

本試題是否可以使用計算機：可使用，不可使用（請命題老師勾選）

考試日期：0302，節次：1

**Part I: 50%**

## 一、解釋名詞（一題 4 分、第四題 6 分；共 34 分）

1. Proteoglycan vs. Glycoprotein
2. Amylose vs. Amylopectin
3. Aerobic glycolysis vs. Anaerobic glycolysis
4. 請針對下列三項問題做 Hexokinase 及 Glucokinase 之比較：
  - (1) 所在細胞
  - (2)  $K_m$  值較血糖濃度為高或低
  - (3) 是否受 glucose-6-phosphate 迴饋抑制
5. CpG island vs. methylation vs. gene expression
6. polyadenylation（定義、過程、存在之生理意義）
7. Enhancer vs. promoter（定義、相同、相異處）
8. cDNA microarray（目的、原理、大致流程）

## 二、問答題：（一題 8 分；共 16 分）

1. 人類四種血型 A, B, O, AB 如何區分？為何 O 型血液可為 universal donor？而 AB 型者可接受任何血液的輸血？
2. 請以 E.coli 為例說明 replication bubble 中二股 parental DNA 的結構與 daughter DNA 之關係，及所參與 DNA 複製的酵素與功能。

（背面仍有題目，請繼續作答）

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**Part II : 50%****I. Please select one of the best answers in the following questions. (2.5 % each)**

1. Which of the following amino acids are acidic in pH 7.4?

- A) Arginine and Aspartate
- B) Leucine and Arginine
- C) Lysine and Arginine
- D) Aspartate and Glutamate
- E) Tyrosine and Aspartate

2. Phospholipase C will digest which of the following phospholipids?

- A) phosphatidyl inositol
- B) phosphatidyl choline
- C) phosphatidyl serine
- D) phosphatidyl ethanolamine
- E) All are correct

3. Which one of the following amino acid residue can form disulfide bond in a protein?

- A) Serine
- B) Cystine
- C) Methionine
- D) Threonine
- E) Asparagine

4. Which amino acids could be measured by a spectrophotometer at 280 nm for protein concentration:

- A) Lysine and Arginine;
- B) Serine and Threonine;
- C) Tyrosine and Tryptophan;
- D) Leucine and Isoleucine;
- E) Methionine

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**II. 簡答題: (5% each)**

1. What are the three major kinds of membrane lipids? Which one does not contain fatty acid?
2. Why insulin is synthesized and then secreted outside?
3. Membrane lipids are amphipathic molecules. What does "amphipathic" mean?
4. What is "Isoelectric Focusing"? How is it applied in biochemical study?
5. Anhydrous hydrazine ( $H_2N-NH_2$ ) has been used to cleave peptide bonds in proteins. What are the reaction products? How might this technique be used to identify the carboxyl-terminal amino acid?

**III. Please explain the following terms :**

- a. Allosteric regulation (4%)
- b. Competitive inhibition and noncompetitive inhibition (4%)
- c. Second messenger (3%)
- d. Post-translational modification (4%)