Chemistry Ch 11
Wkst 11 D

1) Using the following equation:

$$2\ NaOH + H_2SO_4 \rightarrow 2\ H_2O + Na_2SO_4$$

200. g excess ?g

How many grams of sodium sulfate will be formed if you start with 200. grams of sodium hydroxide and you have an excess of sulfuric acid?

$$\left(\frac{200.\ g\ NaOH}{1}\right)\left(\frac{1\ mole\ NaOH}{40.0\ g\ NaOH}\right)\left(\frac{1\ mole\ Na_2SO_4}{2\ mole\ NaOH}\right)\left(\frac{142.1\ g\ Na_2SO_4}{1\ mole\ Na_2SO_4}\right)$$

$$\boxed{= 355\ g\ Na_2SO_4}$$

2) Using the following equation:

$$Pb(SO_4)_2 + 4\ LiNO_3 \rightarrow Pb(NO_3)_4 + 2\ Li_2SO_4$$

Excess ?g 250g

How many grams of lithium nitrate will be needed to make 250 grams of lithium sulfate, assuming that you have an adequate amount of lead (IV) sulfate to do the reaction?

$$\left(\frac{250g\ Li_2SO_4}{1}\right)\left(\frac{1\ mole\ Li_2SO_4}{109.9g\ Li_2SO_4}\right)\left(\frac{4\ mole\ LiNO_3}{2\ mole\ Li_2SO_4}\right)\left(\frac{68.9g\ LiNO_3}{1\ mole\ LiNO_3}\right)$$

$$\boxed{= 310g\ LiNO_3}$$

3) $Pb(NO_3)_{2(aq)} + 2NaI_{(aq)} \rightarrow 2NaNO_{3(aq)} + PbI_{2(s)}$

25.0g 15.0g ?g

which is Limiting?

?g of excess Left over

(Have)

$$\left(\frac{25.0g\ Pb(NO_3)_2}{1}\right)\left(\frac{1\ mole\ Pb(NO_3)_2}{331.2g\ Pb(NO_3)_2}\right)\left(\frac{2\ mole\ NaI}{1\ mole\ Pb(NO_3)_2}\right)\left(\frac{149.9\ g\ NaI}{1\ mole\ NaI}\right)$$

= 22.6 g NaI Needed

only Have 15.0g NaI Given so

$\boxed{\text{NaI is Limiting}}$

* To Determine amount of Excess, we Need to Know how much is <u>Needed</u>

(Have)

$$\left(\frac{15.0g\ NaI}{1}\right)\left(\frac{1\ mole\ NaI}{149.9g\ NaI}\right)\left(\frac{1\ mole\ Pb(NO_3)_2}{2\ mole\ NaI}\right)\left(\frac{331.2g\ Pb(NO_3)_2}{1\ mole\ Pb(NO_3)_2}\right) = 16.6g\ Pb(NO_3)_2\ \text{Needed}$$

25.0g $Pb(NO_3)_2$ Have

16.6g $Pb(NO_3)_2$ Need

$\boxed{8.4g\ Pb(NO_3)_2\ \text{Excess}}$

* Amount Produced → Start with <u>Limiting</u>!!

$$\left(\frac{15.0g\ NaI}{1}\right)\left(\frac{1\ mole\ NaI}{149.9g\ NaI}\right)\left(\frac{2\ mole\ NaNO_3}{2\ mole\ NaI}\right)\left(\frac{85.0g\ NaNO_3}{1\ mole\ NaNO_3}\right) = \boxed{8.5g\ NaNO_3}$$