Final Exam Example Numeric Problems

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

0.987 __________

9.87 __________

9 __________

99.0 __________

0.0099 __________

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

5.987 x 3.5 = ______________

5.987/3.5 = ______________

5.987 - 3.0 = ______________

1. How many tablespoons of cough syrup are there in 5.0 ml of codeine cough syrup. (15 ml = 1 tablespoon)
2. How many miles are there in 21 meters? (1 meter = 0.000 621371 miles)
3. The molar mass of iron (Fe) is 55.84g/mole. How many moles of iron are there in a 8.97 grams of iron?
4. The molar mass of LiCl is 42.394 g/mole. How many grams of LiCl are there in 0.098 moles of 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?
   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?
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.
7. How many grams of Arsenic are in a 72 ml sample of water that contains 72 ppm Arsenic. (1 g sample = 1 ml sample)
8. How many grams of vitamin C are there in a 3 g vitamin C tablet that is 70% vitamin C?
9. How many moles of tin (Sn(s)) are produced when 2.98 moles of hydrogen (H2) react?

   \[ \text{SnO}_2(\text{s}) + 2 \text{H}_2(\text{g}) \rightarrow \text{Sn}(\text{s}) + 2 \text{H}_2\text{O}(\text{g}) \]

10. How many moles of Aluminum metal (Al(s)) are used up when 0.0089 moles of chlorine gas (Cl2(g)) react?

   \[ 2 \text{Al}(\text{s}) + 3 \text{Cl}_2(\text{g}) \rightarrow 2 \text{AlCl}_3(\text{s}) \]