Chemistry:
Study Guide: Ch. 15

1. Why is it logical that the bonding in ionic-compounds like sodium chloride is different from the bonding in molecular substances like water and hydrogen.

2. Illustrate the formation of a single covalent bond when two hydrogen atoms join together to form a hydrogen molecule.

3. What does the dash in H-H represent?

4. Chemical formulas that show the arrangement of atoms in molecules and ployatomic ions are called _____. Each dash represents a _____ of _____ _____. Such dashes are never used to show _____ _____.

5. What is the difference between formula for an ionic compound and a covalent compound?

6. Covalent bonds are likely to form between _____elements. Ionic bonds form between a cation usually a metal ion) and an anion (usually nonmetal ion).

7. Illustrate the formation of a molecule of fluorine using dot structures. Explain does each atom in F_2 have a stable octet electrons.

8. Look at the dot structure for F_2. How many shared pars of electrons does each F have?

9. How may unshared pairs of electrons does each F have?

10. Draw the electron dot structure for booth water and H_2S.

How many shared and unshared airs of electrons does each atom have?

11. Draw the electron dot structure for both NH_3 and PH_3.

12. Draw the dot structure for both CH_4 and SiH_4.

13. Explain why methane is CH_4 instead of CH_2 in terms of electron promotion.

14. Use dot structures to illustrate the formation of a double covalent bond in O_2 CO_2 and C_2H_4.

15. Use dot structures to illustrate the formation of a triple covalent bond in N_2 and C_2H_2.

15b. Draw the dot structure for the ionic compound NaCl. Since NaCl is ionic, is the pair of electrons between Na and Cl shared?

Draw the dot structure for the ionic compound NaOh. Which bond (attraction) is ionic? Which bond (attraction) is covalent?

16. Which is a coordinate covalent bond?

Illustrate the formation of a coordinate covalent bond when NH_3 and hydrogen ion join together to form an ammonium ion.

17. Study Table 16.2 on p. 445. Which molecules contain a triple covalent bond?
Which molecules contain a double covalent bond?
Which molecules contain a coordinate covalent bond?
How many unshared pairs of electrons are in H_2O_2?

How may shared pairs of electrons are in H_2O_2?

18. A bond between atoms is an attraction. The energy it takes to pull apart atoms that are attracted to each other is called _____ _____ _____. How much energy is required to separate one mole of hydrogen molecules into two moles of hydrogen atoms?

19. Use Table 16.3 to determine the following:

a) How much energy is required to break 1 mole of CH_3 in to individual atoms? _____.

b) How much energy is released when C_2H_6 is formed form 2 moles of C and 6 moles of H atoms?

_____

20. If a bond breaking is always endothermic, then bond formation must always be_____.

21. A _____ _____ is formed between two atoms that share one or or more pairs of electrons equally. List seven diatomic molecules that contain nonpolar covalent bonds.

22. A _____ _____ is formed between two atoms that do not share one or more pairs of electrons equally. The more _____ atom will have the _____ _____ _____ and will acq2uire a slightly negative charge. The less _____ atom will acquire a slightly positive charge. I the tug-of-war between two atoms, the more electronegative atom attracts the shared pair of electrons in the bond more than the less electronegative atom. This results in the pair of electrons in the bond spending more than 50% of their time around the nucleus of the more electronegative atom which imports a partial negative charge to that atom. Since the pair of electrons spend less than 50% of their time around the nucleus of the less electronegative atom it takes on a partial positive charge. The bond is said to be polar because one atom has a partial negative charge while the atom of the other end of the bond has a partial positive charge. Polar means having a positive end and a negative end.

23. What symbol is used to represent partial when showing partial charge?

24. How can an arrow be used to show polarity of a bond (which way does the arrow point)?

25. The greater the difference in electronegativity values (p.405) between two bonding atoms, the more polar the bond. Circle the molecule with the more polar bond in the following pairs:

a) HCl or HF b) NH_3 or PH_{23} c)H_2S or H_2O d) OF_2 or NF_3 e) CCL_4 or CI_4

26. A _____ _____ is a molecule in which one end of the molecule is partially negative while the other end is partially positive.Another name for this type of molecule is _____ which means having two poles (a negative pole and a positive pole).

27. HCl is a polar molecule. What happened to the HCl molecules in Fig.. 16.22?
Why would carbon dioxide not do the same thing?

28. The attraction between a cation and an anion is called an ionic bond
The attraction between a metal atom and another metal atom is called a metallic bond
The attraction between one nonmetal atom and another nonmetal atom is molecule is called covalent bond

Ionic bonds metallic bonds and covalent are all very strong and hard to break. The attraction in between one molecule and another molecule is weak attraction and much easier to break than the three bonds motioned above. These weak attractions are called intermolecular attractions because they are between two molecules.