Colligative Properties

Name: _____

1) 25.00 grams of sodium sulfate is added to 100.0 g of water. What would be the new boiling and freezing point of the solution?

2a) What concentration of magnesium chloride solution would be needed to drop the freezing temperature of water to -14 ^{O}C?

b) How many grams of the solute would need to be dissolved in 500 g of water?

3) Naphthalene normally freezes at 40.9 ^{O}C. A 0.70 m solution of nonelectrolyte solution in naphthalene has a freezing point of 35.7 ^{O}C. What is the K_f for napthalene?

4) Camphor has a freezing point depression constant of 40.0 ^{O}C/m and a freezing point of 175 ^{O}C. What is the new freezing point of a solution made with 30.0 g of NaOH in 1350 g of camphor?

5) What mass of calcium chloride would be needed in water to make 2.0 kg of water boil at 107.6 ^{O}C?

Answers: 1) 102.7 ^{O}C, -9.8 ^{O}C 2b) 120 g 5) 1082 grams

Boiling and Freezing Point 2

Name: _____

1a) A water solution is made with 150 g of $C_{12}H_{22}O_{11}$ (a nonelectrolyte) in 50 grams of water. What should the boiling point of the solution be?

b) Predict the freezing point of the solution.

2a) What concentration of NaBr (aq) solution would be needed to drop the freezing temperature of water to -6 ^{O}C?

b) How many grams of the solute would need to be dissolved in 1500 g of water?

3) Carbon tetrachloride normally boils at 76.8 ^{O}C. A 1.70 m solution of nonelectrolyte solution (i = 1) in naphthalene has a new boiling point of 85.7 ^{O}C. What is the K_b for napthalene?

4) Camphor has a boiling point elevation constant (K_b) of 5.61 ^{O}C/m and a boiling point of 207 ^{O}C. What is the new boiling point of a solution made with NaOH that has a molality of 0.68 m?

5) What mass of potassium iodide would need to dissolve in water to make 2.0 kg of water freeze at -4.5 ^{O}C?

Answers: 1a) 104.6 ^{O}C 2b) 249 g 3) 5.2 ^{O}C/m 5) 402 g