1. Phosphorous reacts with bromine to form phosphorous tribromide. If 35.0 grams of bromine are reacted and 27.9 grams of phosphorous tribromide are formed, what is the percent yield?

\[2 \text{P} + 3 \text{Br}_2 \rightarrow 2 \text{PBr}_3\]

\[
\frac{35.0 \text{ g Br}_2}{1} \times \frac{1 \text{ mole Br}_2}{159.808 \text{ g Br}_2} \times \frac{2 \text{ moles PBr}_3}{3 \text{ moles Br}_2} \times \frac{270.686 \text{ g PBr}_3}{1 \text{ mole PBr}_3} = 39.5 \text{ g PBr}_3
\]

\[
\text{% yield} = \frac{27.9 \text{ g PBr}_3}{39.5 \text{ g PBr}_3} \times 100 = 70.63\%
\]

2. Silver Nitrate reacts with Magnesium Chloride to produce Silver Chloride and Magnesium Nitrate. If 305 grams of silver nitrate are reacted in an excess of magnesium chloride producing 23.7 grams of magnesium nitrate, what is the percent yield?

\[2 \text{AgNO}_3 + \text{MgCl}_2 \rightarrow 2 \text{AgCl} + \text{Mg(NO}_3)_2\]

\[
\frac{305 \text{ g AgNO}_3}{1} \times \frac{1 \text{ mole AgNO}_3}{169.872 \text{ g AgNO}_3} \times \frac{2 \text{ moles Mg(NO}_3)_2}{2 \text{ moles AgNO}_3} \times \frac{148.313 \text{ g Mg(NO}_3)_2}{1 \text{ mole Mg(NO}_3)_2} = 266 \text{ g Mg(NO}_3)_2
\]

\[
\text{% yield} = \frac{23.7 \text{ g Mg(NO}_3)_2}{266 \text{ g Mg(NO}_3)_2} \times 100 = 8.91\%
\]

3. Zinc is reacted with Hydrochloric acid to form zinc chloride and hydrogen gas. The reaction is carried out in a glass container that has a mass of 14.7 grams. After placing the zinc in the glass container, the mass is 29.5 grams. The hydrochloric acid is poured into the container and the zinc chloride is formed. The excess hydrochloric acid is removed leaving the glass container and the zinc chloride, which together have a mass of 37.5 grams. What is the percent yield?

\[\text{Zn} + 2 \text{HCl}_{(aq)} \rightarrow \text{ZnCl}_2 + \text{H}_2(\text{g})\]

\[
\text{Amt ZnCl}_2 \text{ actually produced} = 37.5 \text{ grams} - 14.7 \text{ grams} = 22.8 \text{ grams ZnCl}_2
\]

\[
\text{Amt of Zinc reacted} = 29.5 \text{ grams} - 14.7 \text{ grams} = 14.8 \text{ grams Zn}
\]

\[
\text{Amount of ZnCl}_2 \text{ that could have been produced:} = \frac{14.8 \text{ g Zn}}{1} \times \frac{1 \text{ mole Zn}}{65.39 \text{ g Zn}} \times \frac{1 \text{ mole ZnCl}_2}{1 \text{ mole Zn}} \times \frac{136.296 \text{ g ZnCl}_2}{1 \text{ mole ZnCl}_2} = 30.8 \text{ g ZnCl}_2
\]

\[
\text{% yield} = \frac{22.8 \text{ grams ZnCl}_2}{30.8 \text{ g ZnCl}_2} \times 100 = 74.03\%
\]