元智大學 107 學年度 碩士班 招生試題卷

系(所)別：生物科技與工程研究所碩士班　組別：不分組　科目：生物化學　

●不可使用電子計算機

I. Please choose the most appropriate answer. (45%, 3% each)

1. Translation is the cellular process of making
   (A) New DNA　(B) RNA from DNA
   (C) Proteins from amino acids by way of RNA　(D) None of the above

2. Hydrolysis of lactose yields
   (A) Galactose and fructose　(B) Galactose and glucose
   (C) Glucose and fructose　(D) Fructose and galactose

3. To prepare a 20% sucrose solution, one should
   (A) Add 20g of sucrose into 100 ml of pure water
   (B) Add 10g of sucrose into 50 ml of pure water
   (C) Add 100 ml of pure water into 20g of sucrose
   (D) Dissolve 10 g of sucrose in 35 ml of pure water, and bring the final volume to 50 ml with pure water.

4. The model that is now known to be correct for the structure of biological membrane is
   (A) Fluid mosaic model
   (B) Page's model
   (C) Lac Operon model
   (D) Lock and Key model

5. Which of the following component does not present in the cell membrane?
   (A) Nucleic acid (B) Glycoproteins (C) Glycolipids (D) Phospholipids

6. Proteins are separated in an SDS-PAGE experiment on the basis of their
   (A) Positively charged side chains　(B) Molecular weight
   (C) Negatively charged side chains　(D) Different isoelectric points

7. From the β-oxidation of the fatty acid myristate (14:0), how many molecules of acetyl- CoA are produced?
   (A) 3 (B) 7 (C) 14 (D) 21

8. Which property of proteins is utilized in ion-exchange purification?
   (A) Net charge (B) Size (C) Hydrophilic or hydrophobic nature (D) UV absorption

9. In term of the number of atoms, which element is not considered as "macromolecules" living organisms?
   (A) C (B) H (C) O (D) Zn (E) S

10. What types of molecules can serve as antigens?
    (A) Proteins (B) Polysaccharides (C) Metal ions (D) A and B (E) All of above

11. Which is the main force for the secondary structure of protein?
    (A) Covalent bond (B) Hydrophobic interaction (C) Hydrogen bond (D) Disulfide bond (E) Ionic bond

12. The storage polysaccharide in the animal cells is ?
(A) Glycogen (B) Starch (C) Lipid (D) Cellulose

13 Which of the following is a pyrimidine base that is present in DNA but is NOT present in RNA?
(A) Uracil (B) Guanine (C) Thymine (D) Adenine (E) Cytosine

14. HPLC stands for
(A) High Pressure Liquid Chromatography (B) High Performance Liquid Chromatography
(C) both (a) and (b) (D) Highly Placed Liquid Chromatography

15. An essential amino acid is one that
(A) is essentially easy to synthesize
(B) is essential to flagella motion
(C) the body cannot synthesize
(D) the body can synthesize under essential conditions

II. Define and describe the following terms (35%, each 7%)

1. Photosynthesis
2. Central dogma of molecular biology
3. Polymerase chain reaction (PCR) and Quantitative real time polymerase chain reaction (qPCR)
4. Peptide bond and disulfide bond
5. Metagenomics

III. Answer the following question. (20%)

1. Briefly describe the structure and biological roles of cytoplasmic membrane (10%)
2. Briefly describe what are holoenzyme and apoenzyme (10%)