Stoich. Problems

Name Key Period _____ Date _____

Answer true or false for each of the following:

T 1. Coefficients can represent the number of moles of reactants and products.

F 2. Coefficients can represent the number of grams of reactants and products.

F 3. In the equation $2Na + Cl_2 \rightarrow 2NaCl$; 2 moles of sodium are reacting with 2 moles of chlorine gas.

Balance this equation to answer the following questions:

$$1\ Mg_3N_2 + 3\ H_2O \rightarrow 3\ MgO + 2\ NH_3$$

3 1. How many moles of water react with 1 mole of Mg_3N_2?

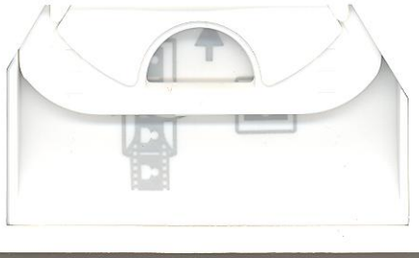
3 2. How many molecules of MgO are produced if 1 molecule of Mg_3N_2 reacts with 3 molecules of H_2O?

magnesium oxide, ammonia 3. Name a product in this reaction (use words, not symbols)

Double Rep 4. What type of reaction is this?

subscript 5. The 3 in Mg_3N_2 is called a what?

coefficient 6. The number in front of H_2O is called a what?



Perform the necessary calculations to solve each of the following problems. Show all work, give units, and round to 4 sig figs!

(1) John reacted 0.3800 g of lithium nitride with water according to the unbalanced equation below. How many grams of lithium hydroxide was John able to form?

Li_3N — 34.7 g/mol

Li: $3 \times 6.9 = 20.7$

N: $1 \times 14.0 = 14.0$

34.7 g/mol

LiOH — 23.9 g/mol

Li: $1 \times 6.9 = 6.9$

O: $1 \times 16.0 = 16.0$

H: $1 \times 1.0 = 1.0$

23.9 g/mol

$$1\ Li_3N + 3\ H_2O \rightarrow 1\ NH_3 + 3\ LiOH \text{ (unbalanced!)}$$

.3800 g → ? g

g Li_3N → mol Li_3N → mol LiOH → g LiOH

$$.3800\text{g } Li_3N \times \frac{1\text{ mol}}{34.7\text{ g}} \times \frac{3\text{ mol LiOH}}{1\text{ mol } Li_3N} \times \frac{23.9\text{ g}}{1\text{ mol}} = .7852\text{ g LiOH}$$

(2) Kelly measured the mass of a butane lighter and then used it. After extinguishing the flame she again measured the mass and determined that she had used 0.8500 g of butane, C_4H_{10}. How many grams of carbon dioxide had she also produced? (Hint: need a balanced reaction)

58.0 g/mol — 44.0 g/mol

$$2\ C_4H_{10} + 13\ O_2 \rightarrow 8\ CO_2 + 10\ H_2O$$

.8500 g → ? g

C_4: $4 \times 12 = 48.0$

H_{10}: $10 \times 1.0 = 10.0$

58.0 g/mol

C: $1 \times 12.0 = 12.0$

O_2: $2 \times 16.0 = 32.0$

44.0 g/mol

g C_4H_{10} → mol C_4H_{10} → mol CO_2 → g CO_2

$$.8500\text{g } C_4H_{10} \times \frac{1\text{ mol}}{58.0\text{ g}} \times \frac{8\text{ mol } CO_2}{2\text{ mol } C_4H_{10}} \times \frac{44.0\text{ g}}{1\text{ mol}} = 2.579\text{ g } CO_2$$