

國立宜蘭大學

111 學年度研究所碩士班考試入學

生物化學試題

(生物技術與動物科學系碩士班聯合招生)

准考證號碼：

《作答注意事項》

- 1.請先檢查准考證號碼、座位號碼及答案卷號碼是否相符。
- 2.考試時間：100 分鐘。
- 3.本試卷共有選擇題 20 題，一題 5 分，共計 100 分。
- 4.請將答案寫在答案卷上。
- 5.考試中禁止使用手機或其他通信設備。
- 6.考試後，請將試題卷及答案卷一併繳交。
- 7.本試卷採雙面影印，請勿漏答。
- 8.應試時不得使用電子計算機。

選擇題(每題5分，共100分)

1. Which enzyme is used in gluconeogenesis, but **NOT** in glycolysis?
(A) PEP carboxykinase
(B) phosphohexose isomerase
(C) enolase
(D) 3-phosphoglycerate dehydrogenase
2. In allosteric interactions
(A) proteins that consist of a single polypeptide chain form aggregate
(B) disulfide bonds are broken
(C) metal ions always bind to the protein
(D) changes that take place in one site of a protein cause drastic changes at a distant site
3. The term “quaternary” with respect to protein structure means
(A) a multisubunit structure.
(B) the ability to form all four kinds of noncovalent bonds.
(C) a linear sequence of four amino acids.
(D) a repeating structure stabilized by intrachain hydrogen bonds.
4. The processing of one molecule of stearic acid (18 carbons) by β -oxidation
(A) requires 9 cycles of β -oxidation and produces 8 molecules of acetyl-CoA
(B) requires 9 cycles of β -oxidation and produces 9 molecules of acetyl-CoA
(C) requires 8 cycles of β -oxidation and produces 9 molecules of acetyl-CoA
(D) requires 8 cycles of β -oxidation and produces 8 molecules of acetyl-CoA
5. What charged group(s) are present in glycine at a pH of 7?
(A) $-\text{NH}_3^+$ (B) $-\text{COO}^-$ (C) $-\text{NH}_2^+$ (D) A and B (E) A, B, and C

6. What is the Bohr effect?
- (A) the alteration of hemoglobin conformation during low oxygen
 - (B) the regulation of hemoglobin-binding by hydrogen ions and carbon Dioxide
 - (C) the ability of hemoglobin to retain oxygen when in competition with myoglobin stress
 - (D) all of the above
7. The protein myoglobin
- (A) contains no histidine
 - (B) carries oxygen in the bloodstream
 - (C) contains a heme group
 - (D) contains a high degree of β -pleated sheet structure
8. Which of the following modifications is likely to happen to the mRNA in a eukaryotic cell?
- (A) removal of intervening sequences (introns)
 - (B) capping of the 5' end
 - (C) addition of a poly-A tail to the 3' end
 - (D) All of the above occur in eukaryotic cells
9. Which of the following lipids is not found in biological membranes?
- (A) phosphoacylglycerols
 - (B) Triacylglycerols
 - (C) cholesterol
 - (D) glycolipids
10. Which of the following four fatty acids has the highest melting point?
- (A) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
 - (B) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
 - (C) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$
 - (D) $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$

11. Which of the following best describes negative cooperativity?
- (A) **Binding of one substrate molecule prevents the enzyme from working at all.**
 - (B) **Binding of one substrate molecule inhibits the binding of a second substrate.**
 - (C) **Binding of one substrate molecule enhances the binding of a second substrate.**
 - (D) **Binding of one substrate molecule inhibits the binding of other effectors.**
12. Two-dimensional electrophoresis is a combination of what two techniques?
- (A) **isoelectric focusing and ion-exchange chromatography**
 - (B) **isoelectric focusing and SDS-PAGE**
 - (C) **ion-exchange chromatography and SDS-PAGE**
 - (D) **affinity chromatography and SDS-PAGE**
13. The degree of membrane fluidity depends on
- (A) **the percentage of unsaturated fatty acids**
 - (B) **the percentage of fatty acids**
 - (C) **the percentage of lipids that contain choline**
 - (D) **the percentage of glycolipids**
14. Which of the following statements concerning messenger RNA is **true**?
- (A) **It is the most abundant of the commonly occurring forms of RNA**
 - (B) **It has extensive intrachain hydrogen bonding.**
 - (C) **It turns over rapidly.**
 - (D) **All of the above are true**
15. Compared with DNA polymerase, reverse transcriptase
- (A) **does not require a primer to initiate synthesis.**
 - (B) **makes more errors because it lacks the 3' to 5' proofreading exonuclease activity.**
 - (C) **introduces no errors into genetic material because it synthesizes RNA, not DNA.**
 - (D) **synthesizes complementary strands in the opposite direction from 3' to 5'**

16. An Okazaki fragment is a
- (A) piece of DNA that is synthesized in the 3' to 5' direction**
 - (B) fragment of RNA that is a subunit of the 30S ribosome.**
 - (C) fragment of DNA resulting from endonuclease action.**
 - (D) segment of DNA that is an intermediate in the synthesis of the lagging strand.**
17. Which of the following amino acids can be phosphorylated?
- (A) tyr, ser, thr**
 - (B) his, ser, phe**
 - (C) tyr, ser, trp**
 - (D) tyr, met, trp**
18. The difference between active transport and passive transport is that
- (A) concentration gradients are involved in one and not in the other**
 - (B) glycolipids play a role in one and not in the other**
 - (C) one requires expenditure of energy by the cell and the other does not**
 - (D) ions are transported into and out of the cell by one process and not by the other**
19. What is substrate level phosphorylation?
- (A) ATP and AMP synthesis from two molecules of ADP**
 - (B) Phosphorylation of AMP by ATP**
 - (C) Phosphorylation of ATP coupled to an ion gradient**
 - (D) ATP synthesis when the phosphate donor is a substrate with high phosphoryl transfer potential**
20. The reactions of glycolysis occur in this eukaryotic cell compartment?
- (A) Mitochondrion**
 - (B) Nucleus**
 - (C) Cytoplasm**
 - (D) Both cytoplasm and mitochondria**