

臺灣綜合大學系統 109 學年度學士班轉學生聯合招生考試試題

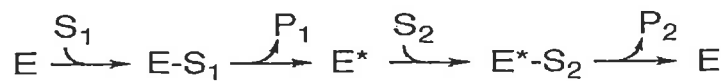
科目名稱	生物化學	類組代碼	C07
		科目碼	C0701
※本項考試依簡章規定所有考科均「不可」使用計算機。		本科試題共計 5 頁	
A. Multiple Choices (50%, 2% each; one correct answer only, 共 25 題) [本大題請於答案卡作答]			
<p>1. In isoelectric focusing, the proteins mixed in the pH gradient move to the regions of their isoelectric points and then stop. Suppose that you set up an agarose gel containing a mixture of acidic and basic substances ranging in pH from 3 to 10, and that you added a mixture of proteins and allowed them to move to the regions where they stopped migrating (their isoelectric pH, or pI). If you sliced the gel and found the protein you were purifying was present in a slice having a pH of 4, you could be pretty confident that this protein contained: :</p> <p>A) more acidic amino acids than basic amino acids B) more basic amino acids than acidic amino acids C) no basic amino acids D) no acidic amino acids E) an equal number of acidic and basic amino acids</p> <p>2. The local, spacial arrangement of peptide backbone is _____ protein structure. A) primary B) secondary C) tertiary D) quaternary</p> <p>3. Ubiquitination of proteins modifies the side chain of _____ residue. A) Asn B) Lys C) Arg D) Cys E) Ser</p> <p>4. The tertiary structure of a protein is stabilized by A) hydrogen bond B) ionic bond C) hydrophobic interaction D) acid-base interaction</p> <p>5. The function of a protein is derived from its structure. The structure of a protein is derived from its _____ protein structure. A) primary B) secondary C) tertiary D) quaternary</p> <p>6. After first dimensional electrophoresis, the IPG gel strips is to incubate in the equilibrium solution, the second equilibrium solution containing iodoacetamide which alkylates the side chain of _____ residue. A) Lys B) Cys C) Ser D) Tyr E) Thr</p> <p>7. Hydrophobicity profile of a protein can be calculated from its _____ protein structure. A) primary B) secondary C) tertiary D) quaternary</p> <p>8. Protein glycosylation doesn't modify the side chain _____ residue. A) asparagine B) hydroxylysine C) threonine D) glutamine E) serine</p>			

9. Palmitoylation modifies the side chain of an internal _____ residue.

- A) Lys B) Glu C) Cys D) Met E) Ser

10. Which of the amino acid residues in **single letter abbreviation** doesn't belong to the **nonpolar** amino acid? A) M B) I C) P D) F E) T

11. In the following enzyme reaction scheme, what sort of multi-enzyme kinetics are shown?



- A) ordered substrate binding with random product release
B) ordered substrate binding with ordered product release
C) random substrate binding with ordered product release
D) random substrate binding with random product release
E) ping-pong mechanism
12. The **turnover number** of an enzyme is the rate at which product is formed. This is the maximum rate of product formation if all of the enzyme substrate binding sites are filled. What can the turnover number tell us about an enzyme?
- A) Number of binding sites B) Reaction mechanism
C) Substrate concentration D) Enzyme efficiency

13. The **steady state assumption** in enzyme kinetics:

- A) insures that the product of an enzymatic reaction will always be formed
B) is based upon the fact that the maximum velocity of an enzyme is very high
C) states that the formation of ES is equal to its breakdown
D) explains why enzymes are effective catalysts E) none of the above

14. An allosteric inhibitor of an enzyme usually A) binds to the active site.
B) participates in feedback regulation. C) denatures the enzyme.
D) causes the enzyme to work faster. E) is a hydrophobic compound.

15. K_M is A) a measure of the catalytic efficiency of the enzyme.
B) equal to half of V_{max} C) the rate constant for the reaction $ES \rightarrow E + P$.
D) the $[S]$ that half-saturates the enzyme.

16. Which of the following amino acids combinations have side chains with groups that have the greatest ability to stabilize the tertiary structure of a protein?

- A) Lys and Arg B) Cys and Glu C) Glu and Lys
D) Gln and Glu E) Pro and Asp

背面有題，請繼續作答。

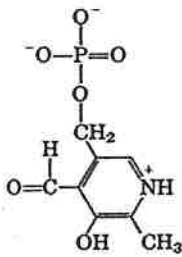
17. In β -pleated sheet structures
- A) neighboring chains lie in a flat plane B) neighboring residues are hydrogen bonded
 C) neighboring chains are connected by α -helices D) neighboring chains are hydrogen bonded
18. Which of the following segments of the integral membrane protein glycoporphin most likely contains the **membrane-spanning sequence**?
- A) LSTTEVAMHTTTSSSVSKSY B) SQTNDTHKRDTYAATPRA
 C) VSEISVRTVYPPEEETGE D) ITLIIFGVMAGVIGTILLI
 E) YGIRRLIKKSPSDVKPLP
19. Movement of ions across a cell membrane by the Na/K ATPase is best described as
- A) sodium moved outside to inside, potassium inside to outside
 B) sodium moved inside to outside, potassium outside to inside
 C) sodium moved inside to outside, potassium inside to outside
 D) sodium moved outside to inside, potassium outside to inside
 E) none of the above
20. Which of the statements regarding enzymes is **false**?
- A) Enzymes are proteins that function as catalysts. B) Enzymes are specific.
 C) Enzymes provide activation energy for reactions. D) Enzyme activity can be regulated.
 E) Enzymes may be used many times for a specific reaction.
21. The first step in the zymogen activation of chymotrypsinogen is
- A) binding of trypsinogen activator B) cleavage by trypsin
 C) folding into the native structure D) self-digestion by chymotrypsin
22. In a Lineweaver-Burke plot, what does the slope represent?
- A) K_M B) V_{max} C) V_{max}/K_M D) K_M/V_{max} E) none of the above
23. What are the expected changes in kinetics in the presence of a competitive inhibitor?
- A) V_{max} decreases, K_M appears to decrease
 B) V_{max} does not change, K_M appears to decrease
 C) V_{max} decreases, K_M appears to increase
 D) V_{max} does not change, K_M appears to increase
 E) V_{max} decreases, K_M does not change
24. An enzyme that catalyzes the intramolecular movement of a functional group from one carbon atom to another would be called a(n) _____.
- A) isomerase B) transferase C) oxidoreductase
 D) kinase E) ligase

25. Which of the following causes denaturation of a protein when disulfide bonds are present?

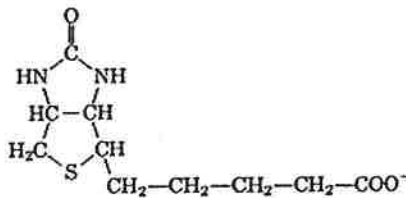
- A) heat B) pH changes C) reducing agent D) detergent E) all of the above

B. Essays (50%, 共 9 題) [本大題請於答案卷作答]

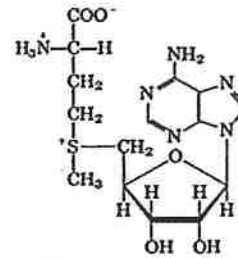
1. Fill out the names for the following compounds (10%) :



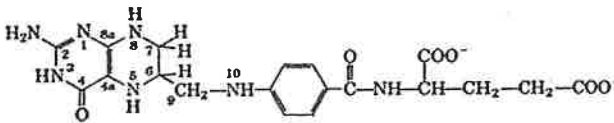
A: _____



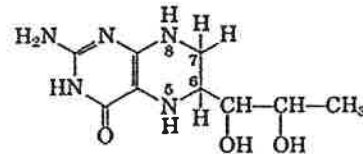
B: _____



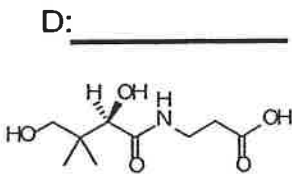
C: _____



D: _____



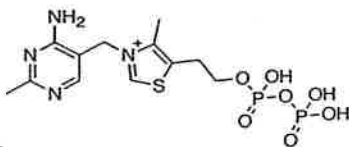
E: _____



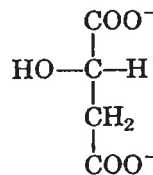
F: _____



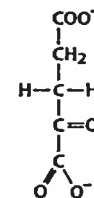
G: _____



I: _____



J: _____



H: _____

背面有題，請繼續作答。

2. Would glycine be a good buffer at its pI? (2%) Explain briefly. (2%).
3. If the selectivity filter binds the potassium ion tightly in the potassium channel, how are ions released to pass through the membrane? (5%)
4. In type I diabetes mellitus, glucose uptake into myocytes and adipocytes is failed. Why? (5%)
5. If one strand of DNA has the sequence: ATCGCGTAACATGGAT
Write the sequence of the complementary strand using the standard convention. (5%)
6. List four major enzymes used in recombinant DNA technology. (4%)
7. What would be the consequences of a deficiency in vitamin B12 for fatty acid oxidation? (5%)
8. Which derivative of folate is used in a reaction in the conversion of
 - (a) glycine into serine? (2%)
 - (b) homocysteine into methionine? (2%)
 - (c) dUMP to dTMP? (2%)
9. Glutamate is an important neurotransmitter whose levels must be carefully regulated in the brain. Depletion of glutamate is occurred in the high concentration of ammonia. Why? (3%)
How might a high concentration of ammonia alter the citric acid cycle? (3%)