

國立成功大學

111學年度碩士班招生考試試題

編 號：324

系 所：臨床醫學研究所

科 目：生命科學

日 期：0220

節 次：第 3 節

備 註：不可使用計算機

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第1頁，共2頁

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一．選擇題 (60分，每題6分)

1. Phalloidin is a toxin that binds to actin subunits and disrupts actin function. Which of the following structure would be most directly affected by phalloidin?

- (A) Microfilaments
- (B) Intermediate filaments
- (C) Microtubules
- (D) Collagen fibers
- (E) Elastic fibers

2. Which of the following metabolic processes occurs in the mitochondria?

- (A) Fatty acid synthesis
- (B) Cholesterol synthesis
- (C) Pentose phosphate pathway
- (D) Glycolysis
- (E) Fatty acid  $\beta$ -oxidation

3. Mammals are homeostatic for all of the following EXCEPT

- (A) body temperature
- (B) blood glucose concentration
- (C) blood calcium concentration
- (D) metabolic rate
- (E) blood pH

4. Stabilization of the unique coiled structure of an  $\alpha$ -helix in a protein is primary attributed to

- (A) peptide linkages that covalently bond amino acids
- (B) disulfide bonding between cysteine side chains
- (C) hydrogen bonding between the peptide backbone atoms
- (D) enriched amino acids with electrically charged side chains
- (E) carbohydrate moieties attached to polar amino acids

5. Which of the following factors does NOT promote linkage disequilibrium?

- (A) Epistasis
- (B) Population subdivision
- (C) Asexual reproduction
- (D) Random mating
- (E) Coadapted gene complexes

6. When \_\_\_\_\_ occurs between nonsister chromatids, genetic exchange between chromosomes provides new combination of genes that are different from either parent.

- (A) synapsis
- (B) crossing-over
- (C) karyotyping
- (D) cytokinesis
- (E) centromeres splitting

(下一頁尚有考題)

7. A person homozygous recessive may have straight hair; a homozygous dominant curly hair, and a heterozygote wavy hair. What is the interaction between these alleles?  
(A) dominant / recessive  
(B) co-dominant  
(C) incompletely dominant  
(D) epistasis  
(E) penetrance
8. Antibiotics that affect bacterial cells interfere with all of the following EXCEPT  
(A) RNA polymerase  
(B) DNA synthesis  
(C) reverse transcriptase  
(D) protein synthesis  
(E) peptidoglycan synthesis
9. Which of the following is typically NOT found in normal somatic cells of a human male?  
(A) A Y chromosome  
(B) A X chromosome  
(C) A diploid nucleus  
(D) An inactivated X chromosome  
(E) Forty-four autosomes
10. Which of the following techniques may be used to demonstrate protein binding to specific DNA sequences?  
(A) Western blotting  
(B) Northern blotting  
(C) Southern blotting  
(D) Electrophoretic mobility shift assay  
(E) In situ hybridization

二. 簡答題 (40 分, 每題 8 分)

Please briefly define the following terms:

1. Coronavirus
2. RNA vaccine
3. Gene editing
4. Real-time PCR
5. Immune checkpoint