

**Task 13: Chemical Kinetics Validation**

**Question/Answer Booklet**

**CHEMISTRY UNIT 2**

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

Teacher’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# TIME ALLOWED FOR THIS PAPER

Reading time for the paper: 3 minutes

Working time for the paper: 25 minutes

# MATERIALS REQUIRED/RECOMMENDED FOR THIS PAPER

**To be provided by the supervisor:**

This Question/Answer Booklet

Chemistry Data Book

**To be provided by the candidate:**

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, eraser, correction tape/fluid, ruler, highlighters

Special items: up to three non-programmable calculators approved for use in the WACE examinations

# IMPORTANT NOTE TO CANDIDATES

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further

Tiela was doing an experiment to determine the rate at which iodine was produced from iodide in an iodine clock reaction. Any iodine that was made would react with starch to slowly produce a dark blue colour that eventually became completely opaque and could not be seen through. Tiela’s incomplete table of results is shown below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Trial | Volume of 1.0M iodide solution (mL) | Total Volume (mL) | Concentration of iodide in final solution (mol L-1) | Time taken (s) | 1/time (s-1) |
| 1 | 5.0 | 50.0 |  | 100 |  |
| 2 | 15.0 | 50.0 |  | 34 |  |
| 3 | 20.0 | 50.0 |  | 25 |  |
| 4 | 30.0 | 50.0 |  | 15 |  |
| 5 | 35.0 | 50.0 |  | 12 |  |
| 6 | 45.0 | 50.0 |  | 9 |  |

1. Calculate the final concentration of iodide in the first trial. Round your answer to the appropriate amount of significant figures.(3 marks)
2. Calculate the 1/time for the first trial. Round your answer to 2 significant figures.(3 marks)
3. Complete the above table with all answers to the appropriate amount of significant figures.(2 marks)
4. Explain why we calculate and graph ‘1/time’ against concentration, rather than ‘time’. (1 mark)

1. Give one method Tiela could have used to ensure her experiment was repeatable.(1 mark)
2. Using the grid below, create a graph that showcases Tiela’s results. Make sure to draw a line of best fit.(5 marks)

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1. If the concentration of iodide is doubled, what happens to the rate of reaction? Interpolate data from your graph to provide specific evidence.(3 marks)  
    hint: interpolation means to use data within the range of what you have collected.
2. State the collision theory and how it relates to chemical reactions.(3 marks)
3. Referencing collision theory and with the help of diagrams, explain why concentration has an impact on the rate of reaction.(4 marks)