

Stoichiometry (Mass → Mass Conversions) Key

$$1a) \frac{80.0 \text{ g BaCl}_2 \quad | \quad 1 \text{ mol BaCl}_2 \quad | \quad 2 \text{ mol NaCl} \quad | \quad 58.5 \text{ g NaCl}}{208.3 \text{ g BaCl}_2 \quad | \quad 1 \text{ mol BaCl}_2 \quad | \quad 1 \text{ mol NaCl}} = \boxed{44.9 \text{ g NaCl}}$$

$$b) \frac{65.5 \text{ g NaCl} \quad | \quad 1 \text{ mol NaCl} \quad | \quad 1 \text{ mol BaCl}_2 \quad | \quad 208.3 \text{ g BaCl}_2}{58.5 \text{ g NaCl} \quad | \quad 2 \text{ mol NaCl} \quad | \quad 1 \text{ mol BaCl}_2} = \boxed{117 \text{ g BaCl}_2}$$

$$2a) \frac{120 \text{ g CuO} \quad | \quad 1 \text{ mol CuO} \quad | \quad 2 \text{ mol Al} \quad | \quad 27.0 \text{ g Al}}{79.5 \text{ g CuO} \quad | \quad 3 \text{ mol CuO} \quad | \quad 1 \text{ mol Al}} = \boxed{27 \text{ g Al}}$$

$$b) \frac{15.5 \text{ g Al} \quad | \quad 1 \text{ mol Al} \quad | \quad 3 \text{ mol Cu} \quad | \quad 63.5 \text{ g Cu}}{27.0 \text{ g Al} \quad | \quad 2 \text{ mol Al} \quad | \quad 1 \text{ mol Cu}} = \boxed{54.7 \text{ g Cu}}$$

$$3. \frac{52.0 \text{ g KClO}_3 \quad | \quad 1 \text{ mol KClO}_3 \quad | \quad 2 \text{ mol KCl} \quad | \quad 74.6 \text{ g KCl}}{122.6 \text{ g KClO}_3 \quad | \quad 2 \text{ mol KClO}_3 \quad | \quad 1 \text{ mol KCl}} = \boxed{31.6 \text{ g KCl}}$$

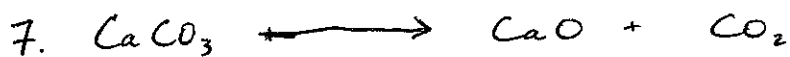
$$4. \frac{32.0 \text{ g N}_2 \quad | \quad 1 \text{ mol N}_2 \quad | \quad 3 \text{ mol H}_2 \quad | \quad 2.0 \text{ g H}_2}{28.0 \text{ g N}_2 \quad | \quad 1 \text{ mol N}_2 \quad | \quad 1 \text{ mol H}_2} = \boxed{\cancel{6.9 \text{ g H}_2}} \\ \boxed{6.9 \text{ g H}_2}$$



$$\frac{100.0 \text{ g Cu} \quad | \quad 1 \text{ mol Cu} \quad | \quad 2 \text{ mol Ag} \quad | \quad 107.9 \text{ g Ag}}{63.5 \text{ g Cu} \quad | \quad 1 \text{ mol Cu} \quad | \quad 1 \text{ mol Ag}} = \boxed{\cancel{334.8 \text{ g Ag}}} \\ \boxed{3.40 \times 10^2 \text{ g Ag}}$$



$$\frac{408 \text{ g Al}_2\text{O}_3 \quad | \quad 1 \text{ mol Al}_2\text{O}_3 \quad | \quad 4 \text{ mol Al} \quad | \quad 27.0 \text{ g Al}}{102.0 \text{ g Al}_2\text{O}_3 \quad | \quad 2 \text{ mol Al}_2\text{O}_3 \quad | \quad 1 \text{ mol Al}} = \boxed{216 \text{ g Al}}$$

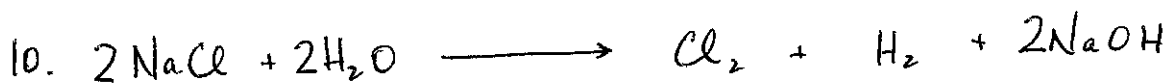


$$\frac{25.0 \text{ g CaCO}_3}{100.1 \text{ g CaCO}_3} \times \frac{1 \text{ mol CaCO}_3}{1 \text{ mol CaCO}_3} \times \frac{1 \text{ mol CO}_2}{1 \text{ mol CaCO}_3} \times \frac{44.0 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{11.0 \text{ g CO}_2}$$

$$8. a) \frac{0.150 \text{ g C}_{14}\text{H}_{10}\text{O}_3\text{S}}{258.1 \text{ g C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}}{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{5 \text{ mol H}_2\text{O}}{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \boxed{0.0523 \text{ g H}_2\text{O}}$$

$$b) \frac{0.150 \text{ g C}_{14}\text{H}_{10}\text{O}_3\text{S}}{258.1 \text{ g C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}}{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{16 \text{ mol O}_2}{1 \text{ mol C}_{14}\text{H}_{10}\text{O}_3\text{S}} \times \frac{32.0 \text{ g O}_2}{1 \text{ mol O}_2} = \boxed{0.298 \text{ g O}_2}$$

$$9. \frac{1.00 \text{ kg Al}}{1 \text{ kg}} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mol Al}}{27.0 \text{ g Al}} \times \frac{3 \text{ mol NH}_4\text{ClO}_4}{3 \text{ mol Al}} \times \frac{117.5 \text{ g NH}_4\text{ClO}_4}{1 \text{ mol NH}_4\text{ClO}_4} = \boxed{4.35 \times 10^3 \text{ g NH}_4\text{ClO}_4}$$



$$\frac{1.4 \times 10^6 \text{ kg Cl}_2}{1 \text{ kg}} \times \frac{1000 \text{ g}}{1 \text{ kg}} \times \frac{1 \text{ mol Cl}_2}{71.0 \text{ g Cl}_2} \times \frac{1 \text{ mol H}_2}{1 \text{ mol Cl}_2} \times \frac{2.0 \text{ g H}_2}{1 \text{ mol H}_2} \times \frac{1 \text{ kg}}{1000 \text{ g}} = \boxed{3.9 \times 10^4 \text{ kg H}_2}$$



$$b) \frac{2.50 \text{ g Al(OH)}_3}{78.0 \text{ g Al(OH)}_3} \times \frac{1 \text{ mol Al(OH)}_3}{1 \text{ mol Al(OH)}_3} \times \frac{3 \text{ mol HCl}}{1 \text{ mol Al(OH)}_3} \times \frac{36.5 \text{ g HCl}}{1 \text{ mol HCl}} = \boxed{3.51 \text{ g HCl}}$$