Worksheet 5

1. Indicate the principal types of solute-solvent interaction in each of the following solutions, and rank the solutions from weakest to strongest solute-solvent interaction: a) KCl in water, b) CH_2Cl_2 in benzene (C_6H_6), c) methanol (CH_3OH) in water.

2. A solution is made containing 25.5 g of phenol (C_6H_5OH) in 495 g of ethanol (CH_3CH_2OH). Calculate a) the mole fraction of phenol, b) the mass percent of phenol, c) the molality of phenol.

3. A dilute aqueous solution of an organic compound soluble in water is formed by dissolving 2.35 g of the compound in water to form a 0.250 L solution. The resulting solution has an osmotic pressure of 0.605 atm at 25 °C. Assuming that the organic compound is a nonelectrolyte, what is its molar mass?

4. Using Table 13.4 in the book, calculate the boiling point of 20.0 g of decane ($C_{10}H_{22}$) in 45.5 g $CHCl_3$.