Electrolytes and Solutions

1. What 2 components make up a solution?

   a. Solute – substance present in lesser quantity.

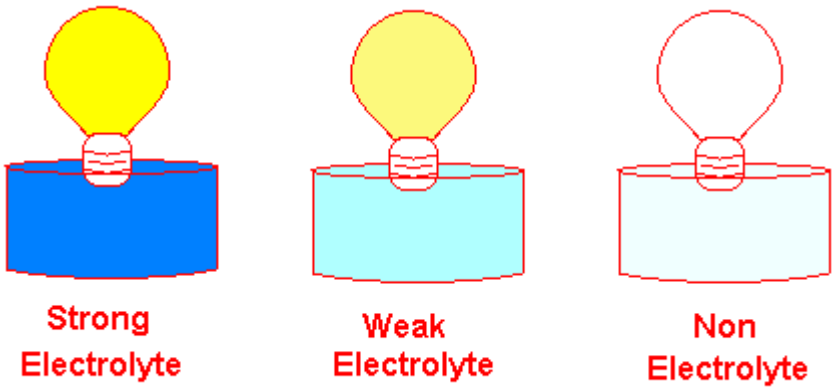
   b. Solvent – substance that dissolves solute, typically water.

2. What are the 3 varieties, in terms of ability to conduct electricity, of solution?

   a. Strongly electrolytic – A current can easily pass through these solutions because of great quantity of free moving charged particles. A light bulb would light most brightly in this solution.

   b. Weakly electrolytic – A current is still able to pass through these solutions. There are fewer particles so a light bulb would only dimly light up.

   c. Non-electrolytic – there are no charged particles released in the solution so a current cannot pass through. The light bulb would not light at all.



3. List three categories of solutes that are strong electrolytes?

   a. Soluble Salts (KCl, NaCl, $NaNO_3$, …)

   b. Strong Acids (HCl, HNO_3, HBr…)

   c. Strong Bases (NaOH, KOH,….)

4. List two categories of solutes that are weak electrolytes?

   a. Weak Acids (CH_3COOH, HF, HNO_2…)

   b. Weak Bases (NH_3, CH_3COO^-…)

5. List two categories of solutes that are non-electrolytes?

   a. Covalently bounded molecules like sucrose ($C_{12}H_{22}O_{11}$) and ethanol (CH_3CH_2OH)

   b. Insoluble Salts (AgCl, $BaSO_4$, etc.)

6. Calculate the molar concentration of all the ions in the following *strongly* electrolytic solutions.

   a. 75g of KCl dissolved in 250 mL of water.

$$75\ g\ KCl \quad \frac{1.0\ mol\ KCl}{74.55g\ KCl} = 1.0\ mol\ KCl$$

$$\frac{1.0\ mol\ KCl}{250 \times 10^{-3} L\ sol'n} = 4.0\ M\ KCl$$

K^+ → $[K^+] = 4.0\ M$

Cl^- → $4.0\ M = [Cl^-]$

b. 100.0g of MgF_2 dissolved in 500.0 mL of water

$$100.0\ g\ MgF_2 \frac{1\ mol\ MgF_2}{62.31\ g\ MgF_2} = 1.605\ mol\ MgF_2$$

$$\frac{1.605\ mol\ MgF_2}{0.500L\ sol'n} = 3.21M\ MgF_2$$

Mg^{2+} $\quad$ $2F^-$

$[Mg^{2+}] = 3.21M$ $\quad$ $6.42M = [F^-]$