

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

一. 選擇題,共 4 題,每題 5 分,共 20 分

1. A method that uses an antibody to detect a specific protein is called _____.

- a. SDS-PAGE
- b. Western blot
- c. Mass Spectrometry
- d. Yeast two hybrid system

2. When a virus displays multiple peptide sequences, this is termed _____.

- a. phage array
- b. yeast two hybrid system
- c. phage display
- d. protein microarray

3. Reverse transcriptase generates cDNA from a _____ template.

- a. DNA
- b. transfer RNA
- c. messenger RNA
- d. cDNA

4. All of the following are second generation sequencing methods except

- a. 454 sequencing
- b. Illumina/Solexa sequencing
- c. SOLiD/Applied Biosystems method
- d. Sanger sequencing

二. 問答題,共 10 題,共 60 分

1. Why must a shuttle vector possess two origins of replication instead of one? (10%)
2. What is the **proteome**? (10%)
3. What is **linkage analysis**? (5%)
4. How did Hershey and Chase proved that **DNA** is the genetic material? (5%)
5. Please justify the biological reason for the presence of **uracil** in RNA but not in DNA. (5%)
6. Please describe the components of a **nucleosome**. (5%)
7. Please describe the role of a **helicase** at a replication fork. (5%)
8. Please describe the **mismatch repair** in *E. coli*. (5%)
9. Please explain why the recombination events occurred more frequently around the **Chi site** in *E.*

coli? (5%)

10. Please describe the mechanistic steps of **Cre** recombinase performed in site-specific recombination. (5%)

三. 填充題, 共 5 題, 每題 4 分, 共 20 分, 請以英文作答, 以中文作答不計分

1. The genetic code is fairly consistent among all organisms. The term often used to describe such consistency in the code is _____.
2. The enzyme _____ relates to peptide bond formation during protein synthesis.
3. _____ are clusters of ribosomes held together by an mRNA.
4. The nature of replication of the chromosome in *E. coli* is _____ and fixed point of initiation.
5. DNA polymerase ____ is thought to add nucleotides in the place of the primer RNA after it is removed.