WORKSHEET #7: REVIEW

STOICHIOMETRY PROBLEMS (hint: make sure to **balance**!)

1. Small quantities of oxygen can be generated in the laboratory by the decomposition of hydrogen peroxide. The unbalanced equation for the reaction is:

$$2\ H_2O_2 \rightarrow 2H_2O + O_2$$

Calculate the mass of oxygen produced when 10.0 g of hydrogen peroxide decomposes.

$10.0\text{g } H_2O_2 \left|\frac{1\text{mole } H_2O_2}{34.02\text{g } H_2O_2}\right|\frac{1\text{mole } O_2}{2\text{mole } H_2O_2}\left|\frac{32.00\text{g } O_2}{1\text{mole } O_2}\right. = 4.70\text{g } O_2$

2. A tried and true introductory experiment involves heating finely divided copper metal with sulfur to determine the proportions in which the elements react to form copper II sulfide.

$$Cu + S \rightarrow CuS$$

If 1.25 g of copper is heated with an excess of sulfur, how many grams of copper(II)sulfide will form?

$1.25\text{g Cu} \left|\frac{1\text{mole Cu}}{63.55\text{g Cu}}\right|\frac{1\text{mole CuS}}{1\text{mole Cu}}\left|\frac{95.61\text{g CuS}}{1\text{mole CuS}}\right. = 1.88\text{g CuS}$

3. Ammonium nitrate has been used as a high explosive because it is unstable and decomposes into several gases. The rapid expansion of the gases produces the explosive force. The unbalanced equation is:

$$2\ NH_4NO_3 \rightarrow 2N_2 + O_2 + 4H_2O$$

Calculate the ~~liters~~ grams of nitrogen gas product gas if 1.25 g of ammonium nitrate reacts.

$1.25\text{g } NH_4NO_3 \left|\frac{1\text{mole } NH_4NO_3}{80.06\text{g } NH_4NO_3}\right|\frac{2\text{mole } N_2}{2\text{mole } NH_4NO_3}\left|\frac{28.02\text{g } N_2}{1\text{mole } N_2}\right. = 0.44\text{g } N_2$

4. Magnesium metal, which burns in oxygen with an intensely bright white flame, has been used in photographic flash units. The unbalanced equation is:

$$2Mg + O_2 \rightarrow 2MgO$$

How many grams of MgO are produced by the complete reaction of 1.25 ~~L~~ g of oxygen gas?

$1.25\text{g } O_2 \left|\frac{1\text{mole } O_2}{32.00\text{g } O_2}\right|\frac{2\text{mole MgO}}{1\text{mole } O_2}\left|\frac{40.31\text{g MgO}}{1\text{mole MgO}}\right. = 3.15\text{g MgO}$