國立成功大學 106 學年度碩士班招生考試試題

系　　所：化學系

考試科目：生物技術

考試日期：0214，節次：4

※ 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: (100 分，每題 5 分)

1) Which of the following sequences is most commonly found at eukaryotic promoters? (A) TATAAT (B) Poly(A) tail (C) 7-methyl G cap (D) 5'-GU . . . AG-3' (E) Shine-Dalgarno sequence.

2) DNA photolyase recognizes which of the following in order to repair pyrimidine dimmers? (A) The distortion in the double helix (B) A specific palindromic sequence (C) Three hydrogen bonds between affected base pairs (D) A specific origin for repair to initiate (E) A free 3' end on the affected DNA strand.

3) Which of the following elements is not normally found in cells? (A) Copper (B) Iron (C) Silver (D) Cobalt (E) Zinc

4) Which of the following molecular genetic techniques is used to identify protein-protein interactions? (A) Yeast two-hybrid system (B) Southern hybridization analysis (C) Polymerase chain reaction (D) Fluorescence in situ hybridization (FISH) (E) Northern hybridization analysis.

5) ATP is the main energy currency in cells, and it can especially be used to drive condensation reactions that produce macromolecular polymers. How does ATP normally catalyze the condensation reaction, which by itself is energetically unfavorable? (A) It transfers its terminal phosphate to an enzyme and is released as ADP. (B) It transfers its two terminal phosphates to an enzyme, and is released as AMP. (C) It covalently attaches to both of the substrates. (D) It transfers either one or two terminal phosphate(s) to one of the substrates and is released as either ADP or AMP. (E) It covalently attaches to the enzyme, forming an enzyme–AMP adduct.

6) Fluorescent tubulin is microinjected into the cytoplasm of a mammalian cell in interphase. Which of the following best describes where the fluorescent tubulin will first be incorporated? (A) In the nucleus (B) In the centromeres (C) Throughout the length of the existing microtubules (D) At the distal tips of microtubules (E) At the plus ends of microfilaments.

7) G-protein linked receptors exhibit which of the following? (A) Tyrosine kinase activity (B) ATPase activity (C) Seven transmembrane domains (D) Nuclear localization (E) Dimerization.

8) Which is LEAST likely to be involved in the expression of mammalian immunoglobulin genes? (A) Gene amplification (B) DNA rearrangements to produce new antibody variable regions (C) Transcription factors expressed only in antibody-producing cells (D) Deletion of some chromosomal DNA sequences (E) Enhancers bound by tissue-specific transcription factors.

9) Which of the following is LEAST soluble in aqueous solution (A) Sucrose (B) KCl (C) Ethanol (D) Palmitic acid (E) Oxaloacetic acid.

10) Which of the following best indicates that a segment of DNA is a gene? (A) Multiple expressed sequence tags (ESTs) of the DNA sequence (B) Multiple short overlapping reading frames (C) A 50% sequence that is predicted to be able to form a large hairpin loop (D) A DNA sequence that is similar to introns.

11) The technique of chromosome painting in the analysis of human karyotypes relies on which of the

following? (A) Inherent fluorescence due to G-C base pairs (B) Inherent fluorescence due to A-T base pairs (C) Specific hybridization with fluorescent probe molecules (D) Restriction digestion followed by nick translation with fluorescent nucleotides (E) Fluorescence resonance energy transfer.

12) Which of the following is the origin of the majority of the ATP used in the pathway of gluconeogenesis? (A) β-oxidation of fatty acids (B) Breakdown of amino acids (C) Degradation of glycogen (D) Oxidation of fructose-6-phosphate (E) Fructose-2,6-bisphosphate.

13) _____ is the use of genes for treating human genetic disorders. (A) Genetics (B) Genomics (C) Pharmacogenomics (D) Gene therapy (E) Recombinant DNA technology

14) Combining DNA from different sources is an example of _____. (A) genomics (B) bioinformatics (C) bioremediation (D) nanotechnology (E) recombinant DNA technology

15) Which part of a gene codes is for the protein? (A) Promoter (B) Exon (C) Intron (D) Enhancer (E) Transcription factor.

16) Which of the following macromolecules would yield only one type of monomer after complete hydrolysis? (A) DNA (B) Glycogen (C) Lipoprotein (D) RNA (E) Triacylglycerol

17) Which type of RNA molecules transport amino acids to the ribosome during translation? (A) rRNA (B) tRNA (C) siRNA (D) mRNA (E) miRNA.

18) The beadlike unit of chromatin structure is the (A) chromatid (B) nucleosome (C) kinetochore (D) solenoid (E) scaffold.

19) Which of the following is NOT a function performed in the nucleus? (A) Storing genes on chromosomes (B) Producing regulatory factors (C) Packaging proteins and transport them around the cell (D) Producing mRNA (E) DNA replication.

20) What is the role of the Golgi apparatus in cellular function? (A) Protein packaging (B) Replication of DNA (C) Protecting the integrity of the cell's shape (D) Filling the cell space with fluid (E) mRNA synthesis.