AP Practice - Solutions

1) A solution that is prepared by dissolving 3.150 grams of the C_3H_2Cl in 25.00 grams of benzene, C_6H_6, has a freezing point of 1.12°C. (The normal freezing point of benzene is 5.50°C and the molal freezing-point depression constant, K_f, for benzene is 5.12 C°/molal.)

(a) Using the data gathered from the freezing point depression method, calculate the molar mass of the unknown substance.

(b) Calculate the mole fraction of benzene in the solution described above.

(c) The vapor pressure of pure benzene at 35°C is 150. millimeters of Hg. Calculate the vapor pressure of benzene over the solution described above at 35°C.

2)Use appropriate chemical principles to explain the following observation:

Sodium chloride may be spread on an icy sidewalk in order to melt the ice; equimolar amounts of calcium chloride are even more effective.

3) The following 0.10M solutions are placed in stoppered flasks: NaF, $MgCl_2$, C_2H_5OH and HCl.

(a) Which solution has the lowest freezing point? Explain.

(b) Above which solution is the pressure of water vapor greater? Explain.