

銘傳大學 97 學年度研究所碩士班招生考試

生物科技學系碩士班

生物化學試題(第三節)

(第 1 頁共 3 頁) (限用答案本作答)

可使用計算機  不可使用計算機

Part I. 單選題(48%), 每題 3 分, 共 16 題

- Membrane proteins :
  - are sometimes non-covalently attached to carbohydrate moieties.
  - are sometimes non-covalently attached to lipid moieties.
  - are composed of the same 20 amino acids found in soluble proteins.
  - diffuse laterally in the membrane unless they are anchored.
  - A and B are both correct.
  - C and D are both correct.
- Which of the following best describes the cholesterol molecule?
  - nonpolar, charged
  - nonpolar, uncharged
  - polar, charged
  - polar, uncharged
  - amphipathic
- Which of the following statements is FALSE ?
  - After a reaction, the enzyme involved becomes available to catalyze the reaction again.
  - A reaction may not occur at a detectable rate even though it has a favorable equilibrium.
  - Lowering the temperature of a reaction will lower the reaction rate.
  - For  $S \rightarrow P$ , a catalyst shifts the reaction equilibrium to the right.
  - Substrate binds to an enzyme's active site.
- A prosthetic group of a protein is a non-protein structure that is :
  - a part of the secondary structure of the protein.
  - a ligand of the protein.
  - permanently associated with the protein.
  - a substrate of the protein.
  - transiently bound to the protein.
- In the  $\alpha$  helix the hydrogen bonds :
  - are roughly perpendicular to the axis of the helix.
  - occur mainly between electronegative atoms of the R groups.
  - occur only between some of the amino acids of the helix.
  - are roughly parallel to the axis of the helix.
  - occur only near the amino and carboxyl termini of the helix.
- Which of the following statements about aminoacyl-tRNA synthetases is FALSE?
  - The enzyme attaches an amino acid to the 3' end of a tRNA.
  - The enzyme splits ATP to AMP +  $PP_i$ .
  - The enzyme will use any tRNA species, but is highly specific for a given amino acid.
  - There is a different synthetase for every amino acid.
  - Some of the enzymes have an editing/proofreading capability.
- Which of the following contributes to the structure of nucleosomes?
  - Plectonemic supercoiled DNA.
  - Spacer DNA.
  - Z(left-handed) DNA.
  - Relaxed closed-circular DNA.
  - Solenoidal supercoiled DNA.

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8. The compound that condenses with  $\text{CO}_2$  in the first reaction of carbon dioxide assimilation is :
- A) 3-phosphoglycerate.
  - B) ribulose 5-phosphate.
  - C) ribulose 1,5-bisphosphate.
  - D) ribose 1,5-bisphosphate.
  - E) r ubisco.
9. Transketolase requires the coenzyme :
- A) pyridoxal phosphate.
  - B) lipoic acid
  - C) cobalamin
  - D) thiamine pyrophosphate.
  - E) t etrahydrofolic acid.
10. Which of these amino acids are both ketogenic and glucogenic ?
- 1. Valine
  - 2. Histidine
  - 3. Arginine
  - 4. Tyrosine
  - 5. Isoleucine
- A) 1 and 5
  - B) 1,3. and 5
  - C) 2 and 3
  - D) 1,2. and 3
  - E) 4 and 5
11. The fluidity of a lipid bilayer will be increased by :
- A) decreasing the temperature.
  - B) decreasing the number of unsaturated fatty acids.
  - C) increasing the temperature.
  - D) increasing the length of the alkyl chains.
  - E) s ubstituting 18:0 (stearic acid ) in place of 18:2 (linoleic acid).
12. Starch and glycogen are both polymers of :
- A) fructose.
  - B) glucose 1 -phosphate.
  - C)  $\alpha$  - D-glucose.
  - D)  $\beta$  -D-glucose.
  - E)  $\alpha$  - L-glucose.
13. The compound that consists of ribose linked by and *N*-glycosidic bond to N-9 of adenine is :
- A) a purine nucleotide.
  - B) a pyrimidine nucleotide.
  - C) a deoxyribonucleoside.
  - D) adenosine monophosphate.
  - E) adenosine.

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(第 3 頁共 3 頁) (限用答案本作答)

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14. Which vitamin is derived from cholesterol ?
- A) A
  - B) B<sub>12</sub>
  - C) D
  - D) E
  - E) K
15. Which of the following statements is true of lipids ?
- A) Most are simply polymers of isoprene.
  - B) Many contain fatty acids in ester or amide linkage.
  - C) Testosterone is an important sphingolipid found in myelin.
  - D) They are more soluble in water than in chloroform.
  - E) They play only passive roles as energy-storage molecules.
16. 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.
  - E) segment of mRNA synthesized by RNA polymerase.

Part II. 解釋名詞 (18%)

1. ampholyte
2. open reading frame
3. chylomicron
4. coenzyme
5. glucagon
6. chymotrypsin

Part III. 問答題 (34%)

1. Please define the term "ribozyme" (2%), and give an example. (2%)
2. Compare and contrast symport and antiport. Which term best describes the transport system mediated by the Na<sup>+</sup>K<sup>+</sup> ATPase ? (4%)
3. Describe three of the important features of a  $\beta$  sheet polypeptide structure. (6%)
4. Draw structure and give the one-letter and three-letter abbreviations for Arginine, Tyrosine, Tryptophan, Asparagine, Lysine, Glutamic acid? (18%)
5. Draw the structure of sucrose (2%)

試題完