1. Balance the following equation: (2 pts)

\[ 3 \text{N}_2\text{H}_4 \rightarrow 4 \text{NH}_3 + \text{N}_2 \]

Hint: Balance H first.

2. If 25.0 mL of a 0.250 M K$_2$CrO$_4$ solution is added to an excess of AgNO$_3$, what mass of Ag$_2$CrO$_4$ will precipitate from the solution? (4 pts)

\[
\text{K}_2\text{CrO}_4(\text{aq}) + 2\text{AgNO}_3(\text{aq}) \rightarrow \text{Ag}_2\text{CrO}_4(s) + 2\text{KNO}_3(\text{aq})
\]

\[
25.0\text{mL} \times \frac{1\text{L}}{1000\text{mL}} \times \frac{0.250\text{mol}}{L} \times \frac{1\text{molAg}_2\text{CrO}_4}{1\text{molK}_2\text{CrO}_4} \times \frac{332\text{g}}{\text{mol}} = 2.08\text{g Ag}_2\text{CrO}_4
\]

3. Lead ions can be precipitated from solution with KCl according to the following reaction:

\[ \text{Pb}^{2+}(\text{aq}) + 2\text{KCl}(\text{aq}) \rightarrow \text{PbCl}_2(s) + 2\text{K}^+(\text{aq}) \]

When 28.5g KCl is added to a solution containing 25.7 g Pb$^{2+}$, a PbCl$_2$ precipitate forms. The precipitate is filtered and dried and weighed. The mass of this precipitate is 29.4 g. Calculate the percent yield for this reaction. (4 pts)

First find the Limiting Reactant:

\[
28.5 \text{g KCl} \times \frac{\text{mol}}{75 \text{g}} \times \frac{1 \text{mol PbCl}_2}{2 \text{mol KCl}} = 0.19 \text{mol PbCl}_2
\]

\[
25.7 \text{g Pb}^{2+} \times \frac{\text{mol}}{207 \text{g}} \times \frac{1 \text{mol PbCl}_2}{1 \text{mol Pb}^{2+}} = 0.12 \text{mol PbCl}_2
\]

\[
0.12 \text{mol Pb}^{2+} \times \frac{277 \text{g}}{\text{mol}} = 33.2 \text{g PbCl}_2
\]

\[
\% \text{Yield} = \frac{29.4}{33.2} \times 100 = 88.6 \%
\]