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Discussion questions:

To be submitted after performing the lab along with a lab report (Discussion questions may be part of the lab report if writing a lab report)

1. What is the order for each of the reactant in the lab you just performed, explain your rationale?
2. Write the rate law for the experiment that you performed.
3. Is the rate law and law of mass action the same? Does it suggest a possibility for a mechanism for this reaction, explain.
4. List all possible instrumentation errors.
5. List all possible human errors that you may have encountered?
6. List all the errors that could have been **avoided** in this lab.
7. What are some possible modifications that you would suggest for this experiment?
8. Write a conclusion for you experiment
9. Include data sheet along with calculation.
10. Your lab quest is set up to print the graphs.
 - a. Connect to the network LQ
 - b. Print to the HP Color printer

Watch the video before starting the experiment

<https://www.youtube.com/watch?v=EJzxw2NsnYU>

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Data sheet – Submit to teacher after lab

To be submitted to the teacher on the day of the lab immediately after data collection.

Watch the video on set up and calibration of lab-quest and colorimeter

This table now gives you values which can be used to solve for the order of the reaction using initial rate method.

TABLE 2 RATE OF REACTION

Trial	[Fe ³⁺]	[I ⁻]	Initial rate (s ⁻¹)
	$C_f = \frac{C_i V_i}{V_f}$	$C_f = \frac{C_i V_i}{V_f}$	Value of 'm' from Labquest
1			
2			
3			

Detach this page and submit after lab

Quick Setup and Short Lab Guide

1. Wear safety goggles at all times
2. If you come in contact with any of the reagents, wash it off using cold tap water
3. Inform you teacher ASAP
4. Connect the colorimeter to the Labquest
5. Turn the Labquest on
6. Set the wavelength to 470 nm using the <> arrows on the colorimeter
7. Allow the colorimeter to warm up for 5 minutes
8. Sensor set up
 - a. Select sensor > Data Collection> Mode> Time Based>
 - b. Rate = 1 sample/ second
 - c. Interval = 1 sample / second
 - d. Duration = 200 seconds
9. Colorimeter
 - a. Prepare a blank: In this case the blank is the Fe^{3+} ion solution. Fill the cuvette 3/4th with the blank. Close the cuvette.
 - b. Place it in the colorimeter; the clear side of the cuvette should face the white triangle of the colorimeter. Close the colorimeter.
 - c. Press calibrate. It is a one button calibration.
 - d. When the red light stops blinking and the absorbance on the Lab quest is 000 the instrument is calibrated.

Table 1 Dilution guideline

10. Now prepare solutions for one trial at a time and perform data collection for all the three trials, use Table 1 data. Use 50 mL beakers and measuring pipettes.

Trial	FeCl_3 (mL)	KI (mL)	H_2O (mL)
1	10.0	10.0	0.0
2	10.0	5.0	5.0
3	5.0	10.0	5.0

11. Data Analysis on the Labquest:

- Open Run 1
- Select a segment of the graph for 30 seconds (50 seconds to 80 seconds as shown in the video)
- Select analyze > Choose curve fit > Absorbance > Linear >
- Now write down the value of 'm' or slope of line in the data table
- Next select OK
- Choose Run 2 and repeat the process until you find the slopes for all the three runs. Record the data.
- Once you have the values you can calculate the order of the reaction using the calculation page

Trial	$[\text{Fe}^{3+}]$ M	$[\text{I}^-]$ M	Initial rate (s^{-1}) = m
1	0.01	0.01	
2	0.01	0.005	
3	0.005	0.01	

12. Dispose the reagents you have mixed in the cans placed in the fume cupboard. Wash glassware and return to appropriate locations.

Marking Rubric

- Use a Duo-Tang to submit your report
- First page is the cover page

Criteria	5	4	3	2
Lab report template has been followed				
Cover Page/Formatting/Typed Duo-Tang				
Correct order for both reactants				
Sources of Error has been properly explained				
A graph has been included Print the graph directly from Labquest				