

Freezing pt. depression/boiling pt. elevation problems:

1. List the following aqueous solutions in order of their expected freezing points: 0.050 m CaCl_2 ; 0.15 m NaCl ; 0.10 m HCl ; 0.050 m $\text{HC}_2\text{H}_3\text{O}_2$; 0.10 m $\text{C}_{12}\text{H}_{22}\text{O}_{11}$.

2. Which of the following solutes will produce the largest increase in boiling point upon addition of 1 kg of water: 1 mol $\text{Co}(\text{NO}_3)_2$; 2 mol KCl ; 3 mol ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$)?

3. Camphor ($C_{10}H_{16}O$) melts at $179.8^{\circ}C$, and it has a particularly large freezing point depression constant, $K_f = 40.0^{\circ}C/m$. When 0.186 g of an organic substance of unknown molar mass is dissolved in 22.01 g of liquid camphor, the freezing point of the mixture is found to be $176.7^{\circ}C$. What is the molar mass of the solute?