編號： 64

國立成功大學 106 學年度碩士班招生考試試題

系　　所：生命科學系

考試科目：分子生物學

考試日期：0214，節次：3

※ 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: (40 分，每題 5 分)

1. How are proteins denatured in SDS-PAGE?
   (a) detergent and high temperature
   (b) detergent only
   (c) acylamide
   (d) electrical charge

2. A method that uses an antibody to detect a specific protein is called
   (a) Southern blot
   (b) Western blot
   (c) Mass Spectrometry
   (d) Yeast one hybrid system

3. What is the transcriptome?
   (a) The total set of proteins in the cell at any given point.
   (b) The number of genes that are expressed in a specific growth condition.
   (c) The total set of expressed genes encoded by the organism's genome.
   (d) The number of expressed proteins.

4. Yeast, *Saccharomyces cerevisiae*, have approximately_____genes.
   (a) 1,000
   (b) 6,000
   (c) 10,000
   (d) 25,000

5. DNA chip technology relies on the hybridization of RNA to DNA
   (a) True
   (b) False

6. Why *E.coli* frequently used as hosts for cloning?
   (a) They easily form colonies
   (b) They can remove axons from m RNA
   (c) They do not have plasmids cell
   (d) Only E.coli allow the gene to be cloned

7. Sequencing an entire genome, such as that of Saccharomyces cerevisiae , a yeast, is most important because
(a) It allows researchers to use the sequence to build a "better" yeast, resistant to disease.
(b) It allows research on a group of organisms we do not usually care much about.
(c) The yeast is a good animal model for trying out cures for viral illness
(d) A sequence that is found to have a particular function in the yeast is likely to have a closely related function in animals.

8. Genetic engineering is being used by the pharmaceueutical industry. Which of the following is not currently one of the uses
(a) production of human erythropoietin (EPO)
(b) production of interferon
(c) Genetic modification of plant to produce terpenoids
(d) Creation of products that will remove poisons from the human body

二、簡答題: (60 分)

1. Please describe the components of a nucleosome. (5%)
2. Please describe the role of **DNA polymerase I** at the replication fork (5%)
3. Please describe the **nucleotide excision repair** in *E. coli*. (5%)
4. Please describe the **homologous recombination** in *E. coli*. (5%)
5. How does one use **Cre-lox** system for knockout mice construction? (5%)
6. What purpose do capping and poly-A tail addition serve for eukaryotic mRNAs? (5%)
7. Please describe two mechanisms for prokaryotic cells to inhibit initiation of translation as a means to regulate translation. (5%)
8. What is a nonsense suppressor mutation? (5%)
9. Give an example how gene regulation makes cells different. (10%)
10. Please describe what system biology is. (10%)