Chapter 13 Homework

1.Identify the solute and solvent in each of the following

a. salt water   Solute_____   Solvent _____

b. wine (11 % alcohol)   Solute_____   Solvent _____

c. carbonated water (CO_2 in water) Solute_____   Solvent _____

2. Water is a polar liquid while hexane is a nonpolar liquid. Would the following be more soluble in water or hexane?

    a. glucose (polar)   water *OR* hexane

    b. salt   (ionic)   water *OR* hexane

    c.   olive oil (nonpolar)   water *OR* hexane

    d. carbon dioxide (nonpolar)   water *OR* hexane

    e. ammonia (polar)   water *OR* hexane

3. What is the molarity of each of the following solutions?

a. 0.115 moles of magnesium acetate ($Mg(C_2H_3O_2)_2$) in 35.2 milliliters of solution.

b. 195 grams of calcium nitrite ($Ca(NO_3)_2$) in 210 mL of solution.

c. 181.2 milligrams of calcium chloride in 25.3 mL of solution.

4. What mass of K_3PO_4 is required to prepare 4.00 L of 0.50 M solution?

5. What mass of glucose ($C_6H_{12}O_6$) is required to prepare 193 mL of 0.35 M solution?

6. What is the molarity of solution prepared by dissolving 78.11 grams of sodium hydroxide (NaOH) in 1.95 liters of water?

7. If you need to prepare 525 mL of 1.05 M $NaNO_3$ solution, how many grams of $NaNO_3$ would you use?

8. You need 1.00 M HCl for an experiment but all you can find on the shelf is 6.00 M HCl. If you need 25.0 mL of 1.00 M HCl, how many milliliters of the 6.00 M HCl will you need to prepare it?

9. A 3.7 L sample of a 0.75 M NaCl solution is diluted to a volume of 9.2 L. What is the molarity of the diluted solution?

10. How many mL of commercial HCl, which is 11.6 M, should be used to prepare 4.25 L of 0.570 M HCl?

11. What volume of 0.25 M NaOH can be prepared from 124 mL of 0.80 M NaOH solution?

12. If I make a solution by adding water to 75 grams of ethanol until the total volume of the solution is 375 grams, what's the percent by mass of ethanol in the solution?

13. What is the percent by mass of 5.0 g of iron (II) sulfate dissolved in 75.0 g of water?

14. A solution is formed by adding 35 g of ammonium nitrate to 250 g of water. What is the percent by mass of ammonium nitrate?

15. A solution is made by dissolving 125 g of sodium chloride in 1.5 kg of water. What is the percent by mass?