

$$1. \quad \frac{1.75 \text{ g C}_7\text{H}_6\text{O}_3}{138.0 \text{ g C}_7\text{H}_6\text{O}_3} \times \frac{1 \text{ mol C}_7\text{H}_6\text{O}_3}{1 \text{ mol C}_7\text{H}_6\text{O}_3} \times \frac{1 \text{ mol C}_8\text{H}_8\text{O}_3}{1 \text{ mol C}_7\text{H}_6\text{O}_3} \times \frac{152.0 \text{ g C}_8\text{H}_8\text{O}_3}{1 \text{ mol C}_8\text{H}_8\text{O}_3} = 1.93 \text{ g C}_8\text{H}_8\text{O}_3$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{1.42 \text{ g C}_8\text{H}_8\text{O}_3}{1.93 \text{ g C}_8\text{H}_8\text{O}_3} \times 100 = 73.6\%$$

$$2. \quad \frac{8.0 \text{ g O}_2}{32.0 \text{ g O}_2} \times \frac{1 \text{ mol O}_2}{3 \text{ mol O}_2} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 3.0 \text{ g H}_2\text{O}$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{2.3 \text{ g H}_2\text{O}}{3.0 \text{ g H}_2\text{O}} \times 100 = 77\%$$

$$3. \quad \frac{5.50 \text{ g H}_2}{2.02 \text{ g H}_2} \times \frac{1 \text{ mol H}_2}{3 \text{ mol H}_2} \times \frac{2 \text{ mol NH}_3}{1 \text{ mol NH}_3} \times \frac{17.0 \text{ g NH}_3}{1 \text{ mol NH}_3} = 30.9 \text{ g NH}_3$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{20.4 \text{ g NH}_3}{30.9 \text{ g NH}_3} \times 100 = 66.0\%$$

4.

$$\begin{array}{c}
 \frac{66.0 \text{ g Cr(OH)}_3}{103.0 \text{ g Cr(OH)}_3} \left| \frac{1 \text{ mol Cr(OH)}_3}{1 \text{ mol Cr(OH)}_3} \right| \frac{1 \text{ mol NaCr(OH)}_4}{1 \text{ mol NaCr(OH)}_4} \left| \frac{143.0 \text{ g NaCr(OH)}_4}{1 \text{ mol NaCr(OH)}_4} \right. \\
 \left. = 91.6 \text{ g NaCr(OH)}_4
 \end{array}$$

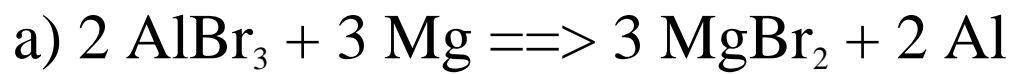
$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{38.4 \text{ g NaCr(OH)}_4}{91.6 \text{ g NaCr(OH)}_4} \times 100 = 41.9\%$$

5.

$$\frac{6.0 \text{ g CO}}{28.0 \text{ g CO}} \left| \frac{1 \text{ mol CO}}{3 \text{ mol CO}} \right| \frac{3 \text{ mol CO}_2}{1 \text{ mol CO}_2} \left| \frac{44.0 \text{ g CO}_2}{1 \text{ mol CO}_2} \right. = 9.4 \text{ g CO}_2$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{8.9 \text{ g CO}_2}{9.4 \text{ g CO}_2} \times 100 = 95\%$$

6. (3, 2, 5 points)

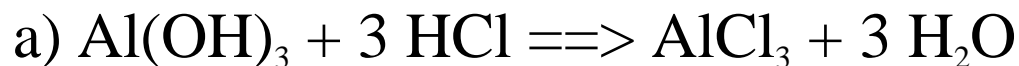


b) Single Displacement

c) 
$$\frac{10.8 \text{ g AlBr}_3}{266.7 \text{ g AlBr}_3} \times \frac{1 \text{ mol AlBr}_3}{2 \text{ mol AlBr}_3} \times \frac{2 \text{ mol Al}}{1 \text{ mol Al}} \times \frac{27.0 \text{ g Al}}{1 \text{ mol Al}} = 1.09 \text{ g Al}$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{0.8 \text{ g Al}}{1.09 \text{ g Al}} \times 100 = 70\%$$

7. (3,2,5 points)



b) Double Displacement

c) 
$$\frac{0.50 \text{ g Al(OH)}_3}{78.0 \text{ g Al(OH)}_3} \times \frac{1 \text{ mol Al(OH)}_3}{1 \text{ mol Al(OH)}_3} \times \frac{3 \text{ mol H}_2\text{O}}{1 \text{ mol Al(OH)}_3} \times \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 0.35 \text{ g H}_2\text{O}$$

$$\% \text{ yield} = \frac{\text{actual}}{\text{theoretical}} \times 100 = \frac{0.28 \text{ g H}_2\text{O}}{0.35 \text{ g H}_2\text{O}} \times 100 = 8.0 \times 10^1\% (80\%)$$

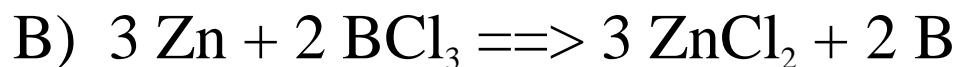
## Limiting Reactant

A)

$$\frac{4.11 \text{ g I}_2}{253.8 \text{ g I}_2} \left| \frac{1 \text{ mol I}_2}{1} \right. = 0.0162 \text{ mol I}_2 / 1 = 0.0162 \text{ mol I}_2$$

$$\frac{0.48 \text{ g H}_2\text{S}}{34.1 \text{ g H}_2\text{S}} \left| \frac{1 \text{ mol H}_2\text{S}}{1} \right. = 0.014 \text{ mol H}_2\text{S} / 1 = \underline{\underline{\mathbf{0.014}}} \text{ mol H}_2\text{S}$$

H<sub>2</sub>S is the limiting reactant



$$\frac{6.7 \text{ g Zn}}{65.4 \text{ g Zn}} \left| \frac{1 \text{ mol Zn}}{3} \right. = 0.10 \text{ mol Zn} / 3 = \mathbf{0.034 \text{ mol Zn}}$$

$$\frac{23.5 \text{ g BCl}_3}{117.3 \text{ g BCl}_3} \left| \frac{1 \text{ mol BCl}_3}{2} \right. = 0.200 \text{ mol BCl}_3 / 2 = 0.100 \text{ mol BCl}_3$$

Zn is the limiting reactant