

單選題 (每題三分, 共六十分。) ※ 本大題請於試卷內之「選擇題作答區」依序作答。

1. Which of the following best describes an intimate ecological association in which the organism is harmed when living on or within the host, but which generally has a negative effect on that host?
(A.) Mutualism (B.) Predation (C.) Commensalism (D.) Parasitism
2. Which concept most completely describes the place an organism is found in an ecosystem?
(A.) habitat (B.) niche (C.) food web (D.) chemical cycle
3. The algal bloom in phosphate-polluted lakes results from (A.) supplementing a limiting factor (B.) the poisoning of competitors by phosphate (C.) biological magnification (D.) decreasing the lake's carrying capacity for algae
4. During the summer months excess nutrient enrichment in a lake can result in the depletion of oxygen in the hypolimnion which eventually causes the death of bottom dwelling fish. The depletion of oxygen is caused by the (A.) the explosive growth of phytoplankton in the limnetic zone (B.) the decomposition of dead matter in the bottom by bacteria (C.) increased photosynthesis by phytoplankton (D.) the increase in the fish population as result of the bloom
5. A population that overshoots the carrying capacity of its habitat (A.) has unlimited biotic potential (B.) will eventually "crash" (C.) is perfectly adapted to its habitat (D.) has a very short log phase
6. Which statement is TRUE concerning an ecological niche?
(A.) Within the same habitat, two or more species can occupy the exact same niche.
(B.) The niche is defined as the microhabitat where an organism is found.
(C.) The concept of the ecological niche is multidimensional including information not only in the functional role of the organism in the ecosystem but also its habitat.
(D.) The type of niche occupied by the organism depends only on the organism's mode of nutrition.
7. Which of the following is not an assumption of the Hardy-Weinberg Principle?
(A.) Large population size (B.) Random mating of individuals within the population (C.) Immigration of new individuals from the outside (D.) All individuals have an equal chance of survival and reproduction
8. A plant produces purple or white flowers based upon two alleles (P and p). The purple color is dominant over the white color. The purple allele (P) occurs at a frequency of 0.82 within the population while the white allele (p) occurs at a frequency of 0.18. What is the genotypic frequency of homozygous recessive individuals within this population?
(A.) 0.8200 (B.) 0.1800 (C.) 0.1476 (D.) 0.0324
9. Optimal foraging theory predicts that
(A.) Predators should always take the most abundant prey size because those are the easiest to find.
(B.) Predators should always take the prey of largest size because they provide the largest nutrient source per kill.
(C.) Predators should always take the smallest prey because they are the least likely to cause injury.
(D.) Predators should select prey that maximizes energy intake while minimizing energy costs.
10. Which of the following is used to measure of species susceptibility to extinction?
(A.) geographic range (B.) habitat requirements (C.) population size (D.) All of the above
11. Which of the following is true regarding r-selected species?
(A.) Tend to be larger organisms (B.) Tend to mature late and produce few offspring
(C.) Tend to be strong competitors (D.) Tend to display a high per capita rate of increase.
12. Upwellings and turnovers
(A) are important in recycling minerals and nutrients (B) result in large fish kills because of sudden changes

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- in temperature (C) occur in the benthic zone (D) occur quite frequently during the year in shallow ponds
13. An animals camouflage disguises the organism's (A.) silhouette (B.) size (C.) eyes (D.) all of the above
14. Which is the term that describes those factors preventing a species from reproducing at its biotic potential?
(A.) carrying capacity (B.) environmental resistance (C.) predation (D.) competitive exclusion
15. The term used to describe very complex interactions involving a series of reciprocal evolutionary adaptations in two species is called (A.) coevolution (B.) divergent evolution (C.) convergent evolution (D.) biogeography
16. Which of the following demonstrated genetic differences among ecotypes of the same plant species?
(A) Different body forms of the same species at different elevations (same region).
(B) Different body forms of the same species in different geographic locations (different regions).
(C) Different body forms of the same species collected from different regions and grown in the same, common garden.
(D) None of the above.
17. Species whose population numbers are resilient to disturbance would normally have all the listed characteristics except (A) Long life span (B) Small body size (C) High reproductive rate (D) All the above would be characteristics of a resilient species
18. Which of the components of water balance represents the greatest loss from terrestrial animals?
(A) Evaporation (B) Secretions (C) Transpiration (D) Excretions
19. Which of the following best describes the relationship between mass-specific metabolic rates and body size in endothermic animals?
(A) Positive, linear (B) Negative, linear (C) Positive, exponential (D) Negative, exponential
20. Which of the following is probably not an adaptation of hot, desert plants to maintain thermal balance?
(A) Growth form high off the ground (B) CAM photosynthetic pathway (C) Large, bare leaves (D) Upper leaves oriented parallel to sun's rays

問答題 (每題十分, 共四十分。)

1. You are a small, herbaceous plant living at 30° latitude North of the equator. Your ancestors evolved here. Mean annual precipitation is <15cm per year. Daytime temperatures are hot and nights are very cool. Name the biome where you live? Describe 4 of your adaptations to survive, grow and successfully reproduce in this climate.
2. Using an example for each, discuss the following ecological concepts.
(A) Succession (B) Energy flow between trophic levels (C) Limiting factors (D) Carrying capacity
3. Discuss the nitrogen cycle. List the four major bacteria involved and the molecular interconversions they engage in as part of the cycle. Also describe the symbiotic relationship that is involved in nitrogen fixation by leguminous plants.
4. Please point out 5 types of marine ecosystem around Taiwan waters and describe their ecological characteristics and locations.

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