

Colligative Properties

Name: _____

1) Ethanol has a boiling point elevation constant of $1.20\text{ }^{\circ}\text{C}/\text{m}$. What concentration of sugar has been added to the ethanol if its boiling point has been elevated $9.3\text{ }^{\circ}\text{C}$?

2) 15.00 grams of sodium chloride is added to 100 g of water.

a) How much higher is the boiling point as compared to pure water.

b) What is the freezing point of the same salt water solution?

3) A water solution has frozen at a temperature of $-7.83\text{ }^{\circ}\text{C}$. What is the concentration of the nonelectrolyte solute in the solution?

4) How many grams of CuSO_4 is present in a 1900 g water solution where the new boiling point is $106.8\text{ }^{\circ}\text{C}$?

5a) 23.0 grams of K_3PO_4 dissolves in 75.0 g of ethanol which has a $K_b = 1.2\text{ }^{\circ}\text{C}/\text{m}$. If pure ethanol boils at $78.3\text{ }^{\circ}\text{C}$, at what temperature will the solution boil?

5b) Ethanol normally freezes at $-114\text{ }^{\circ}\text{C}$. At what temperature would the solution in 5a freeze if ethanol's $K_f = 1.99\text{ }^{\circ}\text{C}/\text{m}$?

Answers: 2a) $2.67\text{ }^{\circ}\text{C}$ 2b) -9.54 4) 1981 g 5b) $-125.5\text{ }^{\circ}\text{C}$