

## Quantities in Chemical Reactions Review

- What is the molar mass of each of the following?
  - $\text{N}_2\text{O}_4$
  - $\text{Al}_2(\text{S}_2\text{O}_3)_3$
- How many molecules of methane are in 3.4 moles?
- $7.8 \times 10^{24}$  atoms is equal to how many moles?
- How many molecules of carbon dioxide are in a 560 g sample?
- How many sodium ions are in a 24 g sample of sodium phosphate?
- What is the mass of  $5.3 \times 10^{22}$  atoms of calcium?
- Calculate the % carbon by mass in each of the following:
  - $\text{C}_7\text{H}_{12}$
  - carbon monoxide
- Determine the empirical formula of a compound that is 26.6% K, 35.4% Cr and 38.0% O.
- A 0.219 g sample of lanthanum was heated in the presence of oxygen. The mass of the compound produced was 0.256 g. What is the empirical formula of the compound?
- A 0.809 g sample of  $\text{CoCl}_2 \cdot x\text{H}_2\text{O}$  was heated. A 0.442 g residue was produced. What is the formula of the hydrate?
- A nitrogen compound is found to be 16.5% nitrogen and 83.5% chlorine. If it has a molar mass of 169.82 g/mol, what is its molecular formula?
- Write a balanced equation for the decomposition of calcium oxide. If you have 35 mol of calcium oxide, how many moles of oxygen and how many moles of calcium will be produced?
- Ammonia ( $\text{NH}_3$ ) is produced by reacting nitrogen with hydrogen.
  - How many grams of hydrogen will be needed to react with 23.9 g of nitrogen?
  - How many grams of ammonia will be produced?
  - If 25.2 g of ammonia are actually produced when the reaction is done in the lab, what is the percent yield?
- Consider the following reaction:  $2 \text{Na}_3\text{PO}_4 + 3 \text{CaCl}_2 \rightarrow \text{Ca}_3(\text{PO}_4)_2 + 6 \text{NaCl}$ 
  - If 55 g of sodium phosphate is added to 58 g of calcium chloride, which is the limiting reagent?
  - What is the theoretical yield of sodium chloride?
  - If 46.2 g of sodium chloride are actually produced, what is the % yield?