Chemistry – Chapter 16 Book problems #5: Review problems

1. What mass of $AgNO_3$ can be dissolved in 250 grams of water at 20^0C? (The solubility of $AgNO_3$ in 100 grams of water at 20^0C is 222.0g)

2. The solubility of methane, the major component of natural gas, in water at 20^0C and 1.00 atm pressure is 0.026 g/L. If the temperature remains constant, what will be the solubility of this gas at the following pressures?

A. 0.60 atm B. 1.80 atm

3. How many milliliters of 0.500 M KCl solution would you need to dilute to make 100.0 mL of 0.100M KCl?

4. Calculate the molarity of a solution that contains 0.50 g of NaCl dissolved in 100.0 mL of solution.

5. Calculate the moles and grams of solute in the solution: 5.0×10^2 mL of 2.0 M KNO_3

6. Calculate the moles and grams of solute in the solution: 2.0 L of 0.30 M Na_2SO_4

7. Calculate the grams of solute required to make the following solution: 2500 grams of solution in a 0.90% solution (m/m)

8. Calculate the grams of solute required to make the following solution: 0.050 kg of 4.0% (m/m) $MgCl_2$ solution.

9. What is the percent by mass of sodium chloride in the solution: 15 grams of NaCl dissolved in 485 grams of water.

10. What is the concentration (in % v/v) of the following solution: 175 mL of isopropyl alcohol (C_3H_6O) is diluted with water to a total volume of 275 mL.

11. Describe how you would make an aqueous solution of methanol (CH_4O) in which the mole fraction of methanol is 0.40.

12. What is the boiling point of the solution when 0.50 mol glucose is in 1000 g H_2O?

13. What is the boiling point of the solution when 1.50 mol NaCl is in 1000 g H_2O?

14. Determine the freezing points of each 0.20 *m* aqueous solution: K_2SO_4

15. Describe how you would prepare an aqueous solution of acetone (C_3H_6O) in which the mole fraction of acetone is 0.25.

16. Calculate the freezing point and also boiling point of a solution that contains 15.0 grams of urea (CH_4N_2O) in 250 grams of water. NOTE: urea is molecular, so it is considered non-volatile. You will need to recognize if something is molecular or not on your own for the test!

17. Calculate the mole fractions (both for the solute and solvent) in a solution that is 25.0 grams ethanol (C_2H_6O) and 40.0 grams of H_2O.