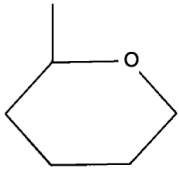


Exam

Name _____

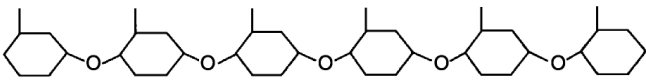
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.



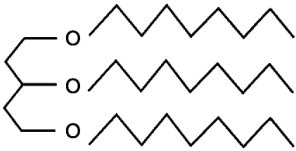
A



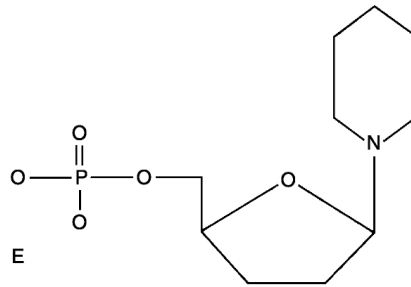
B



C



D



E

Figure 2.1

Using Figure 2.1, match the following:

1) Lipid

1) _____

Answer: D

2) Functional protein

2) _____

Answer: B

3) Nucleotide

3) _____

Answer: E

4) Polysaccharide.

4) _____

Answer: C

5) Monosaccharide

5) _____

Answer: A

6) Polymer

Answer: C

6) _____

7) Tertiary (protein) structure

Answer: B

7) _____

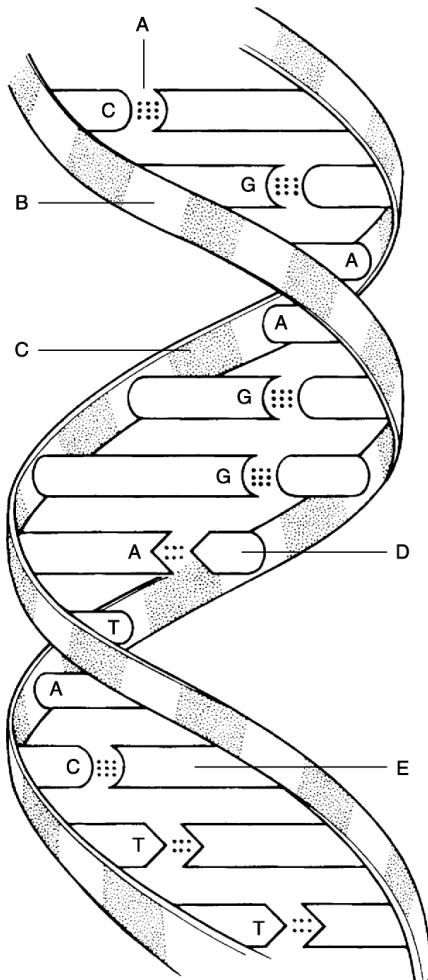


Figure 2.2

Using Figure 2.2, match the following:

8) Deoxyribose sugar.

Answer: B

8) _____

9) Thymine

Answer: D

9) _____

10) Guanine

Answer: E

10) _____

11) Phosphate

Answer: C

11) _____

12) Hydrogen bonds

Answer: A

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.

Answer: C

A) Hydrogen bond

B) Nonpolar covalent bond

13) _____

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

Answer: D

C) Polar covalent bond

D) Ionic bond

14) _____

15) A bond in which electrons are shared equally.

Answer: B

15) _____

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

Answer: A

16) _____

Match the following particles to the correct description:

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

Answer: A

A) Cation

17) _____

18) Neutral subatomic particle.

Answer: A

A) Neutron

18) _____

B) Molecule

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

Answer: C

C) Atom

19) _____

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

Answer: B

20) _____

Match the following:

21) Water.

Answer: B

A) Mixture

21) _____

B) Compound

22) Carbon.

Answer: C

C) Element

22) _____

23) Dry ice (frozen carbon dioxide).

Answer: B

23) _____

24) Blood.

Answer: A

24) _____

Match the following:

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

Answer: A

A) Energy

25) _____

26) Anything that occupies space and has mass.

Answer: B

A) Mass

B) 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.

Answer: A

C) Weight

27) _____

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

Answer: C

28) _____

Match the following:

29) Legs moving the pedals of a bicycle.

Answer: B

A) Radiant energy

B) Mechanical energy

29) _____

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

Answer: C

C) Chemical energy

D) Electrical energy

30) _____

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

Answer: A

31) _____

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

Answer: D

32) _____

Match the following:

33) Heterogeneous, will not settle.

Answer: A

A) Colloids

33) _____

34) Heterogeneous, will settle. A) Suspensions 34) _____

Answer: A

B) Solutions

35) Homogeneous, will not settle. 35) _____

Answer: B

36) Will not scatter light. 36) _____

Answer: B

Match the following:

37) First one or two letters of an element's name A) Atomic symbol 37) _____

Answer: A

B) Atomic number

38) Number of protons in an atom C) Mass number of an element 38) _____

Answer: B

39) Combined number of protons and neutrons in an atom 39) _____

Answer: C

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) _____

Answer: ☒ True ☐ False

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

Answer: ☒ True ☐ False

42) Chemical properties are determined primarily by neutrons. 42) _____

Answer: ☐ True ☒ False

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

Answer: ☒ True ☐ False

44) Isotopes differ from each other only in the number of electrons the atom contains. 44) _____

Answer: ☐ True ☒ False

- 45) About 60% to 80% of the volume of most living cells consists of organic compounds. 45) _____
Answer: True ☒ False
- 46) Lipids are a poor source of stored energy. 46) _____
Answer: True ☒ False
- 47) Current information suggests that omega-3 fatty acids decrease the risk of heart disease. 47) _____
Answer: ☒ True False
- 48) Glucose is an example of a monosaccharide. 48) _____
Answer: ☒ True False
- 49) Glycogen, the storage form of glucose, is primarily stored in muscle tissue only. 49) _____
Answer: True ☒ False
- 50) The lower the pH, the higher the hydrogen ion concentration. 50) _____
Answer: ☒ True False
- 51) Covalent bonds are generally less stable than ionic bonds. 51) _____
Answer: True ☒ False
- 52) Hydrogen bonds are too weak to bind atoms together to form molecules but are important intramolecular bonds. 52) _____
Answer: ☒ True False
- 53) The fact that no chemical bonding occurs between the components of a mixture is the chief difference between mixtures and compounds. 53) _____
Answer: ☒ True False
- 54) The acidity of a solution reflects the free hydrogen ions in the solution 54) _____
Answer: ☒ True False
- 55) A chemical bond is an energy relationship between outer electrons and neighboring atoms. 55) _____
Answer: ☒ True False
- 56) All organic compounds contain carbon. 56) _____
Answer: ☒ True False

57) A dipeptide can be broken into two amino acids by dehydration synthesis. 57) _____

Answer: True ☒ False

58) The pH of body fluids must remain fairly constant for the body to maintain homeostasis. 58) _____

Answer: ☒ True False

59) Mixtures are combinations of elements or compounds that are physically blended together but are not bound by chemical bonds. 59) _____

Answer: ☒ True False

60) Buffers resist abrupt and large changes in the pH of the body by releasing or binding ions. 60) _____

Answer: ☒ True False

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) P B) Fe C) Na D) I

Answer: C

62) The basic structural material of the body consists of _____. 62) _____

- A) Lipids. B) Nucleic acids. C) Proteins. D) Carbohydrates

Answer: C

63) In general, the lipids that we refer to as oils have _____. 63) _____

- A) a high water content B) long fatty acid chains
C) a high degree of unsaturated bonds D) a high degree of saturated bonds

Answer: C

64) The genetic information is coded in DNA by the _____. 64) _____

- A) sequence of the nucleotides
B) arrangement of the histones
C) regular alteration of sugar and phosphate molecules
D) three-dimensional structure of the double helix

Answer: A

65) Which of the following is not true of proteins?

65) _____

- A) They may be denatured or coagulated by heat or acidity.
- B) Their function depends on their three- dimensional shape.
- C) They appear to be the molecular carriers of coded hereditary information.
- D) They have both functional and structural roles in the body..

Answer: C

66) The single most abundant protein in the body is _____.

66) _____

- A) DNA
- B) glucose
- C) collagen
- D) hemoglobin

Answer: C

67) Carbohydrates are stored in the liver and muscles in the form of _____.

67) _____

- A) glycogen
- B) glucose
- C) triglycerides
- D) cholesterol

Answer: A

68) Which of the following does NOT describe enzymes?

68) _____

- A) Some enzymes are protein plus a cofactor.
- B) Some enzymes are purely protein.
- C) Each enzyme is chemically specific.
- D) Enzymes work by raising the energy of activation.

Answer: D

69) Which of the following is not a role of molecular chaperonins?

69) _____

- A) promote the breakdown of damaged or denatured proteins
- B) aid the desired folding and association process of polypeptides
- C) act as a platform for assembling primary protein structure
- D) help to translocate proteins and certain metal ions across cell membranes
- E) prevent accidental, premature, or incorrect folding of polypeptide chains

Answer: C

70) A chemical reaction in which bonds are broken is usually associated with _____.

70) _____

- A) a synthesis
- B) the consumption of energy
- C) forming a larger molecule
- D) the release of energy

Answer: D

- 71) Salts are always _____. 71) _____
A) double covalent compounds B) ionic compounds
C) single covalent compounds D) hydrogen bonded
Answer: B
- 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
Answer: A
- 73) Which of the following statements is false? 73) _____
A) When acids and bases are mixed, they react with each other to form water and a salt.
B) The pH of blood is slightly basic.
C) When the hydrogen ion concentration decreases, the hydroxyl ion concentration also decreases.
D) The more hydrogen ions in a solution, the more acidic the solution.
Answer: C
- 74) Which of the following is the major positive ion outside cells? 74) _____
A) sodium B) potassium C) hydrogen D) magnesium
Answer: A
- 75) Which of the following would be regarded as an organic molecule? 75) _____
A) CH₄ B) H₂O C) NaOH D) NaCl
Answer: A
- 76) What is a chain of more than 50 amino acids called? 76) _____
A) protein B) polypeptide C) polysaccharide D) nucleic acid
Answer: A
- 77) What level of protein synthesis is represented by the coiling of the protein chain backbone into an alpha helix? 77) _____
A) tertiary structure B) quaternary structure
C) primary structure D) secondary structure
Answer: D

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 water molecule between each two units
- C) removal of a carbon atom between each two units
- D) addition of a carbon atom between each two units

Answer: B

79) Which statement about enzymes is false?

79) _____

- A) Enzymes may be damaged by high temperature.
- B) Enzymes may use coenzymes derived from vitamins or cofactors from metallic elements.
- C) Enzymes have the ability to accelerate reactions as much as a billion-fold.
- D) Enzymes require contact with substrate in order to assume their active form.

Answer: D

80) Which of the following statements is false?

80) _____

- A) Chemical reactions progress at a faster rate when the reacting particles are present in higher numbers.
- B) Larger particles move faster than smaller ones and thus collide more frequently and more forcefully.
- C) Chemical reactions proceed more quickly at higher temperatures.
- D) Catalysts increase the rate of chemical reactions, sometimes while undergoing reversible changes in shape.

Answer: B

81) Choose the answer that best describes HCO_3^- .

81) _____

- | | |
|------------------------|----------------------|
| A) common in the liver | B) a proton donor |
| C) a weak acid | D) a bicarbonate ion |

Answer: D

82) Select which reactions will usually be irreversible regarding chemical equilibrium in human bodies.

82) _____

- A) $\text{H}_2\text{O} + \text{CO}_2$ to make H_2CO_3
- B) glucose to CO_2 and H_2O
- C) glucose molecules joined to make glycogen
- D) $\text{ADP} + \text{Pi}$ to make ATP

Answer: B

- 83) What happens in redox reactions? 83) _____
- A) both decomposition and electron exchange occur
 - B) the reaction is uniformly reversible
 - C) the organic substance that loses hydrogen is usually reduced
 - D) the electron acceptor is oxidized
- Answer: A
- 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
- Answer: B
- 85) Which of the following does not describe uses for the ATP molecule? 85) _____
- A) pigment structure
 - B) mechanical work
 - C) chemical work
 - D) transport across membranes
- Answer: A
- 86) Select the most correct statement regarding nucleic acids. 86) _____
- A) RNA is a long, single-stranded molecule made up of the bases A, T, G, and C.
 - B) DNA is a long, double-stranded molecule made up of A, T, G, and C bases.
 - C) Three forms exist: DNA, RNA, and tDNA.
 - D) tDNA is considered a molecular slave of DNA during protein synthesis.
- Answer: B
- 87) Which of the following is an example of a suspension? 87) _____
- A) cytoplasm
 - B) salt water
 - C) blood
 - D) rubbing alcohol
- Answer: C
- 88) Select the correct statement about isotopes. 88) _____
- A) All the isotopes of an element are radioactive.
 - B) All the isotopes of an element have the same number of neutrons but differing numbers of electrons.
 - C) Isotopes of the same element have the same atomic number but differ in their atomic masses.
 - D) Isotopes occur only in the heavier elements.
- Answer: C

- 89) The four elements that make up about 96% of body matter are _____. 89) _____
 A) sodium, potassium, hydrogen, oxygen B) carbon, oxygen, hydrogen, nitrogen
 C) carbon, oxygen, phosphorus, calcium D) nitrogen, hydrogen, calcium, sodium
 Answer: B
- 90) _____ is fat soluble, produced in the skin on exposure to UV radiation, and necessary for normal bone growth and function. 90) _____
 A) Vitamin A B) Vitamin D C) Cortisol D) Vitamin K
 Answer: B
- 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) solution B) mixture C) colloid D) suspension
 Answer: C
- 92) Atom X has 17 protons. How many electrons are in its valence shell? 92) _____
 A) 5 B) 3 C) 7 D) 10
 Answer: C
- 93) Which protein types are vitally important to cell function in all types of stressful circumstances? 93) _____
 A) catalytic proteins B) regulatory proteins
 C) molecular chaperones D) structural proteins
 Answer: C
- 94) If atom X has an atomic number of 74 it would have which of the following? 94) _____
 A) 37 electrons B) 37 protons and 37 neutrons
 C) 37 protons and 37 electrons D) 74 protons
 Answer: D
- 95) What does the formula $C_6H_{12}O_6$ mean? 95) _____
 A) The substance is a colloid.
 B) There are, 6 carbon, 12 hydrogen, and 6 oxygen atoms.
 C) There are 6 calcium, 12 hydrogen, and 6 oxygen atoms.
 D) The molecular weight is 24.
 Answer: B

96) An atom with a valence of 3 may have a total of _____ electrons. 96) _____
A) 13 B) 8 C) 17 D) 3

Answer: A

97) Which of the following is a neutralization reaction? 97) _____
A) $\text{HCl} \rightarrow \text{H}^+ + \text{Cl}^-$ B) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
C) $\text{NH}_3 + \text{H}^+ \rightarrow \text{NH}_4^+$ D) $\text{NaOH} \rightarrow \text{Na}^+ + \text{OH}^-$

Answer: B

98) The chemical symbol $\text{O}=\text{O}$ means _____. 98) _____
A) zero equals zero
B) both atoms are bonded and have zero electrons in the outer orbit
C) this is an ionic bond with two shared electrons
D) the atoms are double bonded

Answer: D

99) What is a dipole? 99) _____
A) an organic molecule B) a type of bond
C) a type of reaction D) a polar molecule

Answer: D

100) What does CH_4 mean? 100) _____
A) There is one carbon and four hydrogen atoms.
B) There are four carbon and four hydrogen atoms.
C) This was involved in a redox reaction.
D) This is an inorganic molecule.

Answer: A

101) Amino acids joining together to make a peptide is a good example of a(n) _____ reaction. 101) _____
A) exchange B) synthesis C) decomposition D) reversible

Answer: B

102) Which of the following is not considered a factor in influencing a reaction rate? 102) _____
A) temperature B) particle size C) concentration D) time

Answer: D

- 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

Answer: B

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

Answer: B

- 105) What is the ratio of fatty acids to glycerol in neutral fats? 105) _____
- A) 4:1
 - B) 1:1
 - C) 3:1
 - D) 2:1

Answer: C

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

Answer: B

- 107) Stress proteins are a type of protein called _____. 107) _____
- A) coenzymes
 - B) chaperones
 - C) cofactors
 - D) eicosanoids

Answer: B

- 108) Which bonds often bind different parts of a molecule into a specific three-dimensional shape? 108) _____
- A) Amino acid
 - B) Hydrogen
 - C) Oxygen
 - D) Carbon

Answer: B

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) _____

Answer: protons (and electrons)

- 110) Molecules such as methane that are made of atoms that share electrons have _____ bonds. 110) _____

Answer: covalent

- 111) An atom with three electrons would have a valence of _____. 111) _____
Answer: one
- 112) $AB \rightarrow A + B$ is an example of a(n) _____ reaction. 112) _____
Answer: decomposition
- 113) _____ have a bitter taste, feel slippery, and are proton acceptors. 113) _____
Answer: Bases
- 114) A holoenzyme is composed of an apoenzyme and a(n) _____. 114) _____
Answer: cofactor
- 115) In a DNA molecule, guanine would connect to _____. 115) _____
Answer: cytosine
- 116) The _____ molecule directly provides energy for cellular work. 116) _____
Answer: ATP
- 117) Hydrogen bonds are more like a type of weak _____ than true bonds. 117) _____
Answer: attraction
- 118) Weak acids and bases make good _____. 118) _____
Answer: buffers
- 119) Starch is the stored carbohydrate in plants, while _____ is the stored carbohydrate in animals. 119) _____
Answer: glycogen
- 120) How many phosphates would AMP have attached to it? 120) _____
Answer: one
- 121) Which metals have a toxic effect on the body? 121) _____
Answer: heavy
- 122) What does the polar end of a phospholipid contain? 122) _____
Answer: a phosphorus-containing group

- 123) What type of chemical bond can form between an element with 11 protons and an element with 17 protons? 123) _____
Answer: ionic
- 124) What happens when globular proteins are denatured? 124) _____
Answer: The active sites are destroyed.
- 125) Explain the difference between potential and kinetic energy. 125) _____
Answer: Potential energy is inactive stored energy that has potential to do work. Kinetic energy is energy in action.
- 126) How can phospholipids form a film when mixed in water? 126) _____
Answer: Phospholipids have both polar and nonpolar ends. The polar end interacts with water, leaving the nonpolar end oriented in the opposite direction.
- 127) What properties does water have that make it a very versatile fluid? 127) _____
Answer: High heat capacity, high heat of vaporization, polarity and solvent properties, reactivity, and cushioning.
- 128) What advantages does ATP have in being the energy currency molecule? 128) _____
Answer: 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) Explain why chemical reactions in the body are often irreversible. 129) _____
Answer: 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 CO₂ and NH₄) that the body then eliminates, but which are needed to reverse a reaction.
- 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) _____
Answer: HCl ionizes to form current-conducting electrolytes. Dextrose does not ionize, and therefore does not conduct current.
- 131) Describe the factors that affect chemical reaction rates. 131) _____
Answer: 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) Protons and electrons exist in every atom nucleus except hydrogen. Is this statement true or false and why? 132) _____
- Answer: 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) A chemical bond never occurs between components of a mixture. Discuss this. 133) _____
- Answer: 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) All chemical reactions are theoretically reversible. Comment on this statement. 134) _____
- Answer: 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) What is the major difference between polar and nonpolar covalent bonds? 135) _____
- Answer: 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) An amino acid may act as a proton acceptor or donor. Explain. 136) _____
- Answer: 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) Name at least four things you know about enzymes. 137) _____
- Answer:
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) In the compound H_2CO_3 , what do the numbers 2 and 3 represent? 138) _____
- Answer: 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) Are all chemical reactions reversible? If not, why aren't they all reversible? 139) _____
- Answer: All chemical reactions are theoretically reversible, but only if the products are not consumed.

140) If all protons, electrons, and neutrons are alike, regardless of the atom considered, what determines the unique properties of each element?

140) _____

Answer: Atoms of different elements are composed of different numbers of protons, electrons, and neutrons.

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?

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

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?

Answer: Cholesterol is produced by the liver, in addition to being ingested in foods.

143) How can DNA be used to "fingerprint" a suspect in a crime?

Answer: 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) 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?

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

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.

Answer: 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) 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.

Answer: 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) 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.

Answer: 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.