

Chapter 15- Solutions

15.1 The Nature of Solutions

Differentiate solute and solvent.

List the different types of solutions.

- 1)
- 2)
- 3)
- 4)

Differentiate miscible and immiscible.

Why is water often referred to as the “universal solvent”?

Differentiate electrolyte and nonelectrolyte.

15.2 Concentrations of Solutions

Differentiate concentrated and dilute.

What does concentration of a solution refer to?

Complete the following measurements of concentration:

Molarity =

** Do Practice Problems 1 and 2.*

Molality =

** Do Practice Problems 3 and 4.*

Mole Fraction =

** Do Practice Problems 5 and 6.*

Differentiate unsaturated, saturated, and supersaturated.

15.3 The Formation of Solutions

What does the dissociation of solute particles refer to?

What does the term solvation refer to?

Explain how cold and heat packs work in terms of the breaking and formation of attractions between solute and solvent particles.

What does solubility refer to?

Explain the “like dissolves like” rule.

How do the effects of temperature changes differ on the solubility of gases, liquids, and solids?

How do the effects of pressure changes differ on the solubility of gases, liquids, and solids?

What is Henry’s law?

Explain why carbonated drinks go flat after they have been opened for an extended period of time.

What factors affect the rate of solution?

1)

2)

3)

15.4 Colligative Properties

What does colligative mean?

What are the four colligative properties of solutions?

1)

2)

3)

4)

What is a nonvolatile substance?

How is the vapor pressure of a pure solvent affected by the addition of a nonvolatile substance? What do they call this phenomenon?

How does increasing and decreasing nonvolatile solute concentration affect the vapor pressure of a solution?

How is the boiling point of a pure solvent affected by the addition of a nonvolatile substance? What do they call this phenomenon?

Write the mathematical equation describing the relationship between the elevation of the boiling point of a solvent and its molality.

** Do Practice Problems 7 and 8.*

How is the freezing point of a pure solvent affected by the addition of a nonvolatile substance? What do they call this phenomenon?

Write the mathematical equation describing the relationship between the depression of the freezing point of a solvent and its molality.

** Do Practice Problems 9 and 10.*

What is osmosis?

What does osmotic pressure refer to?

Why is it important to intravenously administer “isotonic” solutions to hospital patients needing replacement of bodily fluids?

Suppose a 15.0 gram sample of an unknown compound is dissolved in 0.100 kilogram of water. The boiling point of the solution is elevated to 0.483°C above the normal boiling point of pure water. What is the molar mass of the unknown sample?

