

亞洲大學

96 學年度轉學招生考試試題紙

學系別	考試科目	考試日期	時 間	備註
生物科技學系三年級	生物化學(A)	96.07.23	10:30-12:10	共十一頁

單選題 (每題 2 分)

1. Which are the four most common elements in the human body?
 - a. hydrogen, calcium, oxygen and sodium
 - b. hydrogen, oxygen, iron and carbon
 - c. hydrogen, oxygen, carbon and nitrogen
 - d. oxygen, carbon, iron and nitrogen
 - e. oxygen, silicon, calcium and nitrogen
2. The major precursors for the formation of biomolecules include all EXCEPT:
 - a. nitrate and dinitrogen.
 - b. water.
 - c. carbon dioxide.
 - d. ammonium ion.
 - e. none, all are major precursors.
3. The structural integrity of supramolecular complexes (assemblies) of multiple components are bonded to each other by all of the following forces EXCEPT:
 - a. covalent bonds
 - b. van der Waals forces
 - c. hydrogen bonds
 - d. hydrophobic interactions
 - e. ionic interactions
4. Biological function is achieved through mechanisms based on:
 1. structural identity.
 2. rigid, static lattices.
 3. weak chemical interactions.
 4. structural complementarity.
 - a. 4 only
 - b. 1 and 2 only
 - c. 1 and 3 only
 - d. 2 and 3 only
 - e. 3 and 4 only

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5. The unrivaled ability to form ____ hydrogen bonds per liquid water molecule is the source of the strong intermolecular attractions unique to water. a. 1 b. 2 c. 3 d. 4 e. 5 6. Amphiphilic (amphipathic) molecules include: a. sugars. b. acidic amino acids. c. inorganic salts. d. water. e. salts of fatty acids. 7. Grapefruit juice at pH 3.2 contains about _____ times as much H^+ as orange juice at pH 4.3. a. 0.9 b. $10^{-7.5}$ c. 10^{-2} d. 12 e. 101 8. What ionic forms are present at pH 7.0? The pK_as of phosphoric acid are 2.1, 7.2, 12.4. a. HPO_4^{-2} b. $H_2PO_4^-$ c. HPO_4^{-2} and PO_4^{-3} d. $H_2PO_4^-$ and HPO_4^{-2} e. All are correct 9. $pH = pK_a$ when: a. $[A^-]/[HA] = 0$ b. $\log ([A^-]/[HA]) = 1$ c. $[A^-] \gg [HA]$ d. $[A^-] = [HA]$ e. $\log ([HA]/[A^-]) = 1$				

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10. Buffer systems are effective when the pH values are within ____ pH unit(s) of the pK_a value. 1 2 3 4 5 11. Which equation <u>defines</u> a system at equilibrium? $\Delta G > 0$ $\Delta G^\circ = \Delta G$ $\Delta G = 0$ $\Delta G^\circ = 0$ $\Delta G = RT \ln ([\text{products}]/[\text{reactants}])$ 12. ADP can accept both _____ and _____ from the higher-energy phosphates, and ATP thus formed can donate _____ and _____ to the lower-energy molecules of metabolism. - phosphates, energy - reactants, products - phosphates, water - energy, ΔG ΔG, reactants 13. Living systems are: - closed systems exchanging only energy with the surroundings. - isolated systems that are totally contained. - open systems exchanging only energy with the surroundings. - open systems exchanging both energy and matter with their surroundings. - none of the above. 14. All of the statements about the classification of these amino acids are correct EXCEPT: - Aspartic acid and asparagine are acidic amino acids. - Alanine and valine are neutral, nonpolar amino acids. - Serine and glutamine are polar, uncharged amino acids. - Lysine and arginine are basic amino acids. - Tyrosine and phenylalanine are aromatic amino acids.				

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15. Which of the listed amino acids is classified as a basic amino acid? - leucine - phenylalanine - aspartate - asparagine - lysine 16. Ninhydrin has all these properties EXCEPT: - It reacts with an amino acid by oxidatively deaminating its amino group. - It can be used to detect the location of amino acids following chromatography. - It produces a purple colored product upon reaction with alanine. - It produces a yellow product upon reaction with histidine. - It can be used to quantify most amino acids. 17. Which of the peptides would absorb light at 280 nm? - ala-lys-his - ser-gly-asn - ala-ala-trp - val-pro-leu - ser-val-ile 18. 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. 19. Molecules of a given protein have all EXCEPT: - a fixed amino acid composition. - a defined amino acid sequence. - a sequence read from C-terminal end to N-terminal end. - an invariant molecular weight. - a nucleotide sequence from which they are encoded.				

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20. 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. 21. The amino acid sequence is defined as _____ structure. - primary - secondary - tertiary - quaternary - all are true 22. α-Helix and β-strand are components of _____ structure - primary - secondary - tertiary - quaternary - all are true 23. All of the information necessary for a protein to achieve its intricate architecture is contained within its _____ structure. - primary - secondary - tertiary - quaternary - all are true 24. Edman degradation will: - determine the C-terminal amino acid by using a carboxypeptidase. - cleave the protein into a multitude of smaller peptides. - compare overlapping sets of peptide fragments. - determine the N-terminal amino acid. - generate two different, but overlapping sets of peptide fragments.				

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25. Reaction of the peptide, ala-met-lys-ser, with phenylisothiocyanate (PITC) at pH 8.0 followed by mild acidification (first cycle of Edman method) would release: - the labeled peptide ala-met-lys-ser- PTH. - PTH-ala, PTH-ser, PTH-lys and PTH-met. - PTH-ser and the peptide ala-met-lys. - PTH-ala and the peptide met-lys-ser. - All of the above. 26. What is the product formed from the acid hydrolysis of a simple amide? - acid & base - aldehyde & alcohol - acid & amine - ester & alcohol - amine & aldehyde 27. Insulin is a polypeptide hormone that contains two short polypeptide chains linked by two interstrand disulfide bonds. The most logical order of events to perform in order to sequence this protein would be: A: The peptides are reduced with mercaptoethanol. B: The peptides are sequenced using Edman chemistry. C: The peptides are separated by chromatography techniques. D: The peptides are alkylated with iodoacetamide. - A, D, C, B - C, A, D, B - C, B, A, D - A, B, C, D - A, C, D, B 28. Hemoglobin is an example of a(n): - enzyme. - regulatory protein. - transport protein. - storage protein. - structural protein.				

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29. Collagen is an example of a(n): - enzyme. - regulatory protein. - transport protein. - storage protein. - structural protein. 30. The <i>lac repressor</i> is an example of a(n): - enzyme. - regulatory protein. - transport protein. - storage protein. - structural protein. 31. Honey is characteristically composed predominantly of - sucrose - glucose and ribose - fructose and glucose - sucrose and sorbitol - all of the above 32. All of the following are parts of the honeybee's processing of honey EXCEPT: - producing a small amount of gluconic acid. - concentrating the sugars to a supersaturated state. - conversion of some glucose and fructose into sucrose. - conversion of most of the fructose to the β-D-fructopyranose form. - producing an emulsion of glucose hydrate and fructose hydrate crystals in a thick syrup. 33. Which of the following disaccharides contains an α (1$\rightarrow$4) O-glycosidic bond? - sucrose - lactose - maltose - cellobiose - cellulose				

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34. All of the following disaccharides are reducing sugars EXCEPT: - lactose. - maltose. - sucrose. - cellulose. - isomaltose. 35. Cellulose is a: (1→4)-α-D-mannopyranan. (1→4)- β-D-glucopyranan. (1→6)- α-D-glucopyranan. (1→4)- β-D-galactopyranan. (1→6)- α-D-mannopyranan. 36. In plant cells, starch is hydrolyzed by _____ to release _____ and a starch molecule with _____. - starch phosphorylase; glucose-1-phosphate; one less glucose unit - salivary α-amylase; maltose 1-phosphate; two less glucose units - starch phosphorylase; maltose 1-phosphate; two less glucose units $\alpha(1\rightarrow6)$ glucosidase; glucose-6-phosphate; one less glucose unit - starch hydrolase; glucose; one less glucose unit 37. All are true for agarose EXCEPT: - Forms a double helix with a central core large enough to accommodate large quantities of water. - Consists of only a linear component. - Is a chain of alternating D-galactose and 3,6-anhydro-L-galactose, with side-chains of 6-methyl-D-galactose. - Readily forms gels that are up to 99.9% water. - All are true. 38. Alkali hydrolysis of triacylglycerols is called _____ and yields _____ and _____. - triacylation; fatty acids; glycerol - saponification; fatty alcohols; fatty acids - triesteration; salts of fatty acids, fatty alcohols - saponification; salts of fatty acids; glycerol - none are true				

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39. Lipids are the biomolecules of choice for storage of metabolic energy because they: - are soluble in water. - yield a large amount of energy upon oxidation. - are highly oxidized. - are easily hydrolyzed. - are amphipathic. 40. Diets aimed at reducing coronary heart disease should be: - low in <i>trans</i>-fatty acids and high in saturated fatty acids. - high in <i>trans</i>-fatty acids and high in saturated fatty acids. - high in <i>trans</i>-fatty acids and low in saturated fatty acids. - low in <i>trans</i>-fatty acids and low in saturated fatty acids. - low in <i>trans</i>-fatty acids and low in unsaturated fatty acids. 41. The terpenes are all EXCEPT: - made up of isoprene monomers. - formed from two or more 2-methyl-1,3-butadiene molecules. - components of wool wax. - monomers units linked head to tail. - all are true. 42. The dolichols are all EXCEPT: - form dolichyl phosphates. - a class of polyprenols. - polymers of 16-22 isoprene units. - carriers of carbohydrate units in the biosynthesis of glycoproteins. - all are true. 43. In a double-stranded nucleic acid, guanine typically base-pairs with: - adenosine. - uracil. - inosine. - thymine. - cytosine.				

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44. The convention in all notations of nucleic acid structure is to read the polynucleotide chain from the _____ of the polymer to the _____. - poly U head; poly A tail 3'-end; 5'-tail 5'-end; 3'-end - poly-p head; 5'-end - none are true 45. _____ are attached to hnRNAs and mRNAs after transcription has been completed and is essential for efficient translation and stability of the mRNAs. - exons - introns - poly(A) tails - poly(U) tails - All are true 46. All are true for DNA polymerase EXCEPT: - requires a primer with a free 5'-OH end, but the 3'-end may be phosphorylated. - copies the sequence of nucleotides of one strand to form a new second strand. - copies the sequence of nucleotides of one strand in a complementary fashion. - generates dsDNA from ssDNA - synthesizes new strands by adding successive nucleotides in the 5' → 3' direction. 47. What is the nucleotide sequence of the DNA strand that is complementary to 5'-ATCGCAACTGTCCTA-3'? 5'-TAGCGTTGACAGTGAT-3' 5'-UAGUGACAGUUGCGAU-3' 5'-TAGCGTTGACAGTGAT-3' 5'-TAGTGACAGTTGCGAT-3' 5'-ATCACTGTCAACGCTA-3' 48. All are properties of nucleosomes EXCEPT: - protein spools neatly wrapped with DNA. - fundamental structural unit in chromatin. - protein spools made up of pairs of histones H2A, H2B, H3 and H4 octameric aggregates. - DNA binds histones by ionic bonds of positively charged amino acids and the negative charged phosphate groups. - all are true.				

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49. The catalytically active complex of _____ and _____ group is called the _____. a. apoenzyme; holoenzyme; prosthetic b. prosthetic; holoenzyme; apoenzyme c. holoenzyme; prosthetic; apoenzyme d. apoenzyme; prosthetic; holoenzyme e. none are true 50. Enzymes have active sites which have the greatest complementarity to the: a. substrate. b. transition state. c. product. d. both substrate and product. e. none of the above.				