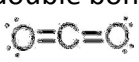
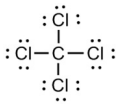
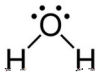
Ch. 6 Test Review

STUDY!! THE PURPOSE OF PROVIDING THE ANSWER KEY IS FOR YOU TO CHECK YOUR ANSWERS TO YOUR TEST REVIEW. SIMPLY READING MY KEY IS NOT "STUDYING." YOU GET MORE OUT OF WORKING THROUGH YOUR REVIEW, LOOKING AT THE WORKSHEETS, LABS, AND VIDEO POWERPOINTS WE DID TOGETHER. STUDY!!! It will be a stamp grade that your review is filled out.

1) Why do atoms form bonds? **A chemical bond is a mutual electrical attraction between the nuclei and valence electrons of different atoms. The electrical attraction binds the atoms together. Chemical bonds form because as independent particles, the atoms that bond have a relatively high potential energy, when they bond they can minimize that potential energy. This means that many atoms are less stable when they are by themselves and they are more stable when they bond. (Remember: octet rule.)**
2) What is the difference between an ionic and covalent? **An ionic bond is an electrical attraction between cations and anions. Ionic bonds form between positive metals and negative nonmetals. In an ionic bond the electrons are <u>transferred</u>. The metal gives his valence electrons away to have a full octet beneath, and the nonmental gains to fill he octet. Covalent bonding is when electrons are <u>shared</u> between atoms so that they can all get a full octet. Polar covalent bonds are when the electrons are not distributed equally and one end of the molecule is more negative (–) where the electrons are concentrated and the other end of the molecule is more positive (+) where there are not as many electrons. Nonpolar covalent molecules share the electrons equally so that the charge is equally distributed.**
3) What are the 2 types of covalent bonds – and how are they distinguished? **See answer for # 2 above. They can also be distinguished by looking at the difference in the electronegativity of the elements. If there is a large difference in the electronegativity, then it is an ionic bond. If there is little or no difference in the electronegativity, then the bond is covalent. If covalent, remember that it can be polar or nonpolar depending on how the electrons are shared or distributed in the molecule.**
4) What is a molecular formula? Give an example. **A molecular formula shows the types and numbers of atoms combined in a single molecule. A molecule is formed by only nonmetals. Some examples are: O_2, Cl_2, H_2O, H_2O_2, NO_2, CO_2, CH_4 ← all nonmetals**
5) Define bond energy. **Bond energy is the energy required to break a chemical bond and form neutral isolated atoms. The bond energy is related to the bond length. The higher the bond energy, the tighter the atoms are held together and therefore the shorter the bond length.**
6) How many electrons are MOST atoms trying to get in their outermost energy level to be the most stable? **Atoms want 8 electrons to satisfy the octet rule. Metals will give electrons away to have a full shell beneath, while nonmetals will try to share or gain electrons to fill their octet.**
7) What is represented in a Lewis structure? **Lewis structures are formulas in which atomic symbols represent nuclei and inner-shell electrons, dot pairs or dashes between two atomic symbols represent electron pairs in covalent bonds and dots adjacent to only the atomic symbol represents unshared electrons.**
8) How do you represent double bonds in a Lewis structure? Show it with CO_2. **With 2 lines between the double bonded atoms.** 
9) Draw a Lewis structure for CCl_4 
10) What is the basis of VSEPR – what is trying to get as far away as possible? **VSEPR stand for Valence shell electron pair repulsion. VSEPR theory states that repulsion between the sets of valence level electrons surrounding an atom causes these sets to be oriented as far apart as possible. VSEPR**

explains why molecules, when drawn as Lewis structures, take the shapes they do. The electrons repel other electrons in an attempt to be as far away as possible from other electrons. The shapes we need to be able to recognize and identify are: linear, bent, trigonal-planar, trigonal-pyramidal, and tetrahedral. Study the chart on your bonding packet to identify the differences in the shapes/structures.

11) What are the shapes of the following molecules: H_2O, HCl, CH_4

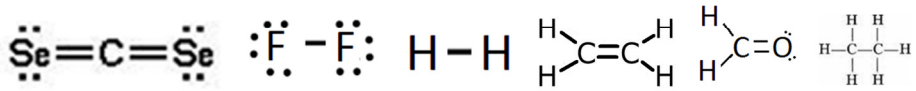
 **Bent**

 **linear**

 **tetrahedral**

12) What type of bond is present in CO_2, $CaCl_2$, H_2? **CO_2 = covalent, $CaCl_2$ = ionic, H_2 = covalent**

13) Draw dash formulas (Lewis) for the following: CSe_2, F_2, H_2, C_2H_4, COH_2, C_2H_6



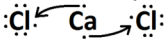
14) How can you determine how many valence electrons an element has? **By looking at its location on the periodic table. Valence electrons are a group property.**

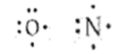
15) How does bond energy relate to bond length? **The higher the bond energy, the tighter the atoms are held together and therefore the shorter the bond length.**

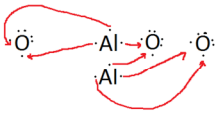
16) What happens when electrons "get excited"? **Electrons in a metal can absorb the energy and when they absorb enough, the reemit light. (This is known as the photoelectric effect.)**

17) Describe the valence electrons of metals? **The valence electrons in a metal act as a sea of electrons and do not stay with one particular atom. This makes them excellent conductors of electricity and heat. Another property of metals due to their electron structure is that they are ductile (easy to draw, pull, or extrude into a wire) and malleable (can be hammered or beaten into thin sheets.)**

18) What are some properties of metals due to their electrons? **Since the valence electrons in a metal act as a sea of electrons and do not stay with one particular atom. This makes them excellent conductors of electricity and heat. Another property of metals due to their electron structure is that they are ductile (easy to draw, pull, or extrude into a wire) and malleable (Can be hammered or beaten into thin sheets.)**

19) Draw a Lewis dot structure for an ionic bond – remember they form ions! (ex: $CaCl_2$) **Remember that an ionic bond involves the transfer of an electron.** 

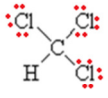
20) Draw dot diagrams of: H, Ca, O, and N. 

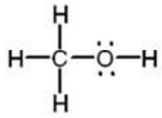


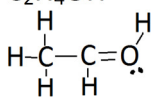
21) Lewis dot structure of ionic bonds between Al_2O_3, MgS

22) Draw Structural diagrams (dashes for bonds and only extra valence e- on the central atoms):

a. N_2 

b. $CHCl_3$ 

c. CH_3OH 

d. C_2H_4OH 

e. N_2H_2