

BIG CHEM: Unit 5 - Bonding

Problem Set #5

Due: Wednesday, December 5th
Mr. Darlington

- * For your test on this unit, you must completely memorize "Table E: Selected Polyatomic Ions."
This will be worth 15 points on your next exam. You will find this sheet attached to this problem set.
- * Make flashcards of the 25 polyatomic ions you have to memorize. This will be checked for a 10 point blitz the 2nd day of this unit.
- 1 Write a summary paragraph on the article: "Small, Yes, but Mighty, The Molecule Called Water."
 - 2 Identify the specific location in an atom where bonding takes place.
 - 3 Describe an ionic bond.
 - 4 Describe the types of elements involved in ionic bonds.
Include in your description what ionization energy and electronegativity has to do with how these elements participate in an ionic bond.
 - 5 Describe a covalent bond.
 - 6 Describe the types of elements involved in covalent bonds.
Include in your description what ionization energy and electronegativity has to do with how these elements participate in an ionic bond.
 - 7 Describe the difference between a polar covalent bond and a nonpolar covalent bond.
What do these types of bonds have to do with electronegativity?
 - 8 Why are metallic bonds both strong and flexible?
 - 9 Why are metals able to conduct both heat and electricity well?
 - 10 Draw Lewis structures for each of the following:
 - a. C_2Cl_2
 - b. SO_3
 - c. CS_2
 - d. AsF_3
 - e. SiO_2
 - f. NH_4^+
 - g. NO_3^-
 - h. PCl_5
 - i. SO_3
 - j. CO_2
 - k. NH_3
 - l. H_2S
 - 11 For each of the formulas below, determine number of atoms of each type of element and the total number of atoms in the compound:
 - a. $4NaHCO_3$
 - b. $15HCl$
 - c. $3Al_2O_3$
 - d. $6KNO_3$
 - e. $2N_2O_5$
 - f. $7Sn(NO_2)_4$
 - g. $4Mn_2(Cr_2O_7)_7$
 - h. $9Na_2SO_3$
 - i. $8Ba_3(PO_4)_2$
 - 12 Determine the oxidation state of every element in each of the compounds below:
 - a. $BaCl_2$
 - b. PbO_2
 - c. $MnCl_7$
 - d. $Cr_3(PO_4)_2$
 - e. $Al_2(SO_4)_3$
 - f. Sn_3P_4
 - g. $Ca(NO_3)_2$
 - h. Cu_2S
 - i. FeO
 - 13 Using the stock system, name the compound based on the formula given, or write the formula based on the name given:
 - a. $NaCl$
 - b. $CuSO_4$
 - c. $(NH_4)_2S$
 - d. BaO
 - e. LiF
 - f. $Sn(NO_3)_4$
 - g. K_3N
 - h. $HgBr_2$
 - i. CaI_2
 - j. $Mg_3(PO_4)_2$
 - k. iron III oxide
 - l. chromium III carbonate
 - m. calcium sulfide
 - n. lead II arsenide
 - o. ammonium nitrate
 - p. potassium oxalate
 - q. aluminum acetate
 - r. cesium thiosulfate
 - s. strontium phosphide
 - t. tin IV oxide
 - 14 Write the correct name of the following compounds:
 - a. $NaCl$
 - b. NH_4CH_3COO
 - c. K_2SO_4
 - d. $Fe_2(SO_4)_3$
 - e. CuO
 - f. $Al_2(CO_3)_3$
 - g. $CuBr$
 - h. FeO
 - i. MgS
 - j. $Ba_3(PO_4)_2$
 - k. H_2S
 - l. FeF_3
 - m. KI
 - n. $LiNO_3$
 - o. BaO
 - p. $AgNO_3$
 - q. KOH
 - r. $(NH_4)_2CO_3$
 - s. $Zn(OH)_2$
 - t. Fe_2S_3
 - 15 Name the following binary covalent compounds:
 - a. $BrCl_5$
 - f. SeS_3

- b. SO_3
- c. P_2O_3
- d. As_3P_5
- e. IF_7

- g. SO_2
- h. CO
- i. SBr_6
- j. N_2O_5

- 16 The following compounds follow different naming conventions. Name them, and be careful to use the proper naming convention:
- a. $\text{Fe}(\text{NO}_2)_3$
 - b. $\text{Na}_2\text{S}_2\text{O}_3$
 - c. P_2O_5
 - d. BaBr_2
 - e. $\text{Mn}_2(\text{Cr}_2\text{O}_7)_7$
 - f. CaCl_2
 - g. $(\text{NH}_4)_2\text{S}$
 - h. CuF
 - i. Br_2O
 - j. HgSO_4
- 17 Fill a cup with water. Continue adding water one drop at a time seeing how many you can add until the water spills over. Draw a picture of a side view of what the surface of the water looked like before it spilled. Why isn't it flat?
- 18 Explain why water's boiling point is unusually high.
- 19 Using the terms: electronegativity, intermolecular forces and hydrogen bonding, explain why ice cubes float.
- 20 Research question: This question is designed to prepare you for college when you will have a teacher you don't like and you are forced to learn out of a textbook. Complete the attached worksheet using only the background information given on that sheet. The title of the worksheet is "The Ties that Bind."