

NAME.....Index No.....

545/3

CHEMISTRY

Paper 3

June 2022

2 hours

MWALIMU EXAMINATIONS BUREAU
UCE RESOURCE PRE-MOCK EXAMINATIONS 2022
CHEMISTRY PRACTICAL

PAPER 3

2 Hours

INSTRUCTIONS TO CANDIDATES

Answer **both** questions. Answers are to be written in the spaces provided in this booklet. Use **blue** or **black** ball point pen only. Any work done in **pencil** will **not** be **marked** except drawings. You are not allowed to use reference books (i.e. text books, Books on qualitative analysis, etc). **All working must be clearly shown.**

Mathematical tables and silent non-programmable calculators may be used.

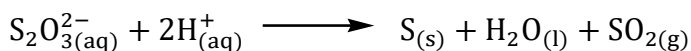
For Examiners' Use Only		
Q.1		
Q.2		
Total		

1. You are provided with the following:

BA1, which is sodium thiosulphate solution.

BA2, which is dilute hydrochloric acid solution.

Sodium thiosulphate reacts with hydrochloric acid to form sulphur, which appears a yellow coloration according to the following.



The rate of the reaction above can be followed by noting the time taken for the yellow coloration to appear.

You are required to investigate how the rate of reaction varies with the concentration of sodium thiosulphate.

Procedure

- Mark a small cross (**X**) with a blue/black pen on a sheet of white paper and place it on the table.
- Place a clean conical flask/glass beaker right onto the cross (**X**) on the white sheet of paper.
- Using a clean measuring cylinder, transfer 50.0 cm³ of **BA1** provided into a clean conical flask/glass beaker which is over the cross (**X**).
- Using another clean measuring cylinder, measure 10.0 cm³ of **BA2** and add at **once** to the solution of **BA1** in the conical flask/glass beaker, and **at the same time start the stop clock/watch**.
- Swirl/shake the solution mixture and place the beaker/ flask over the cross (**X**) as before.
- Look at the cross (**X**) through the solution from above and stop the watch/clock when the cross (**X**) **just** disappears.
- Note and record in the table below, the time, *t*, in seconds taken for the cross (**X**) to disappear.
- Pour away the contents in the beaker/flask, and wash it well. (*If necessary you can dry the beaker/flask after washing using the piece of tissue provided*).

(i) Repeat procedure **(b)** to **(h)** but this time varying the volumes of **BA1** used and adding water as shown in the table below.

(j) Record your results in the table below.

Table of results

Volume of BA1 used (cm ³)	50.0	40.0	30.0	20.0	10.0
Volume of water added (cm ³)	0.0	10.0	20.0	30.0	40.0
Volume of BA2 (cm ³)	10.0	10.0	10.0	10.0	10.0
Time, t (s)					
$\frac{1}{t}$ (s ⁻¹)					

(10Mks)

Questions

(a) Plot a graph of $\frac{1}{t}$ (along vertical axis) against volume of BA1 used (along horizontal axis).

(06 Mks)

(b) Determine the slope of the graph in (a) and indicate the units.

(03 Mks)

.....

.....

.....

.....

.....

.....

.....

(c) State any conclusion that can be drawn from your graph about the relationship between concentration (volume) of **BA1** and the rate of reaction.

(03 Mks)

.....

.....

.....

.....

.....

.....

.....

(d) (d) Explain the relationship in (c) above.

(03 Mks)

.....

.....

.....

.....

.....

.....

.....

2. You are provided with **T**, which contains **two** anions and **one** cation. Carry out the following tests to identify the cations and the anion present in **T**. Identify any gas(es) that may be evolved. Record your observations and deductions in the table below. (25 Mks)

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat a spatula end-full of T until there is no further change.		
(b) To two spatula end-full of T , add about 3 cm ³ of water. Shake well and filter. Keep both the filtrate and the residue.		
(i) To about 1 cm ³ of the filtrate, and add 2-3 drops of lead(II) nitrate solution followed by excess dilute nitric acid.		
(ii) To about 1 cm ³ of the filtrate, add 2-3 drops of silver nitrate followed by excess dilute ammonia		

solution.		
(c) Wash the residue with water and dissolve it in a minimum of amount of dilute nitric acid. Divide the acidic solution into four parts.		
(i) To the first part of the acidic solution, add dilute sodium hydroxide solution drop wise until in excess.		
(ii) To the second part of the acidic solution, add dilute ammonia solution drop wise until in excess.		
(iii) To the third part of the acidic solution, add 3-4 drops of sodium chloride solution. Heat the mixture and allow it cool.		
(iv) Use the fourth part of the acidic solution, to carry out a test of your own choice to confirm the cation in T . Test:		

- (d) (i) The cation in **T** is.....
- (ii) The anions in **T** are

End