

國立成功大學

110學年度碩士班招生考試試題

編 號：276

系 所：藥理學研究所

科 目：生物化學

日 期：0203

節 次：第 1 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。

Part I: single-choice question (45%)

1. The general function of an endonuclease is correlated to
 - A. hydrolyze a nucleotide from both termini of an oligonucleotide
 - B. hydrolyze a nucleotide from only the 3'-end of an oligonucleotide
 - C. hydrolyze a phosphodiester bond located in the interior of a polynucleotide
 - D. hydrolyze a specific sequence of amino acids
2. Which abbreviation is wrong
 - A. Asn: asparagine
 - B. Leu: isoleucine
 - C. Gln: glutamine
 - D. Ser: serine
3. Which description about telomerase is not correct
 - A. it helps to replicate the ends of linear chromosome
 - B. it is a reverse transcriptase
 - C. it helps to protect DNA from degradation
 - D. it can make DNA by using DNA as a template
4. In the polymerase chain reaction (PCR)
 - A. the final product is single-strand DNA
 - B. the oligo(dT) in the reaction mixture is to act as primers for the synthesis of new cDNA
 - C. the DNA template can be sequenced
 - D. the polymerase activity is stable in repeating heat-cycle
5. Proteins are separated according to size by
 - A. polyacrylamide gel electrophoresis
 - B. ion exchange chromatography
 - C. molecular exclusion chromatography
 - D. reverse-phase HPLC
6. The sequence in promoter regions is not associated with transcription efficiency
 - A. DNA methylation
 - B. TATA box
 - C. DNA acetylation
 - D. DNA phosphorylation

7. Types of lipid anchors for attachment of membrane proteins are correct except
 - A. myristoyl anchor
 - B. thioester anchor
 - C. sphingomyelin anchor
 - D. glycosylphosphatidylinositol anchor

8. Amino acid motifs are commonly found in transcription factors except
 - A. zinc finger
 - B. β sheet
 - C. helix-loop-helix
 - D. basic region-leucine zipper

9. Which one is not a nuclear receptor?
 - A. Estrogen receptor
 - B. vitamin D receptor
 - C. vitamin A receptor
 - D. G protein-coupled receptor

10. Which one is not involved in the regulation of crosstalk between cells by releasing signaling molecules
 - A. juxtacrine
 - B. autocrine
 - C. endocrine
 - D. synaptic

11. If a patient has the hyperglycemia, which of the following hepatic enzyme activities falls?
 - A. 6-phosphofructo-2-kinase
 - B. hexokinase
 - C. fructose 1,6-bisphosphatase
 - D. adenylate kinase

12. Which events is not involved in the synthesis of triacylglycerol in adipose tissue?
 - A. addition of a fatty acyl CoA to a diacylglycerol
 - B. a reaction catalyzed by glycerol kinase
 - C. hydrolysis of phosphatidic acid by a phosphatase
 - D. reduction of dihydroxyacetone phosphate

13. Which one is not correlated with excitatory neurotransmitters
- A. dopamine
 - B. acetylcholine
 - C. epinephrine
 - D. γ -aminobutyric acid (GABA)
14. Peptidases for protein digestion
- A. are synthesized in the stomach and pancreas as proenzymes
 - B. are all endopeptidases
 - C. must have a neutral pH
 - D. each have a different activator
15. Which one is required for heme biosynthesis?
- A. Mg^{2+}
 - B. Fe^{2+}
 - C. Zn^{2+}
 - D. Ca^{2+}

Part II: short-answer question (55%)

1. Please define and compare different functions between membrane receptor and nuclear receptor. (10%)
2. Please describe the glucose metabolism and ATP production in normal and hypoxia condition in cells. (11%)
3. How is excess sugar converted into fat? (10%)
4. Please describe the pathway involved in the conversion of tyrosine into epinephrine. (10%)
5. Please define the following terms and its purpose or function: (14%, 2% for each)
(a) small interfering RNA (siRNA); (b) microarray; (c) CRISPR-Cas9; (d) Enzyme-linked immunosorbent assay (ELISA); (e) western blotting; (f) exosome; (g) secretome