

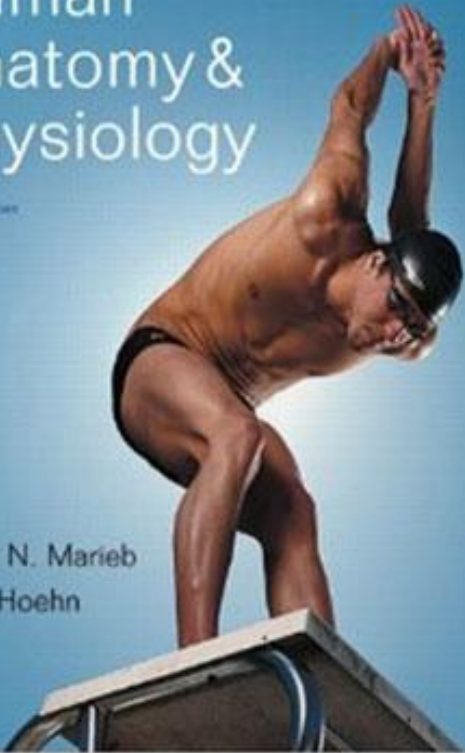
TEST BANK



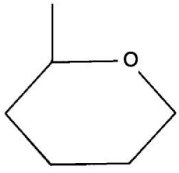
Human
Anatomy &
Physiology

Eighth Edition

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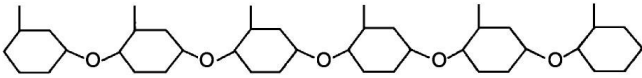
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.



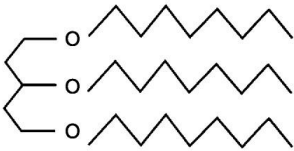
A



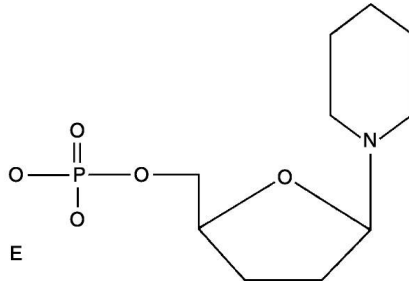
B



C



D



E

Figure 2.1

Using Figure 2.1, match the following:

1) Lipid.

1) _____

2) Functional protein.

2) _____

3) Nucleotide.

3) _____

4) Polysaccharide.

4) _____

5) Monosaccharide.

5) _____

6) Polymer.

6) _____

7) Tertiary (protein) structure.

7) _____

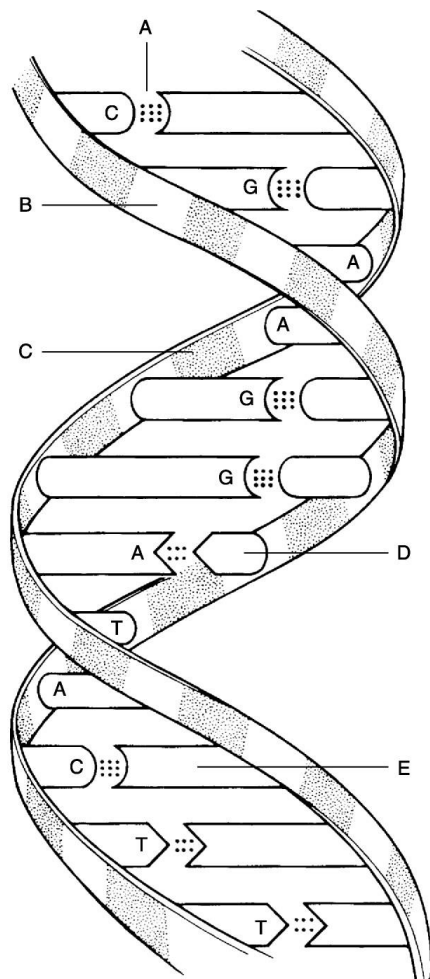


Figure 2.2

Using Figure 2.2, match the following:

- | | |
|-----------------------|-----------|
| 8) Deoxyribose sugar. | 8) _____ |
| 9) Thymine. | 9) _____ |
| 10) Guanine. | 10) _____ |
| 11) Phosphate. | 11) _____ |
| 12) Hydrogen bonds. | 12) _____ |

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following chemical bonds to the correct description:

- | | | |
|--|---------------------------|-----------|
| 13) A bond in which electrons are shared unequally. | A) Polar covalent bond | 13) _____ |
| 14) A bond in which electrons are completely lost or gained by the atoms involved. | B) Nonpolar covalent bond | 14) _____ |
| | C) Hydrogen bond | |
| | D) | |

15) A bond in which electrons are shared equally.

Ionic bond

15) _____

16) A type of bond important in tying different parts of the same molecule together into a three-dimensional structure.

16) _____

Match the following particles to the correct description:

17) Electrically charged particle due to loss of an electron.

A) Neutron

17) _____

18) Neutral subatomic particle.

B) Atom

18) _____

19) Smallest particle of an element that retains its properties.

C) Cation

19) _____

20) Smallest particle of a compound that still retains its properties.

D) Molecule

20) _____

Match the following:

21) Water.

A) Mixture

21) _____

22) Carbon.

B) Compound

22) _____

23) Dry ice (frozen carbon dioxide).

C) Element

23) _____

24) Blood.

24) _____

Match the following:

25) Can be measured only by its effects
on matter.

A) Energy

25) _____

26) Anything that occupies space and has mass.

A) Matter

26) _____

27) Although a man who weighs 175 pounds on Earth would be lighter on the moon and heavier on Jupiter, his _____ would not be different.

B) Weight

27) _____

C) Mass

28) Is a function of, and varies with, gravity.

28) _____

Match the following:

29) Legs moving the pedals of a bicycle.

A) Radiant energy

29) _____

30) When the bonds of ATP are broken, energy is released to do cellular work.

B) Electrical energy

30) _____

31) Energy that travels in waves. Part of the electromagnetic spectrum.

C) Chemical energy

31) _____

32) Represented by the flow of charged particles along a conductor, or the flow of ions across a membrane.

D) Mechanical energy

32) _____

Match the following:

- | | | |
|-------------------------------------|----------------|-----------|
| 33) Heterogeneous, will not settle. | A) Solutions | 33) _____ |
| 34) Heterogeneous, will settle. | B) Suspensions | 34) _____ |
| 35) Homogeneous, will not settle. | C) Colloids | 35) _____ |
| 36) Will not scatter light. | | 36) _____ |

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 37) The atomic weight is only an average of relative weights of an atom and its isotopes, and it may vary from the weight of a specific isotope. 37) _____
- 38) Emulsions and colloids are the same thing. 38) _____
- 39) Chemical properties are determined primarily by neutrons. 39) _____
- 40) A charged particle is generally called an ion. 40) _____
- 41) Isotopes differ from each other only in the number of electrons contained. 41) _____
- 42) About 60% to 80% of the volume of most living cells consists of organic compounds. 42) _____
- 43) Lipids are a poor source of stored energy. 43) _____
- 44) Current information theorizes that omega-3 fatty acids decrease the risk of heart disease. 44) _____
- 45) Glucose is an example of a monosaccharide. 45) _____
- 46) A molecule consisting of one carbon atom and two oxygen atoms is correctly written as CO₂. 46) _____
- 47) The lower the pH, the higher the hydrogen ion concentration. 47) _____
- 48) Covalent bonds are generally less stable than ionic bonds. 48) _____
- 49) Hydrogen bonds are comparatively strong bonds. 49) _____
- 50) The fact that *no* chemical bonding occurs between the components of a mixture is the chief difference between mixtures and compounds. 50) _____
- 51) Alpha particles, although relatively weak energy particles, are second only to smoking as a cause of lung cancer. 51) _____
- 52) No chemical bonding occurs between the components of a mixture. 52) _____
- 53) All organic compounds contain carbon. 53) _____
- 54) A dipeptide can be broken into two amino acids by dehydration syn thesis. 54) _____

54) _____

55) The pH of body fluids must remain fairly constant for the body to maintain homeostasis. 55) _____

56) Mixtures are combinations of elements or compounds that are physically blended together but are not bound by chemical bonds. 56) _____

57) Buffers resist abrupt and large changes in the pH of the body by releasing or binding ions. 57) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

58) Which of the following elements is necessary for proper conduction of nervous impulses? 58) _____
A) Fe B) P C) I D) Na

59) Choose the statement that is false or incorrect. 59) _____
A) In chemical reactions, breaking old bonds requires energy and forming new bonds releases energy.
B) Endergonic reactions absorb more energy than they release.
C) A key feature of the body's metabolism is the almost exclusive use of exergonic reactions by the body.
D) Exergonic reactions release more energy than they absorb.

60) In general, the lipids that we refer to as oils have _____. 60) _____
A) long fatty acid chains
B) a high water content
C) a high degree of unsaturated bonds
D) a high degree of saturated bonds

61) The genetic information is coded in DNA by the _____. 61) _____
A) regular alteration of sugar and phosphate molecules
B) arrangement of the histones
C) three-dimensional structure of the double helix
D) sequence of the nucleotides

62) Which of the following is *not* true of proteins? 62) _____
A) Their function depends on the three-dimensional shape.
B) Some types are called enzymes.
C) They appear to be the molecular carriers of the coded hereditary information.
D) They may be denatured or coagulated by heat or acidity.

63) The single most abundant protein in the body is _____. 63) _____
A) glucose B) DNA
C) collagen D) hemoglobin

64) Carbohydrates are stored in the liver and muscles in the form of _____. 64) _____
A) cholesterol B) triglycerides
C) glycogen D) glucose

- 65) Which of the following describes coenzymes? 65) _____
A) metal ions
B) enzymes that work together
C) organic molecules derived from vitamins
D) two enzymes that perform the same function
- 66) Which of the following is *not* a role of molecular chaperonins? 66) _____
A) promote the breakdown of damaged or denatured proteins
B) act as a biological catalyst
C) prevent accidental, premature, or incorrect folding of polypeptide chains
D) aid the desired folding and association process of polypeptides
E) help to translocate proteins and certain metal ions across cell membranes
- 67) A chemical reaction in which bonds are broken is usually associated with _____. 67) _____
A) the release of energy
B) forming a larger molecule
C) the consumption of energy
D) a synthesis
- 68) Salts are always _____. 68) _____
A) single covalent compounds
B) hydrogen bonded
C) ionic compounds
D) double covalent compounds
- 69) The numbers listed represent the number of electrons in the first, second, and third energy levels, respectively. On this basis, which of the following is an unstable or reactive atom? 69) _____
A) 2, 8, 1
B) 2, 8
C) 2, 8, 8
D) 2
- 70) A solution that has a pH of 2 could best be described as being _____. 70) _____
A) acidic
B) slightly acidic
C) neutral
D) basic
- 71) Which of the following is the major positive ion outside cells? 71) _____
A) sodium
B) hydrogen
C) nitrogen
D) potassium
- 72) Which of the following would be regarded as an organic molecule? 72) _____
A) NaOH
B) NaCl
C) CH₄
D) H₂O
- 73) What is a chain of 25 amino acids called? 73) _____
A) nucleotide
B) polypeptide
C) starch
D) protein
- 74) Which of the following constitutes a long chain of simple sugars? 74) _____
A) protein
B) monosaccharide
C) polysaccharide
D) nucleic acid
- 75) What level of protein synthesis is represented by the coiling of the protein chain backbone into an alpha helix? 75) _____
A) quaternary structure
B) tertiary structure

C) secondary structure

D) primary structure

- 76) Carbohydrates and proteins are built up from their basic building blocks by the _____. 76) _____
- A) addition of a water molecule between each two units
 - B) removal of a nitrogen atom between each two units
 - C) addition of a carbon atom between each two units
 - D) removal of a water molecule between each two units
- 77) Which statement about enzymes is *false*? 77) _____
- A) Enzymes are organic catalysts.
 - B) Enzymes may be damaged by high temperature.
 - C) Enzymes are composed mostly of protein.
 - D) Enzymes raise the activation energy needed to start a reaction.
- 78) Which of the following statements is false? 78) _____
- A) Chemical reactions proceed more quickly at higher temperatures.
 - B) Larger particles move faster than smaller ones and thus collide more frequently and more forcefully.
 - C) Catalysts increase the rate of chemical reactions.
 - D) Chemical reactions progress at a faster rate when the reacting particles are present in higher numbers.
- 79) Which of the following is true regarding the concentration of solutions? 79) _____
- A) To calculate molarity, one must know the atomic number of the solute.
 - B) To calculate molarity, one must know the atomic weight of the solvent.
 - C) Percent solutions are parts per 1000 parts.
 - D) Molarity is one mole of solute per 1000 ml of solution.
- 80) Select the statement about mixtures that is correct. 80) _____
- A) Solutions contain particles that settle out in time.
 - B) Suspensions are homogeneous mixtures of two or more components.
 - C) A solution contains solvent in large amounts and solute in smaller quantities.
 - D) Suspensions can change reversibly from liquid to solid.
- 81) Choose the answer that best describes HCO_3^- . 81) _____
- A) a weak acid
 - B) a bicarbonate ion
 - C) a proton donor
 - D) common in the liver
- 82) Select which reactions will usually be irreversible regarding chemical equilibrium in living systems. 82) _____
- A) glucose to CO_2 and H_2O
 - B) $\text{ADP} + \text{P}_i$ to make ATP
 - C) glucose molecules joined to make glycogen
 - D) $\text{H}_2\text{O} + \text{CO}_2$ to make H_2CO_3
- 83) What happens in redox reactions? 83) _____
- A) the reaction is always easily reversible

- B) the electron acceptor is oxidized
- C) the electron donor is reduced
- D) both decomposition and electron exchange occur

- 84) Choose the answer that best describes fibrous proteins. 84) _____
A) are very stable and insoluble in water
B) are usually called enzymes
C) rarely exhibit secondary structure
D) are cellular catalysts
- 85) Which of the following does *not* describe the ATP molecule? 85) _____
A) pigments
B) transport
C) mechanical work
D) chemical work
- 86) Select the most correct statement regarding nucleic acids. 86) _____
A) Three forms exist: DNA, RNA, and tDNA.
B) TDNA is considered a molecular slave of DNA.
C) DNA is a long, double-stranded molecule made up of A, T, G, and C bases.
D) RNA is a long, single-stranded molecule made up of the bases A, T, G, and C.
- 87) Which of the following is an example of a suspension? 87) _____
A) rubbing alcohol
B) blood
C) salt water
D) cytoplasm
- 88) Select the correct statement about isotopes. 88) _____
A) All the isotopes of an element have the same number of neutrons.
B) All the isotopes of an element are radioactive.
C) Isotopes occur only in the heavier elements.
D) Isotopes of the same element have the same atomic number but differ in their atomic masses.
- 89) The four elements that make up about 96% of body matter are _____. 89) _____
A) nitrogen, hydrogen, calcium, sodium
B) carbon, oxygen, phosphorus, calcium
C) carbon, oxygen, hydrogen, nitrogen
D) sodium, potassium, hydrogen, oxygen
- 90) An example of a coenzyme is _____. 90) _____
A) zinc
B) copper
C) iron
D) riboflavin (vitamin B₂)
- 91) _____ is fat soluble, produced in the skin on exposure to UV radiation, and necessary for normal bone growth and function. 91) _____
A) Vitamin A
B) Cortisol
C) Vitamin K
D) Vitamin D
- 92) In liquid XYZ, you notice that light is scattered as it passes through. There is *no* precipitant in the bottom of the beaker, though it has been sitting for several days. What type of liquid is this? 92) _____
A) solution
B) colloid

C) mixture

D) suspension

- 93) Atom X has 17 protons. How many electrons are in its valence shell? 93) _____
A) 5 B) 10 C) 3 D) 7
- 94) Which protein types are vitally important to cell function in all types of stressful circumstances? 94) _____
A) structural proteins B) catalytic proteins
C) regulatory proteins D) molecular chaperones
- 95) If atom X has an atomic number of 74 it would have which of the following? 95) _____
A) 37 protons and 37 neutrons B) 74 protons
C) 37 electrons D) 37 protons and 37 electrons
- 96) What does the formula $C_6H_{12}O_6$ mean? 96) _____
A) There are 6 calcium, 12 hydrogen, and 6 oxygen atoms.
B) The molecular weight is 24.
C) There are 12 hydrogen, 6 carbon, and 6 oxygen atoms.
D) The substance is a colloid.
- 97) Two good examples of a colloid would be Jell-O[®] and _____. 97) _____
A) blood B) toenails C) cytosol D) urine
- 98) An atom with a valence of 3 may have a total of _____ electrons. 98) _____
A) 17 B) 13 C) 8 D) 3
- 99) Which of the following is a neutralization reaction? 99) _____
A) $HCl \rightarrow H^+ + Cl^-$ B) $NaOH \rightarrow Na^+ + OH^-$
C) $HCl + NaOH \rightarrow NaCl + H_2O$ D) $NH_3 + H^+ \rightarrow NH_4^+$
- 100) The chemical symbol $O=O$ means _____. 100) _____
A) zero equals zero
B) the atoms are double bonded
C) both atoms are bonded and have zero electrons in the outer orbit
D) this is an ionic bond with two shared electrons
- 101) What is a dipole? 101) _____
A) an organic molecule B) a type of bond
C) a polar molecule D) a type of reaction
- 102) What does CH_4 mean? 102) _____
A) This was involved in a redox reaction.
B) There are four carbon and four hydrogen atoms.
C) There is one carbon and four hydrogen atoms.
D) This is an inorganic molecule.
- 103) Amino acids joining together to make a peptide is a good example of a(n) _____ reaction. 103) _____
A) exchange B) decomposition
C) reversible D) synthesis

- 104) Which of the following is *not* considered a factor in influencing a reaction? 104) _____
 A) particle size B) time
 C) concentration D) temperature
- 105) Which of the following is *not* an electrolyte? 105) _____
 A) HCl B) NaOH C) H₂O D) Ca₂CO₃
- 106) Which property of water is demonstrated when we sweat? 106) _____
 A) polar solvent properties
 B) high heat capacity
 C) cushioning
 D) high heat of vaporization
 E) reactivity
- 107) Sucrose is a _____. 107) _____
 A) polysaccharide B) monosaccharide
 C) triglyceride D) disaccharide
- 108) What is the ratio of fatty acids to glycerol in neutral fats? 108) _____
 A) 4:1 B) 3:1 C) 1:1 D) 2:1
- 109) In a DNA molecule, the phosphate serves _____. 109) _____
 A) as a code
 B) as nucleotides
 C) to hold the molecular backbone together
 D) to bind the sugars to their bases
- 110) Heat shock proteins (hsp) are a type of protein called _____. 110) _____
 A) chaperonins B) cofactors
 C) eicosanoids D) coenzymes
- 111) Which bonds often bind different parts of a molecule into a specific three-dimensional shape? 111) _____
 A) Hydrogen B) Amino acid
 C) Oxygen D) Carbon

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 112) The atomic number is equal to the number of _____. 112) _____
- 113) Molecules such as methane that are made of atoms that share electrons have _____ bonds. 113) _____
- 114) An atom with three electrons would have a valence of _____. 114) _____
- 115) $AB \rightarrow A + B$ is an example of a(n) _____ reaction. 115) _____
- 116) _____ have a bitter taste, feel slippery, and are proton acceptors. 116) _____

- 117) A holoenzyme is composed of an apoenzyme and a(n) _____. 117) _____
- 118) In a DNA molecule, guanine would connect to _____. 118) _____
- 119) The _____ molecule directly provides energy for cellular work. 119) _____
- 120) Hydrogen bonds are more like a type of weak _____ than true bonds. 120) _____
- 121) Weak acids and bases make good _____. 121) _____
- 122) Starch is the stored carbohydrate in plants, while _____ is the stored carbohydrate in animals. 122) _____
- 123) How many phosphates would AMP have attached to it? 123) _____
- 124) Which metals have a toxic effect on the body? 124) _____
- 125) What does the polar end of a phospholipid contain? 125) _____
- 126) What type of chemical bond can form between an element with 11 protons and an element with 17 protons? 126) _____
- 127) What happens when globular proteins are denatured? 127) _____
- 128) Explain the difference between potential and kinetic energy. 128) _____
- 129) How can phospholipids form a film when mixed in water? 129) _____
- 130) What properties does water have that make it a very versatile fluid? 130) _____
- 131) What advantages does ATP have in being the energy currency molecule? 131) _____
- 132) Explain why chemical reactions in the body are often *irreversible*. 132) _____
- 133) When a set of electrodes connected to a lightbulb is placed in a solution of dextrose and a current is applied, the lightbulb does not light up. When the same unit is placed in HCl, it does. Why? 133) _____
- 134) Describe the factors that affect chemical reaction rates. 134) _____
- 135) Protons and electrons exist in every atom nucleus except hydrogen. Is this statement true or false and why? 135) _____
- 136) A chemical bond never occurs in a mixture. Discuss this. 136) _____
- 137) All chemical reactions are *theoretically* reversible. Comment on this statement. 137) _____

- 138) What is the major difference between polar and nonpolar covalent bonds? 138) _____
- 139) An amino acid may act as a proton acceptor or donor. Explain. 139) _____
- 140) Name at least four things you know about enzymes. 140) _____
- 141) In the compound H_2CO_3 , what do the numbers 2 and 3 represent? 141) _____
- 142) Are all chemical reactions reversible? If not, why aren't they all reversible? 142) _____

ESSAY. Write your answer in the space provided or on a separate sheet of paper.

- 143) Mrs. Mulligan goes to her dentist and, after having a couple of cavities filled, her dentist strongly suggests that she reduce her intake of sodas and increase her intake of calcium phosphates in the foods she eats. Why?
- 144) Although his cholesterol levels were not high, Mr. Martinez read that cholesterol was bad for his health, so he eliminated all foods and food products containing this molecule. He later found that his cholesterol level dropped only 20%. Why did it not drop more?
- 145) How can DNA be used to "fingerprint" a suspect in a crime?
- 146) Why is it possible for us to drink a solution that contains a mixture of equal concentration of a strong acid and a strong base, either of which, separately, would be very caustic?
- 147) A 65-year-old patient came to the emergency room with complaints of severe heartburn unrelieved by taking a "large handful" of antacids. Would you expect the pH to be high or low? Explain why.
- 148) A 23-year-old male was riding his road bike in 100-degree heat, when he suddenly became nauseated and weak. He called 911 from his cell phone. When the ambulance came, the paramedics started intravenous therapy for severe dehydration. Explain the critical role of water to maintain homeostasis.
- 149) Brenda is a 26-year-old female who is being discharged from the hospital after a vaginal delivery of an 8-pound healthy infant. Brenda is instructed by the nurse to eat a diet high in fiber and to drink 8 glasses of water per day to prevent constipation. Explain the role of fiber and water to promote defecation.
- 150) A 64-year-old man is admitted to the hospital for nonhealing pressure ulcers to his heels. He has been bedridden for 10 years because of a degenerative muscle disease. Explain why protein would be an important part of his diet to promote wound healing.

- 1) D
- 2) B
- 3) E
- 4) C
- 5) A
- 6) C
- 7) B
- 8) B
- 9) D
- 10) E
- 11) C
- 12) A

- 13) A
- 14) D
- 15) B
- 16) C

- 17) C
- 18) A
- 19) B
- 20) D

- 21) B
- 22) C
- 23) B
- 24) A

- 25) A
- 26) A
- 27) C
- 28) B

- 29) D
- 30) C
- 31) A
- 32) B

- 33) C
- 34) B
- 35) A
- 36) A
- 37) TRUE
- 38) TRUE
- 39) FALSE
- 40) TRUE
- 41) FALSE
- 42) FALSE
- 43) FALSE
- 44) TRUE
- 45) TRUE
- 46) TRUE
- 47) TRUE
- 48) FALSE
- 49) FALSE
- 50) TRUE
- 51) TRUE
- 52) TRUE
- 53) TRUE
- 54) FALSE
- 55) TRUE
- 56) TRUE
- 57) TRUE
- 58) D
- 59) C
- 60) C
- 61) D
- 62) C
- 63) C
- 64) C
- 65) C
- 66) B
- 67) A
- 68) C
- 69) A
- 70) A
- 71) A
- 72) C
- 73) B
- 74) C
- 75) C
- 76) D
- 77) D
- 78) B
- 79) D
- 80) C
- 81) B
- 82) A
- 83) D
- 84) A

- 85) A
- 86) C
- 87) B
- 88) D
- 89) C
- 90) D
- 91) D
- 92) B
- 93) D
- 94) D
- 95) D
- 96) C
- 97) C
- 98) B
- 99) C
- 100) B
- 101) C
- 102) C
- 103) D
- 104) B
- 105) C
- 106) D
- 107) D
- 108) B
- 109) C
- 110) A
- 111) A
- 112) protons (and electrons)
- 113) covalent
- 114) one
- 115) decomposition
- 116) Bases
- 117) cofactor
- 118) cytosine
- 119) ATP
- 120) attraction
- 121) buffers
- 122) glycogen
- 123) one
- 124) heavy
- 125) a phosphorus-containing group
- 126) ionic
- 127) The active sites are destroyed.
- 128) Potential energy is inactive stored energy that has potential to do work. Kinetic energy is energy in action.
- 129) Phospholipids have both polar and nonpolar ends. The polar end interacts with water, leaving the nonpolar end oriented in the opposite direction.
- 130) High heat capacity, high heat of vaporization, polarity and solvent properties, reactivity, and cushioning.
- 131) Its energy is easy to capture and store; it releases just the right amount of energy for the cell's needs so it is protected from excessive energy release. A universal energy currency is efficient because a single system can be used by all the cells in the body.

- 132) Chemical reactions that release energy cannot be reversed unless energy is put back into the system. Also, the body may use the chemicals solely for its energy, such as glucose, or some reactions produce molecules in excessive quantities (like CO_2 and NH_4) that the body needs to discard.
- 133) HCl ionizes to form current-conducting electrolytes. Dextrose does not ionize, and therefore does not conduct current.
- 134) Temperature increases kinetic energy and therefore the force of molecular collisions. Particle size: smaller particles move faster at the same temperature and therefore collide more frequently; also, smaller particles have more surface area given the same concentration of reactants. Concentration: the higher the concentration, the greater the chance of particles colliding. Catalysts increase the rate of the reaction at a given temperature. Enzymes are biological catalysts.
- 135) False \square Hydrogen has one proton and one electron. It is the neutron that hydrogen does not have.
- 136) Mixtures come in three forms \square solutions, colloids, and suspensions. Components of these mixtures always retain their original makeup and can be separated into their individual components; therefore no chemical bonding has taken place.
- 137) It is possible to reverse any reaction if the products are still present. Those that are only slightly exergonic are easily reversible. Some would require an enormous amount of energy to reverse. In the simple reaction $\text{Na} + \text{Cl} \rightarrow \text{NaCl}$ the amount of energy it takes to reverse table salt to chlorine gas and sodium metal is enormous. The reversing of the covalently bonded sugar molecule once it is reduced to ATP molecules is even harder or next to impossible.
- 138) Polar bonds have an unequal sharing of electrons resulting in a slight negative charge at one end of the molecule and a slight positive charge at the other end. Nonpolar bonds have an equal sharing of electrons, resulting in a balanced charge among the atoms.
- 139) Amino acids have two components \square a base group (proton acceptor) and an organic acid part (a proton donor).
- 140) 1. They are proteins.
2. They have specific binding sites for specific substrates.
3. They lower the activation barrier for a specific reaction.
4. The names end in "ase."
5. They can be denatured.
6. They can be used again and again.
- 141) The 2 indicates that there are two hydrogen atoms in the compound and the 3 indicates that there are three oxygen atoms in the compound.
- 142) All chemical reactions are theoretically reversible, but only if the products are not consumed.
- 143) Sodas are strong acids that can reduce bone and tooth salts. Calcium phosphate makes teeth hard and therefore more resistant to tooth decay.
- 144) Cholesterol is produced by the liver, in addition to being ingested in foods.
- 145) The DNA of a person is unique to that individual. By obtaining the DNA from nucleated cells from the crime scene (e.g., tissue, sperm), enzymes may be used to break up the DNA into fragments. Because nearly everyone's DNA is different, it also breaks up into fragments differently. When the fragments are separated, they form patterns even more unique than fingerprint patterns. A match of suspect and crime scene DNA is strong evidence.
- 146) When an acid and base of equal strength are mixed, they undergo a displacement reaction to form a water and a salt.
- 147) You would expect a high pH. Taking antacids will neutralize the acidic stomach. Taking a "handful" of antacids can cause an alkaloid state. Certain drugs, such as corticosteroids and antacids that contain baking soda, will lead to metabolic alkalosis.

- 148) Water is the most abundant and important inorganic compound in living material. It makes up 60% to 80% of the volume of most living cells. The properties of water are: high heat capacity, high heat of vaporization, polar solvent properties, reactivity, and cushioning. In this case the bicyclist lost a large amount of water through perspiration in an effort to cool his body. This caused a disruption in homeostasis.
- 149) Cellulose is a polysaccharide found in all plant products that adds bulk to the diet to promote feces through the colon. Water acts as a lubricating liquid within the colon, which eases feces through the bowel.
- 150) Protein composes 10% to 30% of cell mass and is the basic structural material of the body. Proteins regulate body processes. Skin, hair, and eyes are made of protein, as are the enzymes needed for digestion and absorption. Protein is essential for growth, maintenance, and repair of tissue.