AP Chemistry – Chemical Calculations – 19
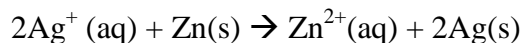
Name _____Per ____

1. The reaction between silver ion and solid zinc is represented by the following equation.

$$2Ag^+ (aq) + Zn(s) \rightarrow Zn^{2+}(aq) + 2Ag(s)$$

1.50 g sample of Zn is combined with 250. mL of 0.110 M $AgNO_3$ at 25°C.
Identify the limiting reactant.

2. Isopropyl alcohol, a substance sold as rubbing alcohol, is composed of C, H, and O. Combustion of 0.255 g of isopropyl alcohol produces 0.561 g of CO_2 and 0.306 g of H_2O. Determine the empirical formula of isopropyl alcohol.

3. Ethylene glycol, the substance used in automobile antifreeze, is composed of 38.7% C, 9.7% H and 51.6% O by mass. Its molar mass is 62.1 g/mol.

(a) What is the empirical formula of ethylene glycol?

(b) What is its molecular formula?

4. Detonation of nitroglycerine proceeds as follows:

$$4\ C_3H_5N_3O_9\ _{(l)}\ \rightarrow\ 12\ CO_2\ _{(g)}\ +\ 6\ N_2\ _{(g)}\ +\ O_2\ _{(g)}\ +\ 10\ H_2O\ _{(g)}$$
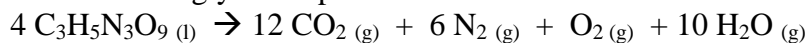
(a) If a sample containing 3.00 mL of nitroglycerin (density = 1.592 g/mL) is detonated, how many total moles of gas are produced?

(b) If each mole of gas occupies 55 L under the conditions of the explosion, how many liters of gas are produced?

(c) How many grams of N_2 are produced in the detonation?