Name: Key Period: ___ Date: _____
Chapter 6 Review

Test format: 9 multiple choice, 9 vocabulary matching, be able to draw molecular structure, Lewis dot diagrams, determine the type of bond, determine the molecular shape, determine whether the molecule is polar or non-polar, and be able to draw the sp, sp^2, and sp^3 hybrid orbitals.

Choose the answer that best completes each statement.

B 1. The basis of an ionic bond is the:
   a. sharing of an electron pair.
   b. electrical attraction between oppositely charge ions.
   c. repulsion created by charged ions.
   d. the attraction between polar molecules.

C 2. Atoms gain or lose electrons to obtain the structure of an:
   a. alkali metal
   b. halogen
   c. noble gas
   d. alkaline earth metal

A 3. Ions that are made up of more than one atom are called:
   a. polyatomic ions
   b. monoatomic ions
   c. cations
   d. anions

D 4. The structural formula of a molecule:
   a. denotes the ratio of ions in a compound.
   b. can be determined by criss-crossing the charges of ions.
   c. uses subscripts to denote the number of atoms of each element.
   d. specifies which atoms are bonded to each other.

B 5. Which of the following is created when two pairs of electrons are shared?
   a. a single bond
   b. a double bond
   c. an ionic bond
   d. a triple bond

D 6. When the difference in electronegativities for a bond is 2.3, the bond is considered to be:
   a. non-polar covalent
   b. unstable
   c. polar covalent
   d. ionic

D 7. Which of the following molecules provides an exception to the octet rule?
   a. H_2O b. CH_4 c. Br_2 d. SF_4

B 8. Which of the following molecules does not have a linear shape?
   a. O_2 b. H_2S c. HI d. CO_2

A 9. What is the predicted molecular shape for CCl4? CCl_4 : tetrahedral
a. tetrahedral
b. bent
c. trigonal planar
d. linear

C 10. What is the bond angle in a trigonal planar molecule?
a. 90° b. 109.5° c. 120° d. 180°

Answer the following questions in the space provided.

11. Explain why water has a bent shape.

Oxygen is group 6A, 6 val e⁻ this means oxygen has 2 non-bonded pairs of e⁻ forcing bonds downward

12. What determines the shape of a large molecule?

polarity

13. Draw the hybrid orbitals for sp, sp^2, and sp^3.

sp ∞ sp^2 sp^3

14. Why are polar molecules called dipoles?

two different ends + -

15. O_2, Cl_2, H_2, , etc. are all referred to as:

diatomic molecules

16. Polyatomic ions generally have negative charges because:

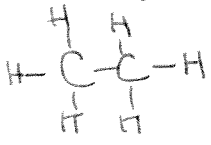
they have "stolen" extra e⁻

17. Give a brief overview of VSEPR.

Valence shell electron pair repulsion
- natural pair of electrons have greater repulsion force than a bonded pair of elections

18. Determine the carbon to carbon bond structure for the following:

C_2H_6



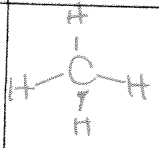
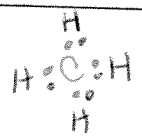
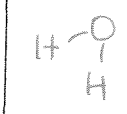
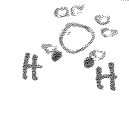
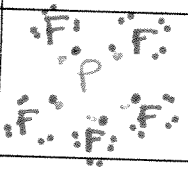
single bond

C_2H_4

double bond

C_2H_2

triple bond

	Molecular Structure	Lewis Structure	Type of Bond	Molecular Shape	Polar or Non-polar Molecule
19. CH_4			C 2.5 H 2.1 0.4 NPC	tetrahedral	nonpolar molecule
20. H_2O			O 3.5 H 2.1 1.4 PC	bent	polar molecule
21. BF_3			F 4.0 B 2.0 2.0 Ionic	trigonal planar	nonpolar molecule
22. NF_3			F 4.0 N 3.0 1.0 PC	pyramidal	polar molecule
23. PF_5			F 4.0 P 2.1 1.9 PC	expanded octet	nonpolar molecule

Define the following terms and symbols.

24. monoatomic - ion formed from a single atom

25. δ+ and δ- δ+ partial positive δ- partial negative

26. cation positive ion

27. covalent bond bond created when two atoms share a pair of electrons

28. empirical formula simplest ratio

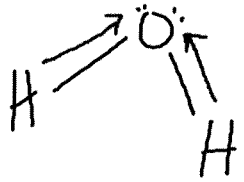
29. dipole molecule with two polar ends (+ −)

30. diatomic molecule molecule that has two of same element

7 of them : H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2

Type of Bond (Math)

0.49 or less	nonpolar covalent (NPC)
0.5 to 1.9	polar covalent (PC)
2.0 or greater	ionic (I)

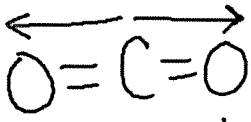


O 3.5
H 2.1 PC
1.4

Molecular Polarity

① Determine type of bonds (Math)

NPC nonpolar covalent
Nonpolar Molecule



O 3.5
C 2.5 PC
1.0

Nonpolar molecule

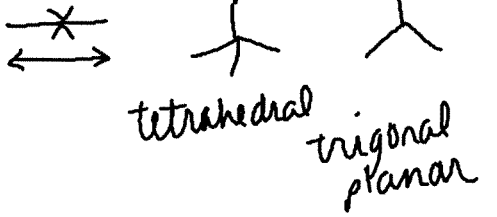
Polar Covalent or Ionic Bonds

② Apply arrows on bonds that face element w/ highest electronegativity

Same basic direction
polar molecule

bent pyramidal

equal + opposite
non-polar molecule



tetrahedral trigonal planar