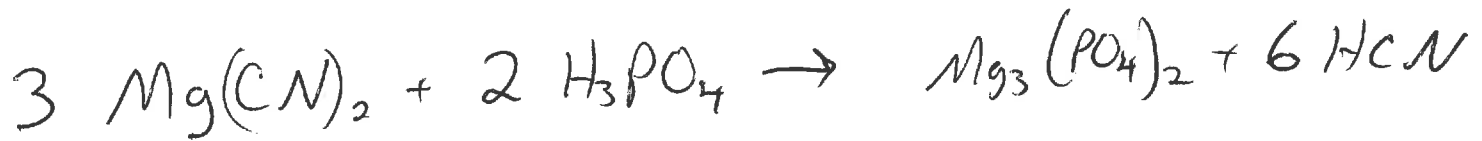


# Stoichiometry Review

1) Balance the equation 1st.



a.) How much  $\text{H}_3\text{PO}_4$  did he start with? This is a tough one because I gave you the excess amount. So start by converting the 32.5g of  $\text{Mg}(\text{CN})_2$  into  $\text{H}_3\text{PO}_4$ . This will tell you how much you started with.

$$\frac{32.5 \text{g Mg}(\text{CN})_2}{76 \text{g}} \left| \frac{1 \text{mole}}{3 \text{Mg}(\text{CN})_2} \right| \left| \frac{2 \text{H}_3\text{PO}_4}{1 \text{mole}} \right| \frac{98 \text{g}}{1} = 27.9 \text{g}$$

so the answer is 27.9g  $\text{H}_3\text{PO}_4$

This is how much was used!!

Now add the excess to it:

$$27.9 + 12 =$$

$$\boxed{39.9 \text{g } \text{H}_3\text{PO}_4}$$

Final answer!!

b) Now just take the original 32.5g  $\text{Mg}(\text{CN})_2$  and convert it into HCN.

$$\frac{32.5 \text{g Mg}(\text{CN})_2}{76 \text{g}} \times \frac{1 \text{mole}}{1 \text{mole}} \times \frac{6 \text{ HCN}}{3 \text{ Mg}(\text{CN})_2} \times \frac{27 \text{g}}{1 \text{mole}} = 23.1 \text{g}$$

oops, calculator error.

Answer: ~~31.1~~ 23.1 g HCN

2.)

$$\frac{9.90 \text{g CuCl}}{99 \text{g}} \times \frac{1 \text{mole}}{1 \text{mole}} \times \frac{1 \text{ Cu}_2\text{S}}{2 \text{ CuCl}} \times \frac{160 \text{g}}{1 \text{mole}} = 8 \text{g Cu}_2\text{S}$$

3.) You need a balanced equation. (Not asked to do that on final)



Theoretical yield:

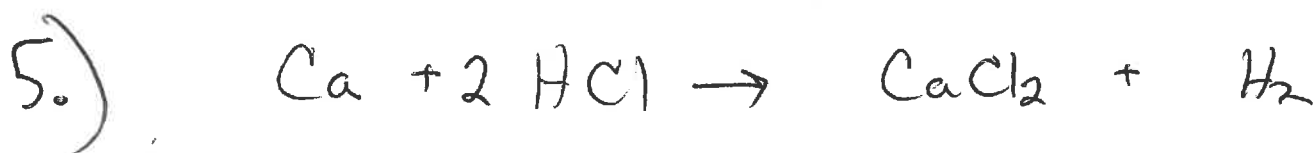
$$\frac{750 \text{g AlBr}_3}{267 \text{g}} \times \frac{1 \text{mole}}{1 \text{mole}} \times \frac{3 \text{ Br}_2}{2 \text{ AlBr}_3} \times \frac{160 \text{g}}{1 \text{mole}} = 674.2 \text{g Br}_2$$

$$(0.552)(674.2) = 372.1 \text{g Br}_2$$

4.) write a balanced equation:



$$\frac{25.0 \text{ g NH}_4\text{NO}_3}{80 \text{ g}} \times \frac{1 \text{ mole}}{1 \text{ NH}_4\text{NO}_3} \times \frac{2 \text{ H}_2\text{O}}{1 \text{ NH}_4\text{NO}_3} \times \frac{18 \text{ g}}{1 \text{ mole}} = \boxed{11.25 \text{ g H}_2\text{O}}$$



a) Convert both amounts to  $\text{CaCl}_2$ :

$$\frac{17 \text{ g Ca}}{40 \text{ g}} \times \frac{1 \text{ mole}}{1 \text{ Ca}} \times \frac{1 \text{ CaCl}_2}{1 \text{ Ca}} \times \frac{110 \text{ g}}{1 \text{ mole}} = 46.75 \text{ g CaCl}_2$$

$$\frac{50 \text{ mL}}{1 \text{ mL}} \times \frac{0.895 \text{ g}}{36 \text{ g}} \times \frac{1 \text{ mole}}{1 \text{ mole}} \times \frac{1 \text{ CaCl}_2}{2 \text{ HCl}} \times \frac{110 \text{ g}}{1 \text{ mole}} = 68.4 \text{ g CaCl}_2$$

extra step

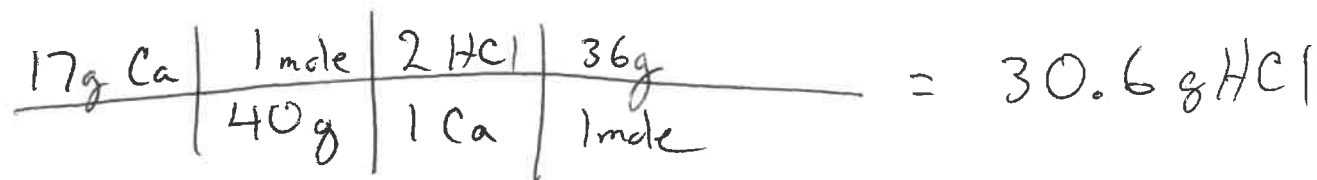
Answer that is largest is excess.

So

the

$\text{HCl}$  is excess

b) To find excess, convert limiting into excess:



Now subtract that from amount of HCl you started with:

$$(50)(0.895) = 44.75g$$

$$\begin{array}{r} 44.75g \\ - 30.6g \\ \hline 14.15g \end{array}$$

c) Already answered in Part A!!

Its the lower value.

