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科目：普通生物學(B)

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一、單選題 (每題 3 分)

請於試卷「選擇題作答區」依題號作答

1. Cell walls are rigid structures found in plant cells but not animal cells. The primary component of most plant cell walls is:
(A) Cellulose
(B) Starch
(C) Protein
(D) Phospholipid
2. Mitochondria are organelles found in both plant and animal cells. Their primary function is:
(A) Photosynthesis
(B) Cellular respiration
(C) Protein synthesis
(D) Waste disposal
3. Enzymes are biological catalysts that speed up biochemical reactions in cells. Which of the following statements about enzymes is FALSE?
(A) Enzymes are specific for a particular substrate molecule.
(B) Enzymes can be denatured by high temperatures or extreme pH.
(C) Enzymes lower the activation energy required for a reaction to occur.
(D) Enzymes are used up in the reactions they catalyze.
4. Mitosis is a process of cell division that produces two daughter cells genetically identical to the parent cell. During which phase of mitosis do the chromosomes condense and become visible under a microscope?
(A) Interphase
(B) Prophase
(C) Metaphase
(D) Telophase
5. Plants lack a circulatory system like animals. How do vascular plants transport water and dissolved nutrients throughout their bodies?
(A) Diffusion only
(B) Through a network of specialized tubes called xylem and phloem
(C) By using flagella for movement
(D) Internal movement is not necessary for plants
6. Auxin is a plant hormone that plays a crucial role in plant growth and development. Which of the following is NOT a primary function of auxin?
(A) Stimulating stem elongation
(B) Promoting the formation of lateral and adventitious roots
(C) enhancing apical dominance
(D) Promoting leaf senescence

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7. Which structure best represents an adaptation to increase surface-to-volume ratio?
- (A) the long bones of a giraffe
 - (B) the smooth skin of an earthworm
 - (C) the multilobed sacs in the lungs
 - (D) the striations of skeletal muscle
8. The mucus-producing cells that line the stomach
- (A) increase the surface area of the stomach for faster digestion.
 - (B) stimulate production of hydrochloric acid.
 - (C) lubricate and protect the stomach lining.
 - (D) move food upward in the stomach to prolong digestion.
9. What part of the respiratory system does cigarette smoke most adversely affect?
- (A) alveoli
 - (B) trachea
 - (C) bronchi
 - (D) diaphragm
10. Which molecule is least likely to be able to pass through a capillary wall?
- (A) an enzyme
 - (B) a sodium ion
 - (C) glucose
 - (D) oxygen
11. What type of immune response is always disadvantageous to a person?
- (A) inflammatory
 - (B) humoral
 - (C) autoimmune
 - (D) complement-mediated
12. The nitrogenous waste product in bears (mammals) is _____, while most saltwater fish get rid of wastes through _____.
- (A) ammonia; urea
 - (B) uric acid; urea
 - (C) urea; ammonia
 - (D) ammonia; uric acid
13. Prednisone is often prescribed to individuals who are suffering from redness and swelling due to allergies. Patients on prednisone typically experience reduced redness and swelling. Based on these responses, what natural hormone does prednisone mimic?
- (A) mineralocorticoid
 - (B) glucocorticoid
 - (C) estrogen
 - (D) progestin

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14. Asthenozoospermia is a medical condition that is characterized by reduced sperm motility. What structure of the sperm is likely affected in a man who has asthenozoospermia?
- (A) acrosome
 - (B) head
 - (C) middle piece
 - (D) flagellum
15. The gap between the transmitting and receiving neurons in a chemical synapse is known as the
- (A) node of Ranvier.
 - (B) ion channel.
 - (C) gap junction.
 - (D) synaptic cleft.
16. Which class of sensory receptors responds to stimuli such as touch, pressure, stretching, and sound?
- (A) thermoreceptors
 - (B) mechanoreceptors
 - (C) electromagnetic receptors
 - (D) chemoreceptors
17. Which part of a bone contains red bone marrow?
- (A) compact bone
 - (B) fibrous connective tissue
 - (C) spongy bone
 - (D) yellow bone marrow
18. Which statement best expresses the concept of natural selection?
- (A) reproductive success influenced by inherited characteristics
 - (B) inheritance of acquired characteristics
 - (C) change in response to need
 - (D) a process of constant improvement, leading eventually to perfection
19. Which description BEST represents the gradual model of speciation (i.e., the formation of new species)?
- (A) Speciation occurs regularly as a result of the accumulation of many small changes.
 - (B) An isolated population differentiates quickly from its parent stock as it adapts to its local environment.
 - (C) Speciation occurs under unusual circumstances and therefore transitional fossils are hard to find.
 - (D) Species undergo little change over long periods interrupted only by short periods of rapid change.
20. Given the concept of invasive species in ecology and conservation biology, which of the following animals you may see in a forest in Taiwan is an invasive species, one that causes severe ecological damage and needs to be completely removed?
- (A) A stray dog (遊蕩犬)
 - (B) A Formosan Reeve's muntjac (山羌)
 - (C) A Formosan macaque (台灣獼猴)
 - (D) A Leopard cat (石虎)

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二、解釋名詞 (每題 4 分)

請標明題號，依序作答於試卷內「非選擇題作答區」

21. Net primary production
22. Endemic species (特有種)
23. Alternation of generations
24. Okazaki fragment
25. Endotoxin

三、簡答題 (每題 10 分)

請標明題號，依序作答於試卷內「非選擇題作答區」

26. Briefly describe the two reactions of photosynthesis and the key products of each reaction.
27. Differentiate between DNA and RNA in terms of structure and function.

試題隨卷繳回