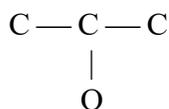


## Chapter 12 Study Questions

1. What is a chemical bond? Why do atoms form chemical bonds? How are covalent bonds and ionic bonds different? How are they the same?
2. How is the valence of an atom related to the number of bonds it usually forms?
3. What types of substances contain covalent bonds?
4. List the atoms in each of the following sets in order of increasing electronegativity:  
a) N, As, P                      b) O, Li, C                      c) Mg, K, B
5. Choose the bond from each pair which is *most* polar.  
a) Cl—Cl, H—Cl                      b) O—C, F—C
6. Choose the atom or ion in each set with the smallest atomic radius.  
a) Li, Li<sup>+</sup>, H<sup>-</sup>                      b) Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup>                      c) F, O<sup>2-</sup>, F<sup>-</sup>
7. For each of the following ions, give its electron configuration, another ion with the same configuration and a noble gas with the same configuration:    a) O<sup>2-</sup>                      b) Sc<sup>3+</sup>
8. Write a balanced chemical equation (always include physical states) for the reaction between calcium and iodine.
9. Draw Lewis structures for the following atoms:  
a) Be                      b) C                      c) F
10. Draw Lewis structures for the following compounds:  
a) H<sub>2</sub>S                      b) Br<sub>2</sub>                      c) NH<sub>2</sub>F                      d) CH<sub>2</sub>I<sub>2</sub>                      e) CO<sub>3</sub><sup>2-</sup>  
f) diphosphorus dichloride                      g) dinitrogen tetroxide  
h) C<sub>3</sub>H<sub>4</sub>Cl<sub>2</sub>                      i) C<sub>3</sub>H<sub>4</sub>
11. For each of the compounds (a)-(d) in question 10, indicate their molecular geometry.
12. For each of the compounds (a)-(d) in question 10, indicate whether the molecule is polar or nonpolar.
13. Add hydrogen atoms and electrons in order to complete Lewis structures of the following following compound: C<sub>3</sub>H<sub>6</sub>O (acetone; nail polish remover)



## **Summary of Chapter 12: Chemical Bonding**

chemical bonds

ionic bonds

covalent bonds

polar and nonpolar covalent bonds

electronegativity

bond polarity

dipole moment

electron configurations of ions

ion size

valence

Lewis structures of atoms

Lewis structures of molecules

Octet rule

lone pairs

resonance

VSEPR Model

molecular geometry:

linear, bent, tetrahedral, trigonal pyramidal, planar