Stoichiometry (mole to mole conversions)Supplemental Packet p 129-130

There are seven skills which the student must master before performing stoichiometric calculations.

1.Using the periodic table, a student should be able to name and write chemical formulas correctly

2.Write a balanced chemical equation

3.Calculate molar mass to at least one digit past the decimal place.

4.To convert mass to moles

5.To convert moles to mass.

6.To convert between moles of reactants and moles of products using mole ratios from the balanced chemica equation.

7.Determine the limiting reagent.

3.Calculate molar mass and place each molar mass underneath

2. Write out a balanced reaction.

1. Write out the word problem into a reaction of reactants and products.

$$\underset{16.0}{1\ CH_4(g)} + \underset{32.0}{2\ O_2(g)} \dashrightarrow \underset{18.0}{2\ H_2O(l)} + \underset{44.0}{1\ CO_2(g)}$$

Methane gas is burned in excess oxygen to produce carbon dioxide & wate
If 25.0 grams of methane is burned how many grams of water is produced?

1.balance the reaction

2.calculate molar mass

grams	25.0		excess		**?**		**?**
	1 CH_4 (g)	+	2 O_2 (g)	--------->	2 H_2O (l)	+	1 CO_2 (g)
MM (g/mole)	16.0		32.0		18.0		44.0
moles	1.56		excess		**?**		**?**

3.make a table

grams

A_2--->2A (balanced reaction)

MM

moles

4.complete the table

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.

The term excess means you have enough reagent for complete reaction.

Complete the table by first calculating moles H_2O and moles CO_2

grams	25.0		excess		**?**		**?**
	1 CH_4 (g)	+	2 O_2 (g)	--------->	2 H_2O (l)	+	1 CO_2 (g)
MM (g/mole)	16.0		32.0		18.0		44.0
moles	1.56		excess		moles H_2O?		moles CO_2?

moles 1.56 moles CH_4 x $\frac{2 \text{ moles } H_2O}{1 \text{ mole } CH_4}$ = 3.125 moles H_2O

moles 1.56 moles CH_4 x $\frac{1 \text{ moles } CO_2}{1 \text{ mole } CH_4}$ = 1.56 moles CO_2

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.
The term excess means you have enough reagent for complete reaction.

Using the moles H_2O and moles CO_2, calculate grams of H_2O and CO_2

grams	25.0		excess		**?**		**?**
	1 CH_4 (g)	+	2 O_2 (g)	--------->	2 H_2O (l)	+	1 CO_2 (g)
MM (g/mole)	16.0		32.0		18.0		44.0
moles	1.56		excess		3.125		1.56

moles 1.56 moles CH_4 x $\frac{2 \text{ moles } H_2O}{1 \text{ mole } CH_4}$ = 3.125 moles H_2O

moles 1.56 moles CH_4 x $\frac{1 \text{ moles } CO_2}{1 \text{ mole } CH_4}$ = 1.56 moles CO_2

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.
The term excess means you have enough reagent for complete reaction.

grams	25.0		excess		grams H_2O		grams CO_2
	1 CH_4 (g)	+	2 O_2 (g)	--------->	2 H_2O (l)	+	1 CO_2 (g)
MM (g/mole)	16.0		32.0		18.0		44.0
moles	1.56		excess		3.125		1.56

moles 3.125 moles H_2O x $\frac{18.0 \text{ grams } H_2O}{1 \text{ mole } H_2O}$ = 52.6 grams H_2O

moles 1.56 moles CO_2 x $\frac{44.0 \text{ grams } CO_2}{1 \text{ mole } CO_2}$ = 68.6 grams CO_2

4. From the original equation, place the given masses of starting materials or products above the corresponding reagent and a question mark for the information you are seeking.
The term excess means you have enough reagent for complete reaction.

And Your Done!!!!!

grams	25.0		excess			56.2		68.6
	1 CH_4 (g)	+	2 O_2 (g)	--------->		2 H_2O (l)	+	1 CO_2 (g)
MM (g/mole)	16.0		32.0			18.0		44.0
moles	1.56		excess			3.125		1.56

moles 3.125 moles H_2O x $\frac{18.0 \text{ grams } H_2O}{1 \text{ mole } H_2O}$ = 56.2 grams H_2O

moles 1.56 moles CO_2 x $\frac{44.0 \text{ grams } CO_2}{1 \text{ mole } CO_2}$ = 68.6 grams CO_2