Part I：50%

A. Chose the best answer of the following question (2% of each answer)：20%

1. A racemic mixture is one containing equimolar concentrations of
(a) Epimers.
(b) Diastereomers.
(c) Anomers.
(d) Enantiomers.
(e) Geometric isomers

2. Gel filtration chromatography is used to separate molecules by
(a) ionic charge
(b) isoelectric pH
(c) size
(d) binding specificity
(e) none of the above

3. The Edman deradation sequences polypeptides by using
(a) 2,4-dinitrofluorobenzene to remove one amino acid at a time from the N-terminus.
(b) 2,4-dinitrofluorobenzene to remove one amino acid at a time from the C-terminus.
(c) Phenylisothiocyanate to remove one amino acid at a time from the N-terminus.
(d) Phenylisothiocyanate to remove one amino acid at a time from the C-terminus.
(e) DANSYL chloride to remove one amino acid at a time from the N-terminus.

4. The amino acids that absorb light in the region of 260-280 nm are
(a) Tyr, Trp, Phe
(b) His, Arg, Lys
(c) Leu, Val, Ile,
(d) Glu, Asp
(e) All α-amino acids

5. The x-intercept of a Lineweaver-Burk plot is
(a) V_{max}
(b) $-1/V_{max}$
(c) $1/V_{max}$
(d) $-1/K_M$
(e) K_M

6. Each of the following is a biological compartment surround by a membrane except
(a) Golgi apparatus

(b) Ribosomes
(c) Endoplasmic reticulum
(d) Lysosomes
(e) Mitochondria

7. The products released when phospholipase C caltalyzes phosphatidylinositol hydrolysis are
(a) diacylglycerol and inositol monophosphate
(b) diacylglycerol, inositol, and phosphate
(c) phosphatidate and inositol
(d) phosphatidate and inositol monophosphate
(e) phosphatidate, inositol, and phosphate

8. The Gs protein complex
(a) is a soluble enzymes in the cytoplasm.
(b) contains a subunit that can hydrolyze GTP.
(c) binds cAMP
(d) binds adrenalin or gucagon
(e) catalyzes the phosphorylation of protein kinase

9. The conversion of 1 mole of pyruvate to 3 moles of carbon dioxide via pyruvate dehydrogenase and the citric acid cycle also produces
(a) 3 moles of NADH, 2 moles of $FADH_2$, and 0 moles of GTP.
(b) 3 moles of NADH, 1 mole of $FADH_2$, and 1 mole of GTP.
(c) 4 moles of NADH, 2 moles of $FADH_2$, and 1 mole of GTP.
(d) 4 moles of NDAH, 1 mole of $FADH_2$, and 1 mole of GTP.
(e) 6 moles of NADH, 2 moles of $FADH_2$, and 2 moles of GTP.

10. Of the following inhibitors, the only one that will not block both oxygen consumption and ATP synthesis in normal mitochondria is
(a) oligomycin
(b) 2,4-dinitrophenol
(c) antimycin A
(d) rotenone
(e) cyanide

B. 簡答題：30%

1. 何謂蛋白質的一、二、三、及四級結構？ (5 %)

2. 假設你要研究的蛋白質是一個 seven transmembrane receptor，而這種蛋白質，在純化過程中，容易斷裂，試問你要如何利用現代的生物科技來研究這個蛋白質？ (10 %)

3. 試簡述下列名詞？ (15 %)
   (a) allosteric regulation
   (b) alternative splicing
   (c) promoter and enhancer
   (d) microarray technique
   (e) salvage pathway

Part II：50%

Briefly answer the following questions (50% total)

1. What is the major source of acetyl-CoA other than the pyruvate dehydrogenase reaction? (3%)
2. How many ATP molecules are generated in glycolysis from:
   (a) glucose;
   (b) a glycosidic unit of glycogen. (4%)
3. Peripheral tissues obtain their free fatty acids from oxidation from the blood. Explain three ways in which free fatty acids become available to cells. (6%)
4. (a) What are eicosanoids?
   (b) What are they made from?
   (c) Briefly describe their physiological significance.
   (d) What is the relevance of aspirin in this area of metabolism? (8%)
5. Pyruvate dehydrogenase is a key regulatory enzyme. In general, products of the reaction inhibit the reaction. There are three mechanisms of control involved; what are these? (6%)
6. How does glucagons cause fatty acid release by fatty cells? (3%)
7. What is the cofactor involved in transamination? Give its structure and explain how transamination occurs. (5%)
8. How does the antileukemia drug methotrexate inhibit cancer cell reproduction? (4%)
9. Please list three types of DNA binding proteins and briefly describe how they bind to DNA. (6%)
10. Explain the role of chaperones in protein synthesis (5%).