

※ 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。

簡答題 (共 80 分)

1. Please briefly define the following terms. (50%)

- A. Cell cycle
- B. Apoptosis
- C. Polymerase chain reaction
- D. Centromeres
- E. Telomeres
- F. Oncogenes
- G. Epigenetics
- H. Next-Generation Sequencing
- I. Innate immunity
- J. Single nucleotide polymorphism

2. The 2016 Nobel Prize in physiology or medicine was awarded to Dr. Yoshinori Ohsumi for his discoveries of mechanisms for autophagy. (20%)

- A. What is cell autophagy?
- B. What is the function of lysosome?
- C. What is the function of proteasome?
- D. Describe a link of autophagy to a human disease.

3. What sequence would a DNA strand with the sequence 5' TTC CAA GG 3' be complementary to? Please list the sequence from 5' to 3'. (5%)

4. Briefly describe what you know about "Translational medicine". (5%)

選擇題 (請選 A~E 其中最適合的答案. 共 20 分)

5. Proteins destined to be secreted move through the secretory pathway in which of the following orders? (5%)

- (A) Smooth ER → Golgi transport vesicle → Golgi cisternae → secretory vesicle → cell surface
- (B) Golgi cisternae → ER transport vesicle → smooth ER → secretory vesicle → cell surface
- (C) Rough ER → smooth ER → Golgi transport vesicle → Golgi cisternae → secretory vesicle → cell surface
- (D) Golgi cisternae → ER transport vesicle → rough ER → secretory vesicle → cell surface
- (E) Rough ER → Golgi transport vesicle → Golgi cisternae → secretory vesicle → cell surface

6. A cell nucleus contains which of the following? (5%)

I. DNA

II. RNA

III. Protein

(A) I only

(B) II only

(C) I and II only

(D) I and III only

(E) I, II, and III

7. Which of the following techniques could be used to demonstrate protein binding to specific DNA sequences? (5%)

(A) Southern blot hybridization

(B) Western blot hybridization

(C) Northern blot hybridization

(D) Quantitative polymerase chain reaction

(E) Electrophoretic mobility shift assay

8. Which of the following is typically NOT found in the normal somatic cells of a human male? (5%)

(A) A diploid nucleus

(B) A Y chromosome

(C) An inactivated X chromosome

(D) Forty-four autosomes

(E) The entire genomes from the original zygote