

國立成功大學

113學年度碩士班招生考試試題

編 號：304

系 所：口腔醫學研究所

科 目：生物化學

日 期：0202

節 次：第 3 節

備 註：不可使用計算機

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、選擇題 (每題 4 分)

1. The isoelectric point of a protein is

- (A) pH value where positive and negative charges are equal
- (B) Sedimentation constant of protein
- (C) Protein position in gel
- (D) The point of maximum protein binding to the uncharged surface
- (E) None of the above

2. There are five types of histones. The histones that stabilize DNA binding between nucleosomes are

- (A) H1
- (B) H2A
- (C) H2B
- (D) H3
- (E) H4

3. Which of the following is not a part of the cell plasma membrane?

- (A) Cholesterol
- (B) Phospholipids
- (C) Fatty acids
- (D) Glycoprotein
- (E) None of the above

4. Generally, the functions of vitamins in the body are as follows:

- (A) Catalyst
- (B) Enzymes
- (C) Activating factor
- (D) Coenzymes
- (E) All of the above

5. Many drugs work by inhibiting the activity of specific enzymes. The type of inhibition is usually

- (A) Allosteric
- (B) competitive
- (C) noncompetitive
- (D) Uncompetitive
- (E) participating in a chemical reaction

6. The pentose phosphate pathway produces a product used in the synthesis of nucleotides, DNA, and RNA.
- (A) Arginine
 - (B) Glucose-1-phosphate
 - (C) Glucose-6-phosphate
 - (D) Glucose-5-phosphate
 - (E) Phosphoribosylpyrophosphate
7. Proteins embedded in the outer phospholipid layer of low-density lipid (LDL) particles are
- (A) Interleukin-2
 - (B) Apolipoprotein C-25 (ApoC-25)
 - (C) Apolipoprotein B-100 (ApoB-100)
 - (D) Fibroblast growth factor-23
 - (E) None of the above
8. Saturated fatty acids exist in a straight chain form. However, which of the following changes can make the saturated fatty acid chain bend:
- (A) Carboxyl carbon forms salt
 - (B) Carboxyl carbon forms ester
 - (C) An oxygen atom is attached to two adjacent carbon atoms
 - (D) A double bond is inserted between two adjacent carbon atoms
 - (E) None of the above
9. Phosphoglyceride can be broken down by which of the following enzymes?
- (A) Phospholipase D
 - (B) Phospholipase A1
 - (C) Phospholipase A2
 - (D) Phospholipase C
 - (E) All of the above
10. High-density lipoprotein (HDL) has
- (A) More cholesterol than low-density lipoprotein (LDL)
 - (B) Protein content lower than LDL
 - (C) Higher protein content than LDL
 - (D) Phospholipid content is higher than LDL
 - (E) None of the above

11. Base pairing is a characteristic of RNA and DNA
- (A) Base pairs are held together by ionic bonds
 - (B) Pairing of adenine and uracil in DNA
 - (C) Pairing of adenine and thymine in RNA
 - (D) Base pairs are held together by hydrogen bonds
 - (E) None of the above
12. The complementary strand corresponding to polynucleotide 5' ATGCTACGC 3' is
- (A) 5' ATGCTACGC 3'
 - (B) 5' TACGATGCG 3'
 - (C) 5' GCGTAGCAT 3'
 - (D) 5' CGCATCGTA 3'
 - (E) None of the above
13. Ultraviolet rays can cause DNA distortion, resulting in the formation of
- (A) Uracil dimer
 - (B) Thymine dimer
 - (C) Cytosine dimer
 - (D) Adenine dimer
 - (E) guanine dimer
14. The formation of complementary DNA (cDNA) from genes in eukaryotic cells involves
- (A) Removing introns from RNA
 - (B) Splicing of exons of RNA to form mRNA
 - (C) Transcribe genes into corresponding RNA
 - (D) The role of reverse transcriptase
 - (E) All of the above
15. How does messenger RNA (mRNA) transfer to the cytoplasm for protein synthesis after being synthesized in the nucleus?
- (A) Move through nuclear pores
 - (B) By binding to Hsp90 protein
 - (C) First combine with microsomes
 - (D) By attachment to the nuclear matrix
 - (E) None of the above

16. Many steroid receptors have two zinc fingers involved in specific binding to DNA. Which amino acids can zinc coordinate with in these zinc finger structures?
- (A) Lysine and glycine
 - (B) Cysteine and histidine
 - (C) proline and alanine
 - (D) Tryptophan and histidine
 - (E) None of the above
17. The final product of glucose metabolism is
- (A) sucrose
 - (B) UTP
 - (C) ATP
 - (D) GTP
 - (E) ceramide
18. The electron transport chain in the inner mitochondrial membrane involves many reactions that lead to the formation of ATP. One of the ingredients involved is
- (A) Adrenochrome
 - (B) Hypoxanthine
 - (C) flavin adenine dinucleotide
 - (D) Glycated insulin
 - (E) None of the above
19. Which of the following statements about the melting temperature (t_m) of DNA is correct?
- (A) The higher the content of G≡C base pairs, the higher the t_m
 - (B) The higher the content of G≡C base pairs, the lower the t_m
 - (C) The higher the A=T base pair content, the higher the t_m
 - (D) The higher the A=T base pair content, the lower the t_m
 - (E) None of the above
20. Which of the following enzymes is used in polymerase chain reaction (PCR)?
- (A) EcoRII
 - (B) EcoRI
 - (C) Taq DNA polymerase
 - (D) RNA polymerase
 - (E) DNA topoisomerase

21. In cell signaling, which of the following enzymes catalyzes phosphatidylinositol biphosphate (PIP₂) to produce inositol triphosphate (IP₃) and diacylglycerol?
- (A) Phosphodiesterase C (Phosphodiesterase C)
 - (B) Phospholipase C
 - (C) Phosphokinase C
 - (D) Phospholipase A₂
 - (E) Lipokinase
22. Which of the following enzymes directly phosphorylates tyrosines of membrane proteins to initiate cell signaling cascades?
- (A) Receptor guanylyl cyclases
 - (B) Receptor threonine kinase
 - (C) Receptor serine kinase
 - (D) Receptor tyrosine kinase
 - (E) Receptor tyrosine phosphatase
23. Which of the following is the smallest structural unit of a chromosome?
- (A) 30nm fiber
 - (B) Nucleosome
 - (C) Euchromatin (eurochromatin)*
 - (D) Heterochromatin
 - (E) None of the above
24. Which of the following enzymes are required for cellular DNA replication?
- (A) DNA helicase
 - (B) DNA topoisomerase
 - (C) DNA polymerase
 - (D) RNA primase
 - (E) All of the above
25. What effect do competitive inhibitors of enzymes have on enzyme-mediated reactions?
- (A) V_{max} decreases and K_m remains unchanged
 - (B) V_{max} increases, K_m remains unchanged
 - (C) V_{max} remains unchanged and K_m decreases
 - (D) V_{max} remains unchanged and K_m increases
 - (E) V_{max} remains unchanged and K_m remains unchanged