

1. If you use 3.68mol of sucrose ( $C_{12}H_{22}O_{12}$ ) and dissolve this into 2.50kg of water, what will be the change in the freezing point of your solution. Assume the  $K_f$  of water is  $-1.86^\circ\text{C}/\text{m}$ .
2. If you use 5.76mol of sodium fluoride (NaF) and dissolve this into 3.62kg of water, what will be the change in the boiling point of your solution. Assume the  $K_b$  of water is  $0.51^\circ\text{C}/\text{m}$ .
3. You dissolve 30.0g of potassium iodide (KI) into 1.75kg of water. What will be the change in the freezing point of your solution? Assume the  $K_f$  of water is  $-1.86^\circ\text{C}/\text{m}$ .
4. Salt is often added to water in order to raise the temperature of the boiling point and to heat food more quickly. If you add 30.0g of salt to 3.75kg of water, what will be the change in the boiling point of your salt water? Assume the  $K_b$  of water is  $0.51^\circ\text{C}/\text{m}$ .
5. Assume you have a 3.60m solution that depressed the freezing point of the solution by  $0.851^\circ\text{C}$ . What is the molal freezing point depression constant ( $K_f$ ) of the solution?
6. Assume you have a 5.70m solution that raised the boiling point of the solution by  $1.62^\circ\text{C}$ . What is the molal boiling point elevation constant ( $K_b$ ) of the solution?
7. Camphor ( $C_{10}H_{16}O$ ) has a molal freezing point depression constant of  $5.95^\circ\text{C}/\text{m}$ . If you dissolve 10.0g of dimethyl ether ( $C_2H_6O$ ) into 3.00kg of camphor, what will be the change in the freezing point of camphor?

8. Suppose you had solute dissolved into diethyl ether which has caused the freezing point of diethyl ether to decrease by 4.75 degrees Celsius. What is the concentration, in molality, of the solution? Assume the  $K_f$  of diethyl ether is  $-1.79^\circ\text{C}/\text{m}$ .
9. A solution of salt water raised the boiling point of water from 100 degrees Celsius to 102.5 degrees Celsius. What is the molality of the solution? Assume the  $K_b$  of water is  $0.51^\circ\text{C}/\text{m}$ .
10. 10.8g of glucose ( $\text{C}_6\text{H}_{12}\text{O}_6$ ) is dissolved into 3.00kg of water. If the molal boiling point elevation of water is  $0.51^\circ\text{C}/\text{m}$ , what will be the change in the boiling point of water?
11. You decide to dissolve 3.86g of naphthalene ( $\text{C}_{10}\text{H}_8$ ) into 56.0g of benzene. This ends up causing the boiling point of the solution to increase by 1.52 degrees Celsius. What is the molal boiling point elevation constant of benzene?