

## Stoichiometry Notes: Solving Problems

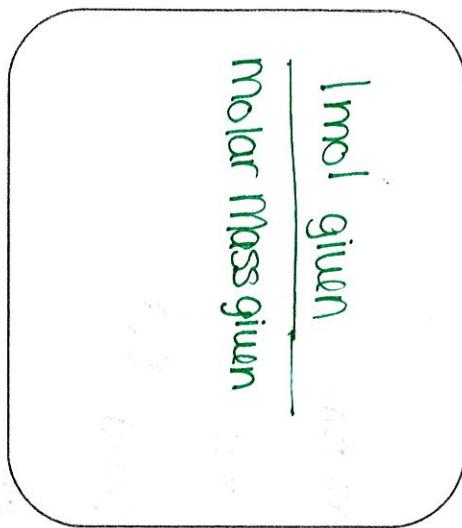
Part 1: Are you given a mass (g)?

Convert it to moles!

Part 2: Use the MOLE RATIO!

Part 3: Do you need to convert  
your answer back to  
grams?

comes from the  
coefficients in the  
balanced equation



molar mass ?  
1 mol ?

You always have to do  
Part 2!

Definitions:

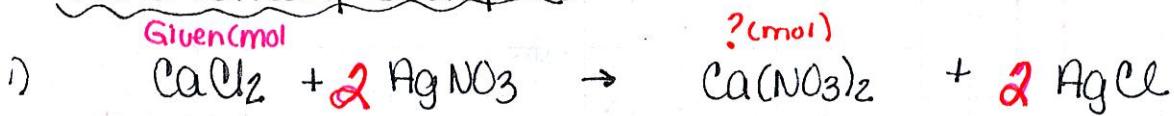
- Theoretical yield: the amount of product (usually in grams) that can be produced when solving a stoichiometry problem
- Actual yield: the amount of product (usually in grams) that is actually produced in the lab.

Equation

% yield: (theoretical yield - actual yield) × 100

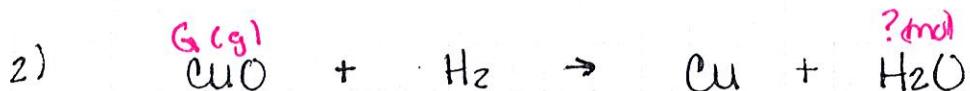
theoretical yield

## Stoichiometry Examples



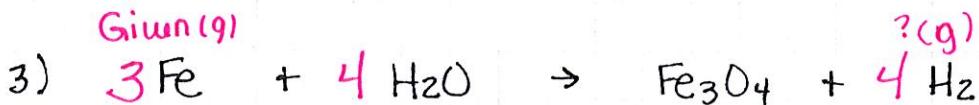
How many mols of calcium nitrate theoretically form from the reaction of 1.36 moles of calcium chloride reacting with excess silver(I) nitrate? **GIVEN**

$$\frac{1.36 \text{ mol } \text{CaCl}_2}{1 \text{ mol } \text{CaCl}_2} \left| \begin{array}{c} 1 \text{ mol } \text{Ca}(\text{NO}_3)_2 \\ 1 \text{ mol } \text{CaCl}_2 \end{array} \right| = 1.36 \text{ mol } \text{Ca}(\text{NO}_3)_2$$



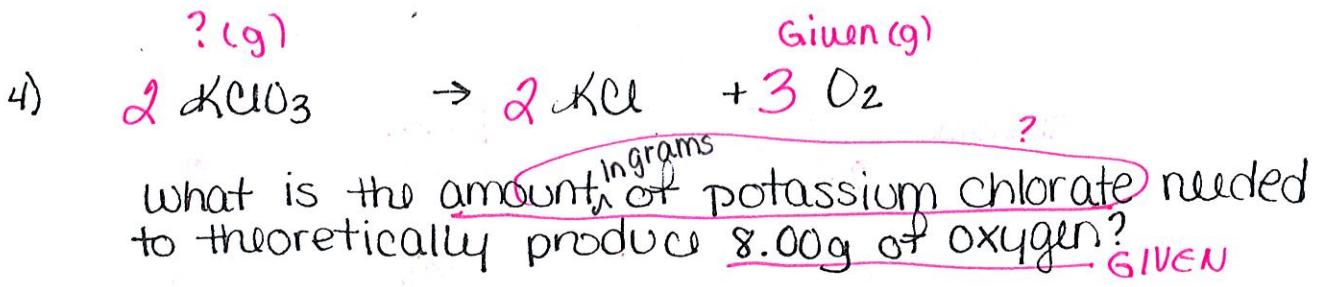
How many mols of water are produced from the reaction of 10.91 g of copper (II) oxide reacting with excess hydrogen gas? **GIVEN**

$$\frac{10.91 \text{ g CuO}}{1 \text{ mol CuO}} \left| \begin{array}{c} 1 \text{ mol H}_2\text{O} \\ 79.55 \text{ g CuO} \end{array} \right| \frac{1 \text{ mol H}_2\text{O}}{1 \text{ mol CuO}} = .1371 \text{ mol H}_2\text{O}$$

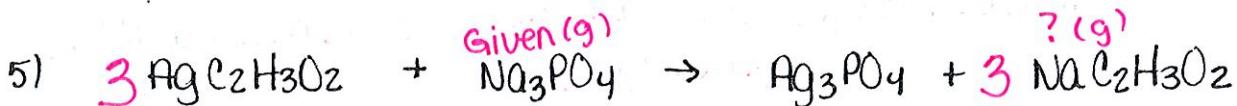


What mass of hydrogen can be theoretically produced by the reaction of 167.55 g of iron with excess water? **GIVEN**

$$\frac{167.55 \text{ g Fe}}{1 \text{ mol Fe}} \left| \begin{array}{c} 4 \text{ mol H}_2 \\ 55.85 \text{ g Fe} \end{array} \right| \frac{4 \text{ mol H}_2}{3 \text{ mol Fe}} \left| \begin{array}{c} 2.02 \text{ g H}_2 \\ 1 \text{ mol H}_2 \end{array} \right| = 8.0800 \text{ g H}_2$$



$$\frac{8.00 \text{ g O}_2}{32.00 \text{ g O}_2} \left| \begin{array}{c} 1 \text{ mol O}_2 \\ 3 \text{ mol O}_2 \end{array} \right| \frac{2 \text{ mol KClO}_3}{3 \text{ mol O}_2} \left| \begin{array}{c} 122.559 \text{ g KClO}_3 \\ 1 \text{ mol KClO}_3 \end{array} \right| = 20.4 \text{ g KClO}_3$$



what is the theoretical yield of sodium acetate (in grams) from the reaction of 25.00 g of GIVEN sodium phosphate with excess silver(I) acetate?

$$\frac{25.00 \text{ g Na}_3\text{PO}_4}{163.94 \text{ g Na}_3\text{PO}_4} \left| \begin{array}{c} 1 \text{ mol Na}_3\text{PO}_4 \\ 1 \text{ mol Na}_3\text{PO}_4 \end{array} \right| \frac{3 \text{ mol NaC}_2\text{H}_3\text{O}_2}{1 \text{ mol Na}_3\text{PO}_4} \left| \begin{array}{c} 62.04 \text{ g NaC}_2\text{H}_3\text{O}_2 \\ 1 \text{ mol NaC}_2\text{H}_3\text{O}_2 \end{array} \right| = 2.763 \text{ g NaC}_2\text{H}_3\text{O}_2$$