

銘傳大學 100 學年度轉學生招生考試

生物科技學系

三年級第二節

「生物化學」試題

(第 | 頁共 3 頁) (限用答案本作答)

可使用計算機 不可使用計算機

A. Single-choice problems (30%)

- The amino and carboxyl groups of amino acids react in a head-to-tail fashion, eliminating water, and forming a covalent _____ linkage typically referred to as a _____ bond.
 - ester, aromatic
 - anhydride, phosphoanhydride
 - amide, peptide
 - dehydration, hydrogen
 - none of the above
- All are true for stereoisomers EXCEPT:
 - A diastereomer is a nonsuperimposable non-mirror image.
 - An enantiomer is a nonsuperimposable mirror image.
 - Diastereomers have different melting points.
 - Diastereomers rotate plane polarized light in equal but opposite directions.
 - None, all are true.
- A gene can be defined as:
 - the unique function that some cells have but other cells do not have.
 - a specific segment of nucleotide bases in DNA that encode for the synthesis of a particular protein.
 - a single strand of DNA that is designated as the sense strand.
 - a functional segment of a unique protein.
 - the segment of DNA that is changed in a mutation.
- Hemoglobin is an α_2, β_2 _____ whereas, glutamine synthetase from *E. coli* is an α_{12} _____.
 - homodimer, -homomultimer
 - heteromultimer, -homomultimer
 - homomultimer, -heterodimer
 - heterodimer, -monomeric protein
 - heterodimer, -homomultimer
- Membrane proteins differ from globular proteins in that:
 - membrane associated amino acids usually have polar side chains.
 - membrane proteins are much more soluble in detergents than water.
 - membrane proteins usually have more hydrophobic amino acids.
 - globular proteins are water insoluble.
 - All are true.
- Protein isolation and purification include all of the techniques EXCEPT:
 - gas-liquid chromatography.
 - ion exchange chromatography.
 - electrophoresis.
 - solubility ("salting in" and "salting out").
 - affinity chromatography.

本試題兩面印刷

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7. Which of the following sugars is an aldopentose?
- galactose
 - ribulose
 - ribose
 - xylulose
 - mannose
8. All of the statements about the following pairs of sugars are correct EXCEPT:
- Galactose and mannose are diastereomers.
 - L-galactose and D-galactose are enantiomers.
 - Glyceraldehyde and dihydroxyacetone are stereoisomers.
 - Glucose and mannose are epimers.
 - Glucose has less chiral centers than fructose.
9. Dietary essential fatty acids for humans include
- γ -linolenic and oleic acids.
 - oleic and linoleic acids.
 - palmitic and oleic acids.
 - linoleic and γ -linolenic acids.
 - all are true.
10. Diets aimed at reducing coronary heart disease should be:
- low in *trans*-fatty acids and high in saturated fatty acids.
 - high in *trans*-fatty acids and high in saturated fatty acids.
 - high in *trans*-fatty acids and low in saturated fatty acids.
 - low in *trans*-fatty acids and low in saturated fatty acids.
 - low in *trans*-fatty acids and low in unsaturated fatty acids.
11. Lipids that spontaneously form micelles, monolayers and bilayers have what property?
- waxy
 - polar
 - amphipathic
 - bipolar
 - polyisoprenoid
12. cAMP and cGMP are _____ with phosphate esterified as a cyclic _____ and are important as _____ of cellular metabolism.
- nucleotides; phosphodiester; inhibitors
 - nucleotides; phosphomonoesters, regulators
 - nucleotides; phosphodiesters, regulators
 - nucleosides; phosphomonoesters, stimulators
 - all of the above

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13. All are true for the DNA double helix EXCEPT:

- a. the two strands are parallel.
- b. the two strands are held together by interchain hydrogen bonds.
- c. the two strands have complementary base pairing.
- d. they are easily sheared into shorter fragments during isolation procedures.
- e. all are true.

14. How is radioactivity incorporated into the newly synthesized DNA using the chain termination protocol for sequencing DNA?

- a. One of the dNTPs are labeled with ^{32}P .
- b. The primer strand is labeled with ^{32}P .
- c. The template strand is labeled prior to the experiment with ^{32}P .
- d. The 5'-end is labeled with ^{32}P .
- e. The dideoxynucleotide is labeled with ^{32}P .

15. All are characteristic of plasmids EXCEPT:

- a. naturally occurring, circular extrachromosomal DNA.
- b. able to perpetuate themselves without a host organism.
- c. artificial plasmids can be constructed by restriction endonuclease digestion, insertion, and ligation.
- d. harbor genes for novel metabolic activities.
- e. an origin of replication must be included in the plasmid to facilitate propagation.

B. Explain these terms: (30%)

- a. PCR, b. exon, c. isoenzyme,
- d. T_m , e. lactose intolerance, f. lac operon

C. Protein structure is described in four levels of organization. What are the primary, secondary, tertiary and quaternary structures in proteins? (10%)

D. How are fatty acid palmitate (16:0) broken down to produce energy? (10%)

E. What are the structure and metabolic fates of pyruvate? (10%)

F. How do cells regulate enzyme activity? (10%)

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