

國立成功大學

112學年度碩士班招生考試試題

編 號：309

系 所：口腔醫學研究所

科 目：生物化學

日 期：0207

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。

選擇題 (每題 5 分)

1. According to the following data, what is the K_m of the enzyme to its substrate?

Substrate concentration (mM)	Reaction rate (mmol/sec)
0.1	2
0.2	10
0.5	25
1.0	50
2.0	67
5.0	88
10.0	95
20.0	99
50.0	100

- (A) 0.2 mM
(B) 0.5 mM
(C) 1.0 mM
(D) 5.0 mM
(E) 50.0 mM
2. The affinities of hexokinase to glucose, fructose, galactose and mannose are 0.08, 6.7, 15, and 0.13 mM, respectively. Based on these data, which monosaccharide is more likely to be phosphorylated by this hexokinase?
(A) Glucose
(B) Fructose
(C) Galactose
(D) Mannose
3. Which residues in proteins are common sites for phosphorylation?
(A) Serine, Histidine
(B) Threonine, Tyrosine
(C) Threonine, Lysine
(D) Serine, Aspartate
4. Which of the following features protect mRNA from premature degradation by cellular exonucleases?
(A) poly(A) tail
(B) 5'-methylguanosine cap
(C) introns
(D) Both A and B
(E) All of the above
5. 5-Fluorouracil (5-FU) is a cancer chemotherapy drug whose main mode of action is to block the synthesis of which of the following materials necessary for DNA replication?
(A) dTTP

- (B) dATP
 (C) dCTP
 (D) dGTP
 (E) All of the above
6. What is the order of protein, DNA and mRNA retention time in the cell from longest to shortest?
 (A) DNA > mRNA > protein
 (B) DNA > protein > mRNA
 (C) protein > DNA > mRNA
 (D) protein > mRNA > DNA
 (E) mRNA > protein > DNA
7. Which of the following structures is produced by the assembly of the eight subunits of histones?
 (A) Centromere
 (B) Condensin
 (C) Nucleosome
 (D) Telomere
 (E) None of above
8. Which of the following is responsible for the epigenetic regulation of gene expression?
 (A) Methylation of cytosine
 (B) Mutations of CpG islands
 (C) Acetylation of histone
 (D) A and C
 (E) All of the above
9. Which of the following DNA regions is most likely to be the target of methylation?
 (A) Telomere
 (B) GC dinucleotides
 (C) Mutated DNA
 (D) TATA box regions
 (E) Trinucleotide expansion regions
10. What is the maximum number of 100 amino acid long polypeptides that could be made?
 (A) 20
 (B) 20^{101}
 (C) 100^{20}
 (D) 20^{100}
 (E) None of above
11. What is the main source of blood sugar after fasting for eight hours?
 (A) dietary carbohydrates
 (B) Glycerol from adipocytes
 (C) Glycogen degradation in the liver
 (D) Glycogen degradation in muscle
 (E) Protein degradation in muscle

12. Gluconeogenesis and glycogenolysis share which of the following enzymes?
- (A) Fructose 1,6-bisphosphatase
 - (B) Glucose 6-phosphatase
 - (C) Glycogen phosphorylase
 - (D) Pyruvate carboxylase
 - (E) Pyruvate kinase
13. Which of the following intracellular locations is the site of beta-oxidation of very-long-chain fatty acids?
- (A) Cytoplasm
 - (B) Endoplasmic reticulum
 - (C) Mitochondrial matrix
 - (D) Mitochondrial in-membrane space
 - (E) Peroxisomes
14. In a double stranded conformation, the following two DNA sequences which have a lower melting temperature?
- (A) GGCATTATGAATCGG
 - (B) GGCGTTATGAATCGG
 - (C) GGCGTCATGAATCGG
 - (D) GGCGTCCTGAATCGG
 - (E) GGCGTCCGGAATCGG
15. Melanin is the pigment of the hair, skin and iris of the eyes and is synthesized in melanocytes. Which of the following amino acids is the precursor of melanin synthesis?
- (A) Arginine
 - (B) Glycine
 - (C) Histidine
 - (D) Tryptophan
 - (E) Tyrosine
16. Which of the following tripeptides would be most likely to be soluble in a hydrophilic solution like phosphate buffer?
- (A) N-phenylalanine-alanine-glycine-C
 - (B) N-glutamate-aspartate-glycine-C
 - (C) N-proline-phenylalanine-leucine-C
 - (D) N-arginine-lysine-proline-C
 - (E) N-leucine-alanine-lysine-C
17. Prostaglandin synthesis requires eicosanoids, which of the following fatty acids are precursors for eicosanoid biosynthesis?
- (A) Arachidonic acid
 - (B) Oleic acid
 - (C) Palmitic acid
 - (D) Stearic acid
 - (E) None of above

18. Which of the following laboratory tests are best for detecting a trisomy of chromosome 21?
- (A) Chromosomal microarray
 - (B) Comparative genomic hybridization
 - (C) G-banding
 - (D) SNP microarray
 - (E) All of above
19. Which of the following complexes contains DNA helicase, DNA topoisomerase, DNA polymerase, and RNA primase?
- (A) Minichromosome maintenance complex (MCM)
 - (B) Mismatch repair complex
 - (C) Origin of replication complex (ORC)
 - (D) Replisome complex
 - (E) All of above
20. The addition of RNA polymerase II to the DNA template sequence 5'-GCTACT-3' will synthesize which of the following products?
- (A) 5'-CGAUGA-3'
 - (B) 5'-CGATGA-3'
 - (C) 5'-AGUAGC-3'
 - (D) 5'-AGTAGC-3'
 - (E) 5'-GCUACU-3'