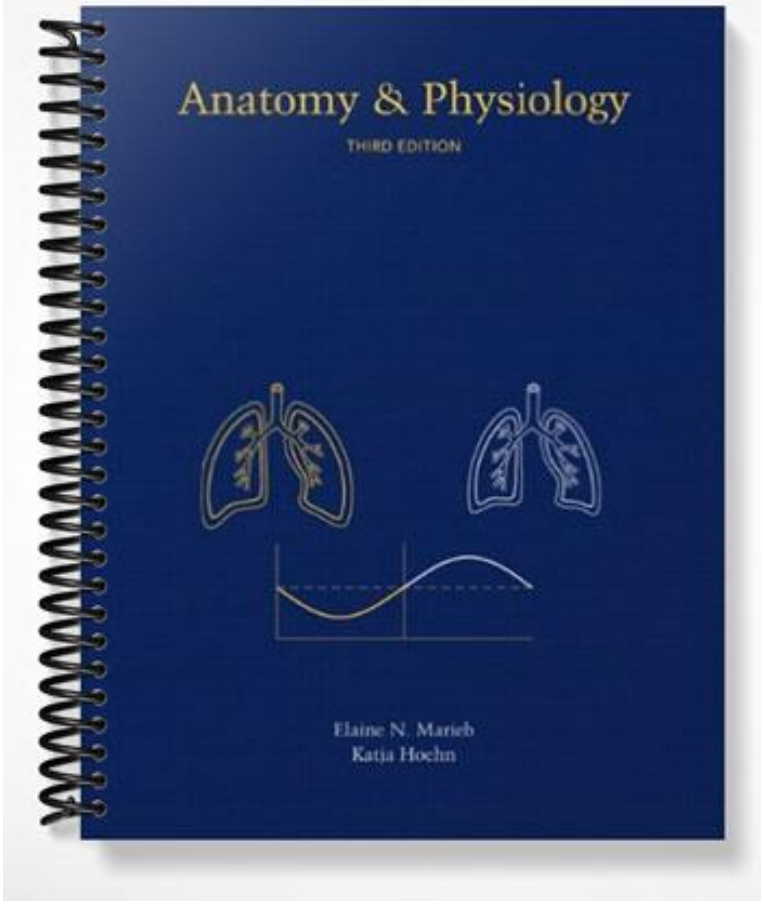
TEST BANK


Anatomy & Physiology
THIRD EDITION
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SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

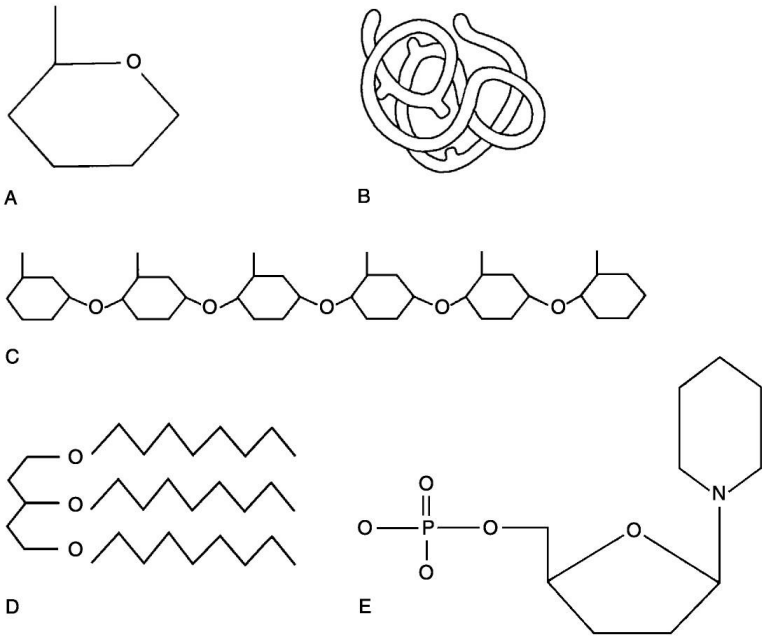

Figure 2.1

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) _____

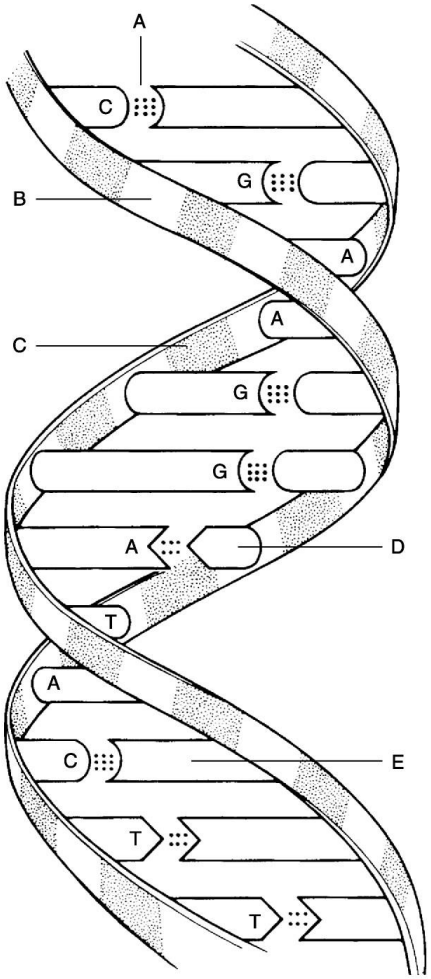

Figure 2.2

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:

13) A bond in which electrons are shared unequally.

14) A bond in which electrons are completely lost or gained by the atoms involved.

A) Ionic bond

B) Polar covalent bond

C) Hydrogen bond

D)

13) _____

14) _____

15) A bond in which electrons are equally shared.

Nonpolar covalent 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:

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

A) Atom

17) _____

B) Cation

18) Neutral subatomic particle.

18) _____

C) Neutron

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

19) _____

D) Molecule

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

20) _____

Match the following:

21) Water.	A) Element	21) _____
22) Carbon.	B) Compound	22) _____
23) Dry ice (frozen carbon dioxide).	C) Mixture	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) Mass

B) Weight

C) 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.

27) _____

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

28) _____

Match the following:

29) Legs moving the pedals of a bicycle.

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

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

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

A) Electrical energy

B) Mechanical energy

C) Chemical energy

D) Radiant energy

29) _____

30) _____

31) _____

32) _____

Match the following:

33) Heterogeneous, will not settle.	A) Solutions	33) _____
34) Heterogeneous, will settle.	B) Colloids	34) _____
35) Homogeneous, will not settle.	C) Suspensions	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 CO_2. 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) _____

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

55) Which of the following is necessary for proper conduction of nervous impulses? 55) _____
A) I B) Na C) Fe D) P

56) A phospholipid is usually _____. 56) _____
A) completely polar
B) completely nonpolar
C) neither polar nor nonpolar
D) partially polar and partially nonpolar

57) In general, the category of lipids that we refer to as oils have _____. 57) _____
A) a high degree of saturated bonds
B) long fatty acid chains
C) a high water content
D) a high degree of unsaturated bonds

58) The genetic information is coded in DNA by _____. 58) _____
A) the arrangement of the histones
B) the regular alteration of sugar and phosphate molecules
C) the three-dimensional structure of the double helix
D) the sequence of the nucleotides

59) Which of the following is *not* true of proteins? 59) _____
A) They may be denatured or coagulated by heat or acidity.
B) Some types are called enzymes.
C) Their function depends on the three-dimensional shape.
D) They appear to be the molecular carriers of the coded hereditary information.

60) The single most abundant protein in the body is _____. 60) _____
A) collagen B) hemoglobin
C) glucose D) DNA

61) Carbohydrates are stored in the liver and muscles in the form of _____. 61) _____
A) triglycerides B) glucose
C) glycogen D) cholesterol

62) Coenzymes are _____. 62) _____
A) two enzymes that perform the same function
B) organic molecules derived from vitamins
C) enzymes that work together
D) metal ions

63) The speed or rate of a chemical reaction is influenced by all of the following *except* _____. 63) _____
A) the presence or absence of carbon
B) the presence of catalysts or enzymes

C) the concentration of the reactants
D) the temperature

64) A chemical reaction in which bonds are broken is usually associated with _____. 64) _____
A) the consumption of energy B) forming a larger molecule
C) the release of energy D) a synthesis

65) Salts are always _____. 65) _____
A) ionic compounds B) double covalent compounds
C) single covalent compounds D) hydrogen bonded

66) The numbers listed represent the first, second, and third energy levels, respectively. On this basis, which of the following is an unstable or reactive atom? 66) _____
A) 2, 8, 1 B) 2, 8 C) 2, 8, 8 D) 2

67) A solution that has a pH of 2 could best be described as being _____. 67) _____
A) basic B) slightly acidic
C) neutral D) acidic

68) Which of the following is the major positive ion outside cells? 68) _____
A) nitrogen B) sodium
C) potassium D) hydrogen

69) Which of the following would be regarded as an organic molecule? 69) _____
A) CH_4 B) H_2O C) NaCl D) NaOH

70) A chain of 25 amino acids would be called a _____. 70) _____
A) polypeptide B) starch
C) nucleotide D) protein

71) A long chain of simple sugars would be a _____. 71) _____
A) protein B) nucleic acid
C) polysaccharide D) monosaccharide

72) The coiling of the protein chain backbone into an alpha helix is referred to as the _____. 72) _____
A) quaternary structure B) primary structure
C) tertiary structure D) secondary structure

73) Carbohydrates and proteins are built up from their basic building blocks by the _____. 73) _____
A) addition of a water molecule between each two units
B) removal of a water molecule between each two units
C) addition of a carbon atom between each two units
D) removal of a nitrogen atom between each two units

74) Which statement about enzymes is *false*? 74) _____
A) Enzymes are composed mostly of protein.
B) Enzymes may be damaged by high temperature.
C) Enzymes are organic catalysts.

D) Enzymes raise the activation energy needed to start a reaction.

75) Many plasma proteins may function as _____. 75) _____
A) buffers B) oxygen transport vesicles
C) antibodies D) structural proteins

76) Which of the following is true regarding the concentration of solutions? 76) _____
A) Molarity is one mole of solute per 1000 ml of solution.
B) Percent solutions are parts per 1000 parts.
C) To calculate molarity, one must know the atomic weight of the solvent.
D) To calculate molarity, one must know the atomic number of the solute.

77) Select the statement about mixtures that is correct. 77) _____
A) Solutions contain particles that settle out in time.
B) A solution contains solvent in large amounts and solute in smaller quantities.
C) Suspensions can change reversibly from liquid to solid.
D) Suspensions are homogeneous mixtures of two or more components.

78) HCO_3^- is _____. 78) _____
A) a proton donor B) a bicarbonate ion
C) a weak acid D) common in the liver

79) Select which reactions will usually be irreversible regarding chemical equilibrium in living systems. 79) _____
A) $H_2O + CO_2$ to make H_2CO_3
B) ADP + Pi to make ATP
C) glucose molecules joined to make glycogen
D) glucose to CO_2 & H_2O

80) In redox reactions _____. 80) _____
A) the electron donor is reduced
B) the reaction is always easily reversible
C) the electron acceptor is oxidized
D) both decomposition and electron exchange occur

81) Fibrous proteins _____. 81) _____
A) are usually called enzymes
B) are cellular catalysts
C) rarely exhibit secondary structure
D) are very stable and insoluble in water

82) The ATP molecule is *not* used in _____. 82) _____
A) pigments B) transport
C) chemical work D) mechanical work

83) Select the most correct statement regarding nucleic acids. 83) _____
A) Three forms exist: DNA, RNA, and tDNA.
B) RNA is a long, single-stranded molecule made up of the bases A,

T, G, and C.

C) DNA is a long, double-stranded molecule made up of A, T, G, and C bases.

D) TDNA is considered a molecular slave of DNA.

84) _____ is a suspension. 84) _____

A) Blood B) Cytoplasm

C) Rubbing alcohol D) Saltwater

85) Select the correct statement about isotopes. 85) _____

A) All the isotopes of an element are radioactive.

B) Isotopes of the same element have the same atomic number but differ in their atomic mass.

C) Isotopes occur only in the heavier elements.

D) All the isotopes of an element have the same number of neutrons.

86) The four elements that make up about 96% of body matter are _____. 86) _____

A) nitrogen, hydrogen, calcium, sodium

B) sodium, potassium, hydrogen, oxygen

C) carbon, oxygen, hydrogen, nitrogen

D) carbon, oxygen, phosphorus, calcium

87) An example of a coenzyme is _____. 87) _____

A) copper B) riboflavin (vitamin B_2)

C) zinc D) iron

88) _____ is fat-soluble, produced in the skin on exposure to UV radiation, and necessary for normal bone growth and function. 88) _____

A) Cortisol B) Vitamin D

C) Vitamin K D) Vitamin A

89) 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. This liquid must be a _____. 89) _____

A) solution B) mixture

C) colloid D) suspension

90) Atom X has seventeen protons. How many electrons are in its valence shell? 90) _____

A) 3 B) 10 C) 7 D) 5

91) If an atom were to have two protons, then it would _____. 91) _____

A) be chemically active B) have a valence of 0

C) be very stable D) have three electrons

92) If atom X has an atomic number of 74 it would have _____. 92) _____

A) 37 electrons

B) 37 protons and 37 neutrons

C) 74 protons and no neutrons

D) 74 protons and roughly the same number of neutrons

93) The formula $C_6H_{12}O_6$ means _____. 93) _____

A) the molecular weight is 24
B) there are 12 hydrogen, 6 carbon, and 6 oxygen atoms
C) the substance is a colloid
D) there are 6 calcium, 12 hydrogen, and 6 oxygen atoms

94) Two good examples of a colloid would be Jell-O® or _____. 94) _____
A) urine B) toenails C) blood D) cytosol

95) An atom with a valance of 3 may have a total of _____ electrons. 95) _____
A) 13 B) 8 C) 17 D) 3

96) An atom with _____ electrons could be an anion when ionically bonded. 96) _____
A) 9 B) 3 C) 6 D) 15

97) The chemical symbol O□O means _____. 97) _____
A) this is an ionic bond with two shared electrons
B) both atoms are bonded and have zero electrons in the outer orbit
C) the atoms are double bonded
D) zero equals zero

98) Dipole is _____. 98) _____
A) a type of bond B) an organic molecule
C) a type of reaction D) a polar molecule

99) CH_4 means _____. 99) _____
A) this was involved in a redox reaction
B) this is an inorganic molecule
C) there are four carbon and four hydrogen atoms
D) there is one carbon and four hydrogen atoms

100) Amino acids joining together to make a peptide is a good example of a _____ reaction. 100) _____
A) reversible B) synthesis
C) exchange D) decomposition

101) _____ is *not* considered to be a factor in influencing a reaction. 101) _____
A) Particle size B) Temperature
C) Concentration D) Time

102) Which of the following is *not* an electrolyte? 102) _____
A) H_2O B) NaOH C) HCl D) Ca_2CO_3

103) Human blood has a pH of _____. 103) _____
A) 8.35-8.55 B) 7.35-7.45
C) 6.80-7.00 D) 7.70-8.00

104) Sucrose is a _____. 104) _____
A) triglyceride B) polysaccharide
C) disaccharide D) monosaccharide

105) Neutral fats have a _____ ratio of fatty acids to glycerol. 105) _____

A) 2:1 B) 3:1 C) 1:1 D) 4:1

106) In a DNA molecule, the phosphate serves _____. 106) _____
A) to hold the molecular backbone together
B) as nucleotides
C) to bind the sugars to their bases
D) as a code

107) Most fibrous proteins in the body contain all of these *except*: 107) _____
A) eledin B) keratin C) collagen D) elastin

108) Heat shock proteins (hsp) are a type of protein called _____. 108) _____
A) coenzymes B) chaperonins
C) eicosanoids D) cofactors

109) _____ bonds often bind different parts of a molecule into a specific 3-dimensional shape. 109) _____
A) Oxygen B) Hydrogen
C) Amino acid D) Carbon

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

110) The atomic number is equal to the number of _____. 110) _____

111) Tritium is a _____. 111) _____

112) Molecules such as methane that are made of atoms that share electrons have _____ bonds. 112) _____

113) An atom with three electrons would have a valence of _____. 113) _____

114) AB → A + B is an example of a _____ reaction. 114) _____

115) _____ have a bitter taste, feel slippery, and are proton acceptors. 115) _____

116) Polysaccharides with long chains of similar units are more generally called _____. 116) _____

117) A holoenzyme is composed of an apoenzyme and a _____. 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) AMP would have _____ phosphate(s) attached to it. 123) _____

124) The polar end of a phospholipid contains a _____. 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 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? 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 in a mixture. Discuss this. 133) _____

134) All chemical reactions are *theoretically* reversible. Comment on this statement. 134) _____

135) Glucose is a monosaccharide classified as a hexose. Comment on this statement. 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) _____

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

138) 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?

139) 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?

140) Why is it possible for us to drink a solution that contains a mixture of equal

concentr strong acid and a strong base, either of which, separately, would be very caustic?
ation of a

141) A 65-year-old client 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.

142) 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.

143) 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.

144) A 64-year-old man is admitted to the hospital for non-healing 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) B
14) A
15) D
16) C

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

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

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

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

33) B
34) C
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) B
56) D
57) D
58) D
59) D
60) A
61) C
62) B
63) A
64) C
65) A
66) A
67) D
68) B
69) A
70) A
71) C
72) D
73) B
74) D
75) A
76) A
77) B
78) B
79) D
80) D
81) D
82) A
83) C
84) A

85) B
86) C
87) B
88) B
89) C
90) C
91) C
92) D
93) B
94) D
95) A
96) A
97) C
98) D
99) D
100) B
101) D
102) A
103) B
104) C
105) B
106) A
107) A
108) B
109) B
110) protons (and electrons)
111) radioisotope
112) covalent
113) one
114) decomposition
115) Bases
116) polymers
117) cofactor
118) cytosine
119) ATP
120) attraction
121) buffers
122) glycogen
123) one
124) phosphorus-containing group
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, 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.

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 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 Na + Cl → 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.

135) Glucose is a simple sugar with six carbons, forming a single six-sided ring.

136) Amino acids have two components a base group (proton acceptor) and an organic acid part (a proton donor).

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) Sodas are strong acids that can reduce bone and tooth salts. Calcium phosphate makes teeth hard and therefore more resistant to tooth decay.

139) Cholesterol is produced by the liver, in addition to being ingested in foods.

140) When an acid and base of equal strength are mixed, they undergo a displacement reaction to form a water and a salt.

141) 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.

142) 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.

143) 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.

144) 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.