Unit 5 – Chapter 16: Electrochemistry **Name _____**

Assignment #3: Pressure of Solution & Raoult's Law **Period _____**

1) Glycerin, $C_3H_8O_3$, is a nonvolatile liquid. What is the vapor pressure of a solution made by adding 164 g of glycerin to 338 mL of H_2O at 39.8^0C? The vapor pressure of pure water at 39.8^0C is 54.75 torr and its density is 0.992 g/cm^3.

2) A solution of sodium chloride in water has a vapor pressure of 19.6 torr at 25^0C. What is the mole fraction of NaCl solute particles in this solution? What would be the vapor pressure of this solution at 45^0C? The vapor pressure of pure water is 23.8 torr at 25^0C and 71.9 torr at 45^0C and assume sodium chloride exists as Na^+ and Cl^- ions in solution.

3) A solution is prepared by mixing 0.0300 mol CH_2Cl_2 and 0.0500 mol CH_2Br_2 at 25^0C. Assuming the solution is ideal, calculate the composition of the vapor (in terms of mole fractions) at 25^0C. At 25^0C, the vapor pressures of pure CH_2Cl_2 and pure CH_2Br_2 are 133 and 11.4 torr, respectively.

4) A solution is made by mixing 50.0 g acetone (CH_3COCH_3) and 50.0 g methanol (CH_3OH). What is the vapor pressure of this solution at 25^0C? What is the composition of the vapor expressed as a mole fraction? Assume ideal solution and gas behavior. (At 25^0C the vapor pressures of pure acetone and pure methanol are 271 and 143 torr, respectively.) The actual vapor pressure of this solution is 161 torr. Explain any discrepancies.