

Name \_\_\_\_\_

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

*Fill in the blank or provide a short answer:*

- 1) When a change in matter alters the basic nature of the substance, it is called a \_\_\_\_\_ change. 1) \_\_\_\_\_
- 2) Isotopes differ from each other only in the number of \_\_\_\_\_ they possess. 2) \_\_\_\_\_
- 3) Decomposition of a protein produces \_\_\_\_\_. 3) \_\_\_\_\_
- 4) The sum of the protons and neutrons in an atom is called the \_\_\_\_\_. 4) \_\_\_\_\_
- 5) Compounds that contain carbon-hydrogen bonding are collectively termed \_\_\_\_\_ compounds. 5) \_\_\_\_\_
- 6) The outermost shell of an atom is called the \_\_\_\_\_ shell. 6) \_\_\_\_\_
- 7) Glycogen and starch are examples of a specific category of carbohydrates called \_\_\_\_\_. 7) \_\_\_\_\_
- 8) The universal energy compound that provides visible energy to cells is \_\_\_\_\_. 8) \_\_\_\_\_

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

- 9) Inactive energy is referred to as: 9) \_\_\_\_\_
  - A) potential energy
  - B) radiant energy
  - C) mechanical energy
  - D) kinetic energy
  - E) electrical energy
- 10) An atom with 11 protons, 12 neutrons, and 10 electrons is a(n): 10) \_\_\_\_\_
  - A) anion
  - B) molecule
  - C) radioisotope
  - D) isotope
  - E) cation
- 11) Ninety-six percent of the human body is composed of the elements: 11) \_\_\_\_\_
  - A) calcium, magnesium, potassium, and iron
  - B) carbon, oxygen, hydrogen, and nitrogen
  - C) carbon, oxygen, iron, and potassium
  - D) carbon, calcium, sodium, and oxygen
  - E) sodium, potassium, hydrogen, and sulfur

- 12) Atomic mass is equivalent to the number of \_\_\_\_\_ in an atom. 12) \_\_\_\_\_  
A) electrons  
B) protons  
C) neutrons  
D) protons and neutrons  
E) protons and electrons
- 13) The simplest atom—containing one proton, one electron, and no neutrons—is: 13) \_\_\_\_\_  
A) nitrogen  
B) carbon  
C) hydrogen  
D) oxygen  
E) sodium
- 14) Which of these elements composes bone: 14) \_\_\_\_\_  
A) sulfur                      B) calcium                      C) iron                      D) chlorine                      E) iodine
- 15) An atom with an atomic number of 14 will have \_\_\_\_\_ electrons in its valence shell. 15) \_\_\_\_\_  
A) 2                      B) 4                      C) 8                      D) 10                      E) 14
- 16) Which of the following statements is correct regarding the electrical charge of subatomic particles: 16) \_\_\_\_\_  
A) protons are positively charged, electrons are negatively charged, and neutrons are neutral  
B) protons are negatively charged, electrons are positively charged, and neutrons are neutral  
C) protons are positively charged, electrons are neutral, and neutrons are negatively charged  
D) protons are neutral, electrons are negatively charged, and neutrons are positively charged  
E) protons are negatively charged, electrons are neutral, and neutrons are negatively charged
- 17) An atom has 6 protons, 8 neutrons, and 6 electrons. Its atomic mass is: 17) \_\_\_\_\_  
A) 8                      B) 14                      C) 6                      D) 2                      E) 20
- 18) The atomic number of an atom reveals the number of: 18) \_\_\_\_\_  
A) protons plus electrons  
B) electrons in the atomic nucleus  
C) neutrons plus electrons  
D) protons in the atomic nucleus  
E) protons plus neutrons
- 19) Isotopes have different numbers of \_\_\_\_\_; thus they also have different \_\_\_\_\_. 19) \_\_\_\_\_  
A) neutrons; atomic masses  
B) neutrons; atomic numbers  
C) protons; atomic masses  
D) electrons; atomic numbers  
E) protons; atomic numbers

20) An atom that has lost two electrons is called a(n): 20) \_\_\_\_\_  
 A) anion  
 B) radioisotope  
 C) isotope  
 D) cation  
 E) proton

21) The subatomic particles that are responsible for the chemical behavior of atoms are the: 21) \_\_\_\_\_  
 A) isotopes  
 B) protons  
 C) neutrons  
 D) electrons  
 E) ions

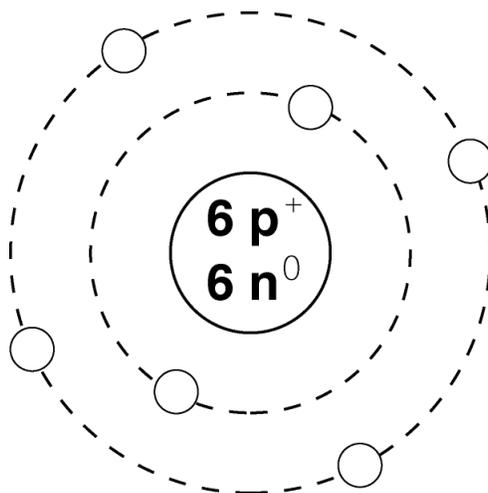


Figure 2.2

22) What is the atomic number of the atom in Figure 2.2: 22) \_\_\_\_\_  
 A) 12                      B) 3                      C) 4                      D) 6                      E) 2

23) Which of these examples is a compound: 23) \_\_\_\_\_  
 A) 2H                      B) O<sub>2</sub>                      C) N<sub>2</sub>                      D) CH<sub>4</sub>                      E) H<sub>2</sub>

24) The reaction  $A + B \rightarrow AB$  is an example of a(n): 24) \_\_\_\_\_  
 A) decomposition reaction  
 B) dehydration reaction  
 C) synthesis reaction  
 D) exchange reaction  
 E) denaturation reaction

25) Water is useful in body processes because: 25) \_\_\_\_\_  
 A) it is a product in hydrolysis reactions  
 B) it is chemically inert  
 C) it is a good solvent  
 D) it acts as an enzyme  
 E) it has a low heat capacity

- 26) Which of the following solutions is the weakest acid: 26) \_\_\_\_\_
- A) a solution with a pH of 2.4
  - B) a solution with a pH of 8.6
  - C) a solution with a pH of 6.4
  - D) a solution with a pH of 10.1
  - E) a solution with a pH of 5.2
- 27) A solution with a pH of 7: 27) \_\_\_\_\_
- A) releases more hydrogen ions than hydroxyl ions into solution
  - B) releases more hydroxyl ions than hydrogen ions into solution
  - C) is neutral
  - D) is basic
  - E) is acidic
- 28) Which of the following is an example of an inorganic molecule: 28) \_\_\_\_\_
- A) cholesterol
  - B) sodium chloride
  - C) an amino acid
  - D) a fatty acid
  - E) RNA
- 29) Glucose and starch are examples of: 29) \_\_\_\_\_
- A) triglycerides
  - B) proteins
  - C) carbohydrates
  - D) phospholipids
  - E) steroids
- 30) Which of the following groups of chemicals includes ONLY monosaccharides: 30) \_\_\_\_\_
- A) glucose, fructose, maltose
  - B) fructose, maltose, sucrose
  - C) maltose, sucrose, lactose
  - D) fructose, maltose, lactose
  - E) glucose, fructose, galactose
- 31) The organic compounds that function in building tissues and acting as enzymes are the: 31) \_\_\_\_\_
- A) nucleic acids
  - B) lipids
  - C) salts
  - D) carbohydrates
  - E) proteins

- 32) Vitamin D can be described as: 32) \_\_\_\_\_
- A) taken in via plant products such as wheat germ and green leafy vegetables; may promote wound healing and contribute to fertility (though not proven in humans)
  - B) derivatives of fatty acids found in cell membranes; various functions include the stimulation of uterine contractions, the regulation of blood pressure, and the control of motility of the gastrointestinal tract
  - C) produced in the skin on exposure to UV radiation; necessary for normal bone growth and function
  - D) made available largely by the action of intestinal bacteria; also prevalent in a wide variety of foods, and necessary for the proper clotting of blood
  - E) a constituent of orange-pigmented vegetables (carrots) and fruits (tomatoes), and part of the photoreceptor pigment involved in vision
- 33) Which one of the following DNA bases are complementary: 33) \_\_\_\_\_
- A) adenine and guanine
  - B) thymine and guanine
  - C) adenine and thymine
  - D) guanine and uracil
  - E) cytosine and adenine
- 34) Enzymes: 34) \_\_\_\_\_
- A) increase the rates of chemical reactions by at least a millionfold
  - B) are essential to virtually every biochemical reaction in the body
  - C) when absent or destroyed, cause all biochemical reactions to cease
  - D) help regulate growth and development
  - E) are highly specialized proteins that recognize, bind with, and inactivate bacteria, toxins, and some viruses
- 35) Which of the following statements about RNA is true: 35) \_\_\_\_\_
- A) RNA contains deoxyribose
  - B) RNA is a double helix
  - C) RNA is composed of cytosine, guanine, adenine, and thymine
  - D) RNA is single stranded
  - E) RNA is found only in the nucleus of the cell
- 36) The nucleotide chains of DNA are held together by: 36) \_\_\_\_\_
- A) carbon bonds
  - B) polar covalent bonds
  - C) nonpolar covalent bonds
  - D) hydrogen bonds
  - E) ionic bonds
- 37) Which of the following statements about ATP is false: 37) \_\_\_\_\_
- A) it activates contractile proteins in muscle cells so that cells can shorten and perform mechanical work
  - B) its energy is captured in high-energy hydrogen bonds
  - C) it is a modified nucleotide
  - D) it provides the energy needed to drive energy-absorbing chemical reactions
  - E) it drives the transport of certain solutes (e.g., amino acids) across cell membranes

38) Glycogen is the storage form of \_\_\_\_\_ in animals. 38) \_\_\_\_\_  
 A) glucose  
 B) protein  
 C) DNA  
 D) lipids  
 E) amino acids

39) \_\_\_\_\_ are simple sugars containing between 3 and 7 carbon atoms. 39) \_\_\_\_\_  
 A) Monosaccharides  
 B) Saturated fats  
 C) Proteins  
 D) Steroids  
 E) Polysaccharides

40) Shell 1 of an atom can hold a maximum of \_\_\_\_\_ electron(s). 40) \_\_\_\_\_  
 A) 1                      B) 2                      C) 4                      D) 8                      E) 18

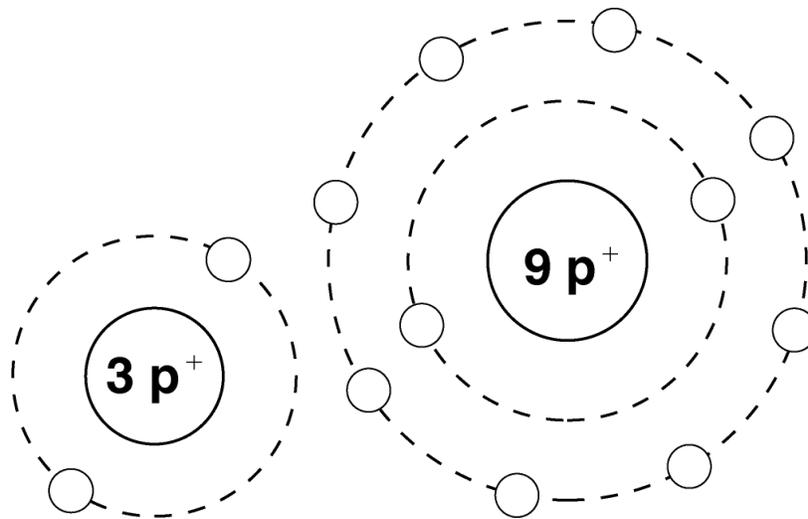


Figure 2.3

41) What type of chemical bond is pictured in Figure 2.3: 41) \_\_\_\_\_  
 A) nonpolar covalent bond  
 B) double covalent bond  
 C) ionic bond  
 D) single covalent bond  
 E) polar covalent bond

42) The sugar found in DNA is: 42) \_\_\_\_\_  
 A) sucrose  
 B) deoxyribose  
 C) lactose  
 D) ribose  
 E) starch

**TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.**

- 43) Inactive or stored energy is called kinetic energy. 43) \_\_\_\_\_
- 44) Stored energy is called potential energy. 44) \_\_\_\_\_
- 45) Negatively charged atoms are called cations. 45) \_\_\_\_\_
- 46) Atoms are the smallest particles of a compound that still retain the properties of that compound. 46) \_\_\_\_\_
- 47) Every atom in a molecule has a full valence shell. 47) \_\_\_\_\_
- 48) Water is the single most abundant inorganic compound in the human body. 48) \_\_\_\_\_
- 49) The lower the pH, the greater the number of hydrogen ions. 49) \_\_\_\_\_
- 50) Carbon is found in all inorganic compounds. 50) \_\_\_\_\_
- 51) When a solution produces equal numbers of hydrogen and hydroxyl ions, it is said to be neutral. 51) \_\_\_\_\_
- 52) Enzymes decrease the rates of chemical reactions. 52) \_\_\_\_\_

**MATCHING. Choose the item in column 2 that best matches each item in column 1.**

*Match the following:*

- |   |                         |           |
|---|-------------------------|-----------|
| 53) The particle(s) contributing to the atomic mass                           | A) protons and neutrons | 53) _____ |
| 54) The number of protons is equal to the number of these subatomic particles | B) electron(s)          | 54) _____ |
| 55) The particle(s) contributing to the atomic number                         | C) neutron(s)           | 55) _____ |
| 56) The particle(s) located within the nucleus                                | D) proton(s)            | 56) _____ |
| 57) The particle(s) shared during covalent bond formation                     |                         | 57) _____ |
| 58) The particle(s) lost during cation formation                              |                         | 58) _____ |
| 59) The particle(s) that differ between isotopes                              |                         | 59) _____ |

Match the following:

60) Building block is the monosaccharide

A) nucleic acids

60) \_\_\_\_\_

61) Triglycerides, steroids, and fat-soluble vitamins are types of these organic compounds

B) carbohydrates

61) \_\_\_\_\_

C) proteins

62) Nucleotides form the building blocks of these organic compounds

D) lipids

62) \_\_\_\_\_

63) Building blocks of these organic compounds are amino acids

63) \_\_\_\_\_

64) Glycogen, glucose, and lactose are examples of these organic compounds

64) \_\_\_\_\_

65) DNA, RNA, and ATP are types of these organic compounds

65) \_\_\_\_\_

66) Antibodies, some hormones, and enzymes are types of these organic compounds

66) \_\_\_\_\_

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

67) Describe the role of the electron in chemical bond formation.

67) \_\_\_\_\_

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

68) Discuss the major properties of water that make it so vital to the proper functioning of the body.