

# 大葉大學九十四學年度碩士班甄試試題紙

所 別	組別	考 試 科 目 (中 文 名 稱)	考 試 日 期	考 試 時 間	備 註
生物系 生物系 碩士班		生物化學	12月13日	9:00~10:30	P2-1

註：備註欄若未註明可攜帶計算機或其他輔助工具作答時，考生一律不准攜帶。 ※背面有試題

## I. Simple choice (2 % each)

1. Which of the following is not the steroids : (a) cholesterol (b) vitamin D (c) bile acid (d)  $\alpha$ -tocopherol
2. How do membrane proteins that are embedded in a lipid bilayer ? (a) electrostatic interaction  
(b) hydrogen bonding (c) hydrophobic interaction (d) Van der Waals force
3. In the following metabolic pathway, which one could not produce ATP ? (a) glycolysis (b) citric acid cycle (c)  
electron transport chain (d) pentose phosphate pathway.
4. What coenzyme does need for fatty acid biosynthesis ? (a) NADH (b) NADPH (c) FADH<sub>2</sub> (d) FMN
5. What is substrate in synthesis of Prostaglandin E<sub>2</sub> ? (a) linolenic acid (b) oleic acid (c) arachidic acid  
(d) arachidonic acid
6. Glucose need be phosphorylated to glucose-6-phosphate in glycogen synthesis. If it happened in muscle cells, which  
enzyme does catalyze the reaction ? (a) glucokinase (b) protein kinase (c) lactokinase (d) hexokinase
7. In the following substances, which one could not be synthesized to glucose through gluconeogenesis ?  
(a) fatty acid (b) lactate (c) glycerol (d) amino acids
8. Why is a primer strand needed in DNA replication?  
(a) It insures the fidelity of the newly synthesized DNA strand  
(b) The DNA polymerases require a preexisting strand with a nucleotide having a 3'-OH  
(c) The DNA polymerases require a preexisting strand with a nucleotide having a 5'-OH  
(d) All of the above are correct.
9. One of the enzymes involved in glycolysis, aldolase, requires Zn<sup>2+</sup> for catalysis. Under conditions of zinc deficiency,  
when the enzyme may lack zinc, it would be referred to as the:  
(a) apoenzyme (b) coenzyme (c) holoenzyme (d) prosthetic group.
10. Which of the following statements about a plot of  $V_0$  vs. [S] for an enzyme that follows Michaelis-Menten  
kinetics is *false*?  
(a) As [S] increases, the initial velocity of reaction  $V_0$  also increases.  
(b) At very high [S], the velocity curve becomes a horizontal line that intersects the y-axis at  $K_m$ .  
(c)  $K_m$  is the [S] at which  $V_0 = 1/2 V_{max}$ .  
(d) The shape of the curve is a hyperbola.
11. One method used to prevent disulfide bond interference with protein sequencing procedures is:  
(a) cleaving proteins with proteases that specifically recognize disulfide bonds.  
(b) protecting the disulfide bridge against spontaneous reduction to cysteinyl sulfhydryl groups.  
(c) reducing disulfide bridges and preventing their re-formation by further modifying the —SH groups.  
(d) removing cysteines from protein sequences by proteolytic cleavage.
12. If electron transfer in tightly coupled mitochondria is blocked (with antimycin A) between cytochrome *b* and  
cytochrome *c*<sub>1</sub>, then:  
(a) all ATP synthesis will stop.  
(b) ATP synthesis will continue, but the P/O ratio will drop to one.  
(c) electron transfer from NADH will cease, but O<sub>2</sub> uptake will continue.  
(d) electron transfer from succinate to O<sub>2</sub> will continue unabated.
13. An Okazaki fragment is a:  
(a) fragment of DNA resulting from endonuclease action.  
(b) fragment of RNA that is a subunit of the 30S ribosome.  
(c) piece of DNA that is synthesized in the 3'→5' direction.  
(d) segment of DNA that is an intermediate in the synthesis of the lagging strand.

※背面有試題

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生物系科技學系 碩士班		生物化學	12月13日	9:00 ~ 10:30	P2-2

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14. Which of the following statements about allosteric control of enzymatic activity is *false*?

- (a) Allosteric effectors give rise to sigmoidal  $V_0$  vs. [S] kinetic plots.
- (b) Allosteric proteins are generally composed of several subunits.
- (c) Binding of the effector changes the conformation of the enzyme molecule.
- (d) Heterotropic allosteric effectors compete with substrate for binding sites.

## II. Multiple choices (4 % each)

1. Which of the following are phospholipids : (a) lecithin (b) plasmalogen (c) cephalin (d) cerebroside
2. Which of the following carbohydrates are reducing ? (a) sucrose (b) ribose (c) lactose (d) starch.
3. In the following carbohydrates, which polymers contain  $\alpha(1,4)$  glycosidic linkages ? (a) cellulose  
(b) maltose (c) glycogen (d) starch
4. Which enzymes do not be involved in  $\beta$ -oxidation of acyl-Co A : (a) thiolase (b) HMG-Co A synthase  
(c) enoyl-Co A hydratase (d) transacylase
5. Which of the following statements about the chemiosmotic theory is correct?
  - (a) Electron transfer in mitochondria is accompanied by an asymmetric release of protons on *one* side of the inner mitochondrial membrane.
  - (b) The effect of uncoupling reagents is a consequence of their ability to carry electrons through membranes.
  - (c) The membrane ATP synthase has no significant role in the chemiosmotic theory.
  - (d) Energy is conserved as a transmembrane pH gradient.
6. Which of the followings are roles in determining the specificity of protein kinases?
  - (a) Disulfide bonds near the phosphorylation site (b) Primary sequence at phosphorylation site
  - (c) Protein quaternary structure (d) Protein tertiary structure
7. Which of the following statements is *not* true concerning glycolysis in anaerobic muscle?
  - (a) Fructose 1,6-bisphosphatase is one of the enzymes of the pathway. (b) It is an endergonic process.
  - (c) It results in net synthesis of ATP and NADH. (d) Its rate is slowed by a high [ATP]/[ADP] ratio.
8. Which of the following statements are correct?
  - (a) A ribosome is the complex within which protein synthesis occurs.
  - (b) Ribosomes contain many separate proteins.
  - (c) The three ribosomal RNAs in a bacterial ribosome are distributed in three separate, large ribosomal subunits.
  - (d) There are four binding sites for aminoacyl-tRNAs on a ribosome.

## III. Questions

1. Describe the following terms: (10 %)
  - a. Ketone bodies
  - b. Lipogenesis
2. Indicate the reaction of following enzymes which they are involved : (10 %)
  - a. HMG-CoA reductase
  - b. phosphofructokinase-1 (PFK-1)
3. Define the terms "cofactor" and "coenzyme" and give an example involved in the glycolysis/TCA cycle. (8 %)
4. What reactions in the glycolysis and citric acid cycle do substrate-level phosphorylation occur? (6 %)
5. Following the synthesis of their polypeptide chain, many proteins require further posttranslational modifications before they attain their full biological activity or function. List and describe briefly at least three possible types of modification that can occur. (6 %)

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