Chapter 5: The Structure and Function of Macromolecules

Chapter Quiz

1. What are the four main classes of large biological molecules?
   a) Proteins, water, lipids, and nucleic acids
   b) Amino acids, carbohydrates, steroid, and nucleic acids
   c) Proteins, carbohydrates, lipids, and nucleic acids
   d) Proteins, carbohydrates, steroid, and cholesterol
   e) Amino acids, carbohydrates, lipids, and nucleic acids

2. What is the process by which monomers are linked together to form polymers? (Concept 5.1)
   a) hydrolysis
   b) monomerization
   c) protein formation
   d) coiling
   e) dehydration or condensation reactions

3. In a hydrolysis reaction, _____, and in this process water is _____. (Concept 5.1)
   a) a polymer is broken up into its constituent monomers ... consumed
   b) a monomer is broken up into its constituent polymers ... produced
   c) monomers are assembled to produce a polymer ... consumed
   d) monomers are assembled to produce a polymer ... produced
   e) a polymer is broken up into its constituent monomers ... produced

4. The type of bond that forms to join monomers (such as sugars and amino acids) into polymers (such as starch and proteins) is a(n) _____ bond. (Concept 5.1)
   a) hydrogen
   b) covalent
   c) ionic
   d) peptide
   e) van der Waals

5. Cellulose is a _____ made of many _____. (Concept 5.2)
   a) polypeptide ... monomers
   b) carbohydrate ... fatty acids
   c) polymer ... glucose molecules
   d) protein ... amino acids
   e) lipid ... triacylglycerols
6. In what polysaccharide form do plants store glucose to be available later as an energy source? (Concept 5.2)
   a) glycogen
   b) cellulose
   c) starch
   d) protein
   e) fatty acids

7. Which one of the following carbohydrate molecules has the lowest molecular weight? (Concept 5.2)
   a) sucrose
   b) lactose
   c) glucose
   d) cellulose
   e) chitin

8. Amylase is an enzyme that breaks down starch. Why can't the same enzyme break down cellulose? (Concept 5.2)
   a) The enzyme cannot attack cellulose because of its helical shape.
   b) Cellulose molecules are much too large.
   c) Starch is made of glucose; cellulose is made of fructose.
   d) The bonds between the monosaccharide monomers in cellulose are much stronger.
   e) The monosaccharide monomers in cellulose are bonded together differently than in starch.

9. The subunits (monomers) in cellulose are linked together by ______. (Concept 5.2)
   a) ionic bonds
   b) glycosidic linkages
   c) peptide bonds
   d) phosphodiester linkages
   e) ester linkages

10. The lipids that form the main structural component of cell membranes are ______. (Concept 5.3)
    a) triacylglycerols
    b) proteins
    c) cholesterol
    d) carbohydrates
    e) phospholipids

11. The fatty acid tails of a phospholipid are _____ because they ______. (Concept 5.3)
a) hydrophobic ... dissolve easily in water
b) hydrophobic ... have no charges to which water molecules can adhere
c) hydrophilic ... consist of units assembled by dehydration reactions
d) hydrophilic ... are easily hydrolyzed into their monomers
e) hydrophobic ... consist of units assembled by dehydration reactions

12. Which of the following would probably not be affected when a protein is denatured? (Concept 5.4)
   a) primary structure
   b) secondary structure
   c) hydrogen bonds
   d) tertiary structure
   e) All of the above must be affected for the protein to be denatured.

13. The α helix and β pleated sheet represent which level of protein structure? (Concept 5.4)
   a) primary structure
   b) secondary structure
   c) tertiary structure
   d) quaternary structure
   e) pentiary structure

14. Protein molecules are polymers (chains) of ______. (Concept 5.4)
   a) DNA molecules
   b) fatty acid molecules
   c) sucrose molecules
d) amino acid molecules
   e) purines and pyrimidines

15. On the basis of the principle of complementary base pairing, you would expect the percentage of ______ to be equal to the percentage of ______. (Concept 5.5)
   a) adenine ... thymine
   b) adenine ... guanine
c) thymine ... guanine
d) adenine ... cytosine
e) thymine ... cytosine

16. Which of the following are pyrimidines found in the nucleic acid DNA? (Concept 5.5)
   a) adenine and guanine
b) thymine and cytosine
c) thymine and adenine
d) uracil and guanine
e) guanine and cytosine

17. Which of the following describes a difference between DNA and RNA? (Concept 5.5)
a) RNA molecules consist of a single polynucleotide chain, whereas DNA molecules consist of two polynucleotide chains organized into a double helix.
b) One of their nitrogenous bases is different.
c) They contain different sugars.
d) The first and second choices are correct differences.
e) The first three choices all describe differences.

18. A nucleotide is made of which of the following chemical components? (Concept 5.5)
a) a nitrogenous base, an amino acid, and a pentose sugar
b) a nitrogenous base, an amino acid, and a phosphate group
c) a nitrogenous base, a phosphate group, and a pentose sugar
d) a nitrogenous base, a fatty acid, and an amino acid
e) a series of nitrogenous bases, a nucleic acid backbone, and a hexose sugar