

Practice Test: Solutions

PART I: In the space provided, write the letter of the term or phrase that best completes each statement or best answers each question.

- C 1. Which of the following does *not* increase the rate at which a solid dissolves in water?
 a. raising the temperature of the water c. using large pieces of the solid
 b. stirring the solution d. crushing the solid
- A 2. Henry's law relates
 a. pressure to gas-liquid solubility. c. pressure to temperature.
 b. temperature to gas-liquid solubility. d. pressure to liquid-solid solubility.
- C 3. A solution that contains a large concentration of solute but can hold even more solute is
 a. unsaturated and dilute. c. unsaturated and concentrated.
 b. saturated and dilute. d. saturated and concentrated.
- C 4. To determine the molarity of an HCl solution, you need to know the number of
 a. grams of HCl in 1×10^6 g of solution.
 b. moles of HCl dissolved in the total moles of solution.
 c. moles of HCl in 1 L of solution.
 d. moles of HCl dissolved in 1 kg of solvent.
- A 5. What is the molarity of a solution that contains 125 g NaCl (molar mass = 58.44 g/mol) in 4.00 L solution?
 a. 0.535 M NaCl c. 8.56 M NaCl
 b. 2.14 M NaCl d. 31.3 M NaCl
- A 6. A dissolved solute that does not form ions is
 a. a nonelectrolyte. c. a strong electrolyte.
 b. a weak electrolyte. d. insoluble.
- A 7. If the temperature stays the same, the solubility of gases in liquids
 a. increases with increasing pressure.
 b. cannot reach equilibrium.
 c. decreases with increasing pressure.
 d. does not depend on pressure.
- D 8. A NaOH solution contains 1.90 mol of NaOH (molar mass = 40.00 g/mol), and its concentration is 0.555 M. What is its volume?
 a. 0.623 L c. 1.05 L
 b. 0.911 L d. 3.42 L
- A 9. Which does *not* affect the rate at which a solid solute dissolves?
 a. the vapor pressure of the solvent
 b. the temperature of the solvent
 c. the surface area of the solid
 d. the speed at which the solution is stirred
- D 10. Under which conditions is more CO_2 dissolved in a carbonated beverage?
 a. in a glass at room temperature
 b. in a bottle that has been left uncapped in the refrigerator
 c. in a glass with ice cubes
 d. in an unopened bottle in the refrigerator
- C 11. What is the molality of an aqueous NaOH solution made with 5.00 kg of water and 3.6 mol NaOH (molar mass = 40.00 g/mol)?
 a. 3.6 m NaOH c. 0.72 m NaOH
 b. 1.4 m NaOH d. 0.090 m NaOH
- A 12. What mass of NaCl (molar mass = 58.44 g/mol) is needed to make a 1.50 m solution using 300. g of solvent?
 a. 26.3 g NaCl c. 1.50 g NaCl
 b. 11.7 g NaCl d. 0.0877 g NaCl

$$\frac{125 \text{ g NaCl}}{1} \times \frac{1 \text{ mol}}{58.5}$$

$$\frac{1.90}{1} \times \frac{1 \text{ L}}{0.555 \text{ mol}}$$

$$\frac{3.6 \text{ mol}}{1} \times \frac{40.00 \text{ g}}{1 \text{ mol}}$$

$$\frac{1.50 \text{ mol}}{1 \text{ kg}} \times \frac{300 \text{ g}}{1} \times \frac{58.5}{1 \text{ mol}}$$

- C 13. Which of the following is a heterogeneous mixture?
 a. water c. whole-wheat bread
 b. a sugar-water solution d. sugar
- A 14. Which mixture contains particles that are in a dispersed phase and do not settle out?
 a. a colloid c. a solution
 b. a heterogeneous mixture d. a suspension
- A 15. Which of the following is an electrolyte?
 a. sodium chloride c. water
 b. sugar d. glass
- C 16. Which of the following does NOT increase the rate of dissolving a solid in water?
 a. raising the temperature c. using larger pieces of solid
 b. stirring d. crushing the solid
- C 17. If the amount of dissolved solute in a solution at a given temperature is greater than the amount that can permanently remain in solution at that temperature, the solution is said to be
 a. saturated. c. supersaturated.
 b. unsaturated. d. diluted.
- A 18. The solubility of gases in liquids
 a. always increases with increasing pressure.
 b. sometimes increases with increasing pressure.
 c. always decreases with increasing pressure.
 d. does not depend on pressure.
- D 19. Which of the following expresses concentration?
 a. molality c. percent concentration by mass
 b. molarity d. all of the above
- C 20. Which of the following is expressed in grams of solute instead of moles of solute?
 a. molality c. neither a nor b
 b. molarity d. a and b

PART II: Write the correct term (or terms) in the space provided.

21. As temperature increases, the solubility of gases in liquids generally decreases.
22. The substance dissolved in a homogeneous mixture is the solute.
23. A mixture that can be identified because it scatters light is a(n) colloid.
24. To carry an electric current, a solution must contain ions.
25. A solution that contains more dissolved solute than a saturated solution contains under the same conditions is called a(n) super saturated.

Chapter 12 Study Guide

1. Define the terms solution, solute, and solvent.
2. Distinguish between solutions, colloids, and suspensions.
3. Be able to explain what an electrolyte is and give identify substances as electrolytes.
4. Know that ionic solutes dissociate into their anions and cations while molecular solutes do not.
5. List three factors that determine how fast a substance dissolves.
6. Explain the difference among saturated, unsaturated, and supersaturated solutions.
7. Apply Henry's law to solve solubility problems. ($S_1/P_1 = S_2/P_2$)
8. Know the difference between molarity and molality and know how to perform calculations using both.
9. Know how to prepare dilutions from a stock solution using the formula $M_1V_1 = M_2V_2$
10. Be able to calculate percent solutions.