

**Name:**

**Freezing Point Depression**

1. Determine the freezing-point depression of H<sub>2</sub>O in each of the following solutions.
  - a. 1.50 *m* solution of C<sub>12</sub>H<sub>22</sub>O<sub>11</sub> (sucrose) in H<sub>2</sub>O
  - b. 171 g of C<sub>12</sub>H<sub>22</sub>O<sub>11</sub> in 1.00 kg H<sub>2</sub>O
  - c. 77.0 g of C<sub>12</sub>H<sub>22</sub>O<sub>11</sub> in 400. g H<sub>2</sub>O
  
2. Determine the molality of each solution of an unknown nonelectrolyte in water, given the following freezing-point depressions.
  - a. -0.930 °C
  - b. -3.72 °C
  - c. -8.37 °C
  
3. A solution contains 20.0 g of C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> (glucose) in 250. g of water.
  - a. What is the freezing-point depression of the solvent?
  - b. What is the freezing point of the solution?
  
4. How many grams of antifreeze, C<sub>2</sub>H<sub>4</sub>(OH)<sub>2</sub>, would be required per 500. g of water to prevent the water from freezing at a temperature of -20.0 °C?