

Multiple Choice

1. The simplest units of matter are:

- A. protons.
- B. electrons.
- C. neutrons.
- D. atoms.
- E. molecules.

Answer: D

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

2. When two hydrogen atoms bind with two oxygen atoms, the result is:

- A. water.
- B. hydrogen peroxide.
- C. hydrogen molecules.
- D. synthesis reactions.
- E. decomposition reactions.

Answer: B

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

3. If the atomic number of an element is 8, how many protons does the element contain?

- A. 4
- B. 6
- C. 8
- D. 10
- E. 12

Answer: C

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

4. Substances that release ions in water are called:

- A. catalysts.
- B. elements.

- C. electrons.
- D. electrolytes.
- E. atoms.

Answer: D

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

5. Ions with a positive charge are referred to as:

- A. cations.
- B. anions.
- C. atoms.
- D. electrolytes.
- E. compounds.

Answer: A

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

6. The most abundant compound in the human body is:

- A. calcium.
- B. water.
- C. protein.
- D. oxygen.
- E. fat.

Answer: B

Subject: Biochemistry, Chapter 2

Complexity: Easy

7. Steroid molecules are large molecules of:

- A. lipids.
- B. carbohydrates.
- C. proteins.
- D. nucleic acid.
- E. water-soluble vitamins.

Answer: A

Subject: Biochemistry, Chapter 2

Complexity: Easy

8. Chemicals that resist pH changes are called:

- A. bases.
- B. acids.
- C. enzymes.
- D. buffers.
- E. catalysts.

Answer: D

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

9. Isotopes of an element differ in the number of:

- A. neutrons in the nucleus.
- B. electron clouds.
- C. protons in the nucleus.
- D. electrons in the nucleus.

Answer: A

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

10. Glycerol contains how many molecules of fatty acids?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

Answer: C

Subject: Biochemistry, Chapter 2

Complexity: Easy

11. An atom's mass is determined mostly by the number of:

- A. protons.
- B. neutrons.
- C. electrons.
- D. isotopes.

E. protons and neutrons.

Answer: E

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

12. Which of the following is *not* an example of an organic substance?

- A. Lipids
- B. Nucleic acid
- C. Bicarbonate
- D. Protein
- E. Carbohydrate

Answer: C

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

13. The atomic weight of an element's atom equals the number of:

- A. electrons and protons.
- B. electrons and neutrons.
- C. protons and neutrons.
- D. protons, electrons, and neutrons.
- E. None of these is correct.

Answer: C

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

14. Which of the following is the largest in size?

- A. A proton
- B. A neutron
- C. An electron
- D. An atom
- E. A molecule

Answer: E

Subject: Molecules and Compounds, Chapter 2

Complexity: Moderate

15. Which of the following indicates the atomic number of an atom?

- A. Protons and electrons in the atom
- B. Protons and neutrons in the nucleus
- C. Protons in the nucleus
- D. Neutrons in the nucleus
- E. Electrons in the outer shells

Answer: B

Subject: Atomic Structure, Chapter 2

Complexity: Moderate

16. The substances present in a mixture in smaller amounts are called:

- A. solutes.
- B. colloids.
- C. solvents.
- D. diluents.
- E. sol-gels.

Answer: A

Subject: Solutions, Chapter 2

Complexity: Moderate

17. Which of the following occurs in an ionic bond?

- A. Two or more atoms lose electrons at the same time.
- B. Hydrogen forms bonds with negatively charged atoms in the same or different molecule.
- C. Atoms share electrons.
- D. Electrons are transferred from one atom to another.
- E. A pair of electrons is shared unequally by two atoms.

Answer: D

Subject: Ionic Bonds, Chapter 2

Complexity: Moderate

18. Which of the following is created between two atoms when a pair of electrons is unequally shared?

- A. Hydrogen bond
- B. Polar covalent bond
- C. Double covalent bond
- D. Single covalent bond

E. Triple covalent bond

Answer: B

Subject: Polar and Nonpolar Molecules, Chapter 2

Complexity: Moderate

19. Water is a polar molecule with two poles of charge. Which of the following best describes these two poles?

A. Surface tension

B. A double bond

C. A dipole

D. Radical

E. Covalent

Answer: C

Subject: Polar and Nonpolar Molecules, Chapter 2

Complexity: Moderate

20. Which of the following is an example of a suspension?

A. Salt water

B. Alcohol

C. Urine

D. Cytoplasm

E. Blood

Answer: E

Subject: Suspensions, Chapter 2

Complexity: Moderate

21. Which of the following is not an example of an inorganic compound?

A. Salt

B. Glucose

C. Water

D. Base

E. Acid

Answer: B

Subject: Inorganic Substances, Chapter 2

Complexity: Moderate

22. Which of the following is the body's most readily available source of energy?

- A. Proteins
- B. Water
- C. Lipids
- D. Carbohydrates
- E. Nucleic acids

Answer: D

Subject: Carbohydrates, Chapter 2

Complexity: Moderate

23. Which of the following is the most important metabolic fuel molecule in the body?

- A. Glucose
- B. Protein
- C. Sucrose
- D. Starch
- E. Vitamins

Answer: A

Subject: Polysaccharides, Chapter 2

Complexity: Moderate

24. Which of the following is the storage carbohydrate of animal tissues?

- A. Glucose
- B. Sucrose
- C. Glycogen
- D. Fructose
- E. Cellulose

Answer: C

Subject: Polysaccharides, Chapter 2

Complexity: Moderate

25. Which of the following lipids is the most abundant in the plasma?

- A. Triglycerides
- B. Phospholipids
- C. Steroids
- D. Cholesterol

E. Lipoproteins

Answer: E

Subject: Lipids, Chapter 2

Complexity: Moderate

26. Which of the following statements is *true* regarding lipids?

- A. They provide roughly twice the energy of carbohydrates.
- B. They contain the genetic information found in cells.
- C. They are composed of C, H, O, and N atoms.
- D. They are integral molecules of the nucleus membrane.
- E. They form the regulatory molecules known as enzymes.

Answer: A

Subject: Lipids, Chapter 2

Complexity: Moderate

27. Which of the following types of lipids is mostly derived from arachidonic acid existing in all cell membranes and is involved in blood clotting and contractions during labor?

- A. Triglyceride
- B. Monoglyceride
- C. Steroid
- D. Prostaglandin
- E. Glycolipid

Answer: D

Subject: Eicosanoids, Chapter 2

Complexity: Difficult

28. Glycoproteins are combinations of proteins and which of the following?

- A. Lipids
- B. Carbohydrates
- C. Fatty acids
- D. Steroids
- E. Nucleic acids

Answer: B

Subject: Proteins, Chapter 2

Complexity: Easy

29. Each amino acid differs from other organic substances regarding which of the following?

- A. Number of peptide bonds in the molecule
- B. Number of central carbon atoms
- C. Number of carboxyl groups
- D. Size of the amino group
- E. Nature of the *R group*

Answer: E

Subject: Proteins, Chapter 2

Complexity: Difficult

30. Which of the following is not an example of globular proteins?

- A. Protein-based hormones
- B. Fibrous proteins
- C. Antibodies
- D. Enzymes
- E. Collagens

Answer: B

Subject: Types of Proteins, Chapter 2

Complexity: Moderate

31. Which of the following is the structural unit of nucleic acids?

- A. Purines
- B. Pyrimidines
- C. Nucleotides
- D. Fatty acids
- E. Amino acids

Answer: C

Subject: Nucleic Acids (DNA and RNA), Chapter 2

Complexity: Moderate

32. When atoms complete their outer electron shells by sharing electrons, they form which of the following?

- A. Cations
- B. Anions
- C. Ionic bonds

- D. Hydrogen bonds
- E. Covalent bonds

Answer: E

Subject: Covalent Bonds, Chapter 2

Complexity: Moderate

33. If an isotope of lithium has 3 protons, 4 neutrons, and 3 electrons, its atomic weight is:

- A. 4.
- B. 6.
- C. 7.
- D. 10.
- E. 16.

Answer: C

Subject: Atomic Structure, Chapter 2

Complexity: Moderate

34. Which of the following is the most important high-energy compound in cells?

- A. Ribonucleic acid
- B. Deoxyribonucleic acid
- C. Adenosine diphosphate
- D. Adenosine monophosphate
- E. Adenosine triphosphate

Answer: E

Subject: Adenosine Triphosphate, Chapter 2

Complexity: Moderate

35. The formula $AB \rightarrow A + B$ is to *decomposition* as the formula $A + B \rightarrow AB$ is to which of the following?

- A. Replacement
- B. Combustion
- C. Synthesis
- D. Metabolism
- E. Exchange

Answer: C

Subject: Synthesis Reactions, Chapter 2

Complexity: Moderate

36. Which of the following pH levels is closest to neutral pH?

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

Answer: B

Subject: Acids, Bases, and the pH Scale, Chapter 2

Complexity: Moderate

37. Which of the following elements is the most plentiful in the human body?

- A. Carbon
- B. Potassium
- C. Sulfur
- D. Oxygen
- E. Sodium

Answer: D

Subject: Elements of the Human Body, Chapter 2

Complexity: Moderate

38. Which of the following is true about ribonucleic acid (RNA)?

- A. It contains the cell's genetic information
- B. It is restricted to the nucleus.
- C. It contains the pyrimidine *uracil* in place of *thymine*.
- D. It is double stranded.
- E. It contains the pentose *deoxyribose*.

Answer: C

Subject: Characteristics of DNA and RNA, Chapter 2

Complexity: Difficult

39. Which of the following elements is the second most abundant in the human body?

- A. Carbon
- B. Calcium
- C. Oxygen

- D. Hydrogen
- E. Phosphorus

Answer: A

Subject: Elements of the Human Body, Chapter 2

Complexity: Moderate

40. Which of the following is the product formed from the phosphorylation of ADP?

- A. Ribose
- B. Deoxyribonucleic acid
- C. Adenosine diphosphate
- D. Adenosine triphosphate
- E. Adenine

Answer: D

Subject: Adenosine Triphosphate, Chapter 2

Complexity: Difficult

41. Which of the following would be the result of this formula: $ADP + P?$

- A. DNA
- B. ATP
- C. ADP
- D. 2 ADP
- E. Adenine

Answer: B

Subject: Adenosine Triphosphate, Chapter 2

Complexity: Difficult

42. In hydrolysis reactions, compounds react with and result in which of the following?

- A. Water, causing synthesis
- B. Carbon, causing decomposition
- C. Hydrogen, causing decomposition
- D. Glucose, causing decomposition
- E. Water, causing decomposition

Answer: E

Subject: Disaccharides, Chapter 2

Complexity: Moderate

43. Proteins, carbohydrates, and lipids are classified as which of the following?

- A. Bases
- B. Acids
- C. Salts
- D. Organic molecules
- E. Inorganic molecules

Answer: D

Subject: Organic Substances, Chapter 2

Complexity: Moderate

44. A nucleotide consists of which of the following?

- A. A nitrogen base, a pentose sugar, and a phosphate group
- B. A five-carbon sugar and an amino acid
- C. A five-carbon sugar and a phosphate group
- D. A five-carbon sugar and a nitrogenous base
- E. A phosphate group and a nitrogen base

Answer: A

Subject: Nucleic Acids (DNA and RNA), Chapter 2

Complexity: Moderate

45. Which of the following is a polysaccharide formed in the liver and in the muscles?

- A. Fructose
- B. Starch
- C. Glycogen
- D. Cellulose
- E. Sucrose

Answer: C

Subject: Polysaccharides, Chapter 2

Complexity: Moderate

46. Which of the following substances would be the least acidic?

- A. White wine, pH = 3
- B. Stomach secretions, pH = 1
- C. Lemon juice, pH = 2
- D. Urine, pH = 6

E. Tomato juice, pH = 4

Answer: D

Subject: Acids, Bases, and the pH Scale, Chapter 2

Complexity: Moderate

47. A triglyceride consists of which of the following?

- A. Amino acids that have been thoroughly saturated with hydrogen
- B. One glycerol molecule bonded to three fatty acid molecules
- C. A sugar-phosphate backbone attached to two amino acid groups
- D. Two or more hexoses
- E. Two or more pentoses

Answer: B

Subject: Triglycerides, Chapter 2

Complexity: Moderate

48. Enzymes are organic catalysts that:

- A. determine the nature of the products of a reaction.
- B. are essential raw materials for a chemical reaction and are converted into some of its products.
- C. alter the direction in which a chemical reaction proceeds.
- D. increase the speed of a chemical reaction.
- E. increase production of vitamin D in the liver.

Answer: D

Subject: Enzymes, Chapter 2

Complexity: Moderate

49. Which of the following are examples of *structural lipids*?

- A. Eicosanoids and lipases
- B. Cholesterol and phospholipids
- C. Unsaturated fats and nucleic acids
- D. Saturated fats and lipoproteins
- E. Triglycerides and carbohydrates

Answer: B

Subject: Phospholipids *and* Steroids, Chapter 2

Complexity: Moderate

Fill-in-the-Blank

50. Ions with a positive charge are called _____.

Answer: cations

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

51. The chemical bond between atoms that share electrons is called a(n) _____ bond.

Answer: covalent

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

52. Hydrogen ion concentrations can be measured by a value called _____.

Answer: pH

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

53. Atoms normally contain an equal number of protons and _____.

Answer: electrons

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

54. Enzymes promote chemical reactions by lowering the activation _____ requirements.

Answer: energy

Subject: Biochemistry, Chapter 2

Complexity: Easy

55. $AB+CD\rightarrow AD+CB$ is an example of a(n) _____ reaction.

Answer: exchange

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

56. Phospholipids are an important part of _____ structures.

Answer: cell

Subject: Biochemistry, Chapter 2

Complexity: Easy

57. Radiation is basically identified as one of three common forms: alpha, beta, or _____.

Answer: gamma

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

58. Inorganic compounds do not contain _____ as the primary structural atom.

Answer: carbon

Subject: Biochemistry, Chapter 2

Complexity: Moderate

59. The _____ contains approximately the entire mass of the atom.

Answer: nucleus

Subject: Atomic Structure, Chapter 2

Complexity: Moderate

60. An example of a nonliving colloid that undergoes a sol-gel transformation is a gelatin product such as _____.

Answer: Jell-O

Subject: Colloids, Chapter 2

Complexity: Easy

61. The center of an atom is called the _____.

Answer: nucleus

Subject: Atomic Structure, Chapter 2

Complexity: Easy

62. A(n) _____ is a homogeneous mixture containing a solvent and a solute.

Answer: solution

Subject: Solutions, Chapter 2

Complexity: Easy

63. Organic molecules are compounds that contain _____ as the primary structural atom.

Answer: carbon

Subject: Biochemistry, Chapter 2

Complexity: Moderate

64. _____ control the rate of chemical reactions that occur in the human body.

Answer: Enzymes

Subject: Enzymes, Chapter 2

Complexity: Moderate

65. A molecule of _____ contains a five-carbon sugar called deoxyribose.

Answer: DNA

Subject: Characteristics of DNA and RNA, Chapter 2

Complexity: Moderate

66. _____ are heterogeneous mixtures that have large, visible solutes.

Answer: Suspensions

Subject: Suspensions, Chapter 2

Complexity: Easy

67. The interaction of sodium and chlorine involves sodium donating one _____ to chlorine.

Answer: electron

Subject: Ionic Bonds, Chapter 2

Complexity: Moderate

68. An example of a(n) _____ bond is when two hydrogen atoms bond to form a hydrogen molecule.

Answer: covalent

Subject: Covalent Bonds, Chapter 2

Complexity: Moderate

69. Most atoms that have only one or two _____ shell electrons are electropositive.

Answer: valence

Subject: Ionic Bonds, Chapter 2

Complexity: Difficult

True/False

70. Copper, fluorine, and iron are major elements of the human body.

Answer: False

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

71. Lipids are a poor source of stored energy.

Answer: False

Subject: Biochemistry, Chapter 2

Complexity: Easy

72. Hydrogen bonds are too weak to bind atoms together to form molecules, but are important intramolecular bonds.

Answer: True

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

73. A phospholipid consists of a glycerol portion with amino acid chains.

Answer: False

Subject: Biochemistry, Chapter 2

Complexity: Easy

74. The major function of carbohydrates in the body is to provide amino acids.

Answer: False

Subject: Biochemistry, Chapter 2

Complexity: Easy

75. Solutions are homogeneous mixtures of components that may be solids, liquids, or gases.

Answer: True

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

76. The three basic types of mixtures include colloids, compounds, and acid-bases.

Answer: False

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

77. Neutrons bear a positive electrical charge.

Answer: False

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

78. Electrons bear a negative electrical charge.

Answer: True

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

79. Acidosis is an abnormal physiological state caused by blood pH that is higher than 7.35.

Answer: False

Subject: atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

80. The simplest and smallest atom is lithium.

Answer: False

Subject: Atoms, Molecules, and Chemical Bonds, Chapter 2

Complexity: Easy

81. Synthesis is a reaction that occurs when two or more atoms bond to form a more complex product.

Answer: True

Subject: Synthesis Reactions, Chapter 2

Complexity: Easy

82. Ammonia is a waste product of the body's breakdown of lipids.

Answer: False

Subject: Acids, Bases, and the pH Scale, Chapter 2

Complexity: Moderate

83. Hydrogen ion concentration can be measured by a value called *pH*.

Answer: True

Subject: Acids, Bases and the pH Scale, Chapter 2

Complexity: Moderate

84. Alkalosis results from blood pH that is lower than 7.

Answer: False

Subject: Acids, Bases and the pH Scale, Chapter 2

Complexity: Moderate

85. For many chemical reactions, water is an important reactant.

Answer: True

Subject: Water, Chapter 2

Complexity: Easy

86. A salt is an ionic compound that contains cations other than hydrogen ions.

Answer: True

Subject: Salts, Chapter 2

Complexity: Moderate

87. Saturated fats have fatty acid chains with single covalent bonds between carbon atoms.

Answer: True

Subject: Triglycerides, Chapter 2

Complexity: Moderate

88. Phospholipids are structurally related to glycolipids, and are actually modified cholesterol.

Answer: False

Subject: Phospholipids, Chapter 2

Complexity: Moderate

89. Most organic cofactors are derived from vitamin D.

Answer: False

Subject: Enzyme Characteristics, Chapter 2

Complexity: Moderate