Name _____ Date _____ Class _____

16.1 PROPERTIES OF SOLUTIONS

Section Review

Objectives

- Identify the factors that determine the rate at which a solute dissolves
- Identify the units usually used to express the solubility of a solute
- Calculate the solubility of a gas in a liquid under various pressure conditions
- Identify the factors that determine the mass of solute that will dissolve in a given mass of a solvent

Vocabulary

- saturated solution
- solubility
- unsaturated solution
- miscible
- immiscible
- supersaturated solution
- Henry's law

Key Equation

- Henry's law: $\frac{S_1}{P_1} = \frac{S_2}{P_2}$

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

Changes in the temperature of a system and ___1___ of a solute alter the ___2___ at which a solute dissolves. The extent to which a gas dissolves in a liquid is proportional to the ___3___ of the gas in accordance with ___4___ law. The solubility of a gas decreases with increasing ___5___. A solution that contains the maximum amount of solute at a given temperature is said to be ___6___. Two liquids that are mutually soluble in each other are said to be ___7___. Generally the ___8___ of a solid in water ___9___ with increasing temperature, but there are exceptions. A(n) ___10___ solution holds more solute than is theoretically possible.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

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Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ **11.** The rate at which a solute dissolves can be increased by grinding.

_____ **12.** As the temperature of a solvent decreases, the solubility of a solute increases.

_____ **13.** Stirring a solute when adding it to a solvent should increase the rate of its dissolving.

_____ **14.** Henry's law states that the solubility of a gas in a liquid is a function of temperature.

_____ **15.** Two liquids that dissolve in each other are miscible.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ **16.** saturated solution	**a.** the amount of a substance that dissolves in a given quantity of solvent at a given temperature
_____ **17.** solubility	**b.** The solubility of a gas in a liquid is directly proportional to the pressure of the gas above the liquid.
_____ **18.** unsaturated solution	**c.** solution that contains the maximum amount of solute for a given amount of solvent at a constant temperature
_____ **19.** miscible	**d.** a solution containing more solute than it can theoretically hold at a given temperature
_____ **20.** immiscible	**e.** description of two liquids that dissolve in each other
_____ **21.** supersaturated solution	**f.** a solution that contains less solute than possible at a given temperature
_____ **22.** Henry's law	**g.** description of two liquids that do not dissolve in each other

Part D Problem

Solve the following problem in the space provided. Show your work.

23. The solubility of a gas in water is 1.6 g/L at 1.0 atm of pressure. What is the solubility of the same gas at 2.5 atm? Assume the temperature to be constant.