545/4
CHEMISTRY
PRACTICAL
Paper 4
29th July 2022
2 Hours

Name : ……..……

Signature : …… Personal No : ……..

KAMPALA WAKISO GIANT SCHOOLS' ASSOCIATION (KWGSA)

National Joint Mock Examination 2022

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 4

2 Hours

INSTRUCTIONS TO CANDIDATES

- *This paper consists of* **two** *sections*
- *Attempt both questions in the spaces provided*
- *Silent non-programmable calculators mat be used*
- *The candidate is not supposed to use any reference books like text books during the examination*

For Examiner's use only

Question	Marks
1	
2	
Total	

1. You have been provided with the following

FA_1 which is a solution of **1.0M** hydrochloric acid.

FA_2 is a solution of 0.2M sodium thiosulphate pentahydrated ($Na_2S_2O_3.5H_2O$)

FA_3 is a solution containing a compound **Q**.

You are required to determine the effect of compound **Q** on the rate of reaction between **FA_1** and **FA_2.** **FA_1** reacts with **FA_2** according to the equation below;

$S_2O_3^{2-}(aq) + 2H^+(aq) \rightarrow S(s) + H_2O(l) + SO_2(g)$

Procedure

(i) Make a cross **X** on a white sheet of paper using a blue of black pen

(ii) Measure 50.0cm^3 of **FA_2** into a conical flask using a measuring cylinder.

(iii) Place the conical flask on the cross and add 10.0cm^3 of **FA_1** from the burette and simultaneously start the stop clock.

(iv) Shake the mixture thoroughly for the solutions to mix while looking at the cross through the solution from above.

(v) Stop the clock when the cross on the paper just becomes invisible.

(vi) Record your results in the table below.

(vii) Repeat the procedure for volumes of **FA_2** = 40, 30, 20 and 10cm^3 and in each case record your results in the table.

Results

Volume of FA_2 (cm^3)	**50**	**40**	**30**	**20**	**10**
Volume of **FA_3** added (cm^3)	0	10	20	30	40
Time *t,* (s)					
$\frac{1}{t}(S^{-1})$					

(05 marks)

(b) Plot a graph of $\frac{1}{t}$ (along the vertical axis) against the volume of **FA_2** (along the horizontal axis) (08 marks)

(c) Calculate the slope of the graph. (03 marks)

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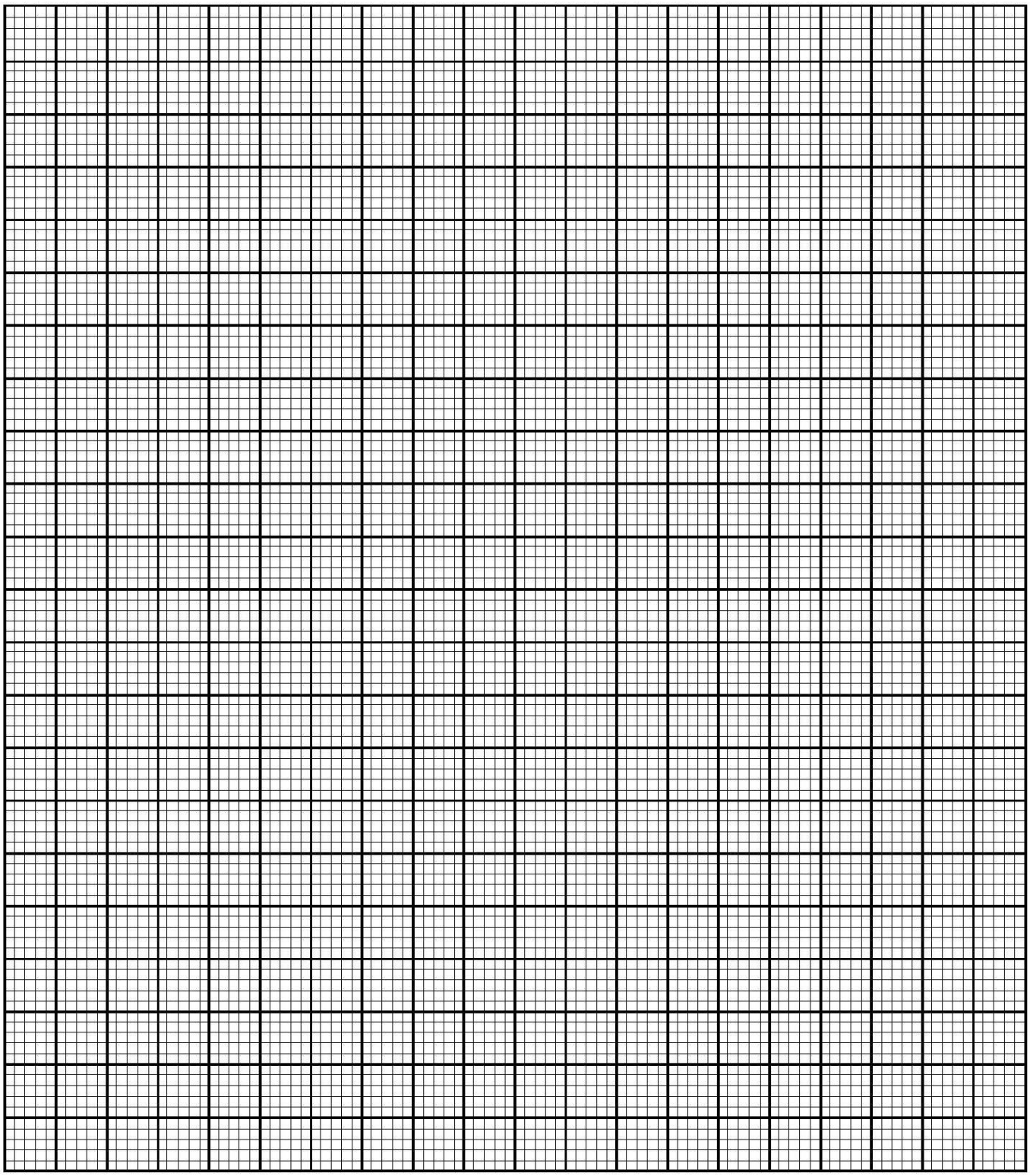

(d) Explain the variation of rate of reaction with volume of FA_2 (02 marks)

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(e) (i) State the factor being investigated. (01 mark)

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ii) State other **two** factors that affect the rate of reaction. (02 marks)

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2. You are provided with substance **V** which contains **two** cations and **one** anion. Carry out the following tests on **V** to identify them. Identify any gas(es) evolved and record your observations in the table below. **(25 marks)**

	Test	**Observation**	**Deduction**
a)	Heat a spatula endful of **V** in a hard test tube strongly until there is no further change		
b)	Dissolve a spatula end ful of **V** in 5cm^3 of distilled water and shake vigorously. Add sodium hydroxide solution drop wise until in excess. Filter Keep both the filtrate and the residue.		
c)	Wash the residue with Sodium hydroxide and add dilute hydrochloric acid until it dissolves. Divide the solution in three portions.		

i)	To the first portion, add sodium hydroxide solution drop wise until in excess		
ii)	To the second portion, add 1cm of magnesium Ribbons and leave it to stand for one minute.		
iii)	To the third portion, add ammonia solution drop wise until in excess.		
d) i)	To 4 cm^3 of the filtrate in a clean test tube, add dilute nitric acid until it becomes just acidic. Divide the solution into **five** portions. To the first part, add sodium hydroxide drop wise until in excess.		
ii)	To the second portion, add 5 drops of sulphuric acid and leave it to stand.		
iii)	Use the third portion to carryout a test of your choice to identify the cation in the filtrate.		

iv)	To the forth portion, add 3 drops of Lead (II) nitrate solution		
v)	To the fifth portion, add 3 drops of barium nitrate solution followed by dilute nitric acid..		

Identify the;
Cations in **V** : …… and……..

Anions in **V** : ……..……

END