Chapter 2
Chemical Basis of Life

1. The five most common elements in living organisms are
   a. C, H, O, Na, Cl
   b. C, H, O, Na, Ca
   c. C, H, O, N, Ca
   d. C, N, O, Na, Cl
   e. C, N, O, Ca, Fe

2. The atom sodium contains 11 electrons, 11 protons, and 12 neutrons. What is the mass number of electrons?
   a. 0
   b. 11
   c. 22
   d. 23
   e. 34

3. The atomic number of an atom is
   a. the number of protons in the atom.
   b. the number of electrons in the atom.
   c. the number of neutrons in the atom.
   d. the number of protons, electrons, and neutrons in the atom.
   e. the net electrical charge of the atom.

4. When full, the innermost electron shell of an atom contains ____________ electrons, and the outermost shell contains ____________ electrons.
   a. 2 ….. 2
   b. 2 ….. 8
   c. 4 ….. 8
   d. 8 ….. 2
   e. 8 ….. 8

5. A(n) ____________ forms when two atoms share electrons.
   a. ion
   b. polar covalent bond
   c. covalent bond
   d. ionic bond
   e. either b or c
6. What is the fundamental difference between covalent and ionic bonding?

a. In a covalent bond, the partners have identical electronegativity; in an ionic bond, one of them is more electronegative.

b. In a covalent bond, the partners share a pair of electrons; in an ionic bond, one partner captures an electron from the other.

c. In covalent bonding, both partners end up with filled outer electron shells; in ionic bonding, one partner does and the other does not.

d. Covalent bonding involves only the outer electron shell; ionic bonding also involves the next inner electron shell.

e. Covalent bonds form between atoms of the same element; ionic bonds, between atoms of different elements.

7. ____________ are weak bonds that are not strong enough to hold atoms together to form molecules but are strong enough to form bridges between molecules.

a. Ionic bonds
b. Covalent bonds
c. Polar covalent bonds
d. Hydrogen bonds
e. Anionic bonds

8. Why can a glass be filled with water to the point where some of the water is above the rim of the glass, yet the water does not overflow the glass?

a. Water molecules exhibit cohesion.
b. The polar covalent bonds of water prevent overflow.
c. The ionic bonds of water prevent overflow.
d. It is an optical illusion, the water is not actually above the rim.
e. The pressure of gravity on the water prevents overflow.

9. A solution with a pH of 7 is

a. strongly acidic
b. weakly acidic
c. neutral
d. weakly basic
e. strongly basic

10. A buffer

a. is an acid that is used to offset overly basic conditions in the body.
b. is a base that is used to offset overly acidic conditions in the body.
c. donates OH⁻ ions when conditions become too acidic and accepts OH⁻ ions when conditions become too basic.
d. donates H⁺ ions when conditions become too basic and accepts OH⁻ ions when conditions become too acidic.
e. donates OH⁻ ions when conditions become too basic and accepts OH⁻ ions when conditions become too acidic.