國立中山大學101學年度碩士暨碩士專班招生考試試題

題號：4031

科目：生物化學【生科系碩士班甲組、乙組】

問答題（68分）

1. The α helix and the β strand are the two major elements of protein secondary structure, describe the structure of α helix and β strand in detail.（12分）

2. Describe the principle used in salting out, gel-filtration chromatography, ion-exchange chromatography, and affinity chromatography for separation of proteins.（12分）

3. The activity of enzymes must be regulated so they function at the proper time and place. Describe any three ways to regulate the enzymatic activity.（12分）

4. The extraction of energy from fuels can be divided into three stages as described by Hans Krebs. Illustrate the three stages in the generation of energy from the oxidation of glucose.（12分）

5. Compare the following pairs of terms:（20分，每小題4分）
   (1) apoenzyme and holoenzyme
   (2) intron and exon
   (3) type 1 diabetes and type 2 diabetes
   (4) protein kinase and protein phosphatase
   (5) standard free-energy change ($\triangle G^{o}$) and free-energy change ($\triangle G$)

配合題（8分，每題1分）

Match each amino acid on the left with the appropriate side chain type on the right.

1. leucine	(A) nonpolar aliphatic
2. lysine	(B) nonpolar aromatic
3. glutamate	(C) hydroxyl-containing
4. serine	(D) sulfur-containing
5. cysteine	(E) imidazole-containing
6. tryptophan	(F) acidic
7. histidine	(G) basic
8. glycine	(H) a single hydrogen atom

解釋名詞（24分，每題4分）

1. ubiquitin
2. phenylketonuria
3. gluconeogenesis
4. The Bohr effect
5. Edman degradation
6. substrate level phosphorylation