

CHAPTER REVIEW

Introduction to Chemical Bonding

SECTION 1 REVIEW

1. What is a chemical bond?
2. Identify and define the three major types of chemical bonding.
3. What is the relationship between electronegativity and the ionic character of a chemical bond?
4. a. What is the meaning of the term polar, as applied to chemical bonding?
b. Distinguish between polar-covalent and nonpolar-covalent bonds.
5. In general, what determines whether atoms will form chemical bonds?

PRACTICE PROBLEMS

6. Determine the electronegativity difference, the probable bond type, and the more-electronegative atom with respect to bonds formed between the following pairs of atoms. (Hint: See Sample Problem A.)
 - a. H and I
 - b. S and O
 - c. K and Br
 - d. Si and Cl
 - e. K and Cl
 - f. Se and S
 - g. C and H
7. List the bonding pairs described in item 6 in order of increasing covalent character.
8. Use orbital notation to illustrate the bonding in each of the following molecules:
 - a. chlorine, Cl_2
 - b. oxygen, O_2
 - c. hydrogen fluoride, HF
9. The lattice energy of sodium chloride, NaCl, is -787.5 kJ/mol . The lattice energy of potassium chloride, KCl, is -715 kJ/mol . In which compound is the bonding between ions stronger? Why?

Covalent Bonding and Molecular Compounds

SECTION 2 REVIEW

10. What is a molecule?
11. a. What determines bond length?
b. In general, how are bond energies and bond lengths related?
12. Describe the general location of the electrons in a covalent bond.
13. As applied to covalent bonding, what is meant by an unshared or lone pair of electrons?
14. Describe the octet rule in terms of noble-gas configurations and potential energy.
15. Determine the number of valence electrons in an atom of each of the following elements:
 - a. H
 - b. F
 - c. Mg
 - d. O
 - e. Al
 - f. N
 - g. C
16. When drawing Lewis structures, which atom is usually the central atom?
17. Distinguish between single, double, and triple covalent bonds by defining each and providing an illustration of each type.
18. In writing Lewis structures, how is the need for multiple bonds generally determined?

PRACTICE PROBLEMS

19. Use electron-dot notation to illustrate the number of valence electrons present in one atom of each of the following elements. (Hint: See Sample Problem B.)
 - a. Li
 - b. Ca
 - c. Cl
 - d. O
 - e. C
 - f. P
 - g. Al
 - h. S