

※注意：請於試卷上「選擇題作答區」依序作答。

一、 單選題 (每題 2 分, 共 10 分)

1. Which of the following is **NOT** part of Darwin's formulation of the process of evolution?
 - a. natural selection leading to changes in populations
 - b. variations as the raw material of the evolutionary process
 - c. formation of new species over very long period of time
 - d. the central role of artificial selection
 - e. interaction between variations and the environment

2. Which of the following statements about cell division, reproduction, and growth is **False**?
 - a. Mitosis produces daughter cells with exactly the same set of chromosomes as the parent cell
 - b. In eukaryotes, mitosis is usually followed by binary fission
 - c. Mitosis is the mechanism of plant growth and asexual reproduction.
 - d. Vegetative reproduction is common in plants.
 - e. Dedifferentiation followed by redifferentiation occurs during wound healing in plants.

3. The three factors that most affect the distribution of biomes are the patterns and/or distribution of:
 - a. heat, minerals, and oxygen.
 - b. oxygen, minerals, and moisture.
 - c. heat, air currents, and mountains.
 - d. humidity, carbon dioxide, and oxygen.
 - e. humidity, air current, and mountains.

4. Mendel's understanding of the inheritance of traits in peas, expressed in modern language, includes all of the following **except**
 - a. Parents transmit information encoded in genes
 - b. Each individual contains two genes for each trait.
 - c. Not all genes are identical; alternative forms (alleles) exist.
 - d. Each of the alleles present in an individual is discrete.
 - e. If a given allele is present, its effects will be seen in the individual.

5. The basic mechanism of gene expression often referred to as the "central dogma" consists of which two steps?
 - a. gene information is transferred to an RNA copy
 - b. the RNA copy directs the sequential assembly of amino acids
 - c. the chain of amino acids assume a specific three dimensional shape to become functional according to the type of genetic information
 - d. a and b
 - e. a and c

接 背 面

※注意：請於試卷上「非選擇題作答區」依序作答，並註明作答之大題及小題題號。

二、解釋名詞 (50 分: 選做 20 題, 多做扣分)

- | | |
|---------------------------------|-------------------------|
| 1. Neuron | 2. homeostasis |
| 3. neurotransmitter | 4. limbic system |
| 5. Otolith | 6. Organ of Corti |
| 7. Pituitary gland | 8. Pheromone |
| 9. Osteocyte | 10. endoskeleton |
| 11. HDL and LDL | 12. B lymphocyte |
| 13. epiglottis | 14. bronchus |
| 15. incomplete digestive system | 16. glomerulus |
| 17. ADH | 18. endoderm |
| 19. neural tube | 20. uterus and placenta |
| 21. FSH | 22. Annelid |
| 23. Echinoderms | 24. dentition |
| 25. Aves and mammals | |

三、問答題 (共 40 分)

1. Mitochondria and chloroplasts are important organelles. Answer following questions.
- (1) Compare and contrast the two organelles. In what ways are their structures similar and different?
 - (2) Please name the biological processes (or functions) occurring in these two organelles, respectively, **in English**.
 - (3) Organisms in which kingdoms contains both organelles?
- (10 points)
2. Water is the major molecule present in plant cells and organs.
- (1) What are the functions of water in plants?
 - (2) Please describe the paths of water movement from the soil, into and through a gymnosperm (such as a pine), then out of the plant's body.
 - (3) What are the mechanisms for the transport processes?
- (12 points)
3. Plants require certain inorganic elements for growth and play an essential role in the circulation of these nutrients within the biosphere.
- (1) What are the functions of nitrogen in plants?
 - (2) How do plants acquire the nitrogen element?
 - (3) Please describe the steps in the nitrogen cycle and the role plants play in the cycle.
 - (4) In what ways have humans affected the cycling of nitrogen?
- (12 points)
4. Plants are constantly under attack by viruses, bacteria, fungi, animals and even other plants. To survive, plants have evolved mechanisms to block the invasion. Please give two examples of how plants defend themselves against pests and diseases? (6 points)

試題必須隨卷繳回