Name_____Per_____Date_____

AP Chem HW 2-B

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 $K_2Cr_2O_7$ 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 (C_2H_5OH) in water is prepared by dissolving 75.0 mL of ethanol (density = 0.79 g/cm3) 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. 1.0 g of potassium chloride in 0.500 L of solution

   d. 132 g of ammonium sulfate in 1.50 L of solution

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?
   a. H_2SO_4 from "concentrated" (18 M) sulfuric acid.

   b. HCl from "concentrated" (12 M) reagent.

   c. $NiCl_2$ from the salt $NiCl_2 \cdot 6H_2O$

   d. Sodium carbonate from the pure solid.

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 L of a 0.02 M potassium iodate solution. You require that the final concentration be within 1% of 0.02 M and that the concentration be known accurately to the fourth decimal place. How would you prepare this solution? Specify the glassware you would use, the accuracy needed for the balance, and the ranges of acceptable masses of KIO_4 that can be used.

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