Chemistry (Math Notes)

Module #10

TERMS

A solute is the substance that is ___dissolved___.

A solvent is the substance that the solute is ___dissolved in___.

A solution is the ___solute___ + the ___solvent___.

Solubility refers to the ___maximum___ amount of solute that can be ___dissolved___ in a ___given___ amount of solvent.

A saturated solution is a solution in which the ___maximum___ amount of solute has been dissolved.

Precipitation is the process by which a ___solid___ solute leaves a solution and turns back into its ___solid phase___

Exothermic is a process that ___releases___ heat.

Endothermic is a process that ___absorbs___ heat.

___water___ is a common solvent because more substances can be dissolved in it than in solids, even ___gasses___ can be dissolved in ___water___.

Example:

$$CO_2 + H_2O \rightarrow H_2CO_3$$
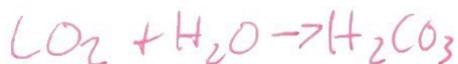
Why? Because all ionic compounds dissolve by splitting into ___ions___. Covalent compounds don't break up into ___ions___ but the ___water___ molecules ___surround___ these compounds.

Example:
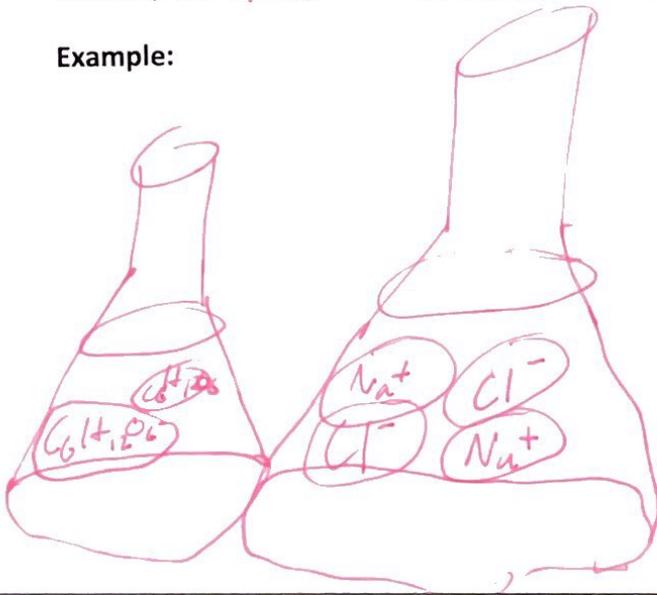
RULES OF SOLUBILITY

1. The solubility of an solute depends both on the _identity_ of the solute *and the* _identity_ of the solvent. **(Be sure to understand and remember the facts in Table 11.1 – p.358)**

2. For _solid_ solutes, solubility _increases_ with _increasing_ temperature. *(Direct relationship)*

3. For _liquid_ solutes, solubility is _not_ affected by temperature. *(No relationship)*

4. For _gas_ solutes, solubility _decreases_ with _increasing_ temperature. *(Inverse relationship)*

5. _increasing_ pressure _increases_ the solubility of gases. *(Direct relationship)*

6. Pressure does _not_ affect the solubility of _solids_ and _liquids_. *(No relationship)*

FORMULAS:

Molarity (M) =
$$\frac{\text{moles of solute}}{\text{liters of solution}}$$

Molality (m) =
$$\frac{\text{moles of solute}}{\text{mass of solvent (kg)}}$$

When a solute is dissolved in a solvent, the resulting change in the freezing temperature is determined by the following formula: $\Delta T_f = -iK_f m$

Define Freezing Point Depression: _Freezing Point is lower_

Define Boiling Point Elevation: _Boiling point is higher._

When a solute is dissolved in a solvent, the resulting change in the boiling point temperature is determined by the following formula:

$$\Delta T_{bp} = iK_{bp} m$$