NAME OF CANDIDATE: _____ FORM 4 ____

MZUZU DIOCESE

2021 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

PAPER II

(40 marks)

Practical

Subject number:M162/II

Thursday, 29 July

Time Allowed: 2hour sessions
7:30 am onwards

Instructions

1. **This paper contains 6 printed pages. Please check.**
2. Write your name clearly in the space provided on top of this page and all other pages.
3. This paper contains **two** sections, **A** and **B.**
4. **Section A** consists of two descriptive questions on practical work to be answered in **1 hour**. Marks will be given for accurate and orderly presentation of facts supported by relevant diagrams.
5. In **Section B** there are two practical questions to be answered in **1 hour**.
6. You should spend 30 minutes on each question. The 30-minute period allowed for each question includes 3 minutes to tidy up the apparatus and have it checked by the supervisor.
7. Marks for Section **B** will be given for observation, accuracy and interpretation of results.
8. In the table provided on this page, **tick** against the question number of the question you have answered.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
4			
	Total		

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SECTION A (20 marks)

1. If potassium nitrate crystals and silver nitrate crystals were provided, describe with a well labelled diagram, an experiment that could be carried out to determine the compound which has a higher electrical conductivity in aqueous solution.

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_____ **(10 marks)**

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2. Describe with the aid of a labelled diagram, how bromine vapour can be used in a laboratory to demonstrate the particulate nature of matter.

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_____ **(10 marks)**

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SECTION B (20 marks)

3. You are provided with unknown compounds labelled **R, S** and **T**, which are propanoic acid, cyclobutane and ethanol, but not necessarily in that order, 3 droppers, 3 test tubes in a test tube rack, distilled water, sodium hydroxide (NaOH) solution and phenolphthalein indicator.

a. Put about 15 drops of distilled water in a test tube.

b. Add 10 drops of compound **R** in the test tube and shake.

c. Observe if the mixture forms one layer or two layers.

d. Record results in **Table 1.**

Table 1 (6 marks)

Unknown compound	Test with distilled water	Test with NaOH (aq)
R		
S		
T		

e. Rinse the test tube with distilled water.

f. Put about 2 drops of sodium hydroxide (NaOH) in the test tube.

g. Add 2 drops of phenolphthalein indicator.

h. Add about 10 drops of compound **R** in the test tube and shake.

i. Record the results in the appropriate space in **Table 2.**

j. Repeat steps **a** to **i** with compounds **S** and **T**.

k. Identify compounds **R, S** and **T**.

R _____ **(1 mark)**

S _____ **(1 mark)**

T _____ **(1 mark)**

l. Name any **one** source of error in the experiment.

_____ **(1 mark)**

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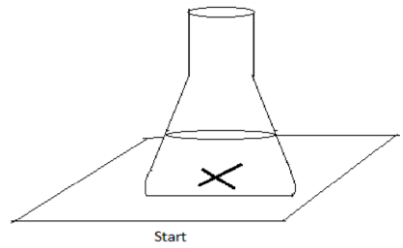
4. You are provided with a 100cm^3 conical flask or100cm^3 glass beaker, filter paper or white tile, stop watch or stop clock, **0.5M** sodium thiosulphate ($\mathbf{Na_2S_2O_3}$) solution, **2M** hydrochloric acid (HCI) solution, pental marker or black ink, distilled water, and measuring cylinder.

a. Place the conical flask / beaker on a bench

b. Place the conical flask onto a **cross** marked white paper as shown below:



c. Put 10cm^3 of HCl solution into the 100cm^3 conical flask / beaker.

d. Add 10cm^3 of NaS_2O_3 and distilled water to 10cm^3 of HCl solution placed in flask. Immediately start the stop watch or stop clock and swirl (shake gently) the contents of the flask. Note and record the time it takes for he cross (**X**) to be obscured (when you cannot see it anymore).

e. Repeat the steps **b** to **d** using the solutions of $Na_2S_2O_3$ of 15cm^3, 20cm^3, 25cm^3 and distilled water respectively as indicated in **Table 2** below.

Volume of $Na_2S_2O_3$ added to distilled water (cm^3)	**Volume of distilled water used (cm^3)**	**Volume of HCl used (cm^3)**	**Time taken for the cross to obscure (s)**	**l/time (s^{-1})**
10	15	10		
15	10	10		
20	5	10		
25	0	10		

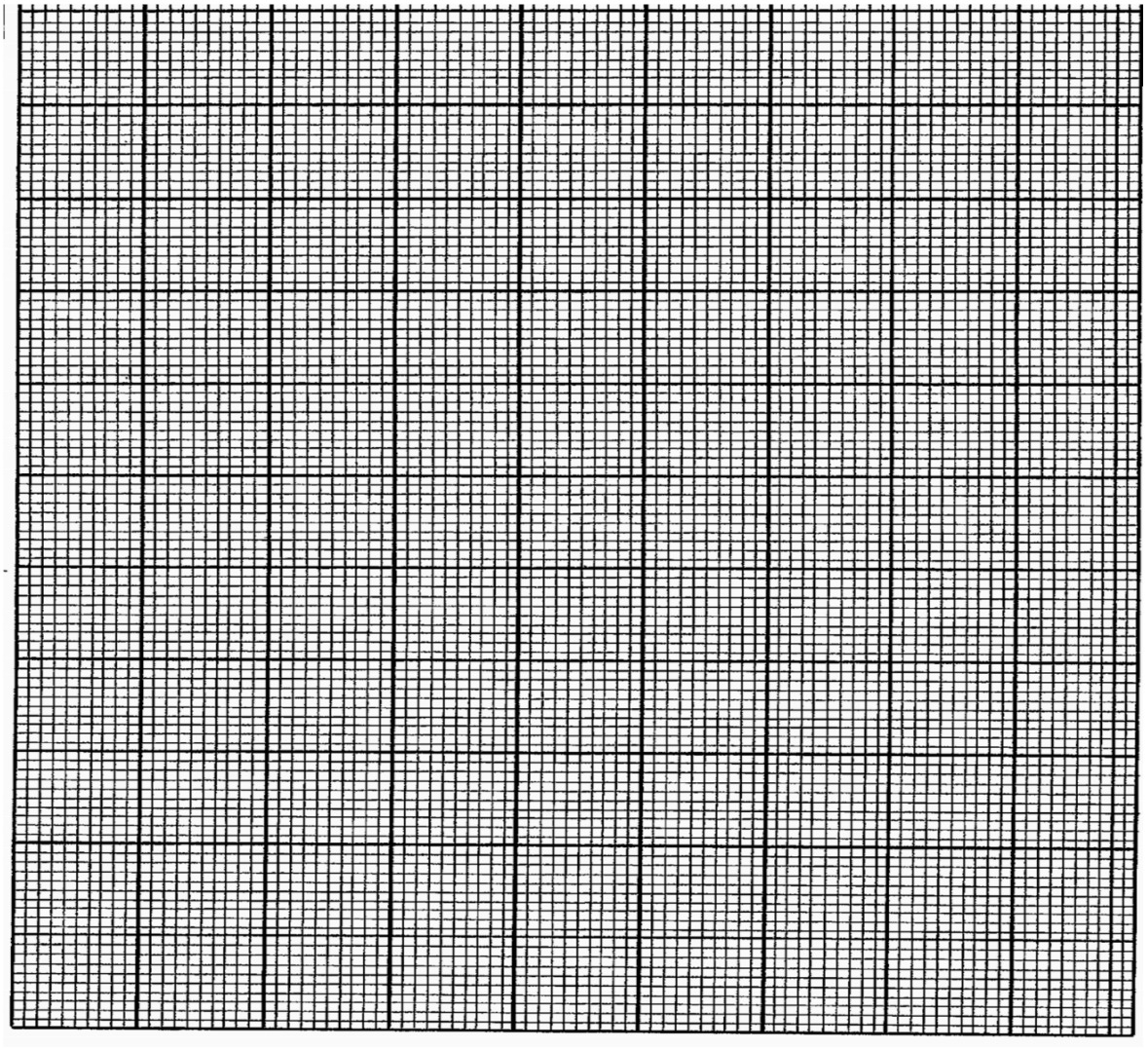
f. Calculate the reaction rate in each beaker. This can be done using the following equation:

Reaction rate = $\frac{1}{Time}$. Fill in the last column. **(4 marks)**

g. Write a balanced chemical equation for the reaction between sodium thiosulphate ($Na_2S_2O_3$) solution and hydrochloric acid (HCl) solution.

_____ **(2 marks)**

h. Plot a graph of reaction rate against volume of $Na_2S_2O_3$ solution. **(3 marks)**



i. Describe the relationship between concentration and reaction rate.

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(1 mark)

END OF QUESTION PAPER