Chem11 Stoichiometry : Notes - 10

The balanced chemical reaction for the decomposition of water is : $2H_2O(l) \rightarrow 2H_2(g) + O_2(g)$

We can write the "**moles equation**" as :

2.0 moles of H_2O yields 2.0 moles of H_2 gas plus 1.0 mole of O_2 gas.

The number of moles of each is in this same ratio. If we have 5.0 moles of H_2O, it will yield 5.0 moles of H_2 and 2.5 moles of O_2.

We can also write the "**mass equation**". (use the gram molecular weights)

36 grams of H_2O react to form 4.0 grams of H_2 plus 32 grams of O_2.

The masses are also in the same ratio. So 9.0 grams of water will yield 1.0 gram of hydrogen plus 8.0 grams of oxygen.

The "**Law of Conservation of Mass**" is obeyed. The sum of the masses of the products equals the sum of the masses of the reactants.

Examples : Use the balanced equation : $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$, to answer the following problems;

Find the number of moles of NO formed if 85 moles of O_2 are consumed. $85/5 = x/4$ $x = 68$ moles.

Write down the mass equation.

$68g\ NH_3 + 160.g\ O_2$ yields $120.g\ NO + 108g\ H_2O$.

If 4.2g of NH_3 are burned, find the mass of H_2O produced.
$x/108 = 4.2/68$ $x = 6.7$ g.