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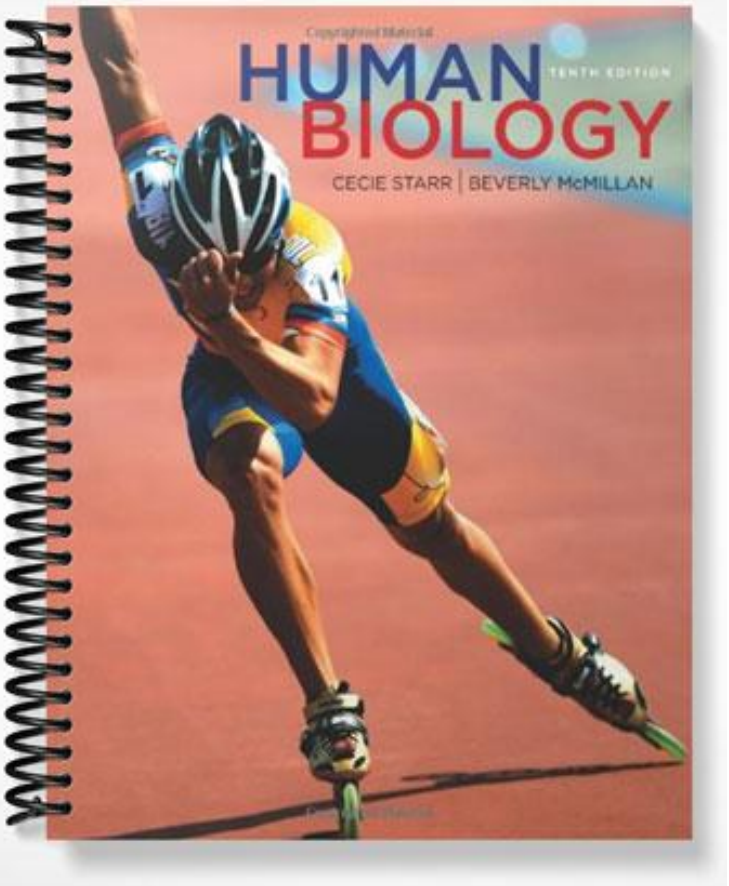

Chapter 02: Chemistry of Life

Student: _____

1. An element that represents less than 0.01 percent of body weight is known as a(n)

   A. compound.
   B. trace element.
   C. molecule.
   D. isotope.
   E. analog.

2. Which is the smallest portion of a substance that retains the properties of an element?

   A. atom
   B. compound
   C. ion
   D. molecule
   E. mixture

3. How many natural elements exist on Earth?

   A. 100
   B. 112
   C. 88
   D. 96
   E. 110

4. Which subatomic particle has a positive charge?

   A. electron
   B. neutron
   C. photon
   D. neutrino
   E. proton

5. Which two subatomic particles are almost always equal in number?

   A. electrons and neutrons
   B. protons and neutrons
   C. protons and electrons
   D. photons and electrons
   E. neutrons and neutrinos

6. Organisms consist mostly of four elements. They are carbon, hydrogen, oxygen, and

   A. iron.
   B. chlorine.
   C. silicon.
   D. nitrogen.
   E. phosphorous.

7. The atomic number refers to the

   A. mass of an atom.
   B. number of protons in an atom.
   C. number of both protons and neutrons in an atom.
   D. number of neutrons in an atom.
   E. number of electrons in an atom.

8. An element's mass number is equal to the sum of its

   A. protons and electrons.
   B. protons and neutrons.
   C. electrons and neutrons.
   D. protons only.
   E. electrons only.

9. Isotopes

   A. are identical in mass number to the "standard" element.
   B. contain a different number of electrons than the "standard" element.
   C. contain a different number of protons than the "standard" element.
   D. contain the same number of protons but a different number of neutrons than the "standard" element.
   E. are actually a different element than the "standard" element.

10. Radioisotopes

    A. are unstable and emit energy and particles to stabilize themselves.
    B. are different elements from the "standard" elements.
    C. are very stable and do not change over time.
    D. contain more electrons than the "standard" element.
    E. contain less electrons than the "standard" element.

11. The negative subatomic particle is (are) the

    A. neutron.
    B. proton.
    C. electron.
    D. neutron and proton.
    E. proton and electron.

12. The neutral subatomic particle is (are) the

    A. neutron.
    B. proton.
    C. electron.
    D. neutron and proton.
    E. proton and electron.

13. The nucleus of an atom contains

    A. neutrons and protons.
    B. neutrons and electrons.
    C. protons and electrons.
    D. protons only.
    E. neutrons only.

14. Which element does not contain a neutron in its nucleus?

    A. helium
    B. carbon
    C. oxygen
    D. hydrogen
    E. nitrogen

15. Transmutation of an element (the change of an element into a different element) occurs due to

    A. exposure to strong sunlight.
    B. exposure to certain chemicals.
    C. natural aging of the element.
    D. combining with another element.
    E. radioactive decay.

16. Examples of isotopes include:

    A. oxygen 8 and oxygen 16.
    B. carbon 12 and nitrogen 14.
    C. hydrogen 1 and helium 1.
    D. sodium 23 and potassium 23.
    E. carbon 12 and carbon 14.

17. All atoms of an element have the same number of

    A. ions.
    B. protons.
    C. neutrons.
    D. electrons.
    E. protons and neutrons.

18. A sugar or other molecule in which radioisotopes have been substituted for some atoms is a(n)

    A. enzyme.
    B. reactant.
    C. tracer.
    D. subatomic particle.
    E. quark.

19. Positron Emission Tomography utilizes ____ to yield results of a scan.

    A. tracers
    B. x-rays
    C. neutrinos
    D. photons
    E. mesons

20. The time it takes for half of a quantity of a radioisotope to decay into a more stable isotope is

    A. the same for all elements.
    B. decay time.
    C. half-life.
    D. disintegration time.
    E. dependent on temperature.

21. A tracer is a substance with what attached to it?

    A. water
    B. carbon
    C. a radioisotope
    D. an ion
    E. a positron

22. PET (positron-emission tomography) scans use radioisotopes attached to what substances to detect abnormalities?

    A. other radioisotopes
    B. subatomic particles
    C. carbon atoms
    D. glucose or other biological molecules
    E. plutonium

23. The time it takes for half of a quantity of a radioisotope to decay into a more stable isotope is

    A. the same for all elements.
    B. decay time.
    C. half-life.
    D. disintegration time.
    E. dependent on temperature.

24. The element in the body with the greatest number of atoms is

    A. phosphorus.
    B. oxygen.
    C. hydrogen.
    D. calcium.
    E. carbon.

25. Which of the following is NOT a compound?

    A. salt
    B. sugar
    C. carbon
    D. oxygen gas
    E. water

26. Electrons move around the atomic nucleus in

    A. zigzag patterns.
    B. straight paths.
    C. shells.
    D. two dimensions.
    E. one dimension.

27. Electrons inside a shell travel in

    A. straight paths.
    B. orbitals
    C. zigzag patterns
    D. two dimensions
    E. one dimension

28. The maximum number of electrons in a shell is

    A. two.
    B. four.
    C. six.
    D. eight.
    E. ten.

29. A union between the electron structures of atoms is a(n)

    A. chemical bond.
    B. hydrogen bond.
    C. isotopic bond.
    D. physical bond.
    E. atomic bond.

30. When an atom's outer shell is filled it is

A. unstable.
B. an ion.
C. most stable.
D. polarized.
E. negatively charged.

31. Which of the following is not one of the four most abundant elements in the body?

A. carbon
B. hydrogen
C. oxygen
D. nitrogen
E. calcium

32. The bonding of two or more atoms creates a(n)

A. ion.
B. molecule.
C. mixture.
D. suspension.
E. particle.

33. Atoms without vacancies are considered to be

A. ions.
B. negatively charged.
C. positively charged.
D. inert.
E. highly active.

34. Choose the correct formula for the reaction that takes place between hydrogen and oxygen to produce water.

A. $H_2 + O_2 \rightarrow H_2O$
B. $H + O \rightarrow H_2O$
C. $2H_2 + O_2 \rightarrow 2H_2O$
D. $2H_2O + O_2 \rightarrow 4H_2O$
E. $2H_2 + 2O_2 \rightarrow 2H_2O$

35. A(n) ____ consists of two or more bonded elements in proportions that never vary.

A. ion
B. mixture
C. compound
D. network solid
E. satisfied orbital

36. When two or more molecules simply mingle, a(n) ____ is created.

A. compound
B. mixture
C. molecule
D. ionic compound
E. suspension

37. An atom that is considered *inert* is

A. oxygen.
B. hydrogen.
C. nitrogen.
D. carbon.
E. helium.

38. Water is an example of a(n)

A. atom.
B. ion.
C. compound.
D. mixture.
E. element.

39. Which of the following answers include all the others?

A. atoms
B. molecules
C. electrons
D. elements
E. protons

40. Which of the following is NOT an element?

A. water
B. oxygen
C. carbon
D. chlorine
E. hydrogen

41. A molecule is

A. a combination of two or more atoms.
B. less stable than its constituent atoms separated.
C. electrically charged.
D. a carrier of one or more extra neutrons.
E. one atom.

42. A bond that joins atoms that have opposite charges is a(n)

A. covalent bond.
B. hydrogen bond.
C. ionic bond.
D. coordinate covalent bond.
E. polar covalent bond.

43. What is formed when an atom loses or gains an electron?

A. a molecule
B. an ion
C. a compound
D. a mixture
E. a solvent

44. Generally, an atom carries no charge because it has as many electrons as

A. neutrons.
B. orbitals.
C. shells.
D. protons.
E. neutrinos.

45. The bond in table salt (NaCl) is

A. polar.
B. ionic.
C. covalent.
D. double.
E. nonpolar.

46. The bond formed when atoms share electrons is a(n) ____ bond.

A. hydrogen
B. ionic
C. covalent
D. crystalline
E. network

47. A hydrogen bond is

A. a sharing of a pair of electrons between a hydrogen and an oxygen nucleus.
B. a sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or a nitrogen nucleus.
C. an attractive force that involves a hydrogen atom and an oxygen or a nitrogen atom that are either in two different molecules or within the same molecule.
D. found only in water molecules.
E. is the strongest form of chemical bond.

48. A water molecule is an example of which type of molecule?

A. polar covalent
B. nonpolar covalent
C. ionic
D. coordinate covalent
E. network

49. Molecular hydrogen is an example of which type of molecule?

A. polar covalent
B. nonpolar covalent
C. ionic
D. coordinate covalent
E. network

50. In a polar covalent bond, the atoms of the different elements do not share electrons equally because

A. one is a metal and one is a non-metal.
B. both are metals.
C. both are non-metals.
D. one element has more neutrons.
E. one element has more protons.

51. Which type of bond holds the two strands of DNA together?

A. ionic
B. network
C. polar covalent
D. hydrogen
E. non-polar covalent

52. Which type of bond makes water liquid?

A. ionic
B. covalent
C. polar covalent
D. nonpolar covalent
E. hydrogen

53. How do hydrophobic molecules interact with water?

A. attracted to
B. absorbed by
C. repelled by
D. mixed with
E. polarized bond

54. Why does water have a high heat capacity?

A. because it has covalent bonds
B. because it has ionic bonds
C. because it has hydrogen bonds
D. because it has a high boiling point
E. because it has a low freezing point

55. What makes water a solvent?

A. Fats dissolve in it.
B. Ions and polar molecules dissolve in it.
C. It mixes well with alcohol.
D. It evaporates easily.
E. It contains no minerals.

56. Water stabilizes body temperature and dissolves many substances because

A. it evaporates easily.
B. its molecules are covalent.
C. its molecules are ionic.
D. it contains hydrogen bonds.
E. it is free of minerals.

57. A salt will dissolve in water to form

A. acids.
B. gases.
C. ions.
D. bases.
E. polar solvents.

58. The process in which an atom or molecule loses one or more electrons to another atom or molecule is called

A. reduction.
B. dehydration.
C. oxidation.
D. condensation.
E. hydrolysis.

59. The many oxidation reactions that take place in our bodies cause the formation of

A. free radicals.
B. antioxidants.
C. covalent molecules.
D. ionic molecules.
E. hydrogen bonds.

60. A free radical will "steal" what particle from a stable molecule?

A. a proton
B. a neutron
C. an atom
D. an electron
E. a positron

61. Substances that give up an electron to a free radical are called

A. reducing agents.
B. oxidizing agents.
C. neutralizing agents.
D. antibiotics.
E. antioxidants.

62. Antioxidant-rich foods are typically

A. low in fat and high in fiber.
B. high in fat and low in fiber.
C. high in sugars and low in fat.
D. high in fiber and high in fat.
E. low in sugars and high in fiber.

63. Natural sources of antioxidants do not include

A. vitamin C.
B. vitamin E.
C. orange vegetables.
D. green leafy vegetables.
E. O_2^-.

64. The pH scale measures the

A. hydroxide ion concentration.
B. concentration of a water-based solution.
C. hydrogen ion concentration.
D. number of water molecules in a solution.
E. concentration of dissolved solute.

65. A reaction of a strong acid and a strong base will produce water and

A. a buffer.
B. a salt.
C. gas.
D. solid precipitate.
E. solute.

66. Which of the following would NOT be used in connection with the word *acid*?

A. excess hydrogen ions
B. contents of the stomach
C. magnesium hydroxide
D. pH less than 7
E. HCl

67. Fluid inside most human cells is about

A. pH 7.
B. pH 9.
C. pH 4.
D. pH 11.
E. pH 2.

68. Smoke from fossil fuels, motor vehicle exhaust, and nitrogen fertilizers can lead to

A. greater cloud formation.
B. acid rain.
C. basic rain.
D. rain with high mineral content.
E. salted rain.

69. Cellular pH is kept near a value of 7 because of

A. salts.
B. buffers.
C. acids.
D. bases.
E. water.

70. H_2CO_3 is

A. sulfuric acid.
B. carbonic acid.
C. carbolic acid.
D. hydrochloric acid.
E. nitric acid.

71. HCl in the stomach acts to

A. neutralize buffers.
B. kill harmful bacteria.
C. switch off certain digestive enzymes.
D. produce trypsin.
E. prevent breakdown of protein.

72. A buffer system

A. makes new hydrogen ions.
B. eliminates hydrogen ions already present.
C. binds carbon ions.
D. releases hydrogen ions.
E. produce excess acid.

73. A pH of 10 is how many times as basic as a pH of 7?

A. 2
B. 3
C. 10
D. 100
E. 1000

74. A buildup of H_2CO_3 in the blood will lead to

A. alkalosis.
B. calcium buildup.
C. acidosis.
D. hydroxide ion increase.
E. HCO_3^- increase.

75. What substances will release hydrogen ions when their concentration is low and accept them when their concentration is high?

A. salts
B. acids
C. bases
D. buffers
E. alkalines

76. If a molecule contains carbon and at least one atom of hydrogen, it is referred to as being

A. inorganic.
B. acidic.
C. basic.
D. organic.
E. crystalline.

77. Each carbon atom can share pairs of electrons with as many as ____ other atoms.

A. 2
B. 3
C. 4
D. 5
E. 6

78. Atoms or clusters of atoms that are covalently bonded to carbon and influence the behavior of organic compounds are known as

A. functional groups.
B. ions.
C. acids.
D. network solids.
E. anhydrides.

79. Proteins that speed up reactions are known as

A. salts.
B. buffers.
C. monomers.
D. polymers.
E. enzymes.

80. Which element makes up more than half of the human body?

A. calcium
B. hydrogen
C. oxygen
D. carbon
E. nitrogen

81. Condensation reactions are also referred to as

A. hydrolysis.
B. dehydration synthesis.
C. lytic reactions.
D. recombination.
E. transmutation.

82. The three most common atoms in your body are

A. hydrogen, oxygen, and carbon.
B. carbon, hydrogen, and nitrogen.
C. carbon, nitrogen, and oxygen.
D. nitrogen, hydrogen, and oxygen.
E. carbon, oxygen, and sulfur.

83. A large molecule built of three to millions of subunits is a(n)

A. monomer.
B. ion.
C. polymer.
D. enzyme.
E. functional unit.

84. The process by which two molecules covalently bond into a larger one is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

85. The process by which a molecule splits into two smaller ones is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

86. The process by which one or more electrons from one molecule are donated to another molecule is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

87. The process by which a molecule gives up a functional group, and a different molecule immediately accepts it, is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

88. The process by which the movement of internal bonds converts one type of organic compound to another is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

89. The insertion of water (H^+ and OH^-) into an enzymatically split molecule is

A. hydrolysis.
B. dehydration synthesis.
C. condensation.
D. cleavage.
E. polymerization.

90. Which of the following includes all of the others?

A. sucrose
B. glucose
C. cellulose
D. glycogen
E. carbohydrate

91. Which of the following is a building block of carbohydrates?

A. glycerol
B. nucleotide
C. simple sugar
D. monosaccharide
E. glucose

92. Which of the following is composed of a 1:2:1 ratio of carbon to hydrogen to oxygen?

A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. steroid

93. Which vitamin is derived from sugar monomers?

A. vitamin D
B. vitamin E
C. vitamin C
D. vitamin A
E. vitamin B_{12}

94. Which simple sugar is the main energy source for body cells?

A. fructose
B. sucrose
C. lactose
D. glucose
E. galactose

95. Which of the following is not a monosaccharide?

A. glucose
B. fructose
C. deoxyribose
D. starch
E. ribose

96. The most plentiful sugar in nature is

A. glucose.
B. fructose.
C. sucrose.
D. lactose.
E. glycogen.

97. Most of the carbohydrates eaten by humans are in the form of

A. monosaccharides.
B. polysaccharides.
C. oligosaccharides.
D. disaccharides.
E. five carbon sugars.

98. Fructose and glucose are

A. isotopes.
B. monosaccharides.
C. disaccharides.
D. six-carbon sugars.
E. monosaccharides and six-carbon sugars.

99. Sucrose is composed of

A. two molecules of fructose.
B. two molecules of glucose.
C. a molecule of fructose and a molecule of glucose.
D. a molecule of fructose and a molecule of galactose.
E. two molecules of glucose

100. Plants store a large amount of glucose in the form of

A. starch.
B. glycogen.
C. glucose.
D. cellulose.
E. fats.

101. Stored sugar in animal muscles and liver is in the form of

A. starch.
B. glycogen.
C. glucose.
D. cellulose.
E. fats.

102. A lipid is a

A. polar hydrocarbon.
B. polar peptide.
C. nonpolar hydrocarbon.
D. nonpolar peptide.
E. coordinate covalent molecule.

103. A saturated hydrocarbon molecule has

A. three double bonds.
B. one double bond.
C. one double and one triple bond.
D. all single bonds.
E. all triple bonds.

104. A molecule consisting of three fatty acid tails attached to glycerol is a(n)

A. carbohydrate.
B. nucleic acid.
C. triglyceride.
D. amino acid.
E. oil.

105. Which of the following are lipids?

A. steroids
B. triglycerides
C. oils
D. waxes
E. all of these

106. The most abundant lipids in the body are

A. oils.
B. waxes.
C. steroids.
D. triglycerides.
E. fatty acids.

107. Which type of fat, often the main ingredient in margarine, has been implicated in the development of certain heart diseases?

A. triglycerides
B. trans fatty acids
C. cholesterol
D. oils
E. waxes

108. Triglycerides yield how much more energy, gram for gram, than carbohydrates?

A. twice as much
B. three times as much
C. four times as much
D. one half as much
E. about the same amount

109. Which is the main material of cell membranes?

A. lipids
B. proteins
C. phospholipids
D. triglycerides
E. fatty acids

110. Why do triglycerides yield more energy than carbohydrates?

A. they have fewer removable electrons
B. they have double bonds
C. they contain glycerol
D. they have more removable electrons
E. fatty acids

111. Which sterol, often associated with heart disease, is a crucial component to the structure and function of cells?

A. cholesterol
B. triglycerides
C. phospholipids
D. cortisol
E. estrogen

112. Which of the following is not a derivative of cholesterol is

A. vitamin D
B. bile salts
C. estrogen
D. testosterone
E. amino acid

113. Which element is NOT characteristic of the primary structure of proteins?

A. carbon
B. hydrogen
C. phosphorus
D. sulfur
E. nitrogen

114. Amino acids are the building blocks for

A. proteins.
B. carbohydrates.
C. nucleic acids.
D. fats.
E. steroids.

115. What kind of bond exists between two amino acids?

A. hydrogen
B. glycosidic
C. peptide
D. ionic
E. sulfhydroxyl

116. The sequence of amino acids is the ____ structure of a protein.

A. primary
B. secondary
C. tertiary
D. quaternary
E. isomeric

117. How many amino acids are known to exist?

A. 100
B. 50
C. 25
D. 20
E. 10

118. Proteins that speed up chemical reactions are

A. substrates.
B. reactants.
C. enzymes.
D. amino acids.
E. carboxyl groups.

119. Which part of the amino acid helps to determine its chemical properties?

A. the amino group
B. the carboxyl group
C. the covalent bonds
D. the peptide bond
E. the R group

120. What type of bond forms at regular, short intervals along a new polypeptide chain?

A. ionic
B. covalent
C. glycosidic
D. hydrogen
E. coordinate covalent

121. Which structure makes a protein a molecule that can perform a particular function?

A. primary
B. secondary
C. tertiary
D. quaternary
E. isomeric

122. Which of the following exhibits fourth level (quaternary) structure?

A. amino acids
B. lipids
C. glycogen
D. hemoglobin
E. complex carbohydrate

123. Which is the most common protein in the body?

A. muscle
B. collagen
C. hemoglobin
D. bone matrix
E. insulin

124. The disruption of a protein's three-dimensional structure is called

A. condensation.
B. hydrolysis.
C. ionization.
D. oxidation.
E. denaturation.

125. A glycoprotein is a combination of a protein and

A. heme.
B. oligosaccharides.
C. collagen.
D. fatty acids.
E. nucleic acids.

126. In addition to hydrogen bonding, what type of bonds may exist in the quaternary structure of a protein?

A. ionic
B. coordinate
C. disulfide
D. network
E. diphosphate

127. A lipoprotein is a combination of a protein and

A. cholesterol, triglycerides and phospholipids.
B. oligosaccharides.
C. fatty acids.
D. nucleic acids.
E. collagen.

128. Which of the following is NOT found in every nucleic acid?

A. ribose
B. phosphate group
C. purine
D. pyrimidine
E. uracil

129. What is the name for a molecule that accepts hydrogen atoms and electrons that are being removed from other molecules and transfers them to other sites for further use?

A. enzyme
B. coenzyme
C. protein
D. lipid
E. steroid

130. Nucleotides are building blocks for

A. proteins.
B. steroids.
C. lipids.
D. carbohydrates.
E. DNA, RNA, and ATP.

131. The nucleotide most closely associated with energy is

A. cyclic AMP.
B. FAD.
C. ATP.
D. NAD.
E. NADPH.

132. Nucleotides contain what kind of sugars?

A. three carbon
B. four carbon
C. five carbon
D. six carbon
E. seven carbon

133. Which molecule links chemical reactions that release energy with other reactions that require energy?

A. DNA
B. RNA
C. NAD
D. ATP
E. cyclic AMP

134. Which type of bond holds the nucleotide bases together in a DNA molecule?

A. hydrogen
B. covalent
C. ionic
D. network
E. peptide

135. Some pesticides can trigger

A. hives.
B. joint pain.
C. headaches.
D. asthma.
E. all of these.

136. In what year did chemists begin developing synthetic toxins to protect crops?

A. 1865
B. 1900
C. 1925
D. 1945
E. 1960

137. A positive effect associated with pesticide usage does not include

A. killing disease-causing insects.
B. killing some pathogens.
C. increasing food supplies.
D. increasing profits for farmers.
E. causing cancer.

138. **Selecting the Exception**

Four of the five answers listed below possess electrons in the third orbital. The atomic number is at the right of the element. Select the exception.

A. sodium (11)
B. magnesium (12)
C. chlorine (17)
D. nitrogen (7)
E. sulfur (16)

139. **Selecting the Exception**

Four of the five answers listed below are related by a unifying characteristic. Select the exception.

A. ionic bond
B. covalent bond
C. polar bond
D. hydrogen bond
E. cluster of nonpolar groups

140. **Selecting the Exception**

Four of the five answers listed below are alkaline (pH above 7). Select the exception.

A. milk of magnesia
B. household ammonia
C. TumsÒ
D. phosphate detergent
E. cola soft drink

141. **Selecting the Exception**

Four of the five answers listed below are acidic (pH below 7). Select the exception.

A. vinegar
B. soft drink
C. soap
D. lemon juice
E. beer

142. **Selecting the Exception**

Four of the five answers listed below are characteristics of water. Select the exception.

A. stabilize temperature
B. common solvent
C. cohesion and surface tension
D. produce salts
E. change shape of hydrophilic and hydrophobic substances

143. **Selecting the Exception**

Four of the five answers listed below are related by a common chemical similarity. Select the exception.

A. cellulose
B. hydrochloric acid
C. amino acid
D. protein
E. nucleic acid

144. **Selecting the Exception**

Four of the five answers listed below are related as members of the same group. Select the exception.

A. glucose
B. fructose
C. cellulose
D. ribose
E. deoxyribose

145. **Selecting the Exception**

Four of the five answers below are related as members of the same group. Select the exception.

A. lactose
B. maltose
C. sucrose
D. table sugar
E. glucose

146. **Selecting the Exception**

Four of the five answers listed below are carbohydrates. Select the exception.

A. glycerol
B. cellulose
C. starch
D. sucrose
E. glycogen

147. **Selecting the Exception**

Four of the five answers listed below are lipids. Select the exception.

A. triglyceride
B. wax
C. oil
D. insulin
E. steroid

148. **Selecting the Exception**

Four of the five answers listed below are saturated fats. Select the exception.

A. butter
B. bacon
C. margarine
D. animal fat
E. lard

149. **Selecting the Exception**

Four of the five answers listed below are amino acids. Select the exception.

A. tryptophan
B. valine
C. alanine
D. adenine
E. leucine

150. **Selecting the Exception**

Four of the five answers listed below are functional groups. Select the exception.

A. R group
B. amino group
C. carboxyl group
D. hydroxyl group
E. methyl group

151. **Selecting the Exception**

Four of the five answers listed below are dissolved substances found in cells. Select the exception.

A. nucleotides
B. sugars
C. amino acids
D. alcohols
E. fatty acids

152. **Selecting the Exception**

Four of the five answers listed below are long chains of sugars. Select the exception.

A. polysaccharides
B. oligosaccharides
C. complex carbohydrates
D. corn starch
E. potato starch

153. An element is

A. a pure substance that can be broken down to another substance.
B. a pure substance that cannot be broken down to another substance.
C. the smallest unit that has properties of a given element.
D. an atom with an unstable nucleus.
E. an atom with positive electrons.

154. Answer the questions by matching the name to the structure of the functional group.

1. OH	amino ____
2. PO_4	phosphate ____
3. NH_2	carbonyl ____
4. COOH	carboxyl ____
5. CHO	hydroxyl ____

155. Choose the one most appropriate answer for each.

1. glucose	speeds up metabolic reactions	____
2. enzyme	a six-carbon sugar	____
3. antioxidant	neutralizes free radicals	____
4. phospholipids	principal components of cell membranes	____

156. **Classification.** Many different types of reactions take place within the cell. Use the following numbers to answer the questions.

1. Moving internal bonds converts one type of organic compound to another.	Cleavage	____
2. A molecule splits into two smaller ones.	Rearrangement	____
3. One or more electrons from one molecule are donated to another molecule.	Condensation	____
4. Two molecules covalently bond into another one.	Functional group transfer	____
5. One molecule gives up a functional group, and a different molecule immediately accepts it.	Electron transfer	____

Chapter 02: Chemistry of Life Key

1. An element that represents less than 0.01 percent of body weight is known as a(n)

   A. compound.
   B. trace element.
   C. molecule.
   D. isotope.
   E. analog.

2. Which is the smallest portion of a substance that retains the properties of an element?

   A. atom
   B. compound
   C. ion
   D. molecule
   E. mixture

3. How many natural elements exist on Earth?

   A. 100
   B. 112
   C. 88
   D. 96
   E. 110

4. Which subatomic particle has a positive charge?

   A. electron
   B. neutron
   C. photon
   D. neutrino
   E. proton

5. Which two subatomic particles are almost always equal in number?

   A. electrons and neutrons
   B. protons and neutrons
   C. protons and electrons
   D. photons and electrons
   E. neutrons and neutrinos

6. Organisms consist mostly of four elements. They are carbon, hydrogen, oxygen, and

A. iron.
B. chlorine.
C. silicon.
D. nitrogen.
E. phosphorous.

7. The atomic number refers to the

A. mass of an atom.
B. number of protons in an atom.
C. number of both protons and neutrons in an atom.
D. number of neutrons in an atom.
E. number of electrons in an atom.

8. An element's mass number is equal to the sum of its

A. protons and electrons.
B. protons and neutrons.
C. electrons and neutrons.
D. protons only.
E. electrons only.

9. Isotopes

A. are identical in mass number to the "standard" element.
B. contain a different number of electrons than the "standard" element.
C. contain a different number of protons than the "standard" element.
D. contain the same number of protons but a different number of neutrons than the "standard" element.
E. are actually a different element than the "standard" element.

10. Radioisotopes

A. are unstable and emit energy and particles to stabilize themselves.
B. are different elements from the "standard" elements.
C. are very stable and do not change over time.
D. contain more electrons than the "standard" element.
E. contain less electrons than the "standard" element.

11. The negative subatomic particle is (are) the

A. neutron.
B. proton.
C. electron.
D. neutron and proton.
E. proton and electron.

12. The neutral subatomic particle is (are) the

A. neutron.
B. proton.
C. electron.
D. neutron and proton.
E. proton and electron.

13. The nucleus of an atom contains

A. neutrons and protons.
B. neutrons and electrons.
C. protons and electrons.
D. protons only.
E. neutrons only.

14. Which element does not contain a neutron in its nucleus?

A. helium
B. carbon
C. oxygen
D. hydrogen
E. nitrogen

15. Transmutation of an element (the change of an element into a different element) occurs due to

A. exposure to strong sunlight.
B. exposure to certain chemicals.
C. natural aging of the element.
D. combining with another element.
E. radioactive decay.

16. Examples of isotopes include:

A. oxygen 8 and oxygen 16.
B. carbon 12 and nitrogen 14.
C. hydrogen 1 and helium 1.
D. sodium 23 and potassium 23.
E. carbon 12 and carbon 14.

17. All atoms of an element have the same number of

A. ions.
B. protons.
C. neutrons.
D. electrons.
E. protons and neutrons.

18. A sugar or other molecule in which radioisotopes have been substituted for some atoms is a(n)

A. enzyme.
B. reactant.
C. tracer.
D. subatomic particle.
E. quark.

19. Positron Emission Tomography utilizes ____ to yield results of a scan.

A. tracers
B. x-rays
C. neutrinos
D. photons
E. mesons

20. The time it takes for half of a quantity of a radioisotope to decay into a more stable isotope is

A. the same for all elements.
B. decay time.
C. half-life.
D. disintegration time.
E. dependent on temperature.

21. A tracer is a substance with what attached to it?

A. water
B. carbon
C. a radioisotope
D. an ion
E. a positron

22. PET (positron-emission tomography) scans use radioisotopes attached to what substances to detect abnormalities?

A. other radioisotopes
B. subatomic particles
C. carbon atoms
D. glucose or other biological molecules
E. plutonium

23. The time it takes for half of a quantity of a radioisotope to decay into a more stable isotope is

A. the same for all elements.
B. decay time.
C. half-life.
D. disintegration time.
E. dependent on temperature.

24. The element in the body with the greatest number of atoms is

A. phosphorus.
B. oxygen.
C. hydrogen.
D. calcium.
E. carbon.

25. Which of the following is NOT a compound?

A. salt
B. sugar
C. carbon
D. oxygen gas
E. water

26. Electrons move around the atomic nucleus in

A. zigzag patterns.
B. straight paths.
C. shells.
D. two dimensions.
E. one dimension.

27. Electrons inside a shell travel in

A. straight paths.
B. orbitals
C. zigzag patterns
D. two dimensions
E. one dimension

28. The maximum number of electrons in a shell is

A. two.
B. four.
C. six.
D. eight.
E. ten.

29. A union between the electron structures of atoms is a(n)

A. chemical bond.
B. hydrogen bond.
C. isotopic bond.
D. physical bond.
E. atomic bond.

30. When an atom's outer shell is filled it is

A. unstable.
B. an ion.
C. most stable.
D. polarized.
E. negatively charged.

31. Which of the following is not one of the four most abundant elements in the body?

A. carbon
B. hydrogen
C. oxygen
D. nitrogen
E. calcium

32. The bonding of two or more atoms creates a(n)

A. ion.
B. molecule.
C. mixture.
D. suspension.
E. particle.

33. Atoms without vacancies are considered to be

A. ions.
B. negatively charged.
C. positively charged.
D. inert.
E. highly active.

34. Choose the correct formula for the reaction that takes place between hydrogen and oxygen to produce water.

A. $H_2 + O_2 \rightarrow H_2O$
B. $H_2 + O \rightarrow H_2O$
C. $2H_2 + O_2 \rightarrow 2H_2O$
D. $2H_2O + O_2 \rightarrow 4H_2O$
E. $2H_2 + 2O_2 \rightarrow 2H_2O$

35. A(n) ____ consists of two or more bonded elements in proportions that never vary.

A. ion
B. mixture
C. compound
D. network solid
E. satisfied orbital

36. When two or more molecules simply mingle, a(n) ____ is created.

A. compound
B. mixture
C. molecule
D. ionic compound
E. suspension

37. An atom that is considered *inert* is

A. oxygen.
B. hydrogen.
C. nitrogen.
D. carbon.
E. helium.

38. Water is an example of a(n)

A. atom.
B. ion.
C. compound.
D. mixture.
E. element.

39. Which of the following answers include all the others?

A. atoms
B. molecules
C. electrons
D. elements
E. protons

40. Which of the following is NOT an element?

A. water
B. oxygen
C. carbon
D. chlorine
E. hydrogen

41. A molecule is

A. a combination of two or more atoms.
B. less stable than its constituent atoms separated.
C. electrically charged.
D. a carrier of one or more extra neutrons.
E. one atom.

42. A bond that joins atoms that have opposite charges is a(n)

A. covalent bond.
B. hydrogen bond.
C. ionic bond.
D. coordinate covalent bond.
E. polar covalent bond.

43. What is formed when an atom loses or gains an electron?

A. a molecule
B. an ion
C. a compound
D. a mixture
E. a solvent

44. Generally, an atom carries no charge because it has as many electrons as

A. neutrons.
B. orbitals.
C. shells.
D. protons.
E. neutrinos.

45. The bond in table salt (NaCl) is

A. polar.
B. ionic.
C. covalent.
D. double.
E. nonpolar.

46. The bond formed when atoms share electrons is a(n) ____ bond.

A. hydrogen
B. ionic
C. covalent
D. crystalline
E. network

47. A hydrogen bond is

A. a sharing of a pair of electrons between a hydrogen and an oxygen nucleus.
B. a sharing of a pair of electrons between a hydrogen nucleus and either an oxygen or a nitrogen nucleus.
C. an attractive force that involves a hydrogen atom and an oxygen or a nitrogen atom that are either in two different molecules or within the same molecule.
D. found only in water molecules.
E. is the strongest form of chemical bond.

48. A water molecule is an example of which type of molecule?

A. polar covalent
B. nonpolar covalent
C. ionic
D. coordinate covalent
E. network

49. Molecular hydrogen is an example of which type of molecule?

A. polar covalent
B. nonpolar covalent
C. ionic
D. coordinate covalent
E. network

50. In a polar covalent bond, the atoms of the different elements do not share electrons equally because

A. one is a metal and one is a non-metal.
B. both are metals.
C. both are non-metals.
D. one element has more neutrons.
E. one element has more protons.

51. Which type of bond holds the two strands of DNA together?

A. ionic
B. network
C. polar covalent
D. hydrogen
E. non-polar covalent

52. Which type of bond makes water liquid?

A. ionic
B. covalent
C. polar covalent
D. nonpolar covalent
E. hydrogen

53. How do hydrophobic molecules interact with water?

A. attracted to
B. absorbed by
C. repelled by
D. mixed with
E. polarized bond

54. Why does water have a high heat capacity?

A. because it has covalent bonds
B. because it has ionic bonds
C. because it has hydrogen bonds
D. because it has a high boiling point
E. because it has a low freezing point

55. What makes water a solvent?

A. Fats dissolve in it.
B. Ions and polar molecules dissolve in it.
C. It mixes well with alcohol.
D. It evaporates easily.
E. It contains no minerals.

56. Water stabilizes body temperature and dissolves many substances because

A. it evaporates easily.
B. its molecules are covalent.
C. its molecules are ionic.
D. it contains hydrogen bonds.
E. it is free of minerals.

57. A salt will dissolve in water to form

A. acids.
B. gases.
C. ions.
D. bases.
E. polar solvents.

58. The process in which an atom or molecule loses one or more electrons to another atom or molecule is called

A. reduction.
B. dehydration.
C. oxidation.
D. condensation.
E. hydrolysis.

59. The many oxidation reactions that take place in our bodies cause the formation of

A. free radicals.
B. antioxidants.
C. covalent molecules.
D. ionic molecules.
E. hydrogen bonds.

60. A free radical will "steal" what particle from a stable molecule?

A. a proton
B. a neutron
C. an atom
D. an electron
E. a positron

61. Substances that give up an electron to a free radical are called

A. reducing agents.
B. oxidizing agents.
C. neutralizing agents.
D. antibiotics.
E. antioxidants.

62. Antioxidant-rich foods are typically

A. low in fat and high in fiber.
B. high in fat and low in fiber.
C. high in sugars and low in fat.
D. high in fiber and high in fat.
E. low in sugars and high in fiber.

63. Natural sources of antioxidants do not include

A. vitamin C.
B. vitamin E.
C. orange vegetables.
D. green leafy vegetables.
E. O_2^-.

64. The pH scale measures the

A. hydroxide ion concentration.
B. concentration of a water-based solution.
C. hydrogen ion concentration.
D. number of water molecules in a solution.
E. concentration of dissolved solute.

65. A reaction of a strong acid and a strong base will produce water and

A. a buffer.
B. a salt.
C. gas.
D. solid precipitate.
E. solute.

66. Which of the following would NOT be used in connection with the word *acid*?

A. excess hydrogen ions
B. contents of the stomach
C. magnesium hydroxide
D. pH less than 7
E. HCl

67. Fluid inside most human cells is about

A. pH 7.
B. pH 9.
C. pH 4.
D. pH 11.
E. pH 2.

68. Smoke from fossil fuels, motor vehicle exhaust, and nitrogen fertilizers can lead to

A. greater cloud formation.
B. acid rain.
C. basic rain.
D. rain with high mineral content.
E. salted rain.

69. Cellular pH is kept near a value of 7 because of

A. salts.
B. buffers.
C. acids.
D. bases.
E. water.

70. H_2CO_3 is

A. sulfuric acid.
B. carbonic acid.
C. carbolic acid.
D. hydrochloric acid.
E. nitric acid.

71. HCl in the stomach acts to

A. neutralize buffers.
B. kill harmful bacteria.
C. switch off certain digestive enzymes.
D. produce trypsin.
E. prevent breakdown of protein.

72. A buffer system

A. makes new hydrogen ions.
B. eliminates hydrogen ions already present.
C. binds carbon ions.
D. releases hydrogen ions.
E. produce excess acid.

73. A pH of 10 is how many times as basic as a pH of 7?

A. 2
B. 3
C. 10
D. 100
E. 1000

74. A buildup of H_2CO_3 in the blood will lead to

A. alkalosis.
B. calcium buildup.
C. acidosis.
D. hydroxide ion increase.
E. HCO_3^- increase.

75. What substances will release hydrogen ions when their concentration is low and accept them when their concentration is high?

A. salts
B. acids
C. bases
D. buffers
E. alkalines

76. If a molecule contains carbon and at least one atom of hydrogen, it is referred to as being

A. inorganic.
B. acidic.
C. basic.
D. organic.
E. crystalline.

77. Each carbon atom can share pairs of electrons with as many as ____ other atoms.

A. 2
B. 3
C. 4
D. 5
E. 6

78. Atoms or clusters of atoms that are covalently bonded to carbon and influence the behavior of organic compounds are known as

A. functional groups.
B. ions.
C. acids.
D. network solids.
E. anhydrides.

79. Proteins that speed up reactions are known as

A. salts.
B. buffers.
C. monomers.
D. polymers.
E. enzymes.

80. Which element makes up more than half of the human body?

A. calcium
B. hydrogen
C. oxygen
D. carbon
E. nitrogen

81. Condensation reactions are also referred to as

A. hydrolysis.
B. dehydration synthesis.
C. lytic reactions.
D. recombination.
E. transmutation.

82. The three most common atoms in your body are

A. hydrogen, oxygen, and carbon.
B. carbon, hydrogen, and nitrogen.
C. carbon, nitrogen, and oxygen.
D. nitrogen, hydrogen, and oxygen.
E. carbon, oxygen, and sulfur.

83. A large molecule built of three to millions of subunits is a(n)

A. monomer.
B. ion.
C. polymer.
D. enzyme.
E. functional unit.

84. The process by which two molecules covalently bond into a larger one is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

85. The process by which a molecule splits into two smaller ones is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

86. The process by which one or more electrons from one molecule are donated to another molecule is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

87. The process by which a molecule gives up a functional group, and a different molecule immediately accepts it, is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

88. The process by which the movement of internal bonds converts one type of organic compound to another is

A. condensation.
B. cleavage.
C. functional group transfer.
D. electron transfer.
E. rearrangement.

89. The insertion of water (H^+ and OH^-) into an enzymatically split molecule is

A. hydrolysis.
B. dehydration synthesis.
C. condensation.
D. cleavage.
E. polymerization.

90. Which of the following includes all of the others?

A. sucrose
B. glucose
C. cellulose
D. glycogen
E. carbohydrate

91. Which of the following is a building block of carbohydrates?

A. glycerol
B. nucleotide
C. simple sugar
D. monosaccharide
E. glucose

92. Which of the following is composed of a 1:2:1 ratio of carbon to hydrogen to oxygen?

A. carbohydrate
B. protein
C. lipid
D. nucleic acid
E. steroid

93. Which vitamin is derived from sugar monomers?

A. vitamin D
B. vitamin E
C. vitamin C
D. vitamin A
E. vitamin B_{12}

94. Which simple sugar is the main energy source for body cells?

A. fructose
B. sucrose
C. lactose
D. glucose
E. galactose

95. Which of the following is not a monosaccharide?

A. glucose
B. fructose
C. deoxyribose
D. starch
E. ribose

96. The most plentiful sugar in nature is

A. glucose.
B. fructose.
C. sucrose.
D. lactose.
E. glycogen.

97. Most of the carbohydrates eaten by humans are in the form of

A. monosaccharides.
B. polysaccharides.
C. oligosaccharides.
D. disaccharides.
E. five carbon sugars.

98. Fructose and glucose are

A. isotopes.
B. monosaccharides.
C. disaccharides.
D. six-carbon sugars.
E. monosaccharides and six-carbon sugars.

99. Sucrose is composed of

A. two molecules of fructose.
B. two molecules of glucose.
C. a molecule of fructose and a molecule of glucose.
D. a molecule of fructose and a molecule of galactose.
E. two molecules of glucose

100. Plants store a large amount of glucose in the form of

A. starch.
B. glycogen.
C. glucose.
D. cellulose.
E. fats.

101. Stored sugar in animal muscles and liver is in the form of

A. starch.
B. glycogen.
C. glucose.
D. cellulose.
E. fats.

102. A lipid is a

A. polar hydrocarbon.
B. polar peptide.
C. nonpolar hydrocarbon.
D. nonpolar peptide.
E. coordinate covalent molecule.

103. A saturated hydrocarbon molecule has

A. three double bonds.
B. one double bond.
C. one double and one triple bond.
D. all single bonds.
E. all triple bonds.

104. A molecule consisting of three fatty acid tails attached to glycerol is a(n)

A. carbohydrate.
B. nucleic acid.
C. triglyceride.
D. amino acid.
E. oil.

105. Which of the following are lipids?

A. steroids
B. triglycerides
C. oils
D. waxes
E. all of these

106. The most abundant lipids in the body are

A. oils.
B. waxes.
C. steroids.
D. triglycerides.
E. fatty acids.

107. Which type of fat, often the main ingredient in margarine, has been implicated in the development of certain heart diseases?

A. triglycerides
B. trans fatty acids
C. cholesterol
D. oils
E. waxes

108. Triglycerides yield how much more energy, gram for gram, than carbohydrates?

A. twice as much
B. three times as much
C. four times as much
D. one half as much
E. about the same amount

109. Which is the main material of cell membranes?

A. lipids
B. proteins
C. phospholipids
D. triglycerides
E. fatty acids

110. Why do triglycerides yield more energy than carbohydrates?

A. they have fewer removable electrons
B. they have double bonds
C. they contain glycerol
D. they have more removable electrons
E. fatty acids

111. Which sterol, often associated with heart disease, is a crucial component to the structure and function of cells?

A. cholesterol
B. triglycerides
C. phospholipids
D. cortisol
E. estrogen

112. Which of the following is not a derivative of cholesterol is

A. vitamin D
B. bile salts
C. estrogen
D. testosterone
E. amino acid

113. Which element is NOT characteristic of the primary structure of proteins?

A. carbon
B. hydrogen
C. phosphorus
D. sulfur
E. nitrogen

114. Amino acids are the building blocks for

A. proteins.
B. carbohydrates.
C. nucleic acids.
D. fats.
E. steroids.

115. What kind of bond exists between two amino acids?

A. hydrogen
B. glycosidic
C. peptide
D. ionic
E. sulfhydroxyl

116. The sequence of amino acids is the ____ structure of a protein.

A. primary
B. secondary
C. tertiary
D. quaternary
E. isomeric

117. How many amino acids are known to exist?

A. 100
B. 50
C. 25
D. 20
E. 10

118. Proteins that speed up chemical reactions are

A. substrates.
B. reactants.
C. enzymes.
D. amino acids.
E. carboxyl groups.

119. Which part of the amino acid helps to determine its chemical properties?

A. the amino group
B. the carboxyl group
C. the covalent bonds
D. the peptide bond
E. the R group

120. What type of bond forms at regular, short intervals along a new polypeptide chain?

A. ionic
B. covalent
C. glycosidic
D. hydrogen
E. coordinate covalent

121. Which structure makes a protein a molecule that can perform a particular function?

A. primary
B. secondary
C. tertiary
D. quaternary
E. isomeric

122. Which of the following exhibits fourth level (quaternary) structure?

A. amino acids
B. lipids
C. glycogen
D. hemoglobin
E. complex carbohydrate

123. Which is the most common protein in the body?

A. muscle
B. collagen
C. hemoglobin
D. bone matrix
E. insulin

124. The disruption of a protein's three-dimensional structure is called

A. condensation.
B. hydrolysis.
C. ionization.
D. oxidation.
E. denaturation.

125. A glycoprotein is a combination of a protein and

A. heme.
B. oligosaccharides.
C. collagen.
D. fatty acids.
E. nucleic acids.

126. In addition to hydrogen bonding, what type of bonds may exist in the quaternary structure of a protein?

A. ionic
B. coordinate
C. disulfide
D. network
E. diphosphate

127. A lipoprotein is a combination of a protein and

A. cholesterol, triglycerides and phospholipids.
B. oligosaccharides.
C. fatty acids.
D. nucleic acids.
E. collagen.

128. Which of the following is NOT found in every nucleic acid?

A. ribose
B. phosphate group
C. purine
D. pyrimidine
E. uracil

129. What is the name for a molecule that accepts hydrogen atoms and electrons that are being removed from other molecules and transfers them to other sites for further use?

A. enzyme
B. coenzyme
C. protein
D. lipid
E. steroid

130. Nucleotides are building blocks for

A. proteins.
B. steroids.
C. lipids.
D. carbohydrates.
E. DNA, RNA, and ATP.

131. The nucleotide most closely associated with energy is

A. cyclic AMP.
B. FAD.
C. ATP.
D. NAD.
E. NADPH.

132. Nucleotides contain what kind of sugars?

A. three carbon
B. four carbon
C. five carbon
D. six carbon
E. seven carbon

133. Which molecule links chemical reactions that release energy with other reactions that require energy?

A. DNA
B. RNA
C. NAD
D. ATP
E. cyclic AMP

134. Which type of bond holds the nucleotide bases together in a DNA molecule?

A. hydrogen
B. covalent
C. ionic
D. network
E. peptide

135. Some pesticides can trigger

A. hives.
B. joint pain.
C. headaches.
D. asthma.
E. all of these.

136. In what year did chemists begin developing synthetic toxins to protect crops?

A. 1865
B. 1900
C. 1925
D. 1945
E. 1960

137. A positive effect associated with pesticide usage does not include

A. killing disease-causing insects.
B. killing some pathogens.
C. increasing food supplies.
D. increasing profits for farmers.
E. causing cancer.

138. **Selecting the Exception**

Four of the five answers listed below possess electrons in the third orbital. The atomic number is at the right of the element. Select the exception.

A. sodium (11)
B. magnesium (12)
C. chlorine (17)
D. nitrogen (7)
E. sulfur (16)

139. **Selecting the Exception**

Four of the five answers listed below are related by a unifying characteristic. Select the exception.

A. ionic bond
B. covalent bond
C. polar bond
D. hydrogen bond
E. cluster of nonpolar groups

140. **Selecting the Exception**

Four of the five answers listed below are alkaline (pH above 7). Select the exception.

A. milk of magnesia
B. household ammonia
C. TumsÒ
D. phosphate detergent
E. cola soft drink

141. **Selecting the Exception**

Four of the five answers listed below are acidic (pH below 7). Select the exception.

A. vinegar
B. soft drink
C. soap
D. lemon juice
E. beer

142. **Selecting the Exception**

Four of the five answers listed below are characteristics of water. Select the exception.

A. stabilize temperature
B. common solvent
C. cohesion and surface tension
D. produce salts
E. change shape of hydrophilic and hydrophobic substances

143. **Selecting the Exception**

Four of the five answers listed below are related by a common chemical similarity. Select the exception.

A. cellulose
B. hydrochloric acid
C. amino acid
D. protein
E. nucleic acid

144. **Selecting the Exception**

Four of the five answers listed below are related as members of the same group. Select the exception.

A. glucose
B. fructose
C. cellulose
D. ribose
E. deoxyribose

145. **Selecting the Exception**

Four of the five answers below are related as members of the same group. Select the exception.

A. lactose
B. maltose
C. sucrose
D. table sugar
E. glucose

146. **Selecting the Exception**

Four of the five answers listed below are carbohydrates. Select the exception.

A. glycerol
B. cellulose
C. starch
D. sucrose
E. glycogen

147. **Selecting the Exception**

Four of the five answers listed below are lipids. Select the exception.

A. triglyceride
B. wax
C. oil
D. insulin
E. steroid

148. **Selecting the Exception**

Four of the five answers listed below are saturated fats. Select the exception.

A. butter
B. bacon
C. margarine
D. animal fat
E. lard

149. **Selecting the Exception**

Four of the five answers listed below are amino acids. Select the exception.

A. tryptophan
B. valine
C. alanine
D. adenine
E. leucine

150. **Selecting the Exception**

Four of the five answers listed below are functional groups. Select the exception.

A. R group
B. amino group
C. carboxyl group
D. hydroxyl group
E. methyl group

151. **Selecting the Exception**

Four of the five answers listed below are dissolved substances found in cells. Select the exception.

A. nucleotides
B. sugars
C. amino acids
D. alcohols
E. fatty acids

152. **Selecting the Exception**

Four of the five answers listed below are long chains of sugars. Select the exception.

A. polysaccharides
B. oligosaccharides
C. complex carbohydrates
D. corn starch
E. potato starch

153. An element is

A. a pure substance that can be broken down to another substance.
B. a pure substance that cannot be broken down to another substance.
C. the smallest unit that has properties of a given element.
D. an atom with an unstable nucleus.
E. an atom with positive electrons.

154. Answer the questions by matching the name to the structure of the functional group.

1. OH	amino **3**
2. PO_4	phosphate **2**
3. NH_2	carbonyl **5**
4. COOH	carboxyl **4**
5. CHO	hydroxyl **1**

155. Choose the one most appropriate answer for each.

1. glucose	speeds up metabolic reactions	**2**
2. enzyme	a six-carbon sugar	**1**
3. antioxidant	neutralizes free radicals	**3**
4. phospholipids	principal components of cell membranes	**4**

156. **Classification.** Many different types of reactions take place within the cell. Use the following numbers to answer the questions.

1. Moving internal bonds converts one type of organic compound to another.	Cleavage	**2**
2. A molecule splits into two smaller ones.	Rearrangement	**1**
3. One or more electrons from one molecule are donated to another molecule.	Condensation	**4**
4. Two molecules covalently bond into another one.	Functional group transfer	**5**
5. One molecule gives up a functional group, and a different molecule immediately accepts it.	Electron transfer	**3**