

Unit 4 – Chapter 4: Types of Reactions

Name _____

Assignment #1: Solution Chemistry & Dilutions

Period _____

- 1) A student wants to prepare 1.00 L of a 1.00 M solution of NaOH (molar mass = 40.00 g/mol).
 - a. If solid NaOH is available, how would the student prepare this solution?
 - b. If 2.00 M NaOH is available, how would the student prepare the solution?
 - c. To help ensure three significant figures in the NaOH molarity, to how many significant figures should the volumes and mass be determined?
- 2) A solution of ethanol (C₂H₅OH) 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) If 10.0 g of AgNO₃ is available, what volume of 0.25 M AgNO₃ solution can be prepared?
- 4) How would you prepare 1.00 L of a 0.50 M solution of each of the following?
 - a. H₂SO₄ from “concentrated” (18 M) sulfuric acid
 - b. HCl from “concentrated” (12 M) reagent
 - c. NiCl₂ from the salt NiCl₂ · 6 H₂O
 - d. HNO₃ from “concentrated” (16 M) reagent
 - e. Sodium carbonate from the pure solid
- 5) Calculate the sodium ion concentration when 70.0 mL of 3.0 M sodium carbonate is added to 30.0 mL of 1.0 M sodium bicarbonate.
- 6) A stock solution containing Mn²⁺ ions was prepared by dissolving 1.584 g pure manganese metal in nitric acid and diluting to a final volume of 1.000 L. The following solutions were then prepared by dilution:
 - For solution A, 50.00 mL of stock solution was diluted to 1000.0 mL.
 - For solution B, 10.00 mL of solution A was diluted to 250.0 mL.
 - For solution C, 10.00 mL of solution B was diluted to 500.0 mL.

Calculate the concentrations of the stock solution and solutions A, B, and C.