

Name: \_\_\_\_\_

Section: \_\_\_\_\_

### Data and Calculations

Wavelength of maximum absorbance is \_\_\_\_\_.

<u>[Co<sup>2+</sup>]</u>	<u>Volume of 0.100 M Co(NO<sub>3</sub>)<sub>2</sub> Stock Solution</u>	<u>ABSORBANCE</u>
<u>0.1000 M</u>	_____ mL	_____
<u>0.0800 M</u>	_____ mL	_____
<u>0.0600 M</u>	_____ mL	_____
<u>0.0400 M</u>	_____ mL	_____
<u>0.0200 M</u>	_____ mL	_____
<u>0.0000 M</u>	_____ mL	_____

UNKNOWN # \_\_\_\_\_ ABSORBANCE \_\_\_\_\_

Path length of the cuvette: \_\_\_\_\_

Using Microsoft Excel, plot a graph of absorbance (y) versus concentration (x). Using the graph plotted from your data and the path length of the cuvette, calculate the extinction coefficient.

Extinction Coefficient: \_\_\_\_\_

Solve for the concentration on your unknown solution...

(a) [Co<sup>2+</sup>] \_\_\_\_\_ (read from graph)

(b) [Co<sup>2+</sup>] \_\_\_\_\_ (calculate from line equation and slope value)

SHOW CALCULATIONS:

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**Post-Lab Questions:** Colorimetric of  $\text{Co}^{+2}$

1. Calculate the transmittance of a solution if its absorbance is 0.352.

2. Calculate the absorbance of a solution if the transmittance is 0.647.

3. The following absorbance values for four solutions with known  $\text{MnO}_4^-$  concentrations were measured using a spectrophotometer:

<b>Solution</b>	<b><math>[\text{MnO}_4^-]</math></b>	<b>Absorbance</b>
1	$0.700 \times 10^{-4} \text{ M}$	0.175
2	$1.00 \times 10^{-4} \text{ M}$	0.250
3	$2.00 \times 10^{-4} \text{ M}$	0.500
4	$3.50 \times 10^{-4} \text{ M}$	0.875

A. Using Microsoft Excel, plot a graph of Absorbance vs. Concentration of  $\text{MnO}_4^-$ . Write the trendline linear equation from the plotted graph.

B. Determine the slope of the graph and include its units.

C. Determine the concentration of an unknown  $\text{MnO}_4^-$  sample whose absorbance is 0.780.

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- D. Using the graph paper, below, construct a graph of Absorbance vs Concentration of  $\text{MnO}_4^-$ . Draw a linear trendline and determine the equation of the line that you drew. How does this compare to the graph that you made using Excel?

