**Final Exam Review**

As you are already abundantly aware, the exams I give in this class are very similar to the review sheets I give. I strongly encourage you to keep this in mind when working on this review sheet!

1. Consider the reaction of magnesium hydroxide with sodium phosphide.
2. What type of reaction is taking place: **Double displacement**
3. Will this reaction take place at all? Explain why or why not.

**It will not take place because magnesium hydroxide is not soluble in water.**

1. What are the products of this reaction? (Assuming that it does occur).

**3 Mg(OH)2 + 2 Na3P 🡪 Mg3P2 + 6 NaOH**

1. Assuming the reaction does occur, how much of the product containing magnesium will be formed if 55.9 grams of magnesium hydroxide reacts with 85.3 grams of sodium phosphide?

**43.1 grams.**

1. What is the limiting reagent for the reaction above?

**Mg(OH)2**

1. How much of the excess reagent will remain after this reaction is performed?

**21.4 grams**

1. If 29.7 grams of the product containing magnesium is actually formed in this reaction, what is the percent yield of the reaction?

**69%**

1. What are some likely sources of systematic error that might be responsible for the error in part g above?

* Spilled some of the limiting reagent or products
* Made some experimental error specific to the reaction (i.e. I splashed something when it was boiling, I heated a mixture too much, the filtration process needed to isolate the product went wrong in some fashion). In all of these cases, there should be evidence given to support your assertion.
* Equipment issues: If you pick this one, you need strong evidence that the equipment is at fault.

g) Is the percent yield you found in part g reasonable? Explain your answer.

1. What are the four postulates (assumptions) of the kinetic molecular theory of gases?
2. Each of these postulates is used to explain some aspect of how gases behave? Explain what these are for each of these postulates.
3. A hot air balloon has a volume of 24 million liters. The air it contains has a temperature of 230o C when it is flying. The balloon travels at a height of 500 meters, where the air pressure is about 0.94 atm. The pressure inside of a hot air balloon is the same as the pressure outside of the balloon.
4. How many moles of gas can be found inside of a hot air balloon? (R = 0.08206 Latm/molK).
5. Though air is a mixture, it’s a good rough approximation to say that it has a molar mass of about 29 grams/mol. If the temperature outside of a balloon at 500 meters is 13o C, how much mass will this balloon be able to lift when flying? Ignore the mass of the gondola and balloon when doing this calculation.
6. The woman working the balloon has lost her mind and decided to crank up the interior heat of the balloon to 330o C. Under these conditions, now much mass will this balloon be able to life while flying?
7. Explain how I would make 500 mL of a 0.35 M NaOH solution.
8. If I were to add 450 mL of water to the solution in problem 5, what would the concentration of the solution be?
9. Explain how I would make 500 mL of a 0.35 m NaOH solution.
10. Would the molarity be higher for the solution in problem 5 above or that in problem 7 above? Explain your answer.
11. What would the freezing point of the solution in problem 7 be? (Kf = 1.86o C/m)
12. What is the only factor that determines the speed of a chemical reaction?
13. What is the difference between kinetics and thermodynamics?
14. What is an equilibrium process?
15. Consider the reaction NaOH + HCl D NaCl + H2O. This is a highly exothermic reaction. If I wanted to form the largest possible quantity of sodium chloride, list several ways in which I could do this.