

Chapter 6 Homework

- 6.1 What mass of glucose ($C_6H_{12}O_6$, $M=180$) should you use to prepare a 0.112 m glucose solution using 250. g of water?
- 6.2 What is the mole fraction of alanine [$CH_3CH(NH_2)COOH$] in a 0.134 m aqueous alanine solution?
- 6.3 What mass of sucrose ($C_{12}H_{22}O_{11}$, $M=342$) should you dissolve in 100. g of water to obtain a solution in which the mole fraction of sucrose is 0.124?
- 6.4 Calculate the freezing point of 150 cm^3 of water to which 7.5 g of sucrose ($C_6H_{12}O_6$, $M=180$) has been added.
- 6.5 The freezing point of tetrachloromethane (CCl_4) is $-9.3\text{ }^\circ C$. The freezing point depression constant of CCl_4 is $K_f = 30\text{ K/m}$ ($= 30\text{ }^\circ C/m$).
- When 28. grams of an unknown compound is added to 750. g CCl_4 , the freezing point of the solution is lowered to $-14.7\text{ }^\circ C$. Calculate the Molar Mass of the compound.
- 6.6 The osmotic pressure of an aqueous solution of Urea at $27\text{ }^\circ C$ is 120. kPa. Calculate the freezing point of the solution. **Note:** You may assume that, in dilute aqueous solution, $m(\text{Urea}) = c(\text{Urea})$.
- 6.7 75 grams of Sucrose ($M=342\text{ g/mol}$) is added to 140 grams of water. The density of the solution is 1.23 g/mL.
- Calculate the mole fraction of sucrose in the solution.
 - Calculate the molality of sucrose in the solution.
 - Calculate the Molarity of sucrose in the solution.
- 6.8 When 0.15 grams of lysozyme is dissolved in 100 mL of water, the measured osmotic pressure of the solution is 2.00 torr at $25\text{ }^\circ C$. Calculate the molar mass of lysozyme.

- 6.9** When 15 grams of the strong electrolyte Na_3PO_4 [$M=164 \text{ g/mol}$] is dissolved in 120 grams of water, the volume of the solution is 132 mL.
- Calculate the boiling point of the solution [$K_b=0.51 \text{ }^\circ\text{C/m}$].
 - Calculate the osmotic pressure of the solution at $40 \text{ }^\circ\text{C}$ (in bar).