

Name: Jada Dixon

Date:

Topic: Rates of Reaction

Title: Effect of concentration on Reaction Rate.

Aim: To investigate the effect of acid concentration on the rate of a chemical reaction between sodium thiosulphate and hydrochloric acid

Apparatus

and Materials: beaker, measuring cylinder, paper with a cross, distilled water, HCl (aq), sodium thiosulphate, conical flask, stopwatch

Method:

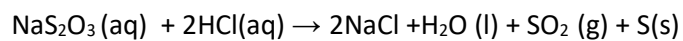
1. An "X" was drawn on a piece of paper.
2. 50cm³ of sodium thiosulphate was measured in a measuring cylinder and transferred to a conical flask.
3. The conical flask was placed on the piece of paper with the "X".
4. 50cm³ of HCl was measured in a measuring cylinder.
5. The HCl was added to the sodium thiosulphate in the conical flask and the timer was immediately started.
6. The time taken for the cross to disappear was recorded.
7. The procedure was repeated, decreasing the volume of thiosulphate by 5cm³ and increasing the volume of water by 5cm³ for each subsequent experiment as shown in the table below.

Observations:

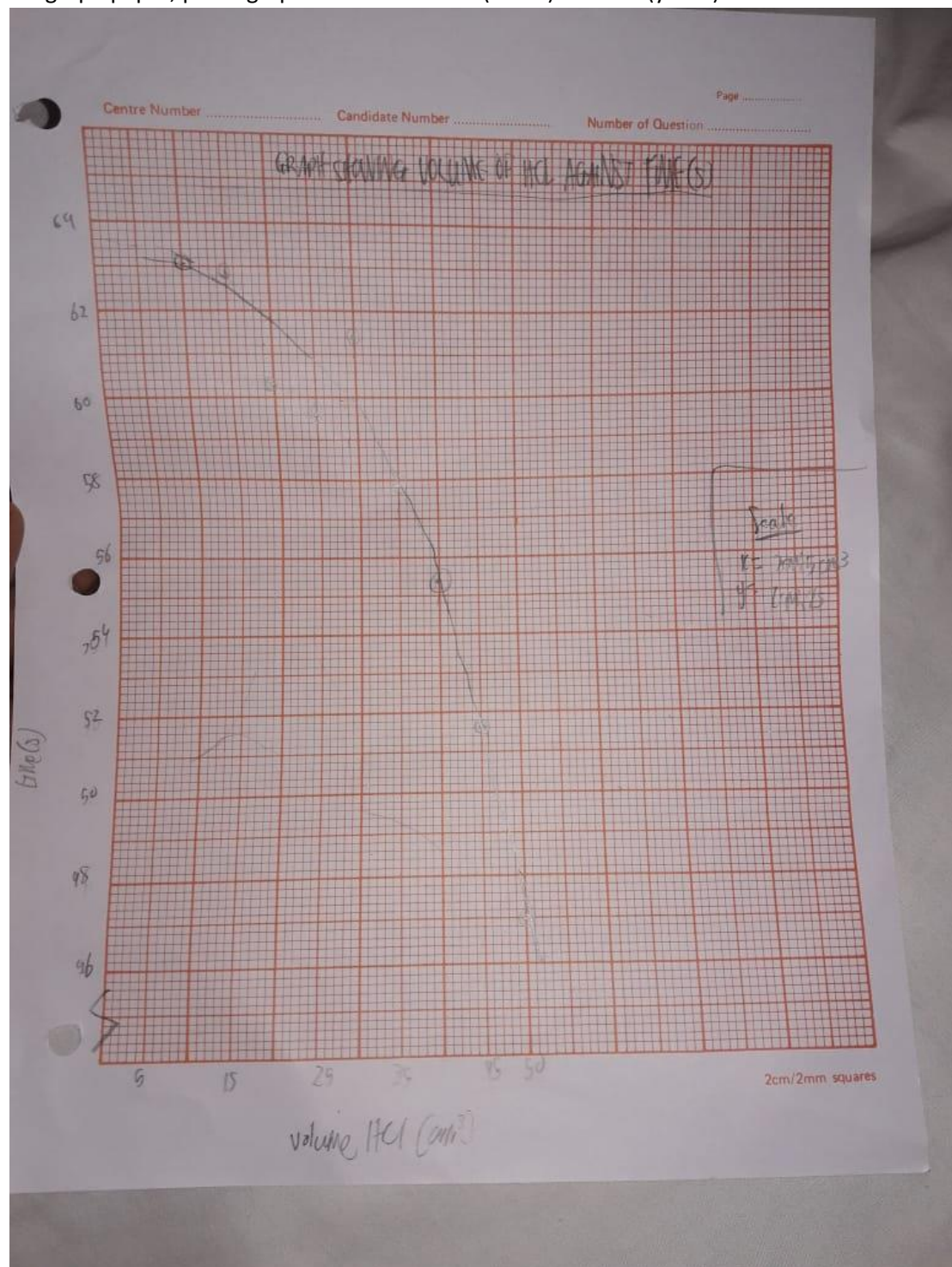
Experiment #	Volume of Na ₂ S ₂ O ₃ (cm ³)	Volume of HCl (cm ³)	Volume of Water (cm ³)	Time (s)	1/t (s ⁻¹)
1	50	50	0	47.02	0.021
2	50	45	5	51.70	0.019
3	50	40	10	55.42	0.018
4	50	35	15	57.91	0.017
5	50	30	20	61.41	0.016
6	50	25	25	59.61	0.017
7	50	20	30	60.30	0.017
8	50	15	35	62.93	0.016
9	50	10	40	63.15	0.016

Discussion: Answer the following questions.

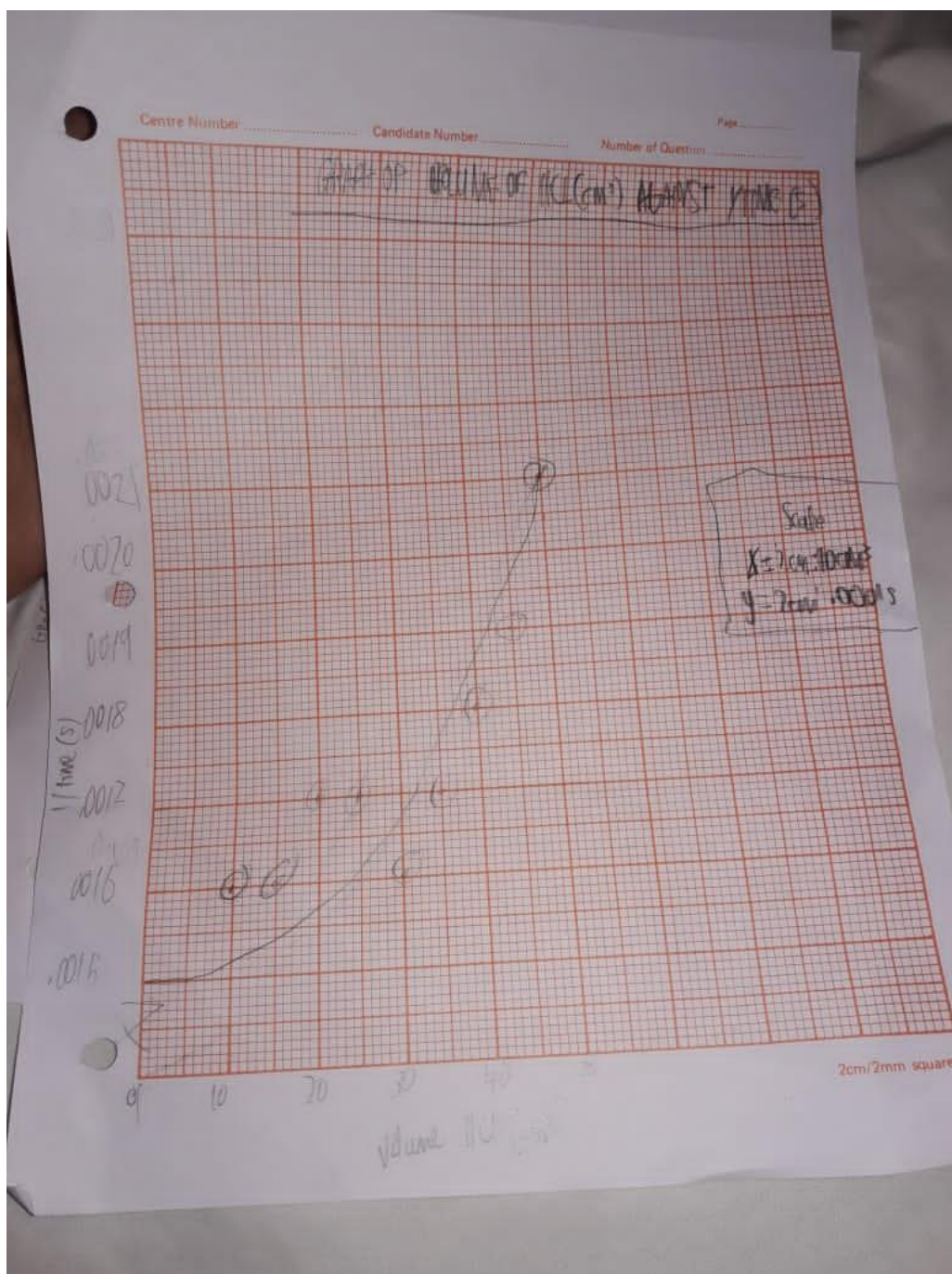
1. Write a balanced equation for the reaction between sodium thiosulphate and hydrochloric acid.



On graph paper, plot a graph of volume of hcl (x-axis) vs. time (y-axis).



2. On a different graph paper, plot a graph of volume of HCl (x-axis) vs. $1/\text{time}$ (y-axis). Ensure that both graphs are **FULLY** labelled.



3. Construct a table to show the measurements which would have been used if the concentration of the thiosulphate was being varied instead of HCl. The table **MUST** be fully labelled.

Table Showing The Volume of Sodium Thiosulphate and Water

Experiment #	Volume of $\text{Na}_2\text{S}_2\text{O}_3$ (cm^3)	Volume of HCl (cm^3)	Volume of Water (cm^3)
1	50	50	0
2	45	50	5
3	40	50	10
4	35	50	15
5	30	50	20
6	25	50	25
7	20	50	30
8	15	50	35
9	10	50	40

Conclusion: In conclusion, as the concentration of the HCl decreased, the time taken for the cross to fully disappear increased, meaning that the reaction rate decreased as concentration of the acid did.