Name Mark Prior **Date** 09/14/05

TA Carlos Zambrano **Section #** 52420

Title: "Are the Densities of Coke and Diet Coke Different?"

Objective: To measure and compare densities of Coke and Diet Coke. To evaluate precision of the volume measurements performed with a 5 ml volumetric pipette, a 10 ml graduated cylinder, and a 50 ml burette. To verify that density is an intensive property.

Sample: Diet Coke

Sample temperature: 22.5 °C

Part 1. "Are the Densities of Coke and Diet Coke Different?"

My data

	Volumetric Pipette		Graduated Cylinder		Burette	
	Trial 1	**Trial 2**	**Trial 1**	**Trial 2**	**Trial 1**	**Trial 2**
Mass of Empty Beaker (g)	28.4576	36.1582	32.0014	37.2285	46.2828	30.6521
Mass of Beaker + Liquid Sample (g)	33.4530	41.1399	36.6603	42.0284	51.1820	35.5737
Mass of Liquid Sample (g)	4.9954	4.9817	4.6589	4.7999	4.8992	4.9216
Volume Delivered (ml)	5	5	5	5	5	5
Calculated Density (g/ml)	0.9991	0.9963	0.9318	0.9600	0.9798	0.9843

(**NOTE:** *Numbers listed in the Table above should be used as an example ONLY. They do not represent a real set of data.*)

Sample Calculation for Trial 1:

$$\text{Mass of liquid sample} = 33.4530\ \text{g} - 28.4576\ \text{g} = 4.9954\ \text{g}$$

$$\text{Density} = \frac{m}{V} = \frac{4.9954\ \text{g}}{5\ \text{ml}} = 0.9991\ \text{g/ml}$$

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Results from the combined class data

Sample	Average Density ± Standard Deviation (g/ml)		
	Pipette	**Grad. Cyl.**	**Burette**
Coke	1.038 ± 0.002	1.02 ± 0.01	1.035 ± 0.006
Diet Coke	0.997 ± 0.007	0.98 ± 0.02	0.995 ± 0.004

(**NOTE:** *Numbers listed in the Table above should be used as an example ONLY. They do not represent a real set of data. Note the use of the significant figures.*)

Part 2. "Does the size of the sample affect the density?"

Sample: Diet Coke

Volume assigned: 20 ml

	Trial 1	**Trial 2**
Mass of Empty Beaker (g)	29.0454	32.4122
Mass of Beaker + Liquid Sample (g)	48.9260	52.3385
Mass of Liquid Sample (g)	19.8806	19.9263
Volume Delivered (ml)	20	20

(**NOTE:** *Numbers listed in the Table above should be used as an example ONLY. They do not represent a real set of data.*)

Sample	**Density (g/ml) determined from the plot**
Coke	1.033
Diet Coke	0.995

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Discussion Questions:

Answer Discussion Questions listed at the end of the Procedure for Experiment 1.

(***Example:*** The average densities and their corresponding standard deviations calculated from the class combined data for both Coke and Diet Coke are listed in the Table above. Briefly, the following sets of data were obtained

for the Coke sample:	1.038 ± 0.002	(pipette)
	1.02 ± 0.01	(grad. cylinder)
	1.035 ± 0.006	(burette)
for the Diet Coke sample:	0.997 ± 0.007	(pipette)
	0.98 ± 0.02	(grad. cylinder)
	0.995 ± 0.004	(burette)

I would expect the density of Coke to be higher than the density of Diet Coke due to its higher sugar content…)

NOTE: *Attach a print-out of your data table and three graphs to your report.*