Final Exam Example Numeric Problems (Answer Key)

1. How many significant figures are there in each of the following.

0.987 ___3_____

9.87 _____3_____

9 _____1_____

99.0 _____3_____

0.0099 _____2_____

1. Compute the following giving the correct number of significant figures in your answer.

5.987 x 3.5 = _____21_____

5.987/ 3.5= _____1.7_____

5.987 - 3.0 = _____3.0_____

1. How many tablespoons of cough syrup are there in 5.0 ml of codeine cough syrup. (15 ml = 1 tablespoon) **(0.33 tablespoons)**
2. How many miles are there in 21 meters? (1 meter = 0.000 621371 miles) **(0.013 miles)**
3. The molar mass of iron (Fe) is 55.84g/mole. How many moles of iron are there is a 8.97 grams of iron? **(.161 moles Fe)**
4. The molar mass of LiCl is 42.394 g/mole. How many grams of LiCl are there is 0.098 moles of LiCl? **(4.2 g LiCl)**
5. The following questions relate to solutions of lithium citrate. Lithium citrate is used as a mood stabilizing drug.
   a) What is the molarity of a lithium citrate solution made with 0.000189 moles lithium citrate, and 0.500 L water? **(0.000378 M)**
   b) If 22.0 ml the solution in part a) is diluted with 78 ml of water, what is the concentration of lithium citrate in the dilute solution? **(0.000083 M)**
6. A salt solution was prepared using 0.0030 grams of salt, and 1 liter of water. What is the concentration of salt in the solution? Give your answer in mass percent, and assume that 1 liter of water has a mass of 1000 grams. **(0.0003% salt)**
7. How many grams of Arsenic are in a 72 ml sample of water that contains 45 ppm Arsenic. (1 g sample = 1 ml sample) **(0.0032 g Arsenic)**
8. How many grams of vitamin C are there in a 3 g vitamin C tablet that is 70% vitamin C? **(2 g vitamin C)**
9. How many moles of tin ($Sn_{(s)}$) are produced when 2.98 moles of hydrogen (H_2) react? **(1.49 moles Sn)**

$$SnO_{2(s)} + 2\ H_{2(g)} \rightarrow Sn_{(s)} + 2\ H_2O_{(g)}$$

10. How many moles of Aluminum metal ($Al_{(s)}$) are used up when 0.0089 moles of chlorine gas ($Cl_{2(g)}$) react? **(0.0059 moles Al)**

$$2\ Al_{(s)} + 3\ Cl_{2(g)} \text{ --> } 2\ AlCl_{3(s)}$$