

LAB TECHNIQUES AND TITRATION

Date: _____ Name: _____ Station # _____

Objectives: To calibrate a pipet, accurately prepare and dilute a solution of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, and to accurately determine the concentration of an unknown acid by titration.

Procedure: As in the Chemistry 1110 lab Manual, pp. _____

Observations:

Data:

Part A: Calibration of 15.00 mL pipet

Mass of empty beaker	
Mass of beaker +15.00 mL	
Mass of beaker +30.00 mL	
Mass of beaker + 45.00 mL	

Water temperature: _____

Part B: Dilution of Solutions

Mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ + boat	
Mass of boat + residual $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	
Mass of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	
Absorbance reading for solution	
Expected absorbance reading	

Part C: Acid-Base Titration

Concentration of NaOH _____

If Needed

± 0.02 mL	Run 1	Run 2	Run 3	Run 4
Initial Vol.				
Final Vol.				
Vol. Used				
End Pt. color				
1 drop End Pt. Yes/No or?				

% Difference calculation between runs

$$\% \text{ diff} = \left| \frac{V_{1 \text{ used}} - V_{2 \text{ used}}}{\text{average}(V_{1 \text{ used}}, V_{2 \text{ used}})} \right| \times 100$$

You need at least 2 runs within 1 %, if not, do a run four, OR MORE.

Calculations:

Part A (include one sample calculation)

Run	Mass of 15.00 mL pipetted water (g)	Absolute value of deviation from the average mass (g)
15.00		
30.00		
45.00		
	Average mass =	Average deviation =

Density of Water at _____ ° C = _____

In the space below, calculate the actual volume of water delivered by the 15.00 mL pipet. Include the uncertainty.

Part B:

In the space below, calculate the molarity of the $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ solution which was used to obtain the absorbance reading.

Part C:

In the space below, calculate the molarity of the unknown acid solution. Only one sample run need to be shown in detail, although the calculations must be done for all three runs (show the results only for each step of the other two runs).

