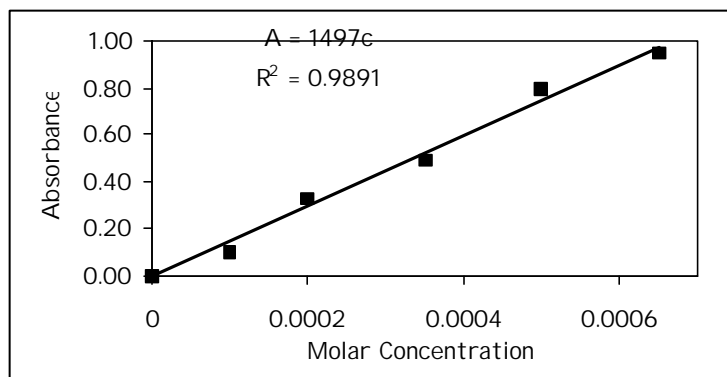


CHM 103 EXAM I

Show all calculations with correct units and significant figures. Write in complete sentences. Turn in the take-home question with your exam. **Good Luck!!!**

1. The molar absorptivity of a substance at a given wavelength is a measure of how strongly the substance absorbs light at that wavelength. Here are the absorbances for para-azobenzoic acid, a dye, measured at $\lambda_{\text{max}} = 430 \text{ nm}$ in a 1.2 cm cell. (30)

Concentration, M	Absorbance	Molar absorptivity
0	0	
0.00010	0.10	
0.00025	0.33	
0.00040	0.49	
0.00060	0.80	
0.00075	0.95	



Calculate the molar absorptivity for each data point in the table above. Calculate the molar absorptivity from the slope of the calibration curve. Show or explain all your calculations. Supply the information in the table below. The experimental value of the molar absorptivity is $1288 \text{ M}^{-1}\text{cm}^{-1}$.

From data points	Your result	From slope	Your result
Mean		Value calculated	
%CV			
%error		%error	

Which method of determining molar absorptivity, from data points or slope, is a better method? Why?

How would the molar absorptivity change if the wavelength was 400 nm? How about if the wavelength was 460 nm? Explain why for both cases.

2. A chemist has a 0.250 M solution of HCl. How much of this solution is required to produce 500 mL of a 0.100 M HCl solution? (10)

3. Comment on the accuracy and precision of the results for the three students given on the scatter plot. Justify your answers. They each did five trials of massing an object. The line is the true value of 9.80 g. (30)

