Colligative Properties – Study Guide

*section 11.4 in OpenStax*

A colligative property is one that depends on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Molality**

Write the definition of molality:

How does molality differ from molarity?

What is the molality of a solution prepared by dissolving 3.41 g. C6H12O6 in 85.0 mL water?

 

Solution:



**Vapor Pressure Lowering - Raoult’s Law**

The vapor pressure of a solution can be calculated using the equation:

When a nonvolatile solute is dissolved in a solvent, the vapor pressure of the resulting solution is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (*higher than, lower than, the same as*) the vapor pressure of the pure solvent.

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What is the vapor pressure at 27oC over a solution containing 4.98 g. C6H12O6 dissolved in 52.2 g H2O?

The vapor pressure of pure water at 27oC is 27 mm Hg.

 *(ans 26.7 mmHg)*

**Boiling Point Elevation**

The presence of a dissolved nonvolatile solute in a solution causes the boiling point to be \_\_\_\_\_\_\_\_\_\_\_\_\_ (*raised, lowered*) compared to that of the pure solvent.

The change in boiling point of the solvent can be calculated using the equation:

**Freezing Point Depression**

The presence of a dissolved nonvolatile solute in a solution causes the freezing point to be \_\_\_\_\_\_\_\_\_\_\_\_\_ (*raised, lowered*) compared to that of the pure solvent.

The change in freezing point of the solvent can be calculated using the equation:

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**Colligative Properties of Electrolytes**

For strong electrolytes, i = number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ per mole of solute dissolved.

CaCl2 dissolves yielding three ions, one Ca+2 ion and two Cl- ions, thus i = \_\_\_\_\_

(NH4)3P dissolves yielding four ions, three NH4+ ions and one P-3 ion, thus i = \_\_\_\_\_

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**End of Chapter 11 Practice Problems**

#33b, 38c, 43, 45,

For detailed solutions to these problems, go to the [OpenStax website](https://openstaxcollege.org/textbooks/chemistry/resources) and download the “Student Answer and Solution Guide.”