Stoichiometry Review

1. Given the following equations:
   $4NH_3 + 5O_2 \Rightarrow 6H_2O + 4NO + 905kJ$

   a) How many moles of H_2O is produced when 2.6mol of NH_3 are reacted with an excess of oxygen?
   b) How many moles of NO are produced when 0.362mol of O_2 are reacted with an excess of NH_3 ?
   c) How many moles of O_2 are needed to react with 54.0g of NH_3 ?
   d) If 60.0g of H_2O was produced, how many moles of NO was also produced?
   e) If 8.96g of NH_3 of react, what mass of NO is produced?

2. What mass of sulfur is produced when 6.0mol of SO_3 decomposes to produce sulfur and oxygen gas?

3. How many grams of NaCl would be produced from 2.50mol of Na_2SO_4 reacting with an excess of $BaCl_2$?

4. What mass of chlorine gas is required to react with carbon in order to produce 355g of carbon tetrachloride?

5. Hydrogen sulfide (H_2S) reacts with oxygen gas to produce water and sulfur dioxide. If, in a reaction, 9.0g of water is produced, how many grams of oxygen would have been used up?

6. An organic compound burns according to this reaction:
   $C_{14}H_{10}O_3S + 16O_2 \Rightarrow 14CO_2 + 5H_2O + SO_2$

   a) What volume of CO_2 will be produced when 0.316g of $C_{14}H_{10}O_3S$ are burned?
   b) What mass of $C_{14}H_{10}O_3S$ is required to produce 16.5L of SO_2 gas?

7. What volume of O_2 would be required for complete combustion of 120g of $C_6H_{12}O_6$?

8. What volume of O_2 is produced if 8.73L of H_2 is produced from the electrolysis of water? $2H_2O \Rightarrow 2H_2 + O_2$

9. What volume of carbon dioxide is required to produce 50.0L of carbon monoxide according to the following reaction? $CO_2 + C \Rightarrow 2CO$

10. 50.0g of oxygen is available for the combustion of 25.0g of acetylene(C_2H_2). Write a balanced equation for the combustion (what are products for a combustion? – see past notes). What is the limiting reactant? What mass of CO_2 is produced? What mass of excess reactant is left over?

11. 5.0g of hydrochloric acid is mixed with 24.0g of magnesium hydroxide. Write a balanced equation for the neutralization. What is the limiting reactant? What mass of water is produced? What mass of excess reactant is left over?

12. Define stoichiometry, stoichiometric ratio, limiting reactant.