Name:_____

Solutions and Colloids Test 5

1. Define or describe each of the following:
   a) Brownian movement.

   b) Alloys

   c) The cleansing action of soap.

2. Using the solubility rules given in class predict which substance in each of the following pairs would be more soluble in water? Circle your choice.
   a) copper sulfide or copper nitrate

   b) cadmium chloride or silver chloride

   c) magnesium sulfate or barium sulfate

   d) zinc carbonate or ammonium carbonate

   e) strontium hydroxide or cadmium hydroxide

3. Calculate the molality of a solution formed by dissolving 46.85 G of codeine, $C_{18}H_{21}NO_3$, in 125.5 G of ethanol, C_2H_5OH. [Note: This question is worth 5 points. Two of the points will be for reporting the answer to the proper number of significant digits.]

4. Using a density of 0.80 G / mL for ethanol, calculate the molarity of the solution in question 3. [Note: At least one assumption needs to be made to complete this problem. This assumption must be clearly stated in order to receive full credit.]

5. A solution was made which contained 50.0 G of carbon disulfide (CS_2) and 50.0 G of chloroform ($CHCl_3$). Calculate the mol fraction of each component.

6. A biochemist isolated a new protein and determined its molar mass by osmotic pressure measurements. She used 0.270 G of the protein in 50.0 mL of solution and observed an osmotic pressure of 3.86 mM of Hg for this solution at 25 °C. What is the molar mass of the new protein?

7. A sample of sulfur having a mass of 0.210 G was dissolved in 17.8 G of carbon disulfide, CS_2, (K_b=2.34 °C / $^{1-}$m). If the boiling point elevation was 0.107 °C, what is the molecular formula of a sulfur molecule?

One Step Beyond: Extra Credit

A salt is known to be an alkali metal fluoride, A quick approximate freezing point determination indicates that 4 G of the salt dissolved in 100 G of water to produce a solution that freezes at about -1.4 °C. What is the identity of the salt? [Hint: Alkali fluoride salts are usually electrolytes.]

Twilight Zone: Extra Credit

If osmosis were responsible for sap rising in a tree, calculate the approximate height to which the sap could rise f it were 0.13 M in sugar and the water outside the tree contained dissolved solids equivalent to a 0.02 M solution. [Note that the pressure exerted by a column of liquid is directly proportional to its density. The density of water is 0.0735 times that of mercury.]