中國文化大學99學年度碩士班考試入學招生考試

系所組：生物科技研究所碩士班

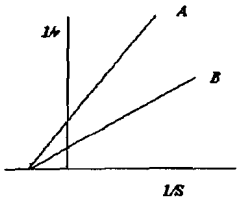
日期節次：99 年 3 月 13 日第 1 節 9:00 -10:30

科目：**生物化學**

（一）解釋名詞 (每小題5分，共30分)

1. Ribozyme
2. Active transport and passive transport
3. 2-D gel electrophoresis
4. DNA microarray
5. Isoelectric point
6. Tm

(二) 某酵素的雙倒數作圖如下圖曲線A，另有一化合物對此酵素的動力學影響如曲線B。請說明此化合物與酵素為何種關係？並說明你的判斷依據。(5%)



（三）將*E. coli* cells 放置於含lactose的培養基中培養。請回答在下列情況下lactose operon 的表現將會有何影響？請以增加、減少或不變來回答，並說明原因。(每小題4分，共16分)

(1) Addition of high levels of glucose

(2) A mutation that inactivates β-galactosidase

(3) A mutation that inactivates galactoside permease

(4) A mutation that prevents binding of CRP to its binding site near the *lac* promoter

(四) Match these molecules with their biological roles. (每小題2分，共12分)

(1)	prostaglandins	(A) carbohydrate storage in plants
(2)	sphingolipids	(B) necessary for sight
(3)	glycogen	(C) mediates pain and inflammation
(4)	starch	(D) carbohydrate storage in animal liver
(5)	vitamin A	(E) important component of myelin membranes
(6)	cellulose	(F) structural component of plant cell walls

（五）當「s」= 5 K_m時，v/V_{max}的比例為何？(5%)

(六) 是非題。若敘述錯誤請訂正。(每小題2%，共14%)

(1) All DNA polymerase synthesize DNA in a 5→3 direction.

(2) DNA synthesis requires a 5-hydroxyl group on the primer strand.

(3) Discontinuous DNA synthesis occurs on the leading strand of DNA.

(4) Enzymes reduce the value of ΔG° for a reaction.

(5) The V_{max} value for an enzyme is independent of substrate and enzyme concentration.

(6) Allosteric enzymes always exhibit sigmodial plots of V versus S.

(7) A molecule, such as diisopropylphosphofluoridate(DIPF), which covalently binds within the active site of serine protease, is an example of an effective competitive inhibitors.

（七）單選題 (每小題2%，共18%)

1. In a highly acidic solution, pH=2, the dominant form of glycine is (a) NH_2-CH_2-COOH (b) NH_2-CH_2-COO^- (c) NH_3^+-CH_2-COOH (d) NH_3^+-CH_2-COO^-
2. The fundamental cause of sickle-cell disease is a change in the structure of (a) blood (b) red cells (c) hemoglobin (d) the heart.
3. By adding SDS (sodium dodecyl sulfate) during the electrophoresis of proteins, it is possible to (a) separate proteins exclusively on the basis of molecular weight (b) preserve a protein's native structure (c) determine a protein's isoelectric point (d) determine the amino acid composition of the protein.
4. Which of the following is not a reducing sugar (a) fructose (b) glucose (c) ribose (d) sucrose.
5. Which of the following is not an intermediate of the citric acid cycle? (a) acetyl-co A (b) citrate (c) oxaloacetate (d) α-ketoglutarate
6. In the laboratory, several factors are known to cause alteration of the chemical structure of DNA. The factor(s) likely to be important in a living cell is (are) (a) heat (b) low pH (c) oxygen (d) UV light. (e) Both C and D.
7. Which of the following statements concerning fatty acids is correct? (a) they all contain one or two double bond (b) they are a constituent of sterols. (c) they are strongly hydrophilic (d) one is the precursor of prostaglandins.
8. Bacterial plasmids (a) are always covalently joined to the bacterial chromosome. (b) are never circular. (c)cannot replicate when cells divide. (d) often encode proteins not normally essential to the bacterium's survival.
9. Compared with DNA polymerase, reverse transcriptase (a) does not require a primer to initiate synthesis (b) introduce no errors into genetic material because it synthesizes RNA, not DNA. (c) Makes fewer errors in synthesizing a complementary polynucleotide. (d) makes more errors because it lacks the 3' → 5' proofreading exonuclease activity.