

Colligative Properties Worksheet

- 1) If I add 45 grams of sodium chloride to 500 grams of water, what will the melting and boiling points be of the resulting solution? $K_b(\text{H}_2\text{O}) = 0.52^\circ\text{C}/\text{m}$ and $K_f(\text{H}_2\text{O}) = 1.86^\circ\text{C}/\text{m}$.
- 2) Which solution will have a higher boiling point: A solution containing 105 grams of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) in 500 grams of water or a solution containing 35 grams of sodium chloride in 500 grams of water?
- 3) Calculate the freezing point of a solution made from 32.7 g of propane, C_3H_8 , dissolved in 137.0 g of benzene, C_6H_6 . The freezing point of benzene is 5.50°C and its K_f is $5.12^\circ\text{C}/\text{m}$.
- 4) Calculate the boiling point of a solution made from 227 g of MgCl_2 dissolved in 700. g of water. What is the boiling point of the solution?
 $K_b = 0.512^\circ\text{C}/\text{m}$.
- 5) Arrange the following aqueous solutions in order of decreasing freezing point: (a) 0.20 m ethylene glycol, (b) 0.12 m K_2SO_4 , (c) 0.10 m NaCl , (d) 0.12 m KBr .
- 6) A solution contains 21.6 g of a nonelectrolyte and 175 g of water. The water freezes at -7.18°C and $K_f = 1.86^\circ\text{C}/\text{m}$. Is the nonelectrolyte CH_3OH or $\text{C}_2\text{H}_5\text{OH}$?

Henry's Law Worksheet

Apply Henry's Law to solve the following problems.
You may use the following formula:

$$\frac{S_1}{P_1} = \frac{S_2}{P_2}$$

S_1 is the solubility of gas at pressure P_1
 S_2 is the solubility of gas at pressure P_2

- (1) If 0.24 g of a gas dissolves in 1.0L of water at 1.5 atm of pressure, how much of the gas will dissolve if the pressure is raised to 6.0 atm? Assume the temperature is held constant.

- (2) A gas has a solubility of 0.086 g/L at a pressure of 3.5 atm. At what pressure would its solubility be 2.3 g/L?

- (3) The solubility of a gas changes from 0.95 g/L to 0.72 g/L. If the initial pressure was 2.8 atm, what is the final pressure?

- 4) If 0.55g of a gas dissolves in 1L of water at 20kpa of pressure, how much will dissolve at 110kpa of pressure?

- 5) A gas has a solubility of 0.66g/L at 10atm pressure. What is the pressure on a 1L sample that contains 1.5g of gas?

- 6) The solubility of a gas is 2g/L at 50kpa of pressure. How much gas will dissolve in 1L at a pressure of 10kpa?