

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

I. Multiple choices (30%, 2% each)

1. Which of the following variables is (are) important in contributing to the rapid growth of human populations?
 - A) the high percentage of young people relative to the whole population
 - B) the average age to first give birth
 - C) the carrying capacity of the environment
 - D) A and B only
 - E) A, B, and C
2. Which of the following is *not* used in calculating an ecological footprint?
 - A) arable land
 - B) pasture and forest lands
 - C) fossil energy land
 - D) demographically transitional land
 - E) built-up land
3. An insect that has evolved to resemble a plant twig will probably be able to avoid
 - A) parasitism.
 - B) symbiosis.
 - C) predation.
 - D) competition.
 - E) commensalism.
4. Which of the following is considered by ecologists a measure of the ability of a community either to resist change or to recover to its original state after change?
 - A) stability
 - B) succession
 - C) partitioning
 - D) productivity
 - E) competitive exclusion
5. According to the competitive exclusion principle, two species cannot continue to occupy the same
 - A) habitat.
 - B) niche.
 - C) territory.
 - D) range.
 - E) biome.
6. If the flow of energy in an arctic ecosystem goes through a simple food chain from seaweeds to fish to seals to polar bears, then which of the following is true?
 - A) Polar bears can provide more food for people than seals can.
 - B) The total energy content of the seaweeds is lower than that of the seals.
 - C) Polar bear meat probably contains the highest concentrations of fat-soluble toxins.
 - D) Seals are more numerous than fish.
 - E) The carnivores can provide more food for people than the herbivores can.
7. Which of the following organisms fix nitrogen in aquatic ecosystems?
 - A) cyanobacteria
 - B) chemoautotrophs
 - C) phytoplankton
 - D) legumes
 - E) fungi
8. Although extinction is a natural process, current extinctions are of concern to environmentalists because
 - A) more animals than ever before are going extinct.
 - B) most current extinctions are caused by introduced species.
 - C) the rate of extinction is unusually high.
 - D) current extinction is primarily affecting plant diversity.
 - E) none of the above

(背面仍有題目,請繼續作答)

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9. Carbon dioxide and other gases prevent some heat from escaping Earth's atmosphere. This is known as the _____ effect.
- A) warming
 - B) summer
 - C) carbon
 - D) carbon dioxide
 - E) greenhouse
10. What is the term for a top predator that contributes to the maintenance of species diversity among its animal prey?
- A) keystone species
 - B) keystone mutualist
 - C) landscape species
 - D) primary consumer
 - E) tertiary consumer
11. The presence or absence of mandibles can be used to distinguish between
- A) insects and centipedes.
 - B) insects and crustaceans.
 - C) insects and millipedes.
 - D) insects and spiders.
 - E) centipedes and millipedes.
12. While vacationing in a country that lacks adequate meat inspection, a student ate undercooked ground beef. Sometime later the student became easily fatigued, and lost body weight. At about the same time, whitish, flattened, rectangular objects full of small white spheres started appearing in his feces. Administration of niclosamide cured the problem. The student had probably been infected by a
- A) pinworm.
 - B) hookworm.
 - C) nematode.
 - D) tapeworm.
 - E) proboscis worm.
13. Which of the following marine organisms produce potent neurotoxins that cause extensive fish kills, contaminate shellfish, and create severe respiratory irritation to humans along the shore?
- A) red algae
 - B) dinoflagellates
 - C) diplomonads
 - D) euglenids
 - E) golden algae
14. Chemicals, secreted by soil fungi, that inhibit the growth of bacteria are known as
- A) antibodies.
 - B) aflatoxins.
 - C) hallucinogens.
 - D) antigens.
 - E) antibiotics.
15. What do the archaea used in primary sewage treatment and the archaea that help cattle digest cellulose have in common?
- A) They produce methane as a waste product.
 - B) They live only at extremely low pH levels.
 - C) They are nitrogen fixers.
 - D) They possess both photosystems I and II.
 - E) They require extremely high temperatures for reproduction.

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科目：生物學

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II. Short Essays (70%)

1. What is global warming? What are the possible effects of global warming on human health? And why? (10%)
2. What is bioremediation? What are the principle agents of bioremediation? Why might these agents relate to resurgence of diseases? (10%)
3. Please explain and compare the basic biological characteristics of the microbial agents that are believed to be responsible for the diseases of Avian Flu, Dengue Fever, and AIDS (Acquired Immune Deficiency Syndromes). Please also include the introduction for their predominant reservoirs in the environment, if any. (15%)
4. "Water" and "light" are often considered as 2 critical elements in sustaining the normal functions of living creatures, at least. Do you agree? Why? (10%)
5. Please compare the similarities and difference of the 2 microorganisms that are attributable to Tuberculosis and Aspergillosis, respectively, in terms of its (1) cell structure (2) metabolic pathway, and (3) reproduction. (15%)
6. How do plants usually react to the pesticide application? How do human beings usually respond to the hazardous materials from different exposure pathways? (10%)