WLHS / Chem / Monson

Name_____
Date_____Per_____

PROBLEM SET: 12.1-12.2 – Mole Ratios (Interpreting and Using Chemical Equations)

"everyday" problems:

1) Your school club has "adopted" a local nursing home and provides welcoming packages to new residents. Each welcoming package contains: 1 toothbrush (B), 3 washcloths (W), 1 tube of toothpaste (P), 2 decks of cards (C), and 3 bottles of skin lotion (L).

A) Calculate the number of **each item** needed for 45 welcoming packages.

B) Assuming you have excess amounts of all ingredients, how many welcoming packages would you be able to put together if you had 111 washcloths?

2) A cookie recipe calls for: 1.25 cups butter; 1.5 cups sugar; 2 eggs; 1 cup brown sugar; 2.75 cups flour; 1 teaspoon salt; 1 teaspoon baking soda; 14 ounces chocolate chips.
****This recipe will produce 54 cookies.**

A) Calculate the amount of **each ingredient** needed to produce 81 cookies.

B) Assuming you have excess amounts of all ingredients, how many cookies would you be able to make if you had 9 eggs?

Chemistry / Stoichiometry Problems:

3) Consider the reaction: $N_2 + H_2 \rightarrow NH_3$
Balance the equation.
How many moles of hydrogen are needed to completely react with 6.8 moles of nitrogen?

4) Consider the reaction: $KClO_3 \rightarrow KCl + O_2$
Balance the equation.
How many moles of oxygen are produced by the decomposition of 11.5 moles of potassium chlorate?

5) Consider the reaction: **Zn + HCl → $ZnCl_2$ + H_2**
Balance the equation.
How many moles of hydrogen are produced from the reaction of 6.25 moles of zinc with an excess amount of hydrochloric acid?

6) Consider the reaction: **C_3H_8 + O_2 → CO_2 + H_2O**
Balance the equation.
How many moles of oxygen are necessary to react completely with 14.0 moles of propane (C_3H_8)?

7) Consider the reaction: **K_3PO_4 + $Al(NO_3)_3$ → KNO_3 + $AlPO_4$**
Balance the equation.
How many moles of potassium nitrate are produced when 3.4 moles of aluminum nitrate react with excess potassium phosphate?

8) Consider the reaction: **C_2H_2 + O_2 → CO_2 + H_2O**
Balance the equation.
How many moles of carbon dioxide will be produced when 7.5 moles of acetylene (C_2H_2) completely combust?

9) Consider the reaction: **K + H_2O → KOH + H_2**
Balance the equation.
How many moles of potassium are needed to produce 32.2 moles of hydrogen gas (H_2)?

10) Consider the reaction: **H_2S + O_2 → SO_2 + H_2O**
Balance the equation.
How many moles of sulfur dioxide are produced when 86.7 moles of oxygen react with excess hydrogen sulfide (H_2S)?