Colligative Properties

1. If 45 grams of sodium chloride were added to 500 grams of water, what would the melting and boiling points be of the resulting solution? $K_b(\text{H}_2\text{O}) = 0.52\frac{\text{C}}{\text{m}}$ and $K_f(\text{H}_2\text{O}) = 1.86\frac{\text{C}}{\text{m}}$.

2. What is the vapor pressure of the solution in problem #1 at 25.0°C? The vapor pressure of pure water at 25.0°C is 3.17 kPa.
3. Which solution will have a higher boiling point: A solution containing 105 g of sucrose \((C_{12}H_{22}O_{11})\) in 500. g of water, or a solution containing 35 g of NaCl in 500. g of water?

4. 0.546 g of a compound with a van’t Hoff factor of 1 was dissolved in 15.0 g of benzene. The freezing point of the solution was found to be 0.240°C lower than the freezing point of pure benzene. If \(K_f\) for benzene is 5.12°C/molal, what is the molar mass of the compound?