Chapters 15 and 16 Review

1. Draw a water molecule, and list properties about water (type of bonds, three bond forces, polar, slight positive/negative, etc).
2. Why does water have high surface tension? Why is water considered the universal solvent?
3. Give two examples of substances that do not dissolve in water. Explain molecularly why this occurs.
4. Why is 4oC an important number for water? What happens above or below this temperature? Why does this happen?
5. Using NaCl as an example, explain HOW water dissolves things.
6. Why are some ionic compounds actually immiscible (unable to be dissolved in water?)
7. What is an electrolyte, and how are they able to form?
8. What separates a strong electrolyte from a weak electrolyte.
9. Colloids and suspensions a similar in terms of the Tyndall Effect and different in terms of Brownian Motion. Explain these two terms in the context of colloids and suspensions, giving one specific example of each.
10. What is the difference between an unsaturated and a saturated solution? What about a saturated and a supersaturated solution?
11. What are the three major factors that influence solubility, or the ability for a substance to dissolve?
12. How are pressure and solubility related, giving one example? Why this relationship only apply to gasses?
13. Name the following hydrates and find their % water composition: CuSO4 ● 5H2O, CoCl2 ● 6H2O
14. If you have 45.0 grams each of the hydrates above, find the amount that remains when all of the water has been evaporated.
15. What is the formula for molarity? What does this formula represent?
16. You are dissolving 23.0 grams of HNO3 into a 200mL solution. Calculate the molarity of your solution.
17. You have a 450 mL Potassium Chloride solution with a concentration of 0.125M. With this information, calculate how much Potassium Chloride, in grams, is needed to make a solution of this concentration.
18. What is the formula for dilution? What type of relationship exists between volume and concentration?
19. How will the volume be affected if you want to double the concentration of a solution?
20. If you add 25mL of water to a 200 mL, 0.432 M solution, how will this affect the concentration?
21. What is the formula for percent by mass and volume?
22. 1 quart juice from concentrate is labeled as being 25% juice, by volume. How much is this in mL? (1 qt = 946mL)
23. What mass of water do I need to add to 50 grams of NiCl2 to make a 4.5%, by mass, solution?
24. What is the formula for molality? If you were given a volume of your solvent, how would you be able to convert this into a mass, in kilograms?
25. Find the amount of water you need to add to 45.0 grams of magnesium chloride to make a 4.56 m solution.
26. You are dissolving 60.0 grams of CH4 into 100. mL of ethanol. If the density of ethanol is 0.789 g/mL, find the molality of this solution.
27. How are the boiling point and freezing point of a solvent affected when you add solute to it? Show this in the two formulas.
28. What does the i in the formula represent? Find the value of i for the following: CaSO4, BeCl2, CH4
29. What is the change in freezing point of a solution containing 132 g C12H22O11 and 250 g of H2O? (Kf = 1.86 oC/m)
30. What is the boiling point of a solution containing 52.0 g MgSO4 and 334 g H2O? (Kb = 0.512 oC/m)