**Solutions Reference Sheet**

 **Definitions**

Solute

The substance that is being dissolved in a solution

Solvent

The substance that something is being dissolved into

Solution

The solute and solvent combined

Solubility

The amount of solute that can be dissolved at a given temperature

Saturated solution

Maximum amount of solute dissolved

Unsaturated solution

Less than the maximum amount of solute dissolved

Supersaturated solution

More than the maximum amount of solute dissolved

Dissolve

When molecules of solute are surrounded by molecules of solvent and are pulled apart from other solute molecules

Dissociate

When an ionic compound has it’s ionic bond disrupted by solvent molecules and it breaks into individual ions

Electrolytes

Ionic solutes that dissociate into ions in a solution

Non-electrolytes

Covalent compounds that do not dissociate into ions in a solution

Heat of solution

The energy involved when solute dissolves/ dissociates

~~Colligative Properties~~

~~Properties whose value depend only on the number of solute particles, and not on what they are. Examples: boiling point elevation, freezing point depression, osmotic pressure.~~

~~Osmotic Pressure~~

~~The minimum pressure that stops osmosis.~~

**Equations**

$$Mass Percent= \left(\frac{mass of solute}{mass of solution}\right) x 100$$

$$Parts per Million= \left(\frac{mass of solute}{mass of solution}\right) x 1,000,000$$

$$Parts per Billion= \left(\frac{mass of solute}{mass of solution}\right) x 10^{9}$$

$$Grams per Liter= \left(\frac{mass of solute}{volume of solution}\right)$$

$$Mole fraction of A= Xa= \left(\frac{n\_{A}}{n\_{A}+ n\_{B}+…}\right)$$

$$Mole \% of A= Xa= \left(\frac{n\_{A}}{n\_{A}+ n\_{B}+…}\right) x 100$$

$$Molarity= M= \left(\frac{moles of solute}{Liters of solution}\right)$$

$$Dilutions= M\_{1}V\_{1}= M\_{2}V\_{2}$$

$$Molality= m= \left(\frac{moles of solute}{kilograms of solvent}\right)$$

$$∆H\_{sol'n}= ∆H\_{solute}+ ∆H\_{solvent}+∆H\_{mix}$$

$$P\_{sol^{'}n= } X\_{solvent}P\_{solvent}^{°}$$

$$∆P= P\_{solvent}^{°}-P\_{solution}=X\_{solute}P\_{solvent}^{°}$$

$$P\_{total}= P\_{A}^{}+P\_{B}=X\_{A}P\_{A}^{°}+X\_{B}P\_{B}^{°}$$

$$∆T= i• K\_{f}•m\_{solute}$$

$$∆T= i• K\_{b}•m\_{solute}$$

$$π=iMRT$$

**R-36**