

Unit 6 – Chapter 11

Name _____

Assignment #1

Period _____

- 1) A solution of phosphoric acid was made by dissolving 10.0 g of H_3PO_4 in 100.0 mL of water. The resulting volume was 104 mL. Calculate the items listed below. Assume water has a density of 1.00 g/cm^3 .
 - a. density
 - b. mole fraction
 - c. molarity
 - d. molality

- 2) An aqueous antifreeze solution is 40.0% ethylene glycol ($\text{C}_2\text{H}_6\text{O}_2$) by mass. The density of the solution is 1.05 g/cm^3 . Calculate the values listed below for the ethylene glycol.
 - a. molality
 - b. molarity
 - c. mole fraction

- 3) Common commercial acids and bases are aqueous solutions with the following properties:
Hydrochloric acid (HCl) density (g/cm^3) = 1.19; mass percent of solute = 38
Nitric acid (HNO_3) density (g/cm^3) = 1.42; mass percent of solute = 70

Calculate the following:
 - a. molarity
 - b. molality
 - c. mole fraction

- 4) A bottle of wine contains 12.5% ethanol by volume. The density of ethanol ($\text{C}_2\text{H}_5\text{OH}$) is 0.789 g/cm^3 . Calculate the concentration of ethanol in wine in terms of mass percent and molality.

- 5) Calculate the molarity and mole fraction of acetone in a 1.00 *m* solution of acetone (CH_3COCH_3) in ethanol ($\text{C}_2\text{H}_5\text{OH}$). (Density of acetone = 0.788 g/cm^3 ; density of ethanol = 0.789 g/cm^3 .) Assume that the volumes of acetone and ethanol add.