Chemistry 111

STUDY GUIDE - EXAM 3

1. Tell which particles are present, and their relative amounts, in solutions of given strong, weak, or nonelectrolytes
2. Given mass or volume of solute and mass or volume of solvent (or volume of solution), calculate the concentration in percent.
3. Given the mass or volume of a solution and its concentration in percent, calculate mass or volume of solute required to prepare it.
4. Given any two of the following quantities, calculate the third: volume of solution, molarity, moles (or grams, given molar mass).
5. Comparison of concentration units:
   a. Given the concentration in percent and density of a solution and the molar mass of the solute, calculate the molarity of the solution.
   b. Given the molarity and density of a solution, calculate the molality.
   c. Given the solution concentration in percent by mass and the molar mass of the solute, calculate the molality.
   d. Given the molality and density of a solution and the molar mass of the solute, calculate the molarity.
5. Given the mass of solvent and mass of solute and its molar mass, calculate the molality of the solution.
6. Given the molarity of a concentrated solution, calculate the volume of that solution required to make a specified volume of a specified molar solution by dilution.
7. Calculate the molarity of a solution prepared by diluting a given volume of a solution of known concentration with water to a specified total volume.
8. Given freezing point depression or boiling point elevation or vapor pressure lowering data, calculate the molar mass of a nonvolatile solute.
9. Given the mass of nonvolatile solute and solvent, the molal freezing or boiling point constant, the molar mass of the solute and the freezing or boiling point of the pure solvent, calculate the freezing point depression or boiling point elevation, or the freezing or boiling point of the solution.
10. Given the quantities and vapor pressures at a specified temperature of two volatile liquids that are the components of an ideal solution, calculate the vapor pressure of the solution at the specified temperature.
11. Given the vapor pressure of an ideal solution and the vapor pressures of the two liquid components at a specified temperature, calculate the composition of the solution (mole fraction of each component) and the composition of the vapor above the liquid mixture (mole fraction of each component).
12. Given the quantity of any species participating in a chemical reaction for which the balanced equation is given or may be written, calculate the quantity - either grams or volume of solution of specified molarity of any other species.
13. Apply No. 12 in calculating the percent by mass of a component in a mixture.
14. Given the volumes and concentrations of two reactants involved in a chemical reaction for which the balanced equation is given or may be written, determine which reactant is present in excess.
15. Given the volumes of two solutions used in a titration reaction, for which the balanced equation is given or may be written, and the molarity of one of the solutions, calculate the molarity of the other solution.
16. Use the van't Hoff equation to calculate osmotic pressure or any other of the variables in that equation, given the appropriate data.
17. Given reactants, complete and balance the molecular equation and write the total ionic equation and the net ionic equation.
18. Given the volumes and molarities of two aqueous solutions whose solutes may or may not react upon mixing, calculate the molarity of all particles present in the mixture after the reaction or mixing is complete. For any solid or gaseous product, calculate the moles or grams of solid or gas formed.
19. Solve assigned text problems and worksheet problems.