

Name KEY Class \_\_\_\_\_ Date \_\_\_\_\_

Assessment  
**Chemical Bonding QUIZ REVIEW**

**Section Quiz: Covalent Bonding and Molecular Compounds**

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.





- C** 1. If two covalently bonded atoms move closer than a distance of the bond length, the potential energy of the atoms  
 a. becomes negative.  
 b. decreases.  
 c. increases.  
 d. remains constant.
- C** 2. The electrons involved in the formation of a covalent bond are  
 a. transferred from one atom to another.  
 b. found only in the s orbitals.  
 c. valence electrons.  
 d. in filled orbitals.
- C** 3. Bond energy is the energy  
 a. absorbed as a molecule forms.  
 b. change as atoms get closer together.  
 c. required to break a chemical bond and form separate, neutral atoms.  
 d. of two covalently bonded atoms.
- B** 4. Bond length between two bonded atoms is  
 a. twice the diameter of the molecular orbital.  
 b. the separation at which their potential energy is minimum.  
 c. the separation at which the motion of each atom stops.  
 d. the sum of the diameters of each of the two overlapping electron clouds.
- A** 5. Which compound most likely has the greatest bond energy?  
 a. HF; H—F bond length = 92 pm  
 b. I<sub>2</sub>; I—I bond length = 266 pm  
 c. Cl<sub>2</sub>; Cl—Cl bond length = 199 pm  
 d. HCl; H—Cl bond length = 127 pm

**Section Quiz: Molecular Geometry**

In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

- D** 1. VSEPR theory  
 a. predicts the shape of some molecules.  
 b. is limited to polar molecules.  
 c. assumes that pairs of valence electrons surrounding an atom repel each other.  
 d. Both (a) and (c).
- A** 2. The shape of molecules that contain only two atoms is  
 a. linear.  
 b. bent.  
 c. trigonal planar.  
 d. Either (a) or (b).
- B** 3. According to VSEPR theory, which molecule has a bent shape?  
 a. CO<sub>2</sub>  
 b. H<sub>2</sub>O  
 c. CS<sub>2</sub>  
 d. HF
- D** 4. VSEPR theory predicts that the shape of carbon tetrachloride, CCl<sub>4</sub>, is  
 a. linear.  
 b. bent.  
 c. trigonal planar.  
 d. tetrahedral.
- B** 5. Which of the following molecules is polar?  
 a. C<sub>2</sub>H<sub>2</sub>  
 b. H<sub>2</sub>O  
 c. BF<sub>3</sub>  
 d. CO<sub>2</sub>

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**Section Quiz, continued**

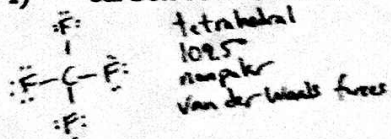
- B** 6. The Lewis structure of which of the following compounds does not follow the octet rule?  
 a. NH<sub>3</sub>  
 b. BF<sub>3</sub>  
 c. CCl<sub>4</sub>  
 d. H<sub>2</sub>O
- D** 7. In a double covalent bond,  
 a. one atom has more than eight valence electrons.  
 b. one atom loses a pair of electrons.  
 c. two atoms share eight valence electrons.  
 d. two atoms share two pairs of electrons.
- D** 8. Which of the following is not a resonance structure of SO<sub>2</sub>?  
 a.   
 b.   
 c.   
 d. 
- A** 9. How many double bonds are in the Lewis structure for hydrogen fluoride, HF?  
 a. none  
 b. one  
 c. two  
 d. three
- A** 10. To draw a Lewis structure, it is not necessary to know  
 a. the length of the bonds.  
 b. the types of atoms in the molecule.  
 c. the number of valence electrons for each atom.  
 d. the number of atoms in the molecule.

- C** 6. The structure of which of the following compounds suggests that it has the highest boiling point?  
 a. CH<sub>4</sub>  
 b. CO<sub>2</sub>  
 c. NaCl  
 d. O<sub>2</sub>
- B** 7. The VSEPR formula for a molecule of type AB<sub>2</sub>E<sub>2</sub> tells you that the molecule is made up of  
 a. a central atom A, with two B atoms and two E atoms bonded to it.  
 b. a central atom A, with two B atoms bonded to it and two unshared electron pairs.  
 c. a central atom A, with two B atoms bonded to it by two bonding electron pairs.  
 d. two central atoms B, with an atom A and two atoms E bonded to it.
- C** 8. Orbitals of equal energy, produced by the combination of two or more orbitals on the same atom are called  
 a. bonding orbitals.  
 b. valence orbitals.  
 c. hybrid orbitals.  
 d. high-energy orbitals.
- A** 9. The effects of hydrogen bonding will cause which compound to have the highest boiling point?  
 a. H<sub>2</sub>O  
 b. PH<sub>3</sub>  
 c. H<sub>2</sub>S  
 d. HCl
- D** 10. Which are the intermolecular forces that can act between non-polar molecules?  
 a. covalent bonds  
 b. hybridization  
 c. hydrogen bonds  
 d. London dispersion forces

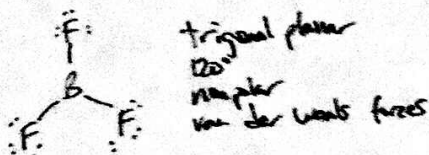
# Lewis Structures, VSEPR, Polarity, IM Forces - Answers

For each of the following molecules, draw the Lewis structure (with any resonance structures, if applicable), indicate the molecular shapes and bond angles, indicate the molecular polarity (if any), and identify the major intermolecular force in each compound. Hint - in this worksheet, as in all chemistry problems you'll see, polyatomic ions aren't drawn as big lines of atoms.

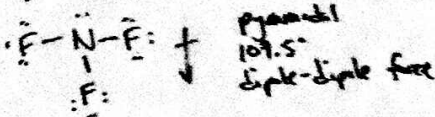
1) carbon tetrafluoride



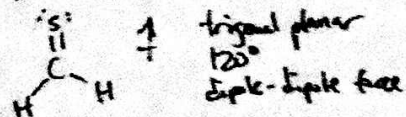
2) BF<sub>3</sub>



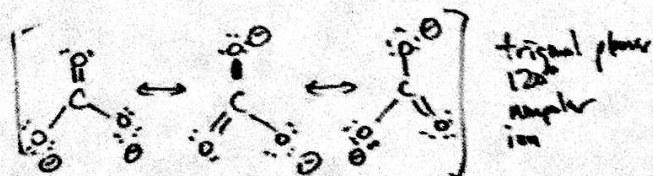
3) NF<sub>3</sub>



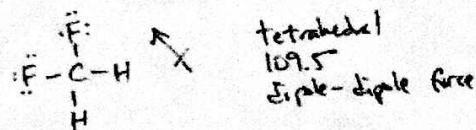
4) H<sub>2</sub>CS



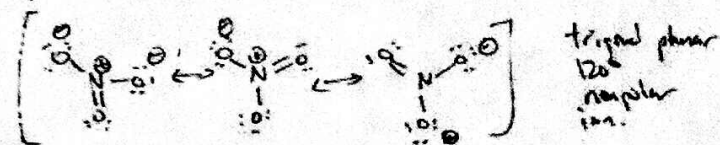
5) carbonate ion



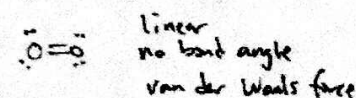
6) CH<sub>2</sub>F<sub>2</sub>



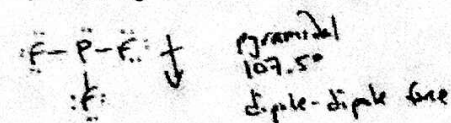
7) nitrate ion



8) O<sub>2</sub>



9) PF<sub>3</sub>



10) H<sub>2</sub>S

