Review Problems for the test tomorrow, based on voting!

1. If 2.00 grams of a compound are combusted to form 4.40 grams of carbon dioxide and 2.40 g water, find the empirical formula of the compound. The answer is on the back of this sheet)

2. Write balanced net-ionic equations, with subscripts:

a. A silver hydroxide precipitate clears up when a concentrated solution of ammonia is added.

b. Solutions of copper (II) nitrate and potassium cyanide are mixed, resulting in a complex ion.

c. A solution of potassium cyanide is added to a copper (II) carbonate precipitate, which causes the ppt to clear up.

d. Solutions containing tin (II) ion and iron (II) ion are mixed, and the iron ion is oxidized.

e. Solutions containing tin (II) ion and lead (II) ion are mixed, and the tin ion is oxidized.

3. Write balanced chemical equations, with subscripts, for each reaction. If the reaction has a star (*) next to it, also write a balanced net ionic equation. (if it involves a complex ion, ONLY do it as anet-ionic.)

* a. Sodium carbonate is strongly heated.

*b. Liquid Heptane (C_7H_{16}) is burned.

c. Aluminum reacts with bromine.

d. Sulfur is heated in air until it ignites.

e. A piece of silver is dropped into a solution of iron (III) chloride.

* f. A piece of iron is dropped into a solution of Iron (III) bromide.

*g. Concentrated HCl is added to a solution of Gold (III) nitrate, forming a complex ion.

*h. A piece of aluminum is dropped into a solution of silver nitrate.

*i. Chlorine is bubbled through a solution of sodium bromide.

j. Sulfur trioxide is bubbled through water.

k. Calcium hydroxide is heated.

*l. A precipitate of chromium (III) carbonate clears up when concentrated ammonia is added. The product has hexa in the name.

m. A solution of sulfurous acid is heated.

*n. Sodium oxide powder is added to water.

*o. Air is heated, so that the nitrogen and oxygen react.

*p. Solutions of silver nitrate and Iron (III) chloride are mixed.

*q. A piece of nickel is dropped into a solution of nitric acid.

r. Magnesium chlorate is strongly heated.

4. For reactions c, f, p, and q: Which of these reactions are redox reactions?
For the ones that are redox reactions, determine the element or ion oxidized by the reaction, and the element or ion that is reduced by the reaction.

Answer to #1: C_3H_8O. (based on : 1.20 grams C, 0.269 grams H, 0.531 grams O)

Formula writing Practice:

K_2O_____

N_2O_____

copper (II) sulfide_____

copper (II) phosphate_____

CI_4_____

PbI_4_____

PbS_2_____

SF_2_____

MgF_2_____

tetrahydroxo zinc (II) ion_____

tetrachloro chromium (III) ion_____

hexaammine aluminum ion_____

Mole Practice Quiz from Chem I!

1. Propane has the formula C_3H_8. **a.** Find the molar mass of propane. Report units in two possible ways.

b. If a propane tank contains 13500 grams of propane, how many molecules of propane are in the tank?

c. Convert 4.0×10^{22} propane molecules to moles.

d. How many total atoms are in the 4.0×10^{22} molecules of propane?

2. a. What is the mass of 3.00×10^{21} uranium atoms?

b. Convert 345 grams of bromine to molecules.

c. How many hydrogen peroxide molecules are in 0.0015 moles of hydrogen peroxide?

d. 1 cup of table sugar (sucrose; $C_{12}H_{22}O_{11}$) has a mass of approximately 290 grams. How many sucrose molecules are in this mass?

e. How many atoms are in 1.00×10^{20} sucrose molecules?

f. What is the mass (in grams) of 1 molecule of sucrose?

3. a. Determine the molar mass of copper (II) phosphate; $Cu_3(PO_4)_2$

b. Convert 32.21 grams of copper (II) phosphate to moles.

c. What is the percent composition (by weight) of phosphorus in this compound?

d. If 3.00 grams of phosphorus were extracted from copper (II) phosphate, how many grams of copper (II) phosphate were initially present?
e. How many grams of phosphorus can be extracted from 30.0 grams of copper (II) phosphate?

4. Determine the empirical formula of $C_{20}H_{36}O_8$

5. A compound is 53.31% carbon, 35.51% oxygen, and 11.12% hydrogen, by weight. Determine the empirical formula.

6. A compund is 39.34% carbon, 8.25% hydrogen, and 52.41% oxygen by weight. The molecular weight of the compound is between 225 and 250 amu. **a.** Determine the empirical formula. **b.** Determine the molecular formula.

Answers: 1a. 44.0962 amu or 44.0962 g/mole <---- notice it is g/mole, not just g.
1b. 1.84×10^{26} molecules c. 0.066 moles d. 4.4×10^{23} atoms
2. a. 1.19 g b. 1.30×10^{24} molecules c. 9.0×10^{20} molecules d. 5.1×10^{23} molecules.
2e. 4.5×10^{21} atoms 2f. 5.69×10^{-22} g
3. a. 380.581 amu or g/mole b. 0.08463 moles c. 16.2771% P d. 18.4 g e. 4.88 g
4. $C_5H_9O_2$ 5. C_2H_5O 6a. $C_2H_5O_2$ b. $C_8H_{20}O_8$

Answers to F.W. Practice
potassium oxide
dinitrogen monoxide
CuS
Cu3(PO4)2
carbon tetraiodide
lead (IV) iodide
lead (IV) sulfide
sulfur difluoride
magnesium fluoride
$Zn(OH)_4^{-2}$
$CrCl_4^{-1}$
$Al(NH_3)_6^{+3}$