Study Guide for the Stoichiometry Test

**Step 1**  **Step 2**  **Step 3**

Convert given mole ratio, convert unknown

from g 🡪 moles from balanced from moles 🡪 g

equation

1 mol given moles unknown molar mass unknown

molar mass given moles given 1 mol unknown

% yield = actual yield •100

theoretical yield

Solve these problems below:

1. **2 Al(OH)3 (s) + 3 H2SO4 (aq) 🡪 Al2(SO4)3 (aq) + 6 H2O (l)**
   1. How many moles of water are produced from the reaction of 0.99 moles of aluminum hydroxide with excess sulfuric acid?
   2. How many moles of aluminum hydroxide are needed to react with 2.40 moles of sulfuric acid?
   3. How many moles of aluminum sulfate are produced from the reaction of 0.04466 moles of sulfuric acid with excess aluminum hydroxide?
2. **8 H2S (g) + 4 O2 (g) 🡪 S8 (l) + 8 H2O (l)**
   1. What is the mass of sulfur produced from the reaction of 2.500 moles of hydrosulfuric acid with excess oxygen?
   2. How many moles of water are produced from the reaction of 2.500g of oxygen reacting with excess hydrosulfuric acid?
   3. What is the mass of oxygen needed to react completely with 0.776 moles of hydrosulfuric acid?
3. **3 BaSO4 (aq) + 2 Fe(NO3)3 (aq) 🡪 3 Ba(NO3)2 (aq) + Fe2(SO4)3 (s)**
   1. What mass of barium nitrate is produced from the reaction of 50.0g of iron (III) nitrate with excess barium sulfate?
   2. What is the theoretical yield of iron (III) sulfate produced when 34.50g of barium sulfate reacts with excess iron (III) nitrate?
   3. What is the theoretical yield of iron (III) sulfate when 34.50g of iron (III) nitrate reacts with excess barium sulfate?
4. **Fe2O3 (s) + 3 CO (g) 🡪 3 CO2 (g) + 2 Fe (s)**
   1. 30.00g of iron (III) oxide reacts with 20.00g of carbon monoxide.
      1. What is the theoretical yield of iron?
      2. What is the limiting reactant?
      3. What is the excess reactant?
      4. If 11.98g of iron are actually produced, what is the % yield?
   2. 0.1000g of iron (III) oxide reacts with 0.1700g of carbon monoxide.
      1. What is the theoretical yield of iron?
      2. What is the limiting reactant?
      3. What is the theoretical yield?
      4. If 0.09880g of iron is actually produced, what is the % yield?