

Lab 4 Report Sheet - Chem 162
Vitamin C Analysis

Name _____
 Team No. _____ Date _____ Section _____

Experimental Results

Table 1. Data for standardization of the sodium thiosulfate solution

	Trial Number			
	1	2	3	4 (if needed)
Final Volume Na ₂ S ₂ O ₃ (mL)				
Initial Volume Na ₂ S ₂ O ₃ (mL)				
Volume Na ₂ S ₂ O ₃ (mL)				
Average volume Na₂S₂O₃ (mL)				
Volume 0.0200 M KIO ₃ (mL)				
Average Molarity of Na₂S₂O₃				

Table 2. Data for the determination of the concentration of vitamin C in unknown # _____

	Trial Number			
	1	2	3	4 (if needed)
Final Volume Na ₂ S ₂ O ₃ (mL)				
Initial Volume Na ₂ S ₂ O ₃ (mL)				
Volume Na ₂ S ₂ O ₃ (mL)				
Average volume Na₂S₂O₃ (mL)				
Volume 0.0200 M KIO ₃ (mL)				
Volume of Unknown (mL)				
Average Molarity of Vitamin C in Unknown # _____				
Concentration of Vitamin C in Unknown in mg per 100 mL				

Table 3. Data for the determination of the concentration of vitamin C in Juice

	Trial Number	
	1	2
Final Volume Na ₂ S ₂ O ₃ (mL)		
Initial Volume Na ₂ S ₂ O ₃ (mL)		
Volume Na ₂ S ₂ O ₃ (mL)		
Average volume Na₂S₂O₃ (mL)		
Volume 0.0200 M KIO ₃ (mL)		
Volume of Juice (mL)		
Average Molarity of Vitamin C in Juice		

Table 4. Nutritional data from the label of the juice

Brand of juice used	
Serving Size	
Percent of recommended daily allowance of Vitamin C per serving	
US FDA Minimum Daily Allowance of Vitamin C	60 mg

Analysis of Results

Instructions:

- Show your work using dimensional analysis and correct significant figures.
- Please circle all numerical answers.

Part 1. Standardization of Sodium Thiosulfate

1. Calculate the *average volume* of sodium thiosulfate used in the standardization titrations. Show your work below and enter the average volume in [table 1](#). Circle your answer.

- Use the data in [table 1](#) to calculate the *average molarity* of your sodium thiosulfate solution. Show your work below and enter the average volume in table 1. Circle your answer.

Part 2. Determination of the concentration of vitamin C in unknown # _____

- Calculate how many moles of I_3^- are produced from the reaction between KI, H_2SO_4 and KIO_3 . Circle your answer.
- Use the *average* volume of sodium thiosulfate to calculate how many moles of I_3^- are consumed from the reaction with thiosulfate in each titration. Circle your answer.
- The difference between the above two quantities will be the moles of I_3^- that reacted with the ascorbic acid. Calculate the concentration of vitamin C in your unknown in *moles per liter*. Circle your answer.
- Now calculate the concentration of vitamin C in your unknown in *mg of Vitamin C per 100 mL* of the unknown. Circle your answer.

7. After you have calculated the concentration of your unknown in moles vitamin C per liter, see the instructor to check for accuracy. Remember, you will receive an additional grade based on the accuracy of your results! If you are unsatisfied with your results you may repeat the lab on your own time. However, any such make-ups must be scheduled in advance with the chemistry lab technician.

If your results have a percent error of...	... then your grade will be:		
	First Attempt	Second Attempt	Third Attempt
± 5.0%	100% (30 pts)	90% (27 pts)	80% (24pts)
± 7.5%	90%	80%	70%
± 10%	80%	70%	60%
± 15%	70%	60%	0%
± 20%	60%	0%	0%
> 20%	0%	0%	0%

Part 3. Determination of the concentration of vitamin C in Juice

8. Calculate how many moles of I_3^- reacted with the ascorbic acid in your sample of juice. Circle your answer.
9. Calculate the concentration of vitamin C in your sample of juice in moles per liter. Circle your answer.
10. Now calculate the concentration of vitamin C in your sample of juice in mg of Vitamin C per 100 mL juice. Circle your answer.

11. Use Excel to calculate the standard deviation and class average of the vitamin C concentration (in mg Vit C per 100 mL juice) for the juice and then comment on the precision of the class results. If there is poor precision, then give possible reasons for the precision being poor. Attach your Excel spreadsheet of the class data to the last page of this "report."

Class average: _____ mg Vit C/100 mL juice **STDEV:** _____

12. a.) Use the information gathered in [table 4](#) to calculate the concentration of Vitamin C in the juice in mg vitamin C per 100 mL juice. Circle your answer.

- b.) Compare the concentration of vitamin C in the juice as calculated in [question 12a](#) with that calculated from the class average in [question 11](#). Explain any differences.

	Concentration Vitamin C in Juice (mg/100 mL juice)
Calculated from juice label	
Calculated experimentally	

Conclusion

Concentration of Na₂S₂O₃ (mol/L): _____

	Concentration of Vitamin C	
	mol/L	mg/100 mL
Unknown # _____		
Juice		