

Ch02 - Chemical Basis of Life

## **Ch02** **Chemical Basis of Life**

### **Multiple Choice Questions**

1. Chemistry deals with

- A. the composition and changes of substances that make up living as well as non-living matter.
- B. the composition and changes of substances found in organisms only.
- C. the composition of and changes of substances that make up non-living matter only.
- D. the location of organs in body cavities.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.01*

*Topic: Chemistry*

2. Chemistry is important to the study of physiology because

- A. the foods that we eat are chemicals.
- B. body functions depend on cellular functions that reflect chemical changes.
- C. chemical reactions enable our bodies to extract energy from nutrients.
- D. all of the above.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.01*

*Topic: Chemistry*

3. Which of the following substances is an element?

- A. Iron
- B. Water
- C. Sodium chloride
- D. Glucose

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

4. Which of the following groups of elements account for more than 95% of the human body by weight?

- A. Carbon, hydrogen, oxygen, nitrogen
- B. Calcium, hydrogen, oxygen, nitrogen
- C. Carbon, phosphorus, oxygen, hydrogen
- D. Calcium, phosphorus, hydrogen, nitrogen

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

5. The atoms of different elements have

- A. the same atomic number and same atomic weight.
- B. the same atomic number but different atomic weights.
- C. different atomic numbers.
- D. different atomic numbers but the same number of electrons.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

6. Isotopes of an element have
- A. the same atomic number and same atomic weight.
  - B.** the same atomic number but different atomic weights.
  - C. different atomic numbers but the same atomic weight.
  - D. different atomic numbers and different atomic weights.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

7. Which of the following is(are) ionizing radiation?
- A. Cosmic radiation only
  - B. Gamma radiation only
  - C.** Both cosmic radiation and gamma radiation
  - D. Neither cosmic nor gamma radiation

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

8. The atomic weight of an element whose atoms contain 8 protons, 8 electrons, and 8 neutrons is
- A. 8.
  - B.** 16.
  - C. 24.
  - D. 32.

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.02*

*Topic: Chemistry*

9. The atoms of the isotopes of a particular element vary in the number of
- A. electrons.
  - B. protons.
  - C.** neutrons.
  - D. nuclei.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

10. The first electron shell of an atom can hold a maximum of
- A. 1 electron.
  - B.** 2 electrons.
  - C. 4 electrons.
  - D. 8 electrons.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

11. When forming a bond, an atom that has 3 electrons in its second shell and a filled first shell will
- A.** lose 3 electrons from its second shell.
  - B. lose all of the electrons from its first shell.
  - C. lose all of the electrons from both its first and second shells.
  - D. gain 5 electrons in its second shell.

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.02*

*Topic: Chemistry*

12. The formula  $\text{H}_2\text{O}$  refers to

- A. Two hydrogen molecules and one oxygen molecule.
- B. One hydrogen molecule and two oxygen molecules.
- C. A molecule that contains two hydrogen atoms and one oxygen atom.
- D. A molecule that contains one hydrogen atom and two oxygen atoms.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

13. A decomposition reaction can be symbolized by

- A.  $\text{A} + \text{B} \rightarrow \text{C} + \text{D}$ .
- B.  $\text{A} + \text{B} \rightarrow \text{AB}$ .
- C.  $\text{AB} \rightarrow \text{A} + \text{B}$ .
- D.  $\text{C} + \text{D} \rightarrow \text{AB}$ .

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

14. A water solution that contains equal numbers of hydrogen ions and hydroxide ions is

- A. acidic.
- B. basic.
- C. alkaline.
- D. neutral.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

15. Electrolytes that release hydrogen ions in water are

- A. bases.
- B. nucleotides.
- C. acids.
- D. electrons.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

16. The difference in hydrogen ion concentration between solutions with pH 4 and pH 5 is

- A. twofold.
- B. fivefold.
- C. tenfold.
- D. twentyfold.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

17. A chemical reaction in which parts of different molecules trade positions is a(n)

- A. decomposition reaction.
- B. exchange reaction.
- C. reversible reaction.
- D. synthesis reaction.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

18. Consider the following list of commonly found items and their pH values:

Battery acid	1.0
Vinegar	2.2
Grapes	3.5-4.5
Tomato	4.0-4.5
Beer	4.2
Coffee	5.0
White bread	5.0-6.0
Butter	6.1-6.4
Egg whites	7.6-8.0
Baking soda	8.3
Milk of magnesia	10.6
Bleach	12.8

Which of the choices includes all acids?

- A. Egg whites, baking soda, milk of magnesia, and bleach
- B. Tomatoes, egg whites, and baking soda
- C. Vinegar, grapes, tomatoes, and coffee**
- D. Beer, butter, and baking soda

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.02*

*Topic: Chemistry*

19. Electrolytes are substances that

- A. form covalent bonds with water.
- B. ionize in water.**
- C. cannot conduct electricity in solution.
- D. form bonds that are stable in water.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

20. The pH scale measures the
- A.** concentration of hydrogen ions in solution.
  - B. number of molecules of salts dissolved in water.
  - C. number of hydroxide ions in water.
  - D. strength of an electrical current that a solution carries.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

21. Which of the following is the most abundant inorganic substance in the body?
- A. Carbohydrate
  - B.** Water
  - C. Lipid
  - D. Protein

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

22. A person has alkalosis if the blood pH
- A. is above 7.0.
  - B. is below 7.0.
  - C.** rises above 7.5.
  - D. drops below 7.3.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*



23. Matter is composed of elements, which are composed of \_\_\_\_\_.

- A. atoms
- B. inorganic molecules
- C. organic molecules
- D. chemicals

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

24. A complete atom is electrically neutral because the number of

- A. protons and neutrons are equal.
- B. electrons and neutrons are equal.
- C. electrons and protons are equal.
- D. electrons is greater than the number of protons.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

25. The atomic number of an atom equals the number of \_\_\_\_\_ and the atomic weight equals the \_\_\_\_\_.

- A. neutrons; number of protons
- B. protons; weight of all the electrons
- C. neutrons; number of protons plus electrons
- D. protons; number of protons plus neutrons

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

26. Synthesis reactions are particularly important in the body for

- A. release of energy.
- B. digestion of food products.
- C. growth of body parts.
- D. neutralization of acids by buffers.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

27. In a covalent bond

- A. one atom loses and another atom gains electrons.
- B. atoms share a pair or more of electrons.
- C. oppositely charged atoms attract.
- D. like-charged atoms repel.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

28. In an ionic bond

- A. each atom gains electrons.
- B. atoms share a pair or more of electrons.
- C. oppositely charged atoms attract.
- D. like-charged atoms repel.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

29. On the pH scale

- A. a tenfold difference in hydrogen ion concentration separates each whole number.
- B. the lower the whole number on the scale, the greater the  $H^+$  concentration.
- C. pH values above 7 are basic (alkaline).
- D.** all of the above.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

30. Sodium ions and calcium ions are examples of

- A.** cations.
- B. uncharged particles.
- C. anions.
- D. salts.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

31. When cations and anions meet they

- A. repel.
- B.** form ionic bonds.
- C. form covalent bonds.
- D. form individual molecules.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

32. An acid reacting with a base is
- A. a synthesis reaction.
  - B. hydrolysis.
  - C. a decomposition reaction.
  - D.** an exchange reaction.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

33. Water causes ionically-bonded atoms to
- A. bond more strongly.
  - B.** dissociate.
  - C. bond covalently.
  - D. decompose.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

34. Bases reacting with acids form \_\_\_\_\_ and water.
- A. buffers
  - B.** salts
  - C. new elements
  - D. proteins

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

35. The secondary structure of a protein molecule is the result of

- A. oxygen double bonds.
- B. covalent bonds.
- C. ionic bonds.
- D.** hydrogen bonds.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

36. In the body, oxygen

- A. reacts with water to form carbonic acid.
- B.** is used during cellular respiration.
- C. is a major electrolyte.
- D. is produced by cells.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

37. Which of the following is characteristic of carbohydrates?

- A. They contain C, H, O, with twice as many hydrogen as oxygen atoms.
- B. They provide much of the energy that the cell requires.
- C. They include sugars and starches.
- D.** all of the above.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

38. A simple carbohydrate

- A. has a molecular formula of  $C_6H_{12}O_6$ .
- B. is a building block of protein.
- C. consists of several joined chains.
- D. has only one nucleotide.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

39. Lipids

- A. are insoluble in water.
- B. include phospholipids, cholesterol, and fats.
- C. contain C, H, and O, but with proportionately less oxygen than in carbohydrates.
- D. all of the above.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

40. Proteins denature when

- A. bonds between carbon and oxygen break.
- B. hydrogen bonds break.
- C. peptide bonds break.
- D. peptide bonds form.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

41. Which of the following is not organic?

- A. Sodium chloride
- B. Lipids
- C. Nucleic acids
- D. Enzymes

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

42. Saturated fats \_\_\_\_\_ than unsaturated fats.

- A. contain more water
- B. have more glycerol
- C. have more single carbon-carbon bonds
- D. have fewer hydrogen atoms bonded to carbon atoms

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

43. Proteins

- A. are structural materials.
- B. can function as enzymes.
- C. contain C, H, O, and N, and sometimes S.
- D. all of the above.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

44. An enzyme is a \_\_\_\_.

- A. protein that speeds up chemical reactions without being changed or depleted
- B. protein that functions as a hormone
- C. protein that inhibits chemical reactions by being changed or depleted
- D. fibrous protein that is part of certain tissues in the body

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

45. The parts of a protein that change when it denatures are

- A. the primary and secondary structures.
- B. the secondary and tertiary structures.
- C. the amino acid sequence and the secondary structure.
- D. the tertiary and quaternary structures.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

46. DNA

- A. is a protein.
- B. plays no role in the synthesis of fats.
- C. stores genetic information, including instructions for enzymes that synthesize fats and carbohydrates.
- D. is routinely broken down to provide cellular energy.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*



47. Nucleic acids are

- A. very small, simple molecules.
- B. structural molecules that have no function other than support.
- C. composed of building blocks called nucleotides.
- D. primary sources of cellular energy.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

48. The informational content of DNA and RNA is in the nitrogenous bases because

- A. the bases are of several types and therefore can form a code sequence.
- B. they all contain nitrogen.
- C. the sugars and phosphates vary.
- D. the bases are also parts of amino acids.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

49. In phenylketonuria, an individual cannot break down the amino acid phenylalanine. Molecules that include phenylalanine build up in the blood, which causes intellectual disability and other symptoms. This inherited disease can be controlled by following a diet that is very low in

- A. carbohydrates.
- B. cholesterol.
- C. protein.
- D. nucleic acids.

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.03*

*Topic: Chemistry*

50. Table sugar breaking down into glucose and fructose is a(n) \_\_\_\_\_ reaction.

- A. synthesis
- B. hydrolysis**
- C. acid-base
- D. exchange reaction

*Bloom's Level: 3. Apply*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

51. Nucleic acids include

- A. proteins and DNA.
- B. RNA and DNA.**
- C. enzymes and RNA.
- D. steroids and triglycerides.

*Bloom's Level: 1. Remember*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

52. DNA and RNA differ in that

- A. RNA has deoxyribose and DNA has ribose.
- B. RNA is double-stranded and DNA is single-stranded.
- C. DNA holds genetic information and RNA uses that information to synthesize protein.**
- D. RNA is found only in the nucleus and DNA is found only in the cytoplasm.

*Bloom's Level: 2. Understand*  
*Learning Outcome: 02.03*  
*Topic: Chemistry*

53. The type of organic molecule that can replicate is a

- A. protein.
- B. lipid.
- C. carbohydrate.
- D.** nucleic acid.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

54. Conformation is

- A.** the three dimensional shape of a molecule, such as a protein.
- B. the energy held in the bonds of an organic molecule, such as a protein.
- C. the ability of DNA to copy itself.
- D. the amino acid sequence (primary structure) of a protein.

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

55. An organic compound always contains

- A.** carbon and hydrogen.
- B. oxygen and nitrogen.
- C. carbon and oxygen.
- D. nitrogen and hydrogen.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

56. Carbon can form \_\_\_\_ covalent bonds.

- A. 1
- B. 2
- C. 4**
- D. 8

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

57. Which of these is not a monosaccharide?

- A. Glucose
- B. Ribose
- C. 6-carbon sugar
- D. Sucrose**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

58. Glycogen is stored in the liver and \_\_\_\_\_.

- A. spleen
- B. skeletal muscles**
- C. pancreas
- D. heart

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

59. A triglyceride consists of
- A. 3 glycerols and 1 fatty acid.
  - B. 3 glucose molecules.
  - C. 3 fatty acids and 3 phosphate groups.
  - D.** 3 fatty acids and 1 glycerol.

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

60. Which of the following groups of compounds is hydrophobic?
- A. Carbohydrates
  - B.** Lipids
  - C. Proteins
  - D. Nucleic Acids

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

61. Which of the following molecules does not have a polar region?
- A. Water
  - B.** Triglyceride
  - C. Water soluble amino acid
  - D. Glucose

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.03*

*Topic: Chemistry*

62. A biomarker is
- A. a gene that encodes a particular protein.
  - B. always a protein.
  - C.** a body chemical associated with a particular disease or exposure to a toxin.
  - D. any chemical in the body.

*Bloom's Level: 2. Understand*

*Boxed Reading: Vignette*

*Topic: Chemistry*

63. An example of a biomarker is
- A.** cholesterol.
  - B. any DNA sequence.
  - C. sodium chloride.
  - D. hydrogen.

*Bloom's Level: 1. Remember*

*Boxed Reading: Vignette*

*Topic: Chemistry*

64. A biomarker test for cancer should ideally be
- A. inexpensive.
  - B. easy to perform.
  - C. specific.
  - D.** all of the above.

*Bloom's Level: 1. Remember*

*Boxed Reading: Vignette*

*Topic: Chemistry*

65. Which of the following isotopes has the longest half-life?

- A. Iodine-131
- B. Iron-59
- C. Phosphorus-32
- D.** Cobalt-60

*Bloom's Level: 2. Understand*

*Boxed Reading: From Science to Technology 2.1*

*Topic: Chemistry*

66. The \_\_\_\_\_ uses iodine in a synthesis reaction.

- A. spleen
- B. liver
- C. thymus
- D.** thyroid gland

*Bloom's Level: 1. Remember*

*Boxed Reading: From Science to Technology 2.1*

*Topic: Chemistry*

67. The isotope most likely to be used to study the thyroid gland is

- A.** Iodine-131
- B. Iron-59
- C. Thallium-201
- D. Cobalt-60

*Bloom's Level: 2. Understand*

*Boxed Reading: From Science to Technology 2.1*

*Topic: Chemistry*

68. Atomic radiation is useful for treating cancer because
- A. radiation affects cancer cells but not normal cells.
  - B. radiation protects normal cells against the effects of cancer.
  - C.** radiation harms cancer cells more readily than it does most non-cancer cells.
  - D. normal cells are not affected by radiation.

*Bloom's Level: 2. Understand*

*Boxed Reading: From Science to Technology 2.2*

*Topic: Chemistry*

69. Exposure to ionizing radiation may
- A. cloud the lens of the eye.
  - B. cause cancer.
  - C. interfere with normal growth.
  - D.** all of the above.

*Bloom's Level: 1. Remember*

*Boxed Reading: From Science to Technology 2.2*

*Topic: Chemistry*

70. Which of the following is not a source of ionizing radiation?
- A. Cosmic rays from outer space
  - B.** Cholesterol and triglycerides
  - C. Atomic and nuclear weapons
  - D. Smoke detectors

*Bloom's Level: 1. Remember*

*Boxed Reading: From Science to Technology 2.2*

*Topic: Chemistry*



71. A CT scan differs from a conventional X-ray image because it is

- A. two dimensional.
- B.** three dimensional.
- C. four dimensional.
- D. safer.

*Bloom's Level: 2. Understand*

*Boxed Reading: From Science to Technology 2.3*

*Topic: Chemistry*

72. PET imaging follows the emission of

- A.** positrons.
- B. electrons.
- C. neutrons.
- D. protons.

*Bloom's Level: 1. Remember*

*Boxed Reading: From Science to Technology 2.3*

*Topic: Chemistry*

### **True / False Questions**

73. Chemistry is the study of the composition of matter and how matter changes.

**TRUE**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.01*

*Topic: Chemistry*

74. The number of protons in an atom of an element always equals its atomic weight.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

75. Radioactive isotopes have stable nuclei.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

76. Sodium and chloride atoms combine readily because they both lose electrons.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

77. The symbol  $\text{Na}^+$  represents a sodium atom that has lost an electron.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

78. An atom that has gained or lost electrons is called an ion.

**TRUE**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

79. Water is an example of a compound.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

80. A substance that releases hydrogen ions in water is a base.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

81. A strong acid reacting with a strong base produces a salt.

**TRUE**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

82. An atom with 10 protons and which has lost 2 electrons is electrically neutral.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

83. Chemically inert atoms always have their outermost electron shell full.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

84. An acid is an electrolyte that releases hydroxide ions ( $\text{OH}^-$ ) in water.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

85. A base is an electrolyte that releases ions that combine with hydrogen ions.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

86. An electrolyte ionizes in water.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

87. A person with alkalosis has a blood pH less than 7.3.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

88. A complex carbohydrate consists of a phosphate group attached to a sugar molecule.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

89. Cholesterol, a type of lipid, is composed of 3 fatty acid chains attached to glycerol.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

90. Glycogen is a complex carbohydrate that we get directly by eating plants.

**FALSE**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

91. A phospholipid differs structurally from a triglyceride in that it has three phosphate groups attached to the glycerol molecule rather than three fatty acid chains.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

92. Nucleic acids are composed of building blocks called amino acids.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

93. A protein is formed from a sequence of amino acids.

**TRUE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

94. Proteins encode nucleic acids.

**FALSE**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

95. DNA and RNA are nucleic acids.

**TRUE**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

### **Fill in the Blank Questions**

96. The parts of an atom that carry single negative electrical charges are called \_\_\_\_\_.

**electrons**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

97. When atoms form chemical bonds, the subatomic particles that directly interact are the \_\_\_\_\_.  
**electrons**

*Bloom's Level: 2. Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

98. The type of subatomic particle that does not have an electrical charge is a(n) \_\_\_\_\_.  
**neutron**

*Bloom's Level: 1. Remember*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

99. The type of chemical bond formed when ions with opposite electrical charges attract is a(n) \_\_\_\_\_ bond.  
**ionic**

*Bloom's Level: 2. Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*

100. Two or more atoms bonding form a \_\_\_\_\_.  
**molecule**

*Bloom's Level: 2. Understand*  
*Learning Outcome: 02.02*  
*Topic: Chemistry*



101. The opposite of a decomposition reaction is a \_\_\_\_\_ reaction.

**synthesis**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.02*

*Topic: Chemistry*

102. The midpoint of the pH scale is pH \_\_\_\_.

**7**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.02*

*Topic: Chemistry*

103. Apricots have a pH of 3.8. Therefore, they are \_\_\_\_\_.

**acidic** or

**acid**

*Bloom's Level: 3. Apply*

*Learning Outcome: 02.02*

*Topic: Chemistry*

104. Organic substances always contain the elements \_\_\_\_\_ and \_\_\_\_\_.

**carbon, hydrogen**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*

Ch02 - Chemical Basis of Life

105. Amino acids are building blocks of \_\_\_\_\_.  
**protein**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

106. The amino acid sequence of a protein is its \_\_\_\_\_ structure.  
**primary**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

107. \_\_\_\_\_ are building blocks of nucleic acids.  
**nucleotides**

*Bloom's Level: 1. Remember*

*Learning Outcome: 02.03*

*Topic: Chemistry*

108. \_\_\_\_ has the unique ability among types of organic molecules to replicate.  
**DNA** or  
**Deoxyribonucleic acid**

*Bloom's Level: 2. Understand*

*Learning Outcome: 02.03*

*Topic: Chemistry*