Name: _____ Section: _____

Data and Calculations

Part 1

Diameter: _____ cm Radius: _____ cm Height (cylinder part): _____ cm

Volume (cylinder part): _____ cm^3
SHOW CALCULATION:

Volume (half-sphere part): _____ cm^3
SHOW CALCULATION:

Total Volume (sum): _____ cm^3

Volume (graduated cylinder): _____ mL

Average Volume: _____ mL
SHOW CALCULATION:

Percent Difference: _____ %
SHOW CALCULATION:

Part 2

Mass of Metal Cylinder _____

Diameter _____ Length _____ Volume $_{calipers}$ _____

Volume$_{water}$ _____ Volume$_{metal + water}$ _____ Volume $_{water\ displacement}$_____

Density of the Cylinder: calipers: _____ water displacement: _____

Handbook Density _____

Identity of Metal _____

% Error: calipers: _____ water displacement: _____

SHOW CALCULATIONS:

Name: _____ Section: _____

Part 3 Unknown Number _____

Mass of Flask with stopper _____ Initial Buret reading _____

Sample	**Mass** Flask+Stopper+Liquid **(g)**	**Mass** Liquid Only **(g)**	**Final Buret Reading (mL)**	**Net Volume (mL)**	**Density (x_m) (g / mL)** 4 sig. figs.	**d ($x_m - \bar{x}$)**	**d^2**
1							
2							
3							
4							
5							
6							
				sum of x_m:		sum of d^2:	

Show your calculation of the standard deviation, s, from d^2 below:

Mean value ($\bar{x}$): _____ Standard Deviation (s): _____

Range: _____ % NaCl from Table: _____

Name: _____ Section: _____

Post-lab Questions

1. Calculate the density of a pure gold sphere with a diameter of 2.120 cm and a mass of 94.19 g.

2. The density of aluminum is 2.70 g/cm^3. Calculate the thickness of a rectangular sheet of aluminum foil with a width of 11.5 cm, a length of 14.0 cm, and a mass of 2.04 g.

3. Examine your results from your data table in Part 3. Do you have any values for the density of the salt solution that lie OUTSIDE the range ($\bar{x} \pm 2s$)? If so, list them here:

   Recalculate $\bar{x}$ by omitting values that lie OUTSIDE the range. This is the density value you should use to determine your experimental % NaCl.

Name: _____ Section: _____

Pre-lab Questions

Upon reading the procedure in preparation for this experiment, you should also answer the following questions:

1. Consider Example One in the laboratory discussion. Since measurement 8 lies outside the range, it may be omitted in the calculation of the reported value. Omit measurement 8 and recalculate the mean ($\bar{x}$). Fill in the d and d^2 columns in the table, then calculate the standard deviation (s) and the range.

   Recalculated mean ($\bar{x}$), without measurement 8: _____

Balance Number	**Mass (g) = x_m**	**d = $x_m - \bar{x}$**	**d^2**
1	24.29		
2	24.26		
3	24.17		
4	24.31		
5	24.28		
6	24.19		
7	24.33		
8 – OMITTED	~~24.50~~		
9	24.30		
10	24.23		
sum of x_m:		sum of d^2:	

   Recalculated standard deviatiation (s): _____ and range: _____

   SHOW CALCULATIONS:

2. Now consider Example Two in the laboratory discussion. The student doing the titration repeated the experiment twice more. The following five values were obtained: 0.555 M, 0.565 M, 0.564 M, 0.567 M, and 0.563 M.

   A. Use the *Q Test* to demonstrate that the first value should be rejected.

   B. Recalculate the values for $\bar{x}$, omitting the value 0.555 M. Compare with the original value of $\bar{x}$.