Lab Report for
Measuring Manganese Using Spectrophotometry

Concentration of Mn\(^{2+}\) (aq) stock solution from bottle: \(\underline{\quad} \text{mg/mL}\)

Concentration of Mn\(^{2+}\) (aq) stock solution in units of molarity: \(\underline{\quad} \text{M Mn}^{2+}\)

\(\text{show calculation:}\)

Double minimum mass of KIO\(_4\) (s) required: \(\underline{\quad}\) g  

\(\text{show calculation:}\)

Size of volumetric flask used: \(\underline{\quad}\) mL

Volume of stock solution pipetted into flask: \(\underline{\quad}\) mL

Concentration of standard solution: \(\underline{\quad}\) M MnO\(_4^-\)

\(\text{show calculation:}\)
Wavelength chosen for analysis: 

justification for choice of wavelength:

Data Table:

<table>
<thead>
<tr>
<th>Solution</th>
<th>Concentration (M)</th>
<th>Absorbance</th>
<th>Appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuvette (0) (blank)</td>
<td></td>
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<tr>
<td>Cuvette (1) (1 mL / 25 mL)</td>
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<tr>
<td>Cuvette (2) (5 mL / 25 mL)</td>
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<tr>
<td>Cuvette (3) (10 mL / 25 mL)</td>
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<tr>
<td>Cuvette (4) (pure standard)</td>
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</tbody>
</table>

show calculations for the concentrations of cuvettes (1-3) below:

Make a graph of Concentration in Molarity on the x-axis vs. the Measured Absorbance on the y-axis and attach it on the next page. The graph should fill one sheet of paper and may be done by hand or on a computer program such as Excel. Draw a best-fit-line on your graph and be sure it goes through zero/zero since blanking your instrument ensured that at zero concentration the absorbance was zero.

Calculate the equation of your best-fit-line and show the calculation and final equation below (use points from the ends of your line and not two actual data points when doing this calculation or use a true regression analysis such as the "trend-line" function in Excel or on a graphing calculator):

Slope of the line: 

E = ___________ M⁻¹cm⁻¹
Unknown Analysis:

Unknown ID Code: ____________
Volume of unknown used: ____________ mL
Volume of volumetric flask: ____________ mL
Mass of KIO₄(s) added: ____________ g
Observed color of unknown solution after boiling: ____________
Wavelength used to analyze unknown solution: ____________ nm
Absorbance of unknown solution: ____________
Concentration of MnO₄⁻ in diluted unknown solution: ____________ M MnO₄⁻

show calculations (hint: this is where you use the slope of your best-fit-line):

Concentration of Mn²⁺(aq) in original undiluted unknown sample: ____________ M

show calculations:

Concentration of Mn²⁺(aq) in units of mg/mL: ____________ mg / mL

show calculations:

On the back of this page (or on a separate sheet of paper), write a brief one paragraph conclusion based on your findings. Include the concentration of manganese present in the ground water sample and your recommendations to the city based on these findings.