

I、簡答題 (40 %)

- 一、骨骼肌細胞的收縮需要哪些胞器(organelles)的參與？請說明這些胞器在肌肉收縮過程中所扮演的角色或功能。(12 %)
- 二、何謂細胞的分化(differentiation)？已分化的細胞其基因組是否形成不可逆(irreversible)的變化？試舉一實例支持你的回答。(13 %)
- 三、SARS 風暴奪走了數百條人命，所幸拜現代醫學及生物學研究進展神速之賜，科學家以空前的速度找出致病的病毒(SARS 冠狀病毒, SARS-CoV)及其基因組，希望盡快發展出快速而有效的診斷及治療方法。請問病毒基因組的解讀對於傳染性疾病的防治或抗病毒藥物的研發有何重要性？(15 %)

II、解釋名詞 (30 %)

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|---------------------|---------------|
| 1. exon | 4. motor unit |
| 2. biodiversity | 5. endotherm |
| 3. cytotoxic T cell | 6. evolution |

III、選擇題 (30 %)

1. Which of the following molecules or structures does not participate directly in translation?
- (A) ribosomes
(B) transfer RNA
(C) messenger RNA
(D) DNA
(E) ATP
2. Which phase of meiosis has the physical basis of Mendel's principle of independent assortment?
- (A) The orientation of homologous chromosome pairs in metaphase I
(B) The separation of homologous chromosomes in anaphase I
(C) The orientation of sister chromatids in metaphase II
(D) The separation of sister chromatids in anaphase II

接背面

3. The characteristic that distinguishes echinoderms and chordates from other animal phyla is that echinoderms and chordates
(A) exhibit bilateral symmetry. (C) are protostomes.
(B) are deuterostomes. (D) are triploblastic.
4. Which event occurs after the second heart sound and before the next first heart sound?
(A) ventricular contraction (C) semilunar valves open
(B) ventricular relaxation (D) aortic systolic pressure
5. Which part of the brain sorts incoming information into categories (such as touch signals from a finger) before relaying it to the cerebral cortex?
(A) Hypothalamus (D) Pons
(B) Thalamus (E) Basal ganglia
(C) Hippocampus
6. How does a steroid hormone cause different effects in different cells?
(A) by binding to different receptors on cell membrane
(B) by activating different second messengers
(C) by acting on different organelles
(D) by activating different genes
(E) by activating different enzymes
7. In the inflammatory response, the absence of which of the following events would prevent all the others from happening?
(A) leakage of plasma to the affected area (D) release of histamine
(B) increased permeability of blood vessels (E) dilation of arterioles
(C) increased population of phagocytes in the area
8. A cat learns to come running into kitchen when it hears the electric can opener. This response is an example of
(A) operant conditioning (D) sensitization
(B) habituation (E) insight learning
(C) classical conditioning
9. In ecosystems, the flow of _____ is one-way, while _____ are constantly cycled.
(A) minerals ... energy (D) food ... energy
(B) organic compounds ... minerals (E) minerals ... food
(C) energy ... materials
10. All of the following respiratory surfaces are associated with capillary beds EXCEPT the
(A) alveoli of lungs. (D) gills of fishes.
(B) skin of earthworms. (E) skin of frogs
(C) tracheae of insects.

試題必須隨卷繳回