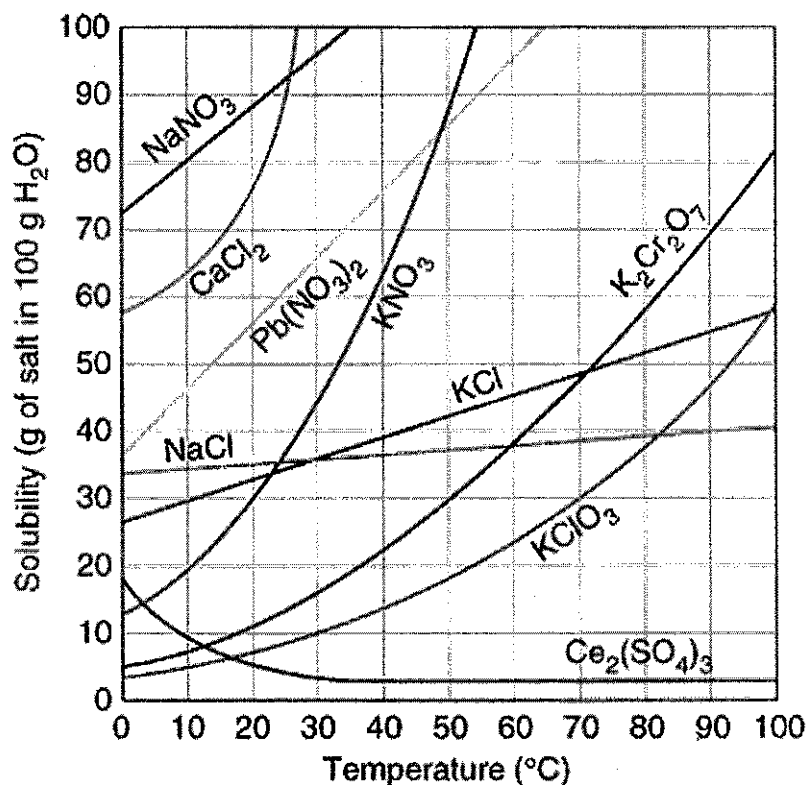


Solutions and Acid-Base Unit Test Study Guide

Solutions



1.

- In order to make a saturated solution of potassium chlorate at 70°C, how much potassium chlorate should be dissolved in 100 g of water?
- How many grams of cerium (III) sulfate are needed to make a saturated solution at 20°C?
- How many grams of NaCl should be dissolved in 500g of water in order to make a saturated solution at 90°C?
- Which is more concentrated: a saturated solutions of sodium nitrate at 20°C or a super saturated solution of calcium chloride holding 83g of calcium chloride dissolved in 100g of water at 20°C?

2. If you are making sweet tea, using sugar and hot tea, which substance is the solute and which is the solvent?

3. Use the equation for molarity to solve these problems: $M = n/V$

a. What is the molarity of a solution made by dissolving 130.0g of $\text{Cu}(\text{NO}_3)_2$ in enough water to make a 2.32L solution?

b. How many moles of CrCl_3 were dissolved to make 0.75L of a 0.75M solution?

c. What is the mass of MgSO_4 used to create 101mL of a 1.11M solution?

4. Use the equation for dilutions to solve these problems: $M_1V_1 = M_2V_2$

a. You have 13.00mL of 3.36M solution of sodium hydroxide, you need a concentration of 2.24M. What volume should you dilute the solution to?

b. You have .250L of 12.0 M sulfuric acid. You dilute it to 1.250L. What is the new molarity of your solution?

5. What are colligative properties?

6. What would happen to the freezing point if you add sugar to water? What would happen to the boiling point?

7. Which solute would have the greatest effect on the boiling point of a solution? (Which solution would have the greater van Hoff factor (i)?):
 - a. CaCl_2
 - b. Br_2
 - c. $\text{Al}(\text{NO}_3)_3$

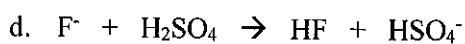
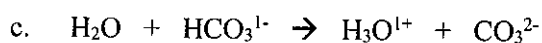
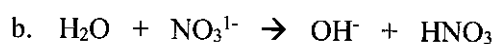
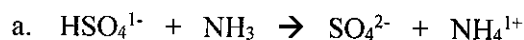
8. What would happen to the freezing point if you add sugar to water? What would happen to the boiling point?

9. Which solute would have the greatest effect on the freezing point of a solution?
 - a. CaCl_2
 - b. Br_2
 - c. $\text{Al}(\text{NO}_3)_3$

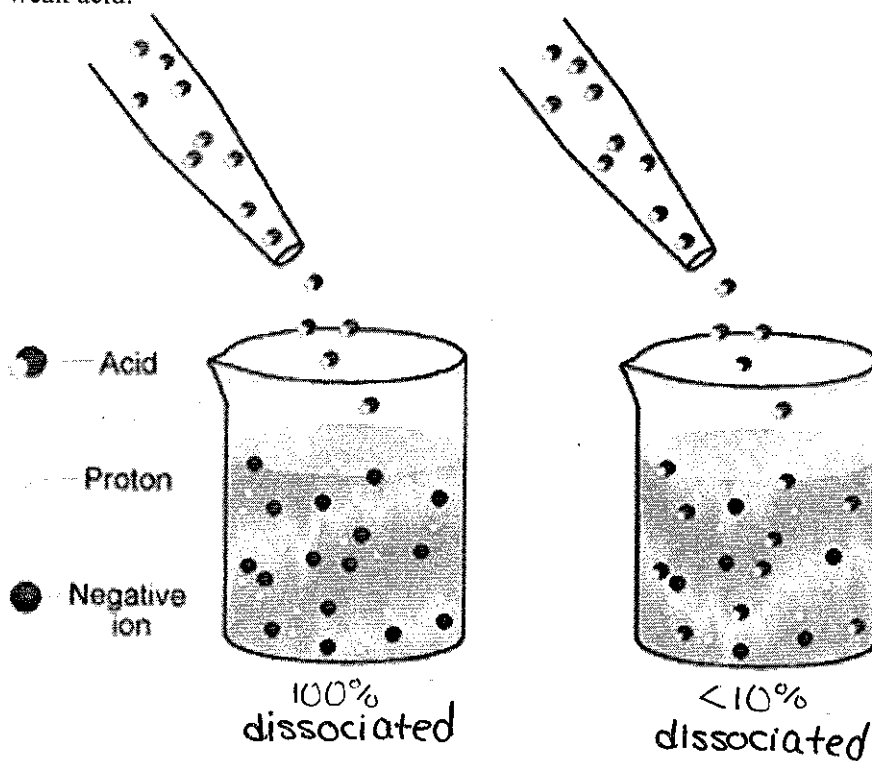
* List 3 Factors that affect how fast a solute dissolves in a solvent.

Acids/Bases

1. What is an Arrhenius acid? What is an Arrhenius base? What is a Brønsted-Lowry acid? What is a Brønsted-Lowry base?
2. Identify the Brønsted-Lowry acid, Brønsted-Lowry base, conjugate acid, and conjugate base in the reactions below:



3. Label the beaker in the picture that represents a strong acid. Label the beaker that represents a weak acid.



- a. What makes an acid or base strong?

- b. What makes an acid or base weak?
 - c. List 7 strong acids.
 - d. List 8 strong bases.
4. List 4 properties of an acid. List 4 properties of a base.
5. Use the pH equations below to answer these questions.

$$\text{pH} = -\log[\text{H}^+] \quad \text{pOH} = -\log[\text{OH}^-] \quad \text{pH} + \text{pOH} = 14.0$$

- a. Find the pOH of a solution of HNO_3 with a pH of 5.45.
- b. Calculate the pH and pOH of a solution of HCl with a concentration of $6.56 \times 10^{-7} \text{ M}$.
- c. Determine the pH and pOH of a solution of HNO_3 with a concentration of $7.67 \times 10^{-11} \text{ M}$.
- d. Find the pH and pOH of a solution of RbOH with a concentration of $8.78 \times 10^{-6} \text{ M}$.
- e. Find the pH and pOH of a solution of H_2SO_4 with a concentration of $9.19 \times 10^{-7} \text{ M}$.
- f. Find the pH and pOH of a solution of $\text{Sr}(\text{OH})_2$ with a concentration of $1.91 \times 10^{-5} \text{ M}$.

6. Use the equation $M_A V_A = M_B V_B$ to solve these neutralization questions.

a. What volume of 4.23 M HNO_3 is needed to completely neutralize 0.750L of 5.00M LiOH ?

b. What volume of 6.0 M NaOH is needed to completely neutralize 1.00L of 12.0 M HI ?