Stoichiometry Review – Ch. 11 & 12

WORK OUT ALL PROBLEMS ON A SEPARATE SHEET OF PAPER; SHOW WORK!!!

SOLVE THE FOLLOWING MOLAR CONVERSION PROBLEMS:

1. How many grams would 8.1×10^{21} molecules of sucrose ($C_{12}H_{22}O_{11}$) weigh?
2. How many moles are in 53.8 g of magnesium chloride?
3. How many molecules are in 50.0 g of calcium sulfide?
4. How many atoms are in a 2.0 kg ingot of gold? (Note mass units.)

SOLVE THE FOLLOWING PERCENTAGE COMPOSITION PROBLEMS:

5. Find the percentage composition of each element in sucrose ($C_{12}H_{22}O_{11}$).
6. How many grams of zinc are in a 37.2-gram sample of zinc nitrate?

SOLVE THE FOLLOWING EMPIRICAL & MOLECULAR FORMULA PROBLEMS:

7. Find the empirical formula of a compound that contains 9.03 g magnesium and 3.48 g of nitrogen.
8. The empirical formula of a compound is NO_2. Its molecular mass is 92 g/mol. What is its molecular formula?
9. A compound is composed of 34.2% sodium, 17.7% carbon, and 47.6% oxygen. Find its empirical formula. If its molecular mass is 134 g/mol, find its molecular formula.

SOLVE THE FOLLOWING STOICHIOMETRY PROBLEMS:

Balance: ____ Cu + ____ $AgNO_3 \rightarrow$ ____ Ag + ____ $Cu(NO_3)_2$

10. Copper metal reacts with silver nitrate to form silver and copper(II) nitrate. How many grams of copper are required to form 250 g of silver?

Balance: ____ Zn + ____ $HCl \rightarrow$ ____ $ZnCl_2$ + ____ H_2

11. Zinc reacts with hydrochloric acid to produce zinc chloride and hydrogen. How many moles of HCl are required to produce 7.50 moles of $ZnCl_2$?
12. When 16.3 g of magnesium and 4.52 g of oxygen gas react, how many grams of magnesium oxide will be formed? Identify the limiting and excess reactants.

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

13. If 25.3 g of aluminum reacts with 25.3 g of copper(II) sulfate, how many grams of copper are formed? Identify the limiting and excess reactants in this single replacement reaction.

$$2\ \ Al + 3\ CuSO_4 \rightarrow 3\ Cu + Al_2(SO_4)_3$$

14. If 6.57 g of iron react with an excess of hydrochloric acid, HCl, then 11.2 g of iron(II) chloride are obtained in addition to hydrogen gas. Find the theoretical and percent yields.

$$Fe + 2\ HCl \rightarrow FeCl_2 + H_2$$