Name _____
Date _____
Due Date _____

Chemistry 11

Unit 7 Review – Stoichiometry

1. Given the balanced equation:

$$2\ Si_4H_{10\ (s)} + 13\ O_{2\ (g)} \rightarrow 8\ SiO_{2\ (s)} + 10\ H_2O_{\ (g)}$$

a) What volume of oxygen (STP) is required to react with 204.0 g of Si_4H_{10}?

b) What mass of SiO_2 is formed when 345.0 g of H_20 are formed?

c) How many molecules of H_2O are formed when 17.92 L of O_2 are used at STP?

d) How many moles of Si_4H_{10} are needed to just react with 1.204×10^{26} molecules of oxygen?

2. Given the balanced equation:

$$Al_2C_6 + 6\,H_2O \rightarrow 2\,Al(OH)_3 + 3CH_{4\,(g)}$$

a) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, which reactant is in excess? Show by calculations.

b) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, what mass of $Al(OH)_3$ is formed?

c) If 34.5 grams of Al_2C_6 is mixed with 72.0 grams of water, what volume of CH_4 is formed at STP?

3. Given the equation: $4\,NH_3 + 5\,O_2 \rightarrow 4\,NO + 6\,H_2O$

When 51.0 grams of NH_3 is burned in an excess of oxygen, 52.65 g of water are produced.

a) Calculate the theoretical yield of H_2O.

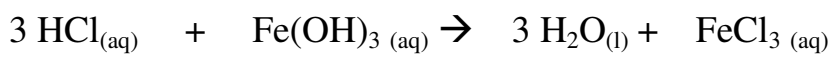
b) Calculate the % yield of H_2O.

4. Given the equation: $N_2 + 3\,H_2 \rightarrow 2\,NH_3$ When 4.0 grams of hydrogen is combined with an excess of nitrogen, a 92% yield of NH_3 is obtained.

a) Calculate the theoretical yield of NH_3

b) Calculate the actual yield of NH_3

5. Given the balanced equation:



$$3\ HCl_{(aq)} + Fe(OH)_{3\ (aq)} \rightarrow 3\ H_2O_{(l)} + FeCl_{3\ (aq)}$$

a) It takes 19.56 mL of 0.50 M HCl to titrate a 25.0 mL sample of a solution of $Fe(OH)_3$. Calculate the $[Fe(OH)_3]$

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?