

## Lab 2: Quantitative Dilution and Solution Preparation

### Questions

1. I expect the concentration of the final solution to be  $40 \text{ mg/mL} \times \frac{0.05 \text{ mL}}{10 \text{ mL}} \times \frac{0.25 \text{ mL}}{25 \text{ mL}} = 0.002 \text{ mg/mL} = 0.002 \text{ mg/mL} \times 10^6 \text{ ng/mL} = 2 \times 10^3 \text{ ng/mL}$ . 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

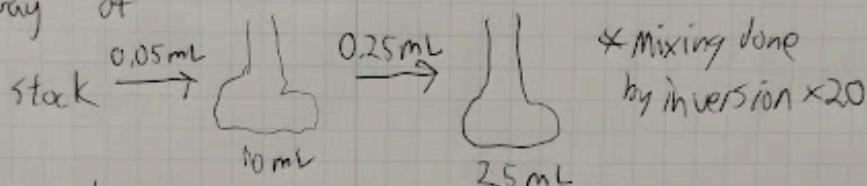
Exp. No. <u>2</u>	Experiment/Subject <u>Quantitative Solution Prep. and Serial Dilution</u>	Date <u>Jan 30</u>
Name <u>Nathaniel White</u>	Lab Partner <u>Luis Rospito (procedure)</u>	Locker/ Desk No. <u>2322</u>

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

UV-vis Measurements  
0.083  
0.083  
0.083

Procedure:

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



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

Signature <u>Nathaniel White</u>	Date <u>Jan 30</u>	Witness/TA <u>[Signature]</u>	Date <u>Jan 30/2025</u>
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THE HAYDEN-McNEIL STUDENT LAB NOTEBOOK

Note: Place fold-over back cover under copy sheet before writing