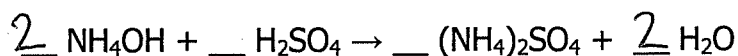


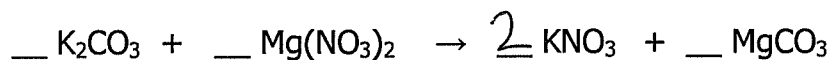
6. In the reaction that follows, how many molecules of sulfuric acid are needed to react with 15 grams of ammonium hydroxide? Balance the equation first.



$$\frac{15 \text{ g NH}_4\text{OH}}{1} \left(\frac{1 \text{ mol NH}_4\text{OH}}{35.06 \text{ g NH}_4\text{OH}} \right) \left(\frac{1 \text{ mol H}_2\text{SO}_4}{2 \text{ mol NH}_4\text{OH}} \right) \left(\frac{6.02 \times 10^{23} \text{ molecules H}_2\text{SO}_4}{1 \text{ mol H}_2\text{SO}_4} \right)$$

$$1.3 \times 10^{23} \text{ molecules H}_2\text{SO}_4$$

7. How many grams of magnesium nitrate are needed to react with 549.6 g of potassium carbonate? The *unbalanced* equation for the reaction is the following:



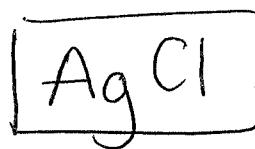
$$\frac{549.6 \text{ g K}_2\text{CO}_3}{1} \left(\frac{1 \text{ mol K}_2\text{CO}_3}{138.21 \text{ g K}_2\text{CO}_3} \right) \left(\frac{1 \text{ mol Mg}(\text{NO}_3)_2}{1 \text{ mol K}_2\text{CO}_3} \right) \left(\frac{148.33 \text{ g Mg}(\text{NO}_3)_2}{1 \text{ mol Mg}(\text{NO}_3)_2} \right) =$$

$$589.8 \text{ g Mg}(\text{NO}_3)_2$$

8. Determine the empirical formula of a compound containing 2.644 grams of gold and 0.476 grams of chlorine.

$$\frac{2.644 \text{ g Au}}{1} \left(\frac{1 \text{ mol Au}}{197.0 \text{ g Au}} \right) = \frac{.0134 \text{ mol}}{.0134 \text{ mol}} = \boxed{1}$$

$$\frac{0.476 \text{ g Cl}}{1} \left(\frac{1 \text{ mol Cl}}{35.45 \text{ g Cl}} \right) = \frac{.0134 \text{ mol}}{.0134 \text{ mol}} = \boxed{1}$$

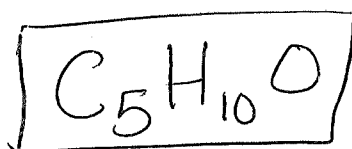


9. Determine the empirical formula of a compound containing 1.723 grams of carbon, 0.289 grams of hydrogen and 0.459 grams of oxygen.

$$\frac{1.723 \text{ g C}}{1} \left(\frac{1 \text{ mol C}}{12.01 \text{ g C}} \right) = \frac{.1435 \text{ mol}}{.0287 \text{ mol}} = \boxed{5}$$

$$\frac{0.289 \text{ g H}}{1} \left(\frac{1 \text{ mol H}}{1.01 \text{ g H}} \right) = \frac{.2861 \text{ mol}}{.0287 \text{ mol}} = \boxed{10}$$

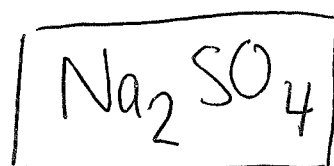
$$\frac{0.459 \text{ g O}}{1} \left(\frac{1 \text{ mol O}}{16.00 \text{ g O}} \right) = \frac{.0287 \text{ mol}}{.0287 \text{ mol}} = \boxed{1}$$



10. Determine the empirical formula for the compound using the data listed below.
32.4% sodium, 22.5% sulfur, and 45.1% oxygen

$$\frac{32.4 \text{ g Na}}{1} \left(\frac{1 \text{ mol Na}}{22.99 \text{ g Na}} \right) = \frac{1.41 \text{ mol}}{.702 \text{ mol}} = \boxed{2}$$

$$\frac{22.5 \text{ g S}}{1} \left(\frac{1 \text{ mol S}}{32.07 \text{ g S}} \right) = \frac{.702 \text{ mol}}{.702 \text{ mol}} = \boxed{1}$$



$$\frac{45.1 \text{ g O}}{1} \left(\frac{1 \text{ mol O}}{16.00 \text{ g O}} \right) = \frac{2.82 \text{ mol}}{.702 \text{ mol}} = \boxed{4}$$