

Test Bank for Human Anatomy and Physiology 9th Edition  
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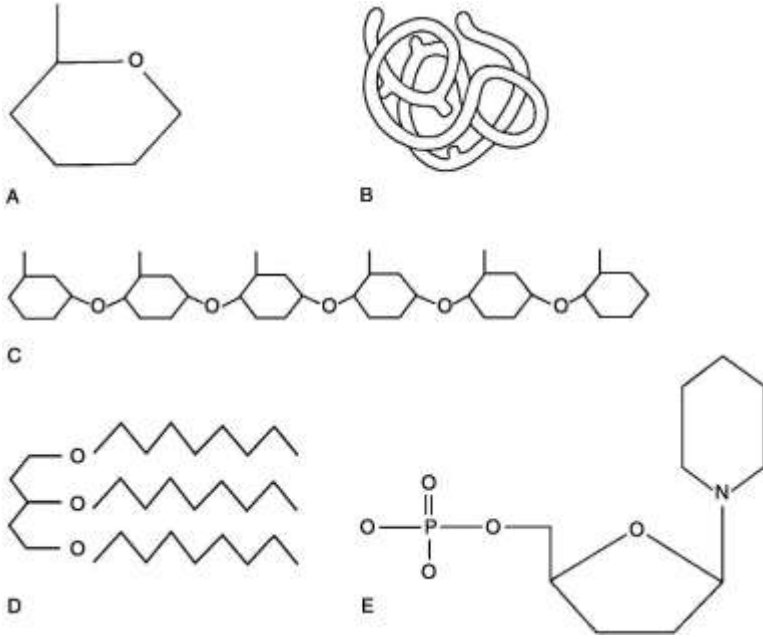
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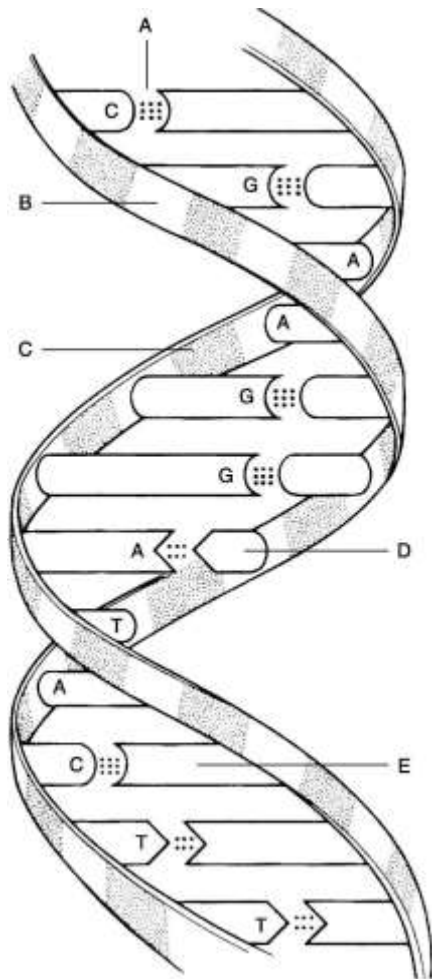
**SHORT ANSWER.** Write the word or phrase that best completes each statement or answers the question.



**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) Ionic bond          | 13) _____ |
| 14) A bond in which electrons are completely lost or gained by the atoms involved. | B) Polar covalent bond | 14) _____ |

15) A bond in which electrons are shared equally. C) Nonpolar covalent bond D) Hydrogen 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) Cation 17) \_\_\_\_\_

18) Neutral subatomic particle. B) Atom 18) \_\_\_\_\_

19) Smallest particle of an element that retains its properties. C) Molecule 19) \_\_\_\_\_

20) Smallest particle of a compound that still retains its properties. D) Neutron 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) Weight 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) Mass

27) \_\_\_\_\_

C) Matter

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

*Match the following:*

29) Legs moving the pedals of a bicycle. A) Chemical 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) Mechanical energy 31) \_\_\_\_\_

D) Radiant energy

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

*Match the following:*

37) First one or two letters of an element's name A) Mass number of an element 37) \_\_\_\_\_

38) Number of protons in an atom B) Atomic symbol 38) \_\_\_\_\_

39) Combined number of protons and neutrons in an atom C) Atomic number 39) \_\_\_\_\_

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

40) 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. 40) \_\_\_\_\_

41) It is the difference in the R group that makes each amino acid chemically unique. 41) \_\_\_\_\_

42) Chemical properties are determined primarily by neutrons.

42) \_\_\_\_\_

43) A charged particle is generally called an ion or electrolyte.

43) \_\_\_\_\_

- 44) Isotopes differ from each other only in the number of electrons the atom contains. 44) \_\_\_\_\_
- 45) About 60% to 80% of the volume of most living cells consists of organic compounds. 45) \_\_\_\_\_
- 46) Lipids are a poor source of stored energy. 46) \_\_\_\_\_
- 47) Current information suggests that omega-3 fatty acids decrease the risk of heart disease. 47) \_\_\_\_\_
- 48) Glucose is an example of a monosaccharide. 48) \_\_\_\_\_
- 49) Glycogen, the storage form of glucose, is primarily stored in muscle tissue only. 49) \_\_\_\_\_
- 50) The lower the pH, the higher the hydrogen ion concentration. 50) \_\_\_\_\_
- 51) Covalent bonds are generally less stable than ionic bonds. 51) \_\_\_\_\_
- 52) Hydrogen bonds are too weak to bind atoms together to form molecules but are important intramolecular bonds. 52) \_\_\_\_\_
- 53) The fact that no chemical bonding occurs between the components of a mixture is the chief difference between mixtures and compounds. 53) \_\_\_\_\_
- 54) The acidity of a solution reflects the free hydrogen ions in the solution 54) \_\_\_\_\_
- 55) A chemical bond is an energy relationship between outer electrons and neighboring atoms. 55) \_\_\_\_\_
- 56) All organic compounds contain carbon. 56) \_\_\_\_\_
- 57) A dipeptide can be broken into two amino acids by dehydration synthesis. 57) \_\_\_\_\_
- 58) The pH of body fluids must remain fairly constant for the body to maintain homeostasis. 58) \_\_\_\_\_
- 59) Mixtures are combinations of elements or compounds that are physically blended together but are not bound by chemical bonds. 59) \_\_\_\_\_
- 60) Buffers resist abrupt and large changes in the pH of the body by releasing or binding ions. 60) \_\_\_\_\_

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

- 61) Which of the following elements is necessary for proper conduction of nervous impulses? 61) \_\_\_\_\_  
 A) I                                      B) Fe                                      C) P                                      D) Na
- 62) The basic structural material of the body consists of \_\_\_\_\_. 62) \_\_\_\_\_  
 A) Lipids.                                      B) Proteins.                                      C) Carbohydrates                                      D) Nucleic acids.
- 63) In general, the lipids that we refer to as oils have \_\_\_\_\_. 63) \_\_\_\_\_  
 A) a high degree of saturated bonds                                      B) a high degree of unsaturated bonds  
 C) long fatty acid chains                                      D) a high water content
- 64) The genetic information is coded in DNA by the \_\_\_\_\_. 64) \_\_\_\_\_  
 A) three-dimensional structure of the double helix  
 B) arrangement of the histones



C) regular alteration of sugar and phosphate molecules

D) sequence of the nucleotides

- 65) Which of the following is not true of proteins? 65) \_\_\_\_\_  
A) They have both functional and structural roles in the body..  
B) They appear to be the molecular carriers of coded hereditary information.  
C) Their function depends on their three-dimensional shape.  
D) They may be denatured or coagulated by heat or acidity.
- 66) The single most abundant protein in the body is\_\_\_\_\_. 66) \_\_\_\_\_  
A) DNA                      B) glucose                      C) collagen                      D) hemoglobin
- 67) Carbohydrates are stored in the liver and muscles in the form of\_\_\_\_\_. 67) \_\_\_\_\_  
A) triglycerides                      B) glycogen                      C) glucose                      D) cholesterol
- 68) Which of the following does NOT describe enzymes? 68) \_\_\_\_\_  
A) Each enzyme is chemically specific.  
B) Enzymes work by raising the energy of activation.  
C) Some enzymes are protein plus a cofactor.  
D) Some enzymes are purely protein.
- 69) Which of the following is not a role of molecular chaperonins? 69) \_\_\_\_\_  
A) help to translocate proteins and certain metal ions across cell membranes  
B) promote the breakdown of damaged or denatured proteins  
C) act as a platform for assembling primary protein structure  
D) aid the desired folding and association process of polypeptides  
E) prevent accidental, premature, or incorrect folding of polypeptide chains
- 70) A chemical reaction in which bonds are broken is usually associated with\_\_\_\_\_. 70) \_\_\_\_\_  
A) the release of energy                      B) forming a larger molecule  
C) a synthesis                      D) the consumption of energy
- 71) Salts are always\_\_\_\_\_. 71) \_\_\_\_\_  
A) ionic compounds                      B) single covalent compounds  
C) hydrogen bonded                      D) double covalent compounds
- 72) 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? 72) \_\_\_\_\_  
A) 2, 8, 1                      B) 2, 8                      C) 2                      D) 2, 8, 8
- 73) Which of the following statements is false? 73) \_\_\_\_\_  
A) When the hydrogen ion concentration decreases, the hydroxyl ion concentration also decreases.  
B) The more hydrogen ions in a solution, the more acidic the solution.  
C) When acids and bases are mixed, they react with each other to form water and a salt.  
D) The pH of blood is slightly basic.
- 74) Which of the following is the major positive ion outside cells? 74) \_\_\_\_\_  
A) sodium                      B) potassium                      C) magnesium                      D) hydrogen
- 75) Which of the following would be regarded as an organic molecule? 75) \_\_\_\_\_  
A) NaOH                      B) H<sub>2</sub>O                      C) CH<sub>4</sub>                      D) NaCl

- 76) What is a chain of more than 50 amino acids called? 76) \_\_\_\_\_  
A) polysaccharide      B) protein      C) polypeptide      D) nucleic acid
- 77) What level of protein synthesis is represented by the coiling of the protein chain backbone into an alpha helix? 77) \_\_\_\_\_  
A) primary structure      B) quaternary structure  
C) tertiary structure      D) secondary structure
- 78) Carbohydrates and proteins are built up from their basic building blocks by the \_\_\_\_\_. 78) \_\_\_\_\_  
A) addition of a water molecule between each two units  
B) removal of a carbon atom between each two units  
C) removal of a water molecule between each two units  
D) addition of a carbon atom between each two units
- 79) Which statement about enzymes is false? 79) \_\_\_\_\_  
A) Enzymes have the ability to accelerate reactions as much as a billion-fold.  
B) Enzymes may be damaged by high temperature.  
C) Enzymes require contact with substrate in order to assume their active form.  
D) Enzymes may use coenzymes derived from vitamins or cofactors from metallic elements.
- 80) Which of the following statements is false? 80) \_\_\_\_\_  
A) Larger particles move faster than smaller ones and thus collide more frequently and more forcefully.  
B) Chemical reactions progress at a faster rate when the reacting particles are present in higher numbers.  
C) Catalysts increase the rate of chemical reactions, sometimes while undergoing reversible changes in shape.  
D) Chemical reactions proceed more quickly at higher temperatures.
- 81) Choose the answer that best describes  $\text{HCO}_3^-$ . 81) \_\_\_\_\_  
A) a weak acid      B) common in the liver  
C) a bicarbonate ion      D) a proton donor
- 82) Select which reactions will usually be irreversible regarding chemical equilibrium in human bodies. 82) \_\_\_\_\_  
A) glucose molecules joined to make glycogen  
B) glucose to  $\text{CO}_2$  and  $\text{H}_2\text{O}$   
C)  $\text{H}_2\text{O} + \text{CO}_2$  to make  $\text{H}_2\text{CO}_3$   
D)  $\text{ADP} + \text{P}_i$  to make ATP
- 83) What happens in redox reactions? 83) \_\_\_\_\_  
A) both decomposition and electron exchange occur  
B) the electron acceptor is oxidized  
C) the reaction is uniformly reversible  
D) the organic substance that loses hydrogen is usually reduced
- 84) Choose the answer that best describes fibrous proteins. 84) \_\_\_\_\_  
A) are usually called enzymes      B) are very stable and insoluble in water  
C) are cellular catalysts      D) rarely exhibit secondary structure
- 85) Which of the following does not describe uses for the ATP molecule? 85) \_\_\_\_\_  
A) mechanical work      B) chemical work

C) transport across membranes

D) pigment structure

- 86) Select the most correct statement regarding nucleic acids. 86) \_\_\_\_\_  
A) DNA is a long, double-stranded molecule made up of A, T, G, and C bases.  
B) Three forms exist: DNA, RNA, and tDNA.  
C) tDNA is considered a molecular slave of DNA during protein synthesis.  
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) blood                      B) rubbing alcohol                      C) cytoplasm                      D) salt water
- 88) Select the correct statement about isotopes. 88) \_\_\_\_\_  
A) All the isotopes of an element have the same number of neutrons but differing numbers of electrons.  
B) Isotopes occur only in the heavier elements.  
C) Isotopes of the same element have the same atomic number but differ in their atomic masses.  
D) All the isotopes of an element are radioactive.
- 89) The four elements that make up about 96% of body matter are\_\_\_\_\_. 89) \_\_\_\_\_  
A) carbon, oxygen, phosphorus, calcium                      B) carbon, oxygen, hydrogen, nitrogen  
C) nitrogen, hydrogen, calcium, sodium                      D) sodium, potassium, hydrogen, oxygen
- 90) \_\_\_\_\_ is fat soluble, produced in the skin on exposure to UV radiation, and necessary for normal bone growth and function. 90) \_\_\_\_\_  
A) Vitamin D                      B) Cortisol                      C) Vitamin K                      D) Vitamin A
- 91) 31) You notice that you cannot read your book through a test tube of patient fluid held against the print, making it so blurred as to be unreadable. There is no precipitant in the bottom of the beaker, though it has been sitting for several days in a rack. What type of liquid is this? 91) \_\_\_\_\_  
A) suspension                      B) mixture                      C) colloid                      D) solution
- 92) Atom X has 17 protons. How many electrons are in its valence shell? 92)\_\_\_\_\_  
A) 3                      B) 10                      C) 7                      D) 5
- 93) Which protein types are vitally important to cell function in all types of stressful circumstances? 93) \_\_\_\_\_  
A) regulatory proteins                      B) structural proteins  
C) molecular chaperones                      D) catalytic proteins
- 94) If atom X has an atomic number of 74 it would have which of the following? 94) \_\_\_\_\_  
A) 37 protons and 37 neutrons                      B) 37 protons and 37 electrons  
C) 37 electrons                      D) 74 protons
- 95) What does the formula  $C_6H_{12}O_6$  mean? 95) \_\_\_\_\_  
A) The molecular weight is 24.  
B) The substance is a colloid.  
C) There are, 6 carbon, 12 hydrogen, and 6 oxygen atoms.  
D) There are 6 calcium, 12 hydrogen, and 6 oxygen atoms.
- 96) An atom with a valence of 3 may have a total of \_\_\_\_\_ electrons. 96)\_\_\_\_\_  
A) 17                      B) 3                      C) 13                      D) 8

- 97) Which of the following is a neutralization reaction? 97) \_\_\_\_\_  
A)  $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$  B)  $\text{NH}_3 + \text{H}^+ \rightarrow \text{NH}_4^+$   
C)  $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$  D)  $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- 98) The chemical symbol  $\text{O}_2$  means \_\_\_\_\_. 98) \_\_\_\_\_  
A) both atoms are bonded and have zero electrons in the outer orbit  
B) this is an ionic bond with two shared electrons  
C) the atoms are double bonded  
D) zero equals zero
- 99) What is a dipole? 99) \_\_\_\_\_  
A) a type of reaction B) an organic molecule  
C) a type of bond D) a polar molecule
- 100) What does  $\text{CH}_4$  mean? 100) \_\_\_\_\_  
A) There are four carbon and four hydrogen atoms.  
B) There is one carbon and four hydrogen atoms.  
C) This was involved in a redox reaction.  
D) This is an inorganic molecule.
- 101) Amino acids joining together to make a peptide is a good example of a(n) \_\_\_\_\_ reaction. 101) \_\_\_\_\_  
A) decomposition B) synthesis C) exchange D) reversible
- 102) Which of the following is not considered a factor in influencing a reaction rate? 102) \_\_\_\_\_  
A) time B) temperature C) particle size D) concentration
- 103) Which property of water is demonstrated when we sweat? 103) \_\_\_\_\_  
A) reactivity  
B) high heat of vaporization  
C) cushioning  
D) polar solvent properties  
E) high heat capacity
- 104) Sucrose is a \_\_\_\_\_. 104) \_\_\_\_\_  
A) polysaccharide B) triglyceride  
C) disaccharide D) monosaccharide
- 105) What is the ratio of fatty acids to glycerol in neutral fats? 105) \_\_\_\_\_  
A) 3:1 B) 4:1 C) 1:1 D) 2:1
- 106) In a DNA molecule, the phosphate serves \_\_\_\_\_. 106) \_\_\_\_\_  
A) as nucleotides B) to bind the sugars to their bases  
C) as a code D) to hold the molecular backbone together
- 107) Stress proteins are a type of protein called \_\_\_\_\_. 107) \_\_\_\_\_  
A) coenzymes B) eicosanoids C) cofactors D) chaperones
- 108) Which bonds often bind different parts of a molecule into a specific three-dimensional shape? 108) \_\_\_\_\_  
A) Amino acid B) Carbon C) Oxygen D) Hydrogen

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

- 109) The atomic number is equal to the number of \_\_\_\_\_. 109) \_\_\_\_\_
- 110) Molecules such as methane that are made of atoms that share electrons have \_\_\_\_\_ bonds. 110) \_\_\_\_\_
- 111) An atom with three electrons would have a valence of \_\_\_\_\_. 111) \_\_\_\_\_
- 112)  $AB \rightarrow A + B$  is an example of a(n) \_\_\_\_\_ reaction. 112) \_\_\_\_\_
- 113) \_\_\_\_\_ have a bitter taste, feel slippery, and are proton acceptors. 113) \_\_\_\_\_
- 114) A holoenzyme is composed of an apoenzyme and a(n) \_\_\_\_\_. 114) \_\_\_\_\_
- 115) In a DNA molecule, guanine would connect to \_\_\_\_\_. 115) \_\_\_\_\_
- 116) The \_\_\_\_\_ molecule directly provides energy for cellular work. 116) \_\_\_\_\_
- 117) Hydrogen bonds are more like a type of weak \_\_\_\_\_ than true bonds. 117) \_\_\_\_\_
- 118) Weak acids and bases make good \_\_\_\_\_. 118) \_\_\_\_\_
- 119) Starch is the stored carbohydrate in plants, while \_\_\_\_\_ is the stored carbohydrate in animals. 119) \_\_\_\_\_
- 120) How many phosphates would AMP have attached to it? 120) \_\_\_\_\_
- 121) Which metals have a toxic effect on the body? 121) \_\_\_\_\_
- 122) What does the polar end of a phospholipid contain? 122) \_\_\_\_\_
- 123) What type of chemical bond can form between an element with 11 protons and an element with 17 protons? 123) \_\_\_\_\_
- 124) What happens when globular proteins are denatured? 124) \_\_\_\_\_
- 125) Explain the difference between potential and kinetic energy. 125) \_\_\_\_\_
- 126) How can phospholipids form a film when mixed in water? 126) \_\_\_\_\_
- 127) What properties does water have that make it a very versatile fluid? 127) \_\_\_\_\_
- 128) What advantages does ATP have in being the energy currency molecule? 128) \_\_\_\_\_
- 129) Explain why chemical reactions in the body are often irreversible. 129) \_\_\_\_\_
- 130) When a set of electrodes connected to a light bulb is placed in a solution of dextrose and a current is applied, the light bulb does not light up. When the same unit is placed in HCl, it does. Why? 130) \_\_\_\_\_

131) Describe the factors that affect chemical reaction rates.

131) \_\_\_\_\_

- 132) Protons and electrons exist in every atom nucleus except hydrogen. Is this statement true or false and why? 132) \_\_\_\_\_
- 133) A chemical bond never occurs between components of a mixture. Discuss this. 133) \_\_\_\_\_
- 134) All chemical reactions are theoretically reversible. Comment on this statement. 134) \_\_\_\_\_
- 135) What is the major difference between polar and nonpolar covalent bonds? 135) \_\_\_\_\_
- 136) An amino acid may act as a proton acceptor or donor. Explain. 136) \_\_\_\_\_
- 137) Name at least four things you know about enzymes. 137) \_\_\_\_\_
- 138) In the compound  $\text{H}_2\text{CO}_3$ , what do the numbers 2 and 3 represent? 138) \_\_\_\_\_
- 139) Are all chemical reactions reversible? If not, why aren't they all reversible? 139) \_\_\_\_\_
- 140) If all protons, electrons, and neutrons are alike, regardless of the atom considered, what determines the unique properties of each element? 140) \_\_\_\_\_

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

- 141) 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?
- 142) 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?
- 143) How can DNA be used to "fingerprint" a suspect in a crime?
- 144) 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?
- 145) 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.
- 146) 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.
- 147) 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.



- 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) B
- 14) A
- 15) C
- 16) D
- 17) A
- 18) D
- 19) B
- 20) C
- 21) B
- 22) C
- 23) B
- 24) A
- 25) C
- 26) D
- 27) B
- 28) A
- 29) C
- 30) A
- 31) D
- 32) B
- 33) C
- 34) B
- 35) A
- 36) A
- 37) B
- 38) C
- 39) A
- 40) TRUE
- 41) TRUE
- 42) FALSE
- 43) TRUE
- 44) FALSE
- 45) FALSE
- 46) FALSE
- 47) TRUE
- 48) TRUE
- 49) FALSE
- 50) TRUE
- 51) FALSE

- 52) TRUE
- 53) TRUE
- 54) TRUE
- 55) TRUE
- 56) TRUE
- 57) FALSE
- 58) TRUE
- 59) TRUE
- 60) TRUE
- 61) D
- 62) B
- 63) B
- 64) D
- 65) B
- 66) C
- 67) B
- 68) B
- 69) C
- 70) A
- 71) A
- 72) A
- 73) A
- 74) A
- 75) C
- 76) B
- 77) D
- 78) C
- 79) C
- 80) A
- 81) C
- 82) B
- 83) A
- 84) B
- 85) D
- 86) A
- 87) A
- 88) C
- 89) B
- 90) A
- 91) C
- 92) C
- 93) C
- 94) D
- 95) C
- 96) C
- 97) D
- 98) C
- 99) D
- 100) B
- 101) B
- 102) A
- 103) B

- 104) C
- 105) A
- 106) D
- 107) D
- 108) D
- 109) protons (and electrons)
- 110) covalent
- 111) one
- 112) decomposition
- 113) Bases
- 114) cofactor
- 115) cytosine
- 116) ATP
- 117) attraction
- 118) buffers
- 119) glycogen
- 120) one
- 121) heavy
- 122) a phosphorus-containing group
- 123) ionic
- 124) The active sites are destroyed.
- 125) Potential energy is inactive stored energy that has potential to do work. Kinetic energy is energy in action.
- 126) Phospholipids have both polar and nonpolar ends. The polar end interacts with water, leaving the nonpolar end oriented in the opposite direction.
- 127) High heat capacity, high heat of vaporization, polarity and solvent properties, reactivity, and cushioning.
- 128) 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.
- 129) Chemical reactions that release energy cannot be reversed unless energy is put back into the system. Also, some reactions produce molecules in excessive quantities (like CO<sub>2</sub> and NH<sub>4</sub>) that the body then eliminates, but which are needed to reverse a reaction.
- 130) HCl ionizes to form current-conducting electrolytes. Dextrose does not ionize, and therefore does not conduct current.
- 131) 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.
- 132) False. Hydrogen has one proton and one electron. It is the neutron, not the electron that can coexist in the nucleus and that hydrogen does not have.
- 133) Mixtures come in three forms—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.
- 134) 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 without plant-like systems.
- 135) 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.
- 136) Amino acids have two components—a base group (proton acceptor) and an organic acid part (a proton donor).

Some have additional base or acid groups on the ends of their R groups as well.

- 137)
  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.
- 138) 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.
- 139) All chemical reactions are theoretically reversible, but only if the products are not consumed.
- 140) Atoms of different elements are composed of different numbers of protons, electrons, and neutrons.
- 141) Sodas are strong acids that can reduce bone and tooth salts. Calcium phosphate makes teeth hard and therefore more resistant to tooth decay.
- 142) Cholesterol is produced by the liver, in addition to being ingested in foods.
- 143) 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.
- 144) When an acid and base of equal strength are mixed, they undergo a displacement reaction to form a water and a salt.
- 145) 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.
- 146) 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.
- 147) 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.