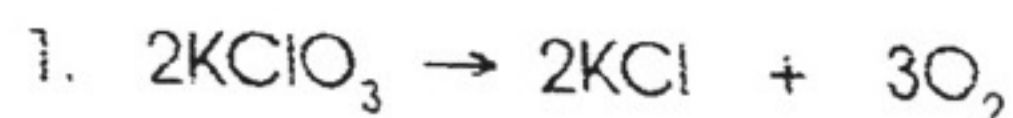
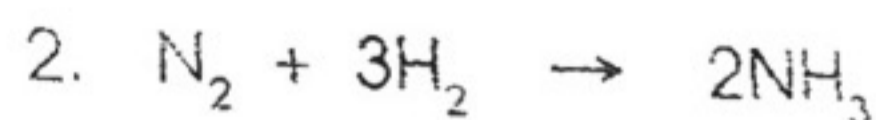


Stoichiometry: Mass-Mass Problems



How many grams of potassium chloride are produced if 25 g of potassium chlorate decompose?

$$25 \text{ g KClO}_3 \times \frac{1 \text{ mol KClO}_3}{122.55 \text{ g KClO}_3} \times \frac{2 \text{ mol KCl}}{2 \text{ mol KClO}_3} \times \frac{74.55 \text{ g KCl}}{1 \text{ mol KCl}} = \underline{15 \text{ g KCl}}$$



How many grams of hydrogen are necessary to react completely with 50.0 g of nitrogen in the above reaction?

$$50.0 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g N}_2} \times \frac{3 \text{ mol H}_2}{1 \text{ mol N}_2} \times \frac{2.02 \text{ g H}_2}{1 \text{ mol H}_2} = \underline{10.8 \text{ g H}_2}$$

3. How many grams of ammonia are produced in the reaction in Problem 2?

$$50.0 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g N}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol N}_2} \times \frac{17.04 \text{ g NH}_3}{1 \text{ mol NH}_3} = \underline{60.8 \text{ g NH}_3}$$



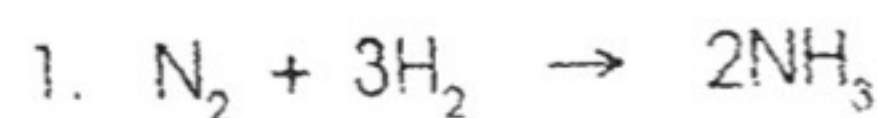
How many grams of silver chloride are produced from 5.0 g of silver nitrate reacting with an excess of barium chloride?

$$5.0 \text{ g AgNO}_3 \times \frac{1 \text{ mol AgNO}_3}{169.91 \text{ g AgNO}_3} \times \frac{2 \text{ mol AgCl}}{2 \text{ mol AgNO}_3} \times \frac{143.35 \text{ g AgCl}}{1 \text{ mol AgCl}} = \underline{4.2 \text{ g AgCl}}$$

5. How much barium chloride is necessary to react with the silver nitrate in Problem 4?

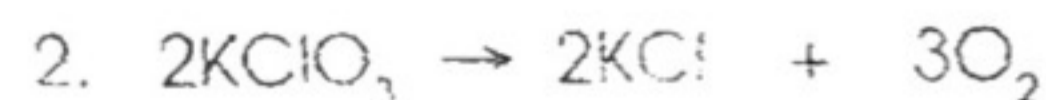
$$5.0 \text{ g AgNO}_3 \times \frac{1 \text{ mol AgNO}_3}{169.91 \text{ g AgNO}_3} \times \frac{1 \text{ mol BaCl}_2}{2 \text{ mol AgNO}_3} \times \frac{208.20 \text{ g BaCl}_2}{1 \text{ mol BaCl}_2} = \underline{3.1 \text{ g BaCl}_2}$$

Stoichiometry: Mixed Problems



What volume of NH_3 at STP is produced if 25.0 g of N_2 is reacted with an excess of H_2 ?

$$25.0 \text{ g N}_2 \times \frac{1 \text{ mol N}_2}{28.02 \text{ g N}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol N}_2} \times \frac{22.4 \text{ L NH}_3}{1 \text{ mol NH}_3} = \underline{40.0 \text{ L}}$$



If 5.0 g of KClO_3 is decomposed, what volume of O_2 is produced at STP?

$$5.0 \text{ g KClO}_3 \times \frac{1 \text{ mol KClO}_3}{122.55 \text{ g KClO}_3} \times \frac{3 \text{ mol O}_2}{2 \text{ mol KClO}_3} \times \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} = \underline{1.4 \text{ L}}$$

3. How many grams of KCl are produced in Problem 2?

$$5.0 \text{ g KClO}_3 \times \frac{1 \text{ mol KClO}_3}{122.55 \text{ g KClO}_3} \times \frac{2 \text{ mol KCl}}{2 \text{ mol KClO}_3} \times \frac{74.55 \text{ g KCl}}{1 \text{ mol KCl}} = \underline{3.0 \text{ g}}$$



What volume of hydrogen at STP is produced when 2.5 g of zinc react with an excess of hydrochloric acid?

$$2.5 \text{ g Zn} \times \frac{1 \text{ mol Zn}}{65.39 \text{ g Zn}} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Zn}} \times \frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} = \underline{0.86 \text{ L}}$$



How many molecules of water are produced if 2.0 g of sodium sulfate are produced in the above reaction?

$$2.0 \text{ g Na}_2\text{SO}_4 \times \frac{1 \text{ mol Na}_2\text{SO}_4}{142.05 \text{ g Na}_2\text{SO}_4} \times \frac{1 \text{ mol H}_2\text{O}}{1 \text{ mol Na}_2\text{SO}_4} \times \frac{6.02 \times 10^{23} \text{ molec. H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \underline{8.5 \times 10^{21} \text{ molec. H}_2\text{O}}$$



If 10.0 g of aluminum chloride are decomposed, how many molecules of Cl_2 are produced?

$$10.0 \text{ g AlCl}_3 \times \frac{1 \text{ mol AlCl}_3}{133.33 \text{ g AlCl}_3} \times \frac{3 \text{ mol Cl}_2}{2 \text{ mol AlCl}_3} \times \frac{6.02 \times 10^{23} \text{ molec. Cl}_2}{1 \text{ mol Cl}_2} = \underline{6.77 \times 10^{22} \text{ molec. Cl}_2}$$