. In this case, population size is indirectly estimated without actually counting them. For example, the number of fishes caught per trap is good enough measure of its total population density in the lake. The tiger census in our national parks and tiger reserves is often based on pug marks is an example of indirect count method. Also, measuring the

biomass of bacterial culture to find out the population density of bacteria in a petri dish is an example of biomass or per cent cover method.

28.(B) Option(B) gives the correct representation for population density at time t + 1.
'N' is the population density at time t then its density at time t + 1 is N t t + 1 = N t+ [(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).

- 30.(A) Option(A) is true for exponential growth. Rest of the options are incorrect and can be corrected as
 - Exponential growth starts to increase as it nears its log phase.
 - Bacterial colonies have not been observed to maintain exponential growth always. Algal populations have been observed to show exponential growth.
- 33.(D) The interspecific interactions arise from the interaction between population of two different species. These could be beneficial, detrimental or neutral to one of the species or both.
- 35.(C) When certain exotic species are introduced into a geographical area, they become invasive and start spreading fast because the invaded land does not have its natural predators.
- 36.(C) Bacteria decompose the organic matter which is not really living. Hence, it cannot be considered as a prey- predator relationship.
- 37.(B) Some time species facing interspecific competition might evolve mechanisms that promote coexistence rather than exclusion. One such mechanism is resource partitioning. In this mechanism, two species competing for the same resource, avoid competition by choosing different times for feeding or different foraging patterns.
- 38.(B) Mycorrhiza represent association between fungi and roots of higher plants. The fungi help the plant in the absorption of essential nutrients from soil, while the plant in return provides carbohydrates and shelter to the fungi.