**Chemistry 11**

## Unit Review – Stoichiometry

Complete the following problems, including ALL UNITS and showing ALL WORK on a separate piece of paper.

1. Given the equation:

Si4H10 (s) + O2 (g) 🡪 SiO2 (s) + H2O (g)

1. What volume of oxygen (STP) is required to react with 204.0 g of Si4H10?
2. What mass of SiO2 is formed when 345.0 g of H20 are formed?
3. How many molecules of H2O are formed when 17.92 L of O2 are used at STP?
4. How many moles of Si4H10 are needed to just react with 1.204 x 1026 molecules of oxygen?
5. Given the equation:

Al2C6 + H2O 🡪 Al(OH)3  + CH4 (g)

a) If 34.5 grams of Al2C6 is mixed with 72.0 grams of water, which reactant is in   
 excess? ***Show by calculations***.  
  
b) If 34.5 grams of Al2C6 is mixed with 72.0 grams of water, what mass of Al(OH)3 is   
 formed?

c) If 34.5 grams of Al2C6 is mixed with 72.0 grams of water, what volume of CH4 is   
 formed at STP?

1. Given the equation: NH3 + O2 🡪 NO + H2O

When 51.0 grams of NH3 is burned in an excess of oxygen.

a) Calculate the expected yield of H2O.  
  
 b) If only 52.65 g of water are produced. Calculate the % yield of H2O.

1. Given the equation: N2 + H2 🡪 NH3

When 4.0 grams of hydrogen is combined with an excess of nitrogen, a 92% yield of NH3 is obtained.  
  
 a) Calculate the expected yield of NH3  
  
 b) Calculate the actual yield of NH3 if only 92% of the product was produced.

1. Given the balanced equation:

HCl(aq) + Fe(OH)3(aq) 🡪 H2O(l) + FeCl3(aq)

a) It takes 19.56 mL of 0.50 M HCl to titrate (react entirely) with a 25.0 mL sample of a solution of Fe(OH)3 . Calculate the concentration of Fe(OH)3  
  
b) What mass of Fe(OH)3  is needed to completely react with 10.0 mL of 0.50M  
 HCl solution?

c) What volume of 0.50M HCl is required to titrate a 21.36-gram sample of iron (III)  
 hydroxide?