Chem Activity 3

Chemistry 142U                      October 16, 2003
Quiz Section 142U ___

Names _______________________  ________________________
_______________________  ________________________

Molarity

A solution is a homogeneous mixture of two or more substances.

The lesser abundant component of a solution is the solute and the greater component is the solvent.

Water is the most common solvent. Unless otherwise specified, all reference is to aqueous solutions.

Solutes are categorized according to their ability to affect the electrical conductivity of the solution upon dissolution of the solute in water.

A strong electrolyte breaks-up (dissociates) completely into ions (+and-) in solution.

A weak electrolyte breaks-up only partly into ions in solution.

A non-electrolyte does not break-up at all in solution.

Molarity of solute A = M = moles of A/volume of solution in liters

When an ionic compound dissolves in water, the cations and anions are separated. Water molecules in the solution surround the cations and anions. It is the mobile charged particles that carry the electric current in the solution.

\[
\text{H}_2\text{O} \quad \text{Ca(NO}_3\text{)}_2 \rightarrow \text{Ca}^{2+} + 2\text{NO}_3^{-}
\]

Use the information presented above to answer the following questions.

1. KBr is a strong electrolyte. How many moles of ions are produced by one mole of KBr dissolved in a liter of water?

2. Ca(NO\textsubscript{3})\textsubscript{2} is a strong electrolyte. How many moles of ions are produced when 2.0 moles of calcium nitrate is dissolved in a liter of water?

3. What chemical species are present in a solution of the weak electrolyte acetic acid HC\textsubscript{2}H\textsubscript{3}O\textsubscript{2}?
4. Calculate the molarity of the solution when 16.4 grams of calcium nitrate are dissolved in a liter of solution?

5. How many moles of calcium ions are present when 16.4 grams of calcium nitrate are dissolved in a liter of solution?

6. What is the number of moles of nitrate ions present when 16.4 grams of calcium nitrate are dissolved in a liter of solution?

7. Which has the highest concentration of nitrate ions, 0.5 M NaNO₃ or 0.3 M Ca(NO₃)₂?

8. Determine the aluminum ion concentration and the chloride ion concentration in 0.125 M AlCl₃?

9. Calculate the molar concentration of acetic acid that has 0.050 moles of solute in 150 mL of solution.

10. Calculate the molar concentration of a solution that has 16.0 grams of the non-electrolyte methanol, CH₃OH, in 700 mL of solution.

11. Calculate the mass of metal ions in 500 mL of 0.580 M NaCl.