Lab 2: Quantitative Dilution and Solution Preparation

Questions

1. I expect the concentration of the final solution to be 40 mg/mL $\times \frac{0.05 \text{ mL}}{10 \text{ mL}} \times \frac{0.25 \text{ mL}}{25 \text{ mL}} =$ 0.002 mg/mL $= 0.002$ mg/mL $\times 10^6$ ng/mL $= 2 \times 10^3$ ng/mL. The absorbance can be calculated as follows (copied from prelab)

$$A_\lambda = c\varepsilon_\lambda l$$
$$A_{503 \text{ nm}} = (2.00 \times 10^3 \text{ ng/mL})(2.59 \times 10^4 \text{ L mol}^{-1} \text{ cm}^{-1})(1.0 \text{ cm})$$
$$A_{503 \text{ nm}} = (2.00 \times 10^3 \text{ ng/mL})(10^{-9} \text{ g/ng})(10^3 \text{mL/L})(2.59 \times 10^4 \text{ L mol}^{-1} \text{ cm}^{-1})(1.0 \text{ cm})$$
$$A_{503 \text{ nm}} = (2.00 \times 10^{-3} \text{ g/L})(2.59 \times 10^4 \text{ L mol}^{-1} \text{ cm}^{-1})(1.0 \text{ cm})$$
$$A_{503 \text{ nm}} = (20.0 \text{ g})(2.59 \text{ mol}^{-1})(1.0)$$
$$A_{503 \text{ nm}} = (20.0 \text{ g})(2.59 \text{ mol}^{-1})(1.0)\frac{1 \text{ mol}}{496.42 \text{ g}}$$
$$A_{503 \text{ nm}} = 0.10$$

2. The mean absorbance of the diluted solution is 0.083 with a standard deviation of 0.000. If the standard deviation were not zero, the same multiplications and divisions would be performed on it to scale it along with the mean. $A_{503 \text{ nm}} = 0.10$
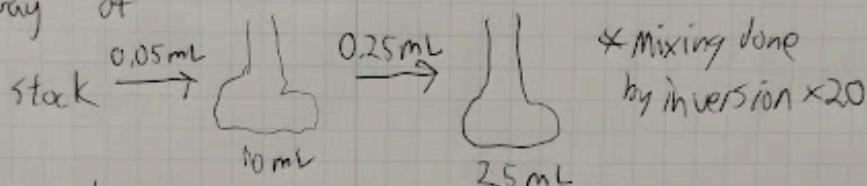
Lab Notebook

Objective: Obtain UV-Vis reading
for the absorbance of a diluted
solution of Red 40

Procedure:

Dilute from $40.0 \, mg/mL$ to $2 \times 10^3 \, ng/mL$
by way of

Stock $\xrightarrow{0.05 \, mL}$ [10 mL flask] $\xrightarrow{0.25 \, mL}$ [25 mL flask]   * Mixing done by inversion ×20

Used a thermo genesys 150 UV-Vis on fixe) @503nm
mode to obtain three readings for three different
curettes drawn from the final dilute solution. Results
UV-Vis was blanked before starting measurements

UV-Vis Measurements
0.083
0.083
0.083