

Exercise 4.3

Solution Concentration

Name: _____

Date: _____ Per: _____

1. Calculate the molarity of each of these solutions.

a. A 5.623 g sample of NaHCO_3 is dissolved in enough water to make 250.0 mL of solution.

b. A 184.6 mg sample of $\text{K}_2\text{Cr}_2\text{O}_7$ is dissolved in enough water to make 500.0 mL of solution.

c. A 0.1025 g sample of copper metal is dissolved in 35 mL of concentrated HNO_3 to form Cu^{2+} ions and then water is added to make a total volume of 200.0 mL. (Calculate the molarity of Cu^{2+} .)

2. A solution of ethanol ($\text{C}_2\text{H}_5\text{OH}$) in water is prepared by dissolving 75.0 mL of ethanol (density = 0.79 g/cm^3) in enough water to make 250.0 mL of solution. What is the molarity of the ethanol in this solution?

3. Calculate the concentrations of all ions present in each of the following solutions of strong electrolytes.

a. 5.00 g of NH_4Cl in 500.0 mL of solution.

b. 1.00 g of K_3PO_4 in 250.0 mL of solution.

c. 1.00 g of potassium chloride in 0.500 L of solution

d. 133 g of ammonium sulfate in 1.50 L of solution

Exercise 4.3

Solution Concentration

Name: _____

Date: _____ Per: _____

4. What mass of NaOH is contained in 250.0 mL of a 0.400 M sodium hydroxide solution?

5. If 10. g of AgNO_3 is available, what volume of 0.25 M AgNO_3 solution can be prepared.

6. How would you prepare 1.00 L of a 0.50 M solution of each of the following? (Assume you are using a volumetric flask.)

a. H_2SO_4 from “concentrated” (18 M) sulfuric acid.

b. HCl from “concentrated” (12 M) reagent.

c. NiCl_2 from the salt $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$

d. Sodium carbonate from the pure solid.

Exercise 4.3

Solution Concentration

Name: _____

Date: _____ Per: _____

7. A solution is prepared by dissolving 10.8 g of ammonium sulfate in enough water to make 100.0 mL of stock solution. A 10.00 mL sample of this stock solution is added to 50.00 mL of water. Calculate the concentration of ammonium ions and sulfate ions in the final solution.

8. A 230. mL sample of 0.275 M CaCl_2 solution is left on a hot plate overnight; the following morning, the solution is 1.10 M. What volume of water evaporated from the 0.275 M CaCl_2 solution?

9. Suppose 50.0 mL of 0.250 M CoCl_2 solution is added to 25.0 mL of 0.350 M NiCl_2 solution. Calculate the concentrations, in moles per liter, of each of the ions present after mixing. Assume that the volumes are additive.

10. You wish to prepare 1.000 L of a 0.2000 M potassium iodate solution. You require that the concentration be as accurate as possible. Specify the equipment needed and the accuracy of the balance (the number of decimal places) required to make this solution. Describe how you would make this solution. Be sure to include the mass of potassium iodate required.
