SHOW ALL WORK; METHOD MUST BE CLEAR

1. (5 pts) Your lab instructions tell you to prepare your hydroxide titrant using NaOH (MW = 40.00, density = 1.525 g/mL), specifically a 50% (w/w) solution. We also have in the department some concentrated KOH (MW = 56.00, density = 1.456 g/mL). It is labelled as a 45% (w/w) solution. It too could be used to prepare a hydroxide titrant (since it also is a strong base). What is the Molarity of this concentrated 45% (w/w) KOH solution?

2. (5 pts) The concentrated NaOH solution, which you really will use to prepare your NaOH titrant, has a concentration of 19 M as it comes out of the bottle. If your “target” concentration for the titrant is 0.10 M, how much (in mL) of the 19 M NaOH will you need to make 2.0 L of your titrant sodium hydroxide solution?

3. (5 pts) Let’s suppose you wish to analyze the commercial ammonia (NH₃, MW = 17.00) solution which you have purchased to wash the salt off your windshield. You decide to weigh out (you can weigh out liquids) a sample for the purpose of titrating it with an available standardized HCl (MW = 36.45) titrant. However, trying to weigh out a volatile ammonia solution is too difficult on an analytical balance, so you settle for using a lower-quality tenth-gram balance. The weight of ammonia sample is 2.4 g. When you titrate this with your 0.1105 M HCl titrant, 38.25 mL are needed to reach the equivalence point. What is the percent NH₃ in the commercial ammonia solution?
4. (10 pts) Look at the problem you’ve just completed (Problem 3 on the previous page)
   a) Identify the pieces of data which you used to write your answer.

   b) Identify the conversion factors (or other non-measurements) which you used to write your answer.

   c) Calculate the Relative uncertainty for each of the pieces of data.

   d) Calculate the Relative uncertainty associated with your answer.

   e) Show that you understand the “Chain-no-stronger-than-its-weakest-link” line of reasoning we’ve been using in class.

Pledge: I have neither given nor received any unacknowledged aid on this quiz.
Signed: ____________________________________________