Essentials of Anatomy & Physiology, 6e **(Martini/Bartholomew)**
Chapter 2 The Chemical Level of Organization

Multiple-Choice Questions

1) The branch of science that investigates matter and its interactions is
A) biology.
B) pathology.
C) botany.
D) geology.
E) chemistry.
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

2) The uncharged subatomic particles are called
A) atoms.
B) molecules.
C) protons.
D) neutrons.
E) electrons.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

3) Which of the following would have a negative charge?
A) an atom
B) a molecule
C) a proton
D) a neutron
E) an electron
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

4) Atoms that are of the same element but contain different numbers of neutrons are called
A) isomers.
B) cations.
C) isotopes.
D) anions.
E) None of these are correct.
Answer: C
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

5) The atomic number of an atom is determined by the
A) number of protons.
B) number of neutrons.
C) number and arrangement of electrons.
D) size of the atom.
E) mass of the atom.
Answer: A
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

6) Positively charged subatomic particles are called
A) isotopes.
B) neutrons.
C) electrons.
D) protons.
E) radioactivity.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

7) A(n) _____ contains atoms with the same atomic number.
A) base
B) element
C) cation
D) anion
E) enzyme
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

8) The area around the center of an atom, which contains negatively charged subatomic particles, is called the electron _____.
A) cloud
B) nucleus
C) active site
D) buffering zone
E) double helix
Answer: A
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

9) Which of the following elements is found in **all** organic molecules?
A) nitrogen
B) oxygen
C) iron
D) carbon
E) copper
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Knowledge

10) Atoms of the same element have the same number of _____ but may have a different number of _____.
A) protons; electrons
B) electrons; protons
C) electrons; neutrons
D) neutrons; electrons
E) protons; neutrons
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Comprehension

11) The mass number represents the number of
A) protons in an atom.
B) electrons in an ion.
C) neutrons in an atom.
D) protons and neutrons.
E) neutrons and electrons.
Answer: D
Learning Outcome: 2-1
Bloom's Taxonomy: Comprehension

12) Which of the following is sometimes used in diagnostic imaging?
A) a radioisotope
B) a proton
C) an ion
D) an atom
E) an electrolyte
Answer: A
Learning Outcome: 2-1
Bloom's Taxonomy: Comprehension

13) How many electrons do **most** atoms need in their second outer shell in order to be stable?
A) two
B) three
C) four
D) six
E) eight
Answer: E
Learning Outcome: 2-1
Bloom's Taxonomy: Comprehension

14) If an element is composed of atoms with an atomic number of 8 and a mass number of 14, then an electrically neutral atom of this element contains
A) 6 protons.
B) 6 neutrons.
C) 6 electrons.
D) 14 protons.
E) 14 electrons.
Answer: B
Learning Outcome: 2-1
Bloom's Taxonomy: Application

15) Which is the correct description of a molecule?
A) It is an electrically charged atom.
B) It cannot be broken down physically.
C) It is comprised of two or more elements bonded together.
D) It is the smallest unit of matter.
E) It is comprised of two or more atoms sharing electrons.
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

16) Combinations of atoms that contain two or more different elements are called
A) molecules.
B) compounds.
C) mixtures.
D) isotopes.
E) None of these are correct.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

17) Ions with a negative charge are called
A) cations.
B) anions.
C) radicals.
D) polyatomic ions.
E) None of these are correct.
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

18) Covalent bonds are formed when
A) atoms share electrons.
B) cations and anions are held together by their opposite charges.
C) electrons are exchanged between atoms.
D) hydrogen forms bonds with negatively charged atoms in the same or different molecules.
E) two or more atoms lose electrons at the same time.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

19) When an anion and a cation are electrically attracted to each other, _____ is formed.
A) an ion
B) a molecule
C) a hydrogen bond
D) an ionic bond
E) a covalent bond
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

20) A molecule containing two atoms of hydrogen and one atom of oxygen in combination is called a(n) _____.
A) oxygen molecule
B) carbon dioxide molecule
C) water molecule
D) hydroxyl molecule
E) hydroxide molecule
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

21) Ions with a positive charge are called _____.
A) anions
B) bases
C) metabolites
D) cations
E) acids
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Knowledge

22) Which of the following is a characteristic of hydrogen bonds?
A) Hydrogen bonds are strong attractive forces between hydrogen atoms and negatively charged atoms.
B) Hydrogen bonds occur only in water.
C) Hydrogen bonds can form between adjacent molecules.
D) Hydrogen bonds are part of fatty-acid structure.
E) Hydrogen bonds are part of carbohydrate structure.
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

23) Which of the following is an example of anions?
A) magnesium
B) potassium
C) calcium
D) chloride
E) sodium
Answer: D
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

24) Matter containing two atoms of the same element that are bonded together by shared electrons are called
A) molecules.
B) cells.
C) compounds.
D) elements.
E) None of these are correct.
Answer: A
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

25) Which of the following is a **weak** electrical attraction between molecules?
A) ionic bond
B) covalent bond
C) polar bond
D) metallic bond
E) hydrogen bond
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

26) In a molecule of hydrogen, a pair of electrons is shared equally. Such a bond is called a(n)
A) ionic bond.
B) polar covalent bond.
C) nonpolar covalent bond.
D) oxygen covalent bond.
E) hydrogen bond.
Answer: C
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

27) If two pairs of electrons are shared between two atoms, what type of bond occurs?
A) single covalent bond
B) double covalent bond
C) triple covalent bond
D) polar covalent bond
E) hydrogen bond
Answer: B
Learning Outcome: 2-2
Bloom's Taxonomy: Comprehension

28) Chlorine atoms have seven electrons in the outermost shell. As a result, one would expect chlorine to form ions with a charge of
A) +1.
B) +2.
C) 0.
D) -2.
E) -1.
Answer: E
Learning Outcome: 2-2
Bloom's Taxonomy: Application

29) The term that applies to all of the decomposition reactions that occur in metabolism is _____.
A) anabolism
B) dehydration synthesis
C) catabolism
D) ionization
E) homeostasis
Answer: C
Learning Outcome: 2-3
Bloom's Taxonomy: Knowledge

30) Reactions that ultimately result in larger molecules formed from smaller ones are called _____ reactions.
A) hydrolysis
B) reversible
C) exergonic
D) dissociation
E) synthesis
Answer: E
Learning Outcome: 2-3
Bloom's Taxonomy: Knowledge

31) Which statement about the reaction $H_2 + Cl_2 \rightarrow 2HCl$ is correct?
A) H_2 and Cl_2 are the products.
B) HCl is the product.
C) One molecule of hydrogen contains one atom.
D) One molecule of chlorine contains one atom.
E) The reaction is unbalanced.
Answer: B
Learning Outcome: 2-3
Bloom's Taxonomy: Comprehension

32) When two monosaccharides undergo a dehydration synthesis,
A) a new monosaccharide is formed.
B) a starch is formed.
C) a polysaccharide is formed.
D) a condensation reaction occurs.
E) hydrolysis occurs.
Answer: D
Learning Outcome: 2-3
Bloom's Taxonomy: Comprehension

33) Hydrolysis is an example of which type of reaction?
A) exchange
B) reversible reaction
C) anabolism
D) synthesis reaction
E) decomposition reaction
Answer: E
Learning Outcome: 2-3
Bloom's Taxonomy: Comprehension

34) Choose the most accurate definition of *chemical reaction*.
A) It is a process in which bonds between atoms are formed or broken.
B) It is the energy of motion.
C) It is an increase in random molecular motion.
D) It is movement or a change in the physical structure of matter.
E) It is the capacity to perform work.
Answer: A
Learning Outcome: 2-3
Bloom's Taxonomy: Comprehension

35) The reaction $N_2 + 3H_2 \rightarrow 2NH_3$ would be an example of a(n)
A) exchange reaction.
B) decomposition reaction.
C) synthesis reaction.
D) enzyme reaction.
E) metabolic reaction.
Answer: C
Learning Outcome: 2-3
Bloom's Taxonomy: Analysis

36) $AB \rightarrow A + B$ is to decomposition as $A + B \leftrightarrow AB$ is to
A) exchange.
B) reversible.
C) combustion.
D) replacement.
E) metabolism.
Answer: B
Learning Outcome: 2-3
Bloom's Taxonomy: Analysis

37) Chemical reactions that occur in the human body are catalyzed by special protein molecules called

_____.
A) electrolytes
B) enzymes
C) metabolites
D) steroids
E) buffers
Answer: B
Learning Outcome: 2-4
Bloom's Taxonomy: Knowledge

38) The addition of energy to start a reaction is called the energy of
A) endergonic control.
B) activation.
C) exergonic control.
D) release.
E) equilibrium.
Answer: B
Learning Outcome: 2-4
Bloom's Taxonomy: Knowledge

39) Chemical reactions that release energy are categorized as _____.
A) endergonic
B) catabolic
C) anabolic
D) hydrolytic
E) exergonic
Answer: E
Learning Outcome: 2-4
Bloom's Taxonomy: Knowledge

40) In an endergonic reaction,
A) large molecules are broken down into smaller ones.
B) small molecules are assembled into larger ones.
C) molecules are rearranged to form new molecules.
D) molecules move from reactants to products and back.
E) energy is consumed during the reaction.
Answer: E
Learning Outcome: 2-4
Bloom's Taxonomy: Comprehension

41) Which is the mechanism of enzyme functioning?
A) Enzymes raise the activation energy of a reaction.
B) Enzymes remove hydrogen ions.
C) Enzymes lower the activation energy of a reaction.
D) Enzymes replace hydrogen ions.
E) Enzymes promote complementary base-pairing.
Answer: C
Learning Outcome: 2-4
Bloom's Taxonomy: Comprehension

42) All of the elements and compounds that are eaten and used by the body for some function are called

A) inorganic compounds.
B) organic compounds.
C) nutrients.
D) metabolites.
E) enzymes.
Answer: C
Learning Outcome: 2-5
Bloom's Taxonomy: Knowledge

43) Which of the following is an essential component of organic compounds?
A) hydrogen
B) carbon dioxide
C) water
D) calcium
E) oxygen
Answer: A
Learning Outcome: 2-5
Bloom's Taxonomy: Knowledge

44) What is the primary composition of organic compounds?
A) carbon and oxygen atoms
B) oxygen and hydrogen atoms
C) oxygen and nitrogen atoms
D) carbon and hydrogen atoms
E) nitrogen and carbon atoms
Answer: D
Learning Outcome: 2-5
Bloom's Taxonomy: Knowledge

45) Which of the following pairs of elements can be classified as inorganic **only**?
A) sodium and hydrogen
B) carbon and oxygen
C) calcium and carbon
D) hydrogen and carbon
E) sodium and calcium
Answer: E
Learning Outcome: 2-5
Bloom's Taxonomy: Comprehension

46) The best definition of organic material is anything that contains
A) carbon and oxygen covalently bonded.
B) carbon, oxygen, and hydrogen covalently bonded.
C) carbon and hydrogen covalently bonded.
D) hydrogen covalently bonded.
E) carbon, nitrogen, and hydrogen covalently bonded.
Answer: C
Learning Outcome: 2-5
Bloom's Taxonomy: Comprehension

47) Which of the following is inorganic?
A) fatty acid

B) protein
C) hydrogen
D) sodium
E) glycogen
Answer: D
Learning Outcome: 2-5
Bloom's Taxonomy: Comprehension

48) Which of the following constitutes most of the total body weight in humans?
A) water
B) acids
C) bases
D) salts
E) organic molecules
Answer: A
Learning Outcome: 2-6
Bloom's Taxonomy: Knowledge

49) A mixture of water and a salt would result in breaking down the salt into a mixture of cations and anions. This process is called _____.
A) dehydration synthesis
B) dissociation
C) hydrolysis
D) condensation reaction
E) equilibrium
Answer: B
Learning Outcome: 2-6
Bloom's Taxonomy: Knowledge

50) When individual anions or cations interact with the positive or negative ends of polar water molecules breaking bonds apart, what is this process called?
A) condensation
B) anabolism
C) ionization
D) equilibrium
E) saturation
Answer: C
Learning Outcome: 2-6
Bloom's Taxonomy: Comprehension

51) A solution containing more hydrogen ions than hydroxide ions is
A) acidic.
B) basic.
C) neutral.
D) alkaline.
E) organic.
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Knowledge

52) The most acidic solution would have a pH of _____.
A) 0
B) 7
C) 14
D) 4
E) 10
Answer: A
Learning Outcome: 2-7
Bloom's Taxonomy: Comprehension

53) Which of the following substances would be nearest the pH of human blood?
A) milk, pH ≈6.5
B) pure water, pH ≈7
C) tomato juice, pH ≈4
D) wine, pH ≈3
E) stomach secretions, pH ≈1
Answer: B
Learning Outcome: 2-7
Bloom's Taxonomy: Application

54) Why is it important to precisely regulate the pH of blood or other body fluids?
A) Blood functions as an excellent solvent.
B) Blood and other body fluids have a very high heat capacity.
C) Dehydration synthesis of large molecules occurs.
D) Hydrogen ions are extremely reactive.
E) Some organic molecules have polar covalent bonds.
Answer: D
Learning Outcome: 2-7
Bloom's Taxonomy: Analysis

55) If a substance resists changes in pH, either by removing or replacing hydrogen ions, it is called
A) neutral.
B) acidic.
C) alkaline.
D) a buffer.
E) a salt.
Answer: D
Learning Outcome: 2-8
Bloom's Taxonomy: Knowledge

56) _____ are compounds that maintain the pH of solutions within given limits.

A) Enzymes
B) Electrolytes
C) Metabolites
D) Isotopes
E) Buffers
Answer: E
Learning Outcome: 2-8
Bloom's Taxonomy: Knowledge

57) Which of the following are defined as soluble inorganic compounds whose ions will conduct an electric current in solutions?
A) catalysts
B) electrolytes
C) strong acids
D) buffers
E) steroid hormones
Answer: B
Learning Outcome: 2-8
Bloom's Taxonomy: Knowledge

58) During ionization, water molecules disrupt the ionic bonds of a solute, resulting in a mixture of ions that can conduct an electrical current in solution. These ions are called
A) cations.
B) anions.
C) isotopes.
D) electrolytes.
E) reactants.
Answer: D
Learning Outcome: 2-8
Bloom's Taxonomy: Knowledge

59) Why is table salt considered to be a "neutral" solute?
A) Its dissociation releases hydrogen ions.
B) Its dissociation does not affect the concentrations of hydrogen ions or hydroxide ions.
C) It removes or replaces hydrogen ions.
D) It contains more hydroxide ions than hydrogen ions.
E) It has a very high heat capacity.
Answer: B
Learning Outcome: 2-8
Bloom's Taxonomy: Comprehension

60) Which of the following is an example of a strong base?
A) NaCl
B) NaOH
C) HCl
D) KF
E) H_2O
Answer: B
Learning Outcome: 2-8
Bloom's Taxonomy: Comprehension

61) When placed in solution, an inorganic substance dissociates completely, forming hydrogen ions and anions. This substance would be a
A) strong base.
B) weak base.
C) strong acid.
D) weak acid.
E) salt.
Answer: C
Learning Outcome: 2-8
Bloom's Taxonomy: Comprehension

62) Functionally, carbohydrates are most important as _____.
A) storage of glucose molecules
B) a part of nucleic acid structure
C) sources of energy
D) receptors of the cell surface
E) insulation under the skin
Answer: C
Learning Outcome: 2-9
Bloom's Taxonomy: Knowledge

63) The most important metabolic fuel molecule in the body is
A) sucrose.
B) starch.
C) protein.
D) vitamin B_{12}.
E) glucose.
Answer: E
Learning Outcome: 2-9
Bloom's Taxonomy: Knowledge

64) Which of the following is an example of a disaccharide?
A) starch
B) glycogen
C) sucrose
D) cellulose
E) fructose
Answer: C
Learning Outcome: 2-9
Bloom's Taxonomy: Knowledge

65) Identify the polysaccharide in the following list of molecules.
A) glycogen
B) sucrose
C) glucose
D) fructose
E) lactose
Answer: A
Learning Outcome: 2-9
Bloom's Taxonomy: Comprehension

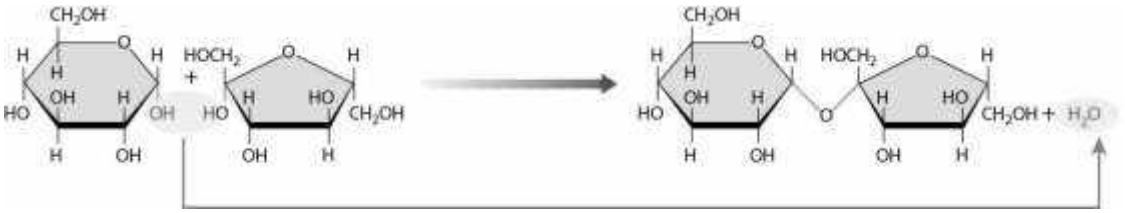

Figure 2-1 A Chemical Reaction

Use Figure 2-1 to answer the following question:

66) Determine which reaction is shown in the figure and specify its mechanism of action.
A) The addition of a water molecule breaks down a complex molecule.
B) The removal of a water molecule breaks down a complex molecule.
C) Ionic bonds are broken apart as individual ions interact with the positive or negative ends of polar water molecules.
D) The removal of a water molecule facilitates the union of two molecules.
E) The addition of a water molecule facilitates the union of two molecules.
Answer: D
Learning Outcome: 2-9
Bloom's Taxonomy: Analysis

Figure 2-2 A Molecule

Use Figure 2-2 to answer the following question:

67) The molecule shown in the figure is considered to be the most important metabolic "fuel" in the body. Choose the best category of molecules to which it belongs.
A) steroid
B) saturated fatty acid
C) monoglyceride
D) cholesterol
E) monosaccharide
Answer: E
Learning Outcome: 2-9
Bloom's Taxonomy: Analysis

68) Lipids are used for which of the following?
A) to form essential structural components of cells
B) to provide roughly 10 times as much energy as carbohydrates
C) to help reduce body temperature
D) to help protect the skeleton
E) to carry genetic information
Answer: A
Learning Outcome: 2-10
Bloom's Taxonomy: Comprehension

69) A class of lipids used as chemical messengers, to signal cells to undergo changes, is called
A) polysaccharides.
B) phospholipids.
C) triglycerides.
D) steroids.
E) monoglycerides.
Answer: D
Learning Outcome: 2-10
Bloom's Taxonomy: Comprehension

70) The group of organic compounds containing mostly carbon and hydrogen with small amounts of oxygen is defined as a(n)
A) carbohydrate.
B) lipid.
C) protein.
D) nucleic acid.
E) fatty acid.
Answer: B
Learning Outcome: 2-10
Bloom's Taxonomy: Comprehension

71) A fatty acid that contains only single covalent bonds in its carbon chain is said to be
A) saturated.
B) polyunsaturated.
C) monounsaturated.
D) hydrogenated.
E) carboxylated.
Answer: A
Learning Outcome: 2-10
Bloom's Taxonomy: Comprehension

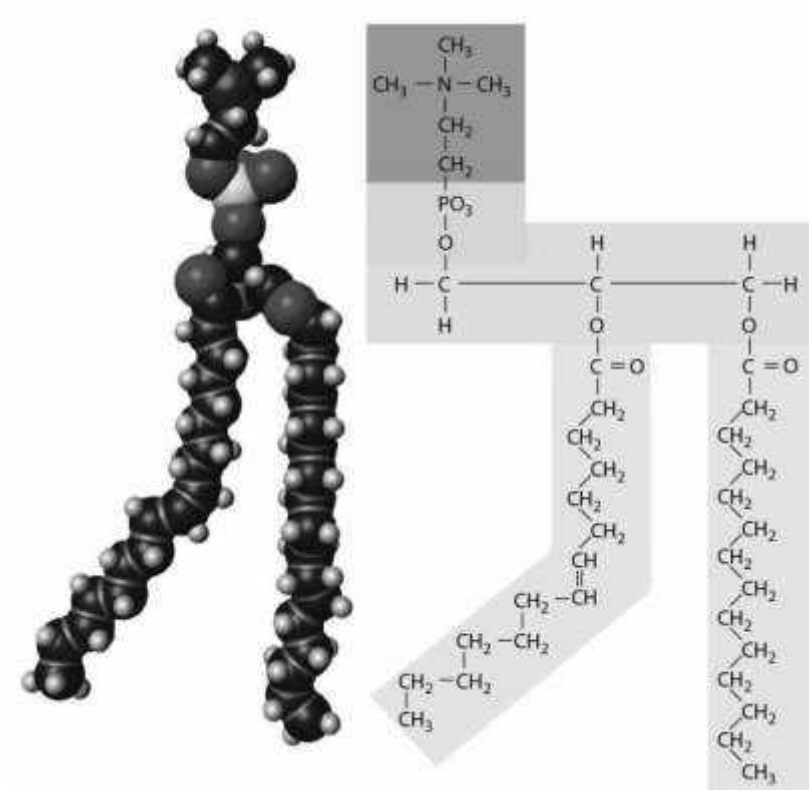

Figure 2-3 A Structure

Use Figure 2-3 to answer the following question:

72) Indicate the primary function(s) of the structure shown in the figure.
A) structural component of cell membranes
B) storage of glucose molecules
C) energy source
D) structural component of cell membranes, hormones, and digestive secretions in bile
E) energy source, energy storage, and insulation
Answer: A
Learning Outcome: 2-10
Bloom's Taxonomy: Analysis

73) Enzymes
A) are lipids.
B) function as biological catalysts.
C) raise the activation energy for a reaction.
D) are carbohydrates.
E) are derived from cholesterol.
Answer: B
Learning Outcome: 2-11
Bloom's Taxonomy: Knowledge

74) Substrate molecules bind to enzymes at the
A) allosteric sites.
B) modification sites.
C) reaction sites.
D) active sites.
E) ionic sites.
Answer: D
Learning Outcome: 2-11
Bloom's Taxonomy: Knowledge

75) Proteins are composed of units called
A) amino acids.
B) simple sugars.
C) fatty acids.
D) adenosines.
E) nucleotides.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Knowledge

76) Each amino acid forms bonds by connecting its carboxyl group to the next amino acid's
A) central carbon atom.
B) amino group.
C) carboxyl group.
D) hydroxyl group.
E) hydroxide group.
Answer: B
Learning Outcome: 2-11
Bloom's Taxonomy: Knowledge

77) Molecules that perform **almost all** cell functions are called
A) proteins.
B) nucleic acids.
C) carbohydrates.
D) steroids.
E) lipids.
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Knowledge

78) Special clotting proteins that restrict bleeding following an injury to the cardiovascular system are an example of which protein function?
A) support
B) transport
C) metabolic regulation
D) movement
E) defense
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Comprehension

79) Which of the following can be denatured?
A) enzymes
B) ions
C) atoms
D) molecules
E) isotopes
Answer: A
Learning Outcome: 2-11
Bloom's Taxonomy: Comprehension

80) Amino acids contain a central carbon atom adjacent to a(n) _____ group and a(n) _____ group.
A) carboxyl; phosphate
B) nitrogenous; carboxyl
C) nitrogenous; amino
D) amino; carboxyl
E) amino; phosphate
Answer: D
Learning Outcome: 2-11
Bloom's Taxonomy: Comprehension

81) If a polypeptide contains 9 peptide bonds, how many amino acids does it contain?
A) 0
B) 5
C) 12
D) 11
E) 10
Answer: E
Learning Outcome: 2-11
Bloom's Taxonomy: Application

82) Which of the following is unique to RNA?
A) glucose
B) phosphate group
C) ribose
D) adenosine triphosphate
E) deoxyribose
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Knowledge

83) The nucleic acid DNA
A) is double stranded.
B) contains uracil in place of thymine.
C) contains the pentose ribose.
D) contains protein bases.
E) synthesizes lipids.
Answer: A
Learning Outcome: 2-12
Bloom's Taxonomy: Knowledge

84) The molecule DNA contains the unique five-carbon sugar _____.
A) ribose
B) pentose
C) deoxyribose
D) sucrose
E) fructose
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Knowledge

85) Which nitrogenous base is unique to RNA molecules?
A) uracil
B) cytosine
C) adenine
D) guanine
E) thymine
Answer: A
Learning Outcome: 2-12
Bloom's Taxonomy: Knowledge

86) A bond between a phosphate group and a sugar can be found linking together
A) two simple sugars.
B) one amino acid to an amino group of another.
C) two nucleotides.
D) a fatty acid and a glycerol molecule.
E) a cholesterol molecule and a fatty-acid molecule.
Answer: C
Learning Outcome: 2-12
Bloom's Taxonomy: Comprehension

87) A DNA nucleotide specifically consists of
A) a five-carbon sugar and a phosphate group.
B) a five-carbon sugar and a nitrogen base.
C) a ribose sugar, a nitrogenous base, and a phosphate group.
D) a deoxyribose sugar, a nitrogenous base, and a phosphate group.
E) a five-carbon sugar and an amino acid.
Answer: D
Learning Outcome: 2-12
Bloom's Taxonomy: Comprehension

88) According to the rules of complementary base pairing, a nucleotide containing the base cytosine

would only pair with a nucleotide containing the base
A) thymine.
B) adenine.
C) uracil.
D) cytosine.
E) guanine.
Answer: E
Learning Outcome: 2-12
Bloom's Taxonomy: Application

89) A(n) _____ bond is a covalent bond that stores an unusually large capacity to perform work.
A) high-energy
B) polar covalent
C) ionic
D) electrically neutral
E) peptide
Answer: A
Learning Outcome: 2-13
Bloom's Taxonomy: Knowledge

90) The hydrolysis of ATP yields the molecule _____.
A) adenine
B) phospholipid
C) ribose
D) thymine
E) adenosine diphosphate
Answer: E
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

91) Choose the correct pairing of macromolecule type to its function.
A) lipid - manufactures proteins
B) DNA - controls reaction rates
C) carbohydrate - major source of energy
D) protein - comprises majority of membrane structure
E) RNA - determines our inherited characteristics
Answer: C
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

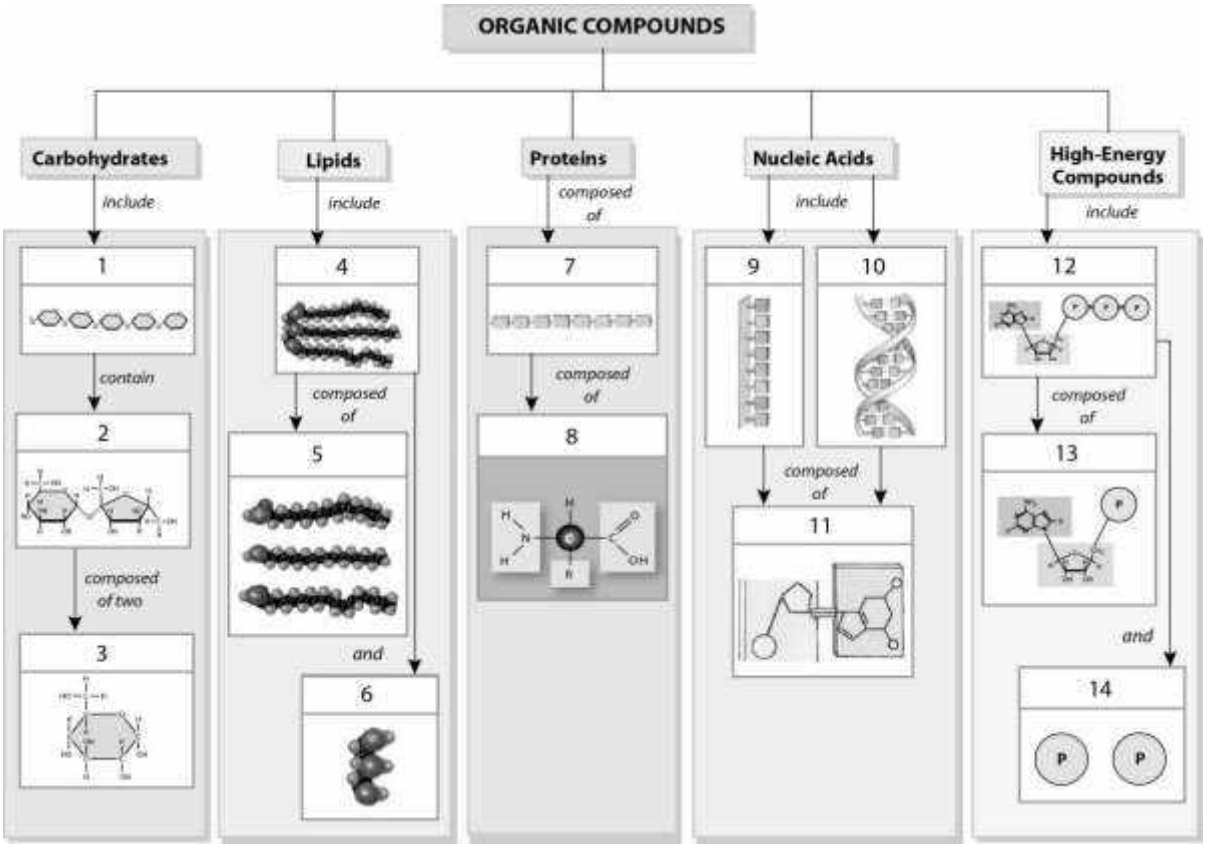

Figure 2-4 An Overview of the Structures of Organic Compounds in the Body

Use Figure 2-4 to answer the following question(s):

92) Glucose-based starches are an example of the structure labeled #1. Identify the structure.
A) triglyceride
B) polysaccharide
C) glycerol
D) steroid
E) phospholipid
Answer: B
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

93) Identify the structure labeled #5, a component of triglycerides, which is comprised of long chains of carbon atoms with attached hydrogen atoms that end in a carboxyl group.
A) glycerol
B) monosaccharide
C) amino acid
D) nucleotide
E) fatty acid
Answer: E
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

94) Identify the structure labeled #8, which is a building block of proteins.
A) nucleic acid
B) peptide
C) amino acid
D) monosaccharide
E) lauric acid
Answer: C
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

95) What is/are the primary function(s) of the structure labeled #9?
A) determines an individual's inherited characteristics
B) structural role when attached to lipids
C) energy source; insulation
D) manufactures specific proteins
E) storage or transfer of energy
Answer: D
Learning Outcome: 2-13
Bloom's Taxonomy: Comprehension

96) Phospholipids consist of _____ linked to a non-lipid group by a phosphate group.
A) four connected rings of carbon atoms
B) a glycerol and three fatty acids
C) a glycerol and two fatty acids
D) long chains of carbon atoms with attached hydrogen atoms that end in a carboxyl group
E) interconnected glucose molecules
Answer: C
Learning Outcome: 2-14
Bloom's Taxonomy: Comprehension

Essay Questions

97) A certain reaction pathway consists of four steps. How would increasing the amount of enzyme that catalyzes in the third step affect the amount of product produced at the end of the pathway?
Answer: Increasing the amount of enzyme at the third step might not affect the whole series of reactions because the rate of the first, second, and fourth enzymes would remain the same. While more substrate would be available for the next step, that doesn't necessarily mean that the fourth enzyme will increase its speed. The net result would be no change if the first, second, and fourth enzymes were working optimally before the change is made. On the other hand, there could be an increase in the amount of product if the first, second, and fourth enzymes were working at below optimum before the change.
Learning Outcome: 2-4
Bloom's Taxonomy: Analysis

98) Why is it life-threatening to have a low pH?
Answer: A low pH can be life-threatening because the change in hydrogen ion concentration can cause certain proteins, such as vital enzymes, to become inactive. When this occurs, the proteins become nonfunctional, and if they catalyze reactions that are necessary for life, life will cease.
Learning Outcome: 2-7
Bloom's Taxonomy: Comprehension

99) How does the RNA molecule differ from a DNA molecule?

Answer: RNA is usually single stranded and DNA is double stranded. RNA contains ribose sugars and DNA contains deoxyribose sugars. DNA contains the nitrogenous bases A, G, C, and T, while RNA contains A, G, C, and U.
Learning Outcome: 2-12
Bloom's Taxonomy: Comprehension