**Homework #1 : Solution Preparation Computations 22 pts total**

*Chem 6614 Chemical Instrumentation*

*Due Wednesday 31 Jan 2018*

*Your name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

1. Convert the indicated solution compositions on the left to indicated units (3 sig figs). (1 pt per box)

 solution1 w/v % g CuCl2\*2H2O/L μM Cu2+ g Cu2+/100 mL ppt (w/v)

 10.0 ppm Cu2+(w/v)

 0.852 g CuCl2\*2H2O

 diluted to 100.0 mL

1Note: Atomic mass of Cu =63.546 g/mol Molecular weight of CuCl2\*2H2O = 170.44 g/mol

1. How many grams of NiCl2\*6H2O (MW=237.688 g/mol) must be weighed out to prepare 100.0 mL of 50 mM Ni2+ ? (2 pts) **Show work**

\_\_\_\_\_\_\_\_\_\_\_ g NiCl2\*6H2O (4 sig figs)

1. A 0.900 gram sample of CuCl2\*2H2O (MW =170.44 g/mol) is dissolved in 100.0 mL of 1% HNO3. A 10.00 mL volume of this primary stock is diluted to 25.00 mL with more 1% HNO3. Next, 2.00 mL of this intermediate solution is delivered to a clean 100.0 mL volumetric flask and diluted to the mark with 1% HNO3 to make a secondary stock. Finally, 20.000 mL of the secondary stock is diluted to 50.00 mL in 1% HNO3.

What is the final solution’s concentration in:

1. μM Cu2+ (3 sig figs) **Show work**

\_\_\_\_\_ μM Cu2+

 2 pts

1. ppm Cu2+ (w/v) (3 sig figs) **Show work**

 \_\_\_\_\_\_ ppm Cu2+

 (w/v) 2 pts

1. Commercial concentrated nitric acid (MW=63 g/mol) has density of ~1.4 g/mL and contains ~70% w/w HNO3. What is the molarity of concentrated HNO3 (2 sig fig)? 2 pts **Show work**

\_\_\_\_\_ M HNO3

(over)

1. **Factoids yea or nay ?**
2. 1 % nitric acid = 1 mL concentrated nitric acid diluted to 1 L T F
3. 1 ppt w/v = 1 g/L T F
4. Conc. H2SO4 ( density of 1.81 g/mL; 98.6% sulfuric acid w/w) T F

has an [H+] ~ 36 M assuming complete dissociation

1. You always add concentrated acid to water, not the other way around T F