Chemistry (Math Notes)

Module #9

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I. Key Terms/Concepts

Concentration:

 The number of molecules in H2O.

Concentrated:

 Lots of molecules in H2O

Diluted:

 A small amount of molecules in H2O

Strength:

 Based on number of molecules that do their job (weak= a small amount that do their job; strong = many that do their job).

Indicator:

 A substance that turns one color in the presence of acids and another color in the presence of bases.

Acid:

 A molecule that donates H+ ions (proton donors).

Base:

 A molecule that accepts H+ ions (proton acceptors).

Amphiprotic:

Amphiprotic - Compound that can act as either an acid or a base, depending on the situation.

II. Chemical Reactions

1. Formation: a reaction that starts with 2 or more elements and produces one compound.

2. Decomposition: a reaction that changes a compound into its constituent elements.

3. Combustion: (complete) - a reaction in which O2 is added to a compound containing carbon and hydrogen, producing CO2 and H2O.

   Incomplete - A reaction in which O2 is added to a compound containing carbon and hydrogen, producing CO or C and H2O.

4. Acid-Base - A reaction in which an acid reacts with a base by the neutralization of both or by forming 2 ions.

III. Molarity & Dilution Equation:

Concentration is amount / volume. Examples of concentration units are: g/ml, g/cm cubed, and mole/ml.

In chemistry we often use molarity to measure concentration. Molarity (M) is the number of moles / # liters of solution.

Chemists usually keep "stock" solutions, which are then diluted for use.

$M_1 \times V_1 = M_2 \times V_2$

M_1 is the molarity of the Stock solution.

V_1 is the molarity of the Stock solution.

M_2 is the molarity of the new solution that the chemist wants.

V_2 is the volume of the new solution that the chemist wants.

(molarity) x (# liters) = #moles

Remember, a typical stoichiometry problem is set up by giving the information of one substance, but asks for information of another substance.

In these problems, molarity for one substance is given, but molarity or grams of a second substance must be determined.

IV. Titration

Molarity of acid X volume acid = molarity of base X volume of base

What is a titration?

It is Stoichiometry and action. You always begin with a balanced chemical Equation.

You take a known amount of acid & add a base to it slowly. An indicator will change color, indicating that you have added just enough base to eat up all the acid. This is the

Endpoint, allowing you to determine the concentration of the acid. This technique also works in reverse, adding an acid slowly to a known amount of a base.