Stoichiometry HW #2
dimensional analysis

① $12\text{g } NF_3 \left| \frac{1\text{mol } NF_3}{71.01\text{g } NF_3} \right| \frac{3\text{ mol } F_2}{2\text{ mol } NF_3} = 0.25\text{mol } F_2$

② $10.0\text{g } N_2 \left| \frac{1\text{mol } N_2}{28.02\text{g } N_2} \right| \frac{2\text{ mol } NF_3}{1\text{mol } N_2} = 0.714\text{ mol } NF_3$

③ $4.75\times10^{23}\text{ molecules } CO_2 \left| \frac{1\text{mol } CO_2}{6.02\times10^{23}\text{ molecules } CO_2} \right| \frac{\text{[redacted] mol } O_2}{3\text{ mol } CO_2} \left| \frac{22.4\text{L } O_2}{1\text{mol } O_2} \right.$

$= \boxed{5.89\text{ L } O_2}$

④ $2.5\text{L } C_3H_8 \left| \frac{1\text{mol } C_3H_8}{22.4\text{L } C_3H_8} \right| \frac{3\text{ mol } CO_2}{1\text{mol } C_3H_8} \left| \frac{44.01\text{g } CO_2}{1\text{mol } CO_2} \right. = \boxed{15\text{g } CO_2}$

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⑤

$$\frac{2.00 \text{ mol Zn} \mid 8 \text{ mol ZnS}}{8 \text{ mol Zn}} = 2.00 \text{ mol ZnS}$$

$$\frac{1.00 \text{ mol } S_8 \mid 8 \text{ mol ZnS}}{1 \text{ mol } S_8} = 8.00 \text{ mol ZnS}$$

a) 2.00 mol ZnS

b) limiting reactant = Zn

c) % Yield = $\left(\frac{\text{Actual}}{\text{Theor.}}\right) \times 100 = \left(\frac{1.00}{2.00}\right) \times 100 =$ **50.0% yield**

Stoich HW #2 dimensional analysis

#6

$$14.7\,g\,Al_2O_3 \left| \frac{1\,mol\,Al_2O_3}{101.96\,g\,Al_2O_3} \right| \frac{2\,mol\,Al}{1\,mol\,Al_2O_3} \left| \frac{26.98\,g\,Al}{1\,mol\,Al} \right.$$

$$= \underline{7.78\,g\,Al}$$

$$10.2\,g\,Fe \left| \frac{1\,mol\,Fe}{55.85\,g\,Fe} \right| \frac{2\,mol\,Al}{2\,mol\,Fe} \left| \frac{26.98\,g\,Al}{1\,mol\,Al} \right.$$

$$= \underline{4.93\,g\,Al}$$

a) 4.93 g Al

b) limiting reactant = Fe

c) excess reactant = Al_2O_3

∴ convert Fe to Al_2O_3

$$10.2\,g\,Fe \left| \frac{1\,mol\,Fe}{55.85\,g\,Fe} \right| \frac{1\,mol\,Al_2O_3}{2\,mol\,Fe} \left| \frac{101.96\,g\,Al_2O_3}{1\,mol\,Al_2O_3} \right.$$

$$= 9.31\,g\,Al_2O_3$$

then subtract

$$14.7\,g\,Al_2O_3 - 9.31\,g\,Al_2O_3 = \boxed{5.4\,g\,Al_2O_3}$$