

【所有答案請寫在答案紙上，並依序作答】

I. Multiple choice questions: There is only ONE best answer for each of the question. Each question is 2 points. (每題 2 分，共 70 分) ※ 本大題請於試卷內之「選擇題作答區」依序作答。

1. All of the following may be associated with mating behavior except
 - A. aggressive behavior
 - B. releaser pheromones
 - C. search image
 - D. territoriality
 - E. visual communication

2. Some species of birds that migrate at night use the night sky as a compass. If juvenile birds are raised under an artificial night sky with no stars (or with major stars missing) for several months after hatching, they are unable to migrate in the correct direction. This is an example of
 - A. associative learning
 - B. extinction
 - C. habituation
 - D. imprinting
 - E. maturation

3. An adaptation
 - A. can be shaped by genetic drift
 - B. cannot be altered
 - C. evolves because it specifically improves an individual's mating success
 - D. affects the fitness of an organism if it is altered
 - E. can be deleterious to an organism

4. The mating calls of two species of frogs are different when they occupy the same island. On separate islands, the mating calls are the same. This is an example of
 - A. commensalism
 - B. character displacement
 - C. Baresian mimicry
 - D. mutualism
 - E. Müllerian mimicry

5. All of the following kinds of plants or animals characterize the initial stages of succession except
 - A. pioneer species
 - B. *r*-selected species
 - C. species with good dispersal ability
 - D. species that can tolerate poor growing conditions
 - E. species that invest large amounts of resources or time into development of progeny

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國立臺灣大學 102 學年度碩士班招生考試試題

科目：普通生物學(D)

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6. In the dinoflagellates → oysters → humans food chain, oysters represent
- A. detritivores
 - B. producers
 - C. primary carnivores
 - D. herbivores
 - E. secondary consumers
7. All of the following are involved in the regulation of blood glucose concentration except:
- A. glucagon
 - B. insulin
 - C. the liver
 - D. the pancreas
 - E. melatonin
8. Systolic blood pressure is maintained by the
- A. right atrium
 - B. left atrium
 - C. right ventricle
 - D. left ventricle
 - E. semilunar valves in the aorta
9. The appearance of a new mutation is
- A. the result of natural selection
 - B. the result of sexual reproduction
 - C. the result of artificial selection
 - D. a random event
 - E. usually a beneficial event
10. Which of the following generates the formation of adaptations?
- A. Genetic drift
 - B. Gene flow
 - C. Mutations
 - D. Sexual reproduction
 - E. Natural selection
11. Body temperature can be increased by all of the following except:
- A. muscle contractions
 - B. drinking alcohol, which results in vasodilation
 - C. increasing metabolic activity
 - D. puffing up feathers or hair
 - E. reducing blood flow to ears

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12. All viruses consist of
- A. a nucleic acid and a protein coat
 - B. DNA and a protein coat
 - C. RNA and a protein coat
 - D. a nucleic acid and a phospholipid bilayer membrane
 - E. proteins and polysaccharides
13. All of the following are examples of evolution except:
- A. changes in an allele frequency in a population
 - B. changes in an allele frequency in a species
 - C. divergence of a species into two species
 - D. mutations in an individual
 - E. adaptive radiation
14. The DNA of an elephant seal and the DNA of an apple tree will probably differ in all of the following respects except
- A. the kinds of genes for which the DNA codes
 - B. the kinds of nucleotides utilized in forming DNA
 - C. the number of DNA molecules
 - D. the length of DNA molecules
 - E. the sequence of DNA nucleotides
15. Which of the following is the original source of all energy used by nearly all organisms on earth?
- A. Plants
 - B. ATP
 - C. Heat
 - D. The sun
 - E. Water
16. Which of the following contains a code for a protein?
- A. DNA polymerase
 - B. RNA polymerase
 - C. rRNA
 - D. mRNA
 - E. tRNA
17. The plasma membrane consists principally of
- A. proteins embedded in a carbohydrate bilayer
 - B. phospholipids embedded in a protein bilayer
 - C. proteins embedded in a nucleic acid bilayer
 - D. proteins embedded in a phospholipid bilayer
 - E. proteins embedded in a polymer of glucose molecules

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18. Which of the following is an evolutionary process not based on random factors?
- A. Genetic drift
 - B. Natural selection
 - C. Mutation
 - D. Gene flow
 - E. Bottlenecks
19. A female monkey licks her wrists, rubs them together, and then rubs them against a nearby tree. What kind of communication is the probably an example of?
- A. Visual
 - B. Auditory
 - C. Territorial
 - D. Tactile
 - E. Chemical
20. Which of the following biome that has the predominate plant life which is short shrubs or grasses
- A. Desert
 - B. Taiga
 - C. Tundra
 - D. Tropical rain forest
 - E. Deciduous forest
21. The biome is known for its cold, lengthy, and snowy winters and the presence of coniferous forests
- A. Desert
 - B. Taiga
 - C. Tundra
 - D. Tropical rain forest
 - E. Deciduous forest
22. Which of the following processes occurs in both respiration and photosynthesis?
- A. Calvin cycle
 - B. Glycolysis
 - C. Citric acid cycle
 - D. Krebs cycle
 - E. Chemiosmosis
23. The ability to reason through a problem the first time through with no prior experience.
- A. Associative learning
 - B. Insight learning
 - C. Optimal foraging
 - D. Imprinting
 - E. Altruistic behavior

24. Which of the following conditions is an X-linked condition?
- A. Cystic fibrosis
 - B. Tay-Sachs disease
 - C. Huntington's disease
 - D. Hemophilia
 - E. Sickle cell anemia
25. Homologous chromosomes are chromosomes that
- A. are found only in identical twins.
 - B. are formed during mitosis.
 - C. split apart during meiosis II.
 - D. resemble one another in shape, size, and function.
 - E. all the above.
26. Where are the youngest wood and the youngest bark in a tree trunk?
- A. Youngest wood is in the center of a tree; youngest bark is the outside of the bark.
 - B. Youngest wood is in the center of a tree; youngest bark is the inner part, next to the vascular cambium.
 - C. Youngest wood is toward the outside, near the vascular cambium; youngest bark is the outside of the bark.
 - D. Youngest wood is toward the outside, near the vascular cambium; youngest bark is the inner part, next to the vascular cambium.
27. Some of the largest leaves in the world can be found on plants in dense tropical rain forests. Which of the following is an input of one of the sets of photosynthetic reactions that is most likely limited in the habitat of these plants with large leaves?
- A. O₂
 - B. CO₂
 - C. water
 - D. carbohydrate (e.g., glucose)
 - E. light
28. Water potential (ψ) can be thought of as the tendency for water to move from one place to another. In plants, it is made up mainly of solute potential and pressure potential. Hypothetical plant cells A and B are adjacent to each other. The solute potential (ψ_S) of cell A is -0.35 MPa, and its pressure potential (ψ_P) is +0.15 MPa. The solute potential (ψ_S) of cell B is -0.30 MPa, and its pressure potential (ψ_P) is +0.05 MPa. In which direction will net water movement occur?
- A. Neither; cells A and B are in equilibrium with each other.
 - B. from cell A to cell B
 - C. from cell B to cell A

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29. How are the bryophytes and seedless vascular plants alike?
- Plants in both groups have vascular tissue.
 - In both groups, sperm swim from antheridia to archegonia.
 - The dominant generation in both groups is the sporophyte.
 - Plants in both groups have true roots, stems, and leaves.
30. How are the life cycles of liverworts and angiosperms alike?
- In both groups, the sporophyte is the dominant generation.
 - In both groups, the gametophyte is the dominant generation.
 - In both groups, the gametophyte is smaller than the sporophyte.
 - In both groups, the sporophyte is smaller than the gametophyte.
 - In both groups, the sporophyte produces spores.
31. The flowering hormone is made in _____ and alters development of _____.
- flowers; leaves
 - flowers; root meristem
 - leaves; apical meristem
 - leaves; flowers
 - roots; flowers
32. A summer occupation in the Corn Belt states is de-tasseling the corn: removing unwanted male flowers so that female flowers on the same plant are pollinated by the desired pollen for the hybrid corn. What does this tell you about corn?
- The flowers are perfect and the plant is dioecious.
 - The flowers are perfect and the plant is monoecious.
 - The flowers are imperfect and the plant is dioecious.
 - The flowers are imperfect and the plant is monoecious.
33. Angiosperms are unique in having double fertilization that forms endosperm. What is true about double fertilization in angiosperms?
- One pollen grain combines with the egg to form the zygote, and one pollen grain combines with the polar nuclei to form endosperm. Two sperm combine with a polar nucleus to form endosperm.
 - Two pollen grains combine with two ovules to form the zygote and endosperm.
 - One sperm combines with the polar nuclei to form the zygote, and one sperm combines with the egg to form endosperm.
 - One sperm combines with the egg to form the zygote, and one sperm combines with the polar nuclei to form endosperm.
34. Suppose a plant had a photosynthetic pigment that absorbed far-red wavelengths of light. In which of the following environments could that plant thrive?
- on the floor of a lake, whose water contains abundant green algae
 - on the forest floor, beneath a canopy of taller plants
 - on the ocean floor, in very deep waters
 - on mountaintops, closer to the Sun

35. Plants are the primary providers of oxygen, which is obtained by the reduction of carbon dioxide. What chemical donates the electrons needed for CO₂ reduction?

- A. sunlight
- B. glucose
- C. water
- D. carbon monoxide
- E. oxygen

II. Explain and distinguish the following terms: (每題 3 分，共 30 分)

1. cohesion-tension theory and pressure-flow hypothesis.
2. oxygenic photosynthesis and anoxygenic photosynthesis
3. embryogenesis and gametogenesis
4. ABC model for flower development
5. monophyletic and paraphyletic origin
6. peptidoglycan and cellulose
7. primary endosymbiosis and secondary endosymbiosis
8. tracheids and vessel elements
9. homospory and heterospory
10. plasmogamy and karyogamy

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