



MARANDA HIGH SCHOOL

The Kenya Certificate of Secondary Education

POST-MOCK II

233/3

Chemistry (PRACTICAL) Paper 3

SEPT, 2025 Time: 2 Hours 15 Minutes

Name: Marking guide

Adm No:

Stream: Signature:

233/3 Chemistry PP3 - Practical

Date:

Instructions to Candidates

- Write your name and Admission number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above
- Answer **ALL** the questions in the spaces provided below each question.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the $2\frac{1}{4}$ hours allowed for this paper. This time is to enable you to read the question paper and make sure you have all the apparatus and chemicals that you may need.
- All working **MUST** be clearly shown where necessary
- Mathematical tables and silent non-programmed electronic calculators may be used.
- This paper consists of 8 printed pages with 3 questions. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

For Examiner's Use Only

QUESTION	MAXIMUM SCORE	CANDIDATES	SCORE
1	19 20		
2	14 13		
3	07		
TOTAL SCORE	40		



1. You are provided with:

Solution Q, 2M Hydrochloric acid.

Solution P, 0.15M Sodium thiosulphate

Solution R, Sodium carbonate

Procedure 1

Measure 20cm^3 of 0.15M Sodium thiosulphate (solution P) into a 100cm^3 glass beaker. Place the beaker on a white piece of paper with ink mark 'X' on it. Measure 20cm^3 of 2M hydrochloric acid solution Q using a 50cm^3 measuring cylinder. Put the acid into the glass beaker containing Sodium thiosulphate and immediately start off the stop watch. Determine the time taken for the marks 'X' to become invisible/obscured when viewed from above. Repeat the procedure by measuring different volumes of the acid and adding the volume of the distilled water to complete table below

Table 1

Volume of acid (cm^3)	Volume of water (cm^3)	Volume of $\text{Na}_2\text{S}_2\text{O}_3$ (cm^3)	Time taken for Cross X to be invisible (seconds)	Reciprocal of time (sec^{-1}) ($\frac{1}{t}$)
20	0	20	32	0.031
18	2	20	34	0.029
16	4	20	37	0.027
14	6	20	41	0.024
12	8	20	46	0.022

a) Complete the table above

b) Plot a graph of $\frac{1}{t}$ (rate) against volume of acid used.

CT-3 (6mks)

Ac-1 (3mks)

Dp-1

Tr-1

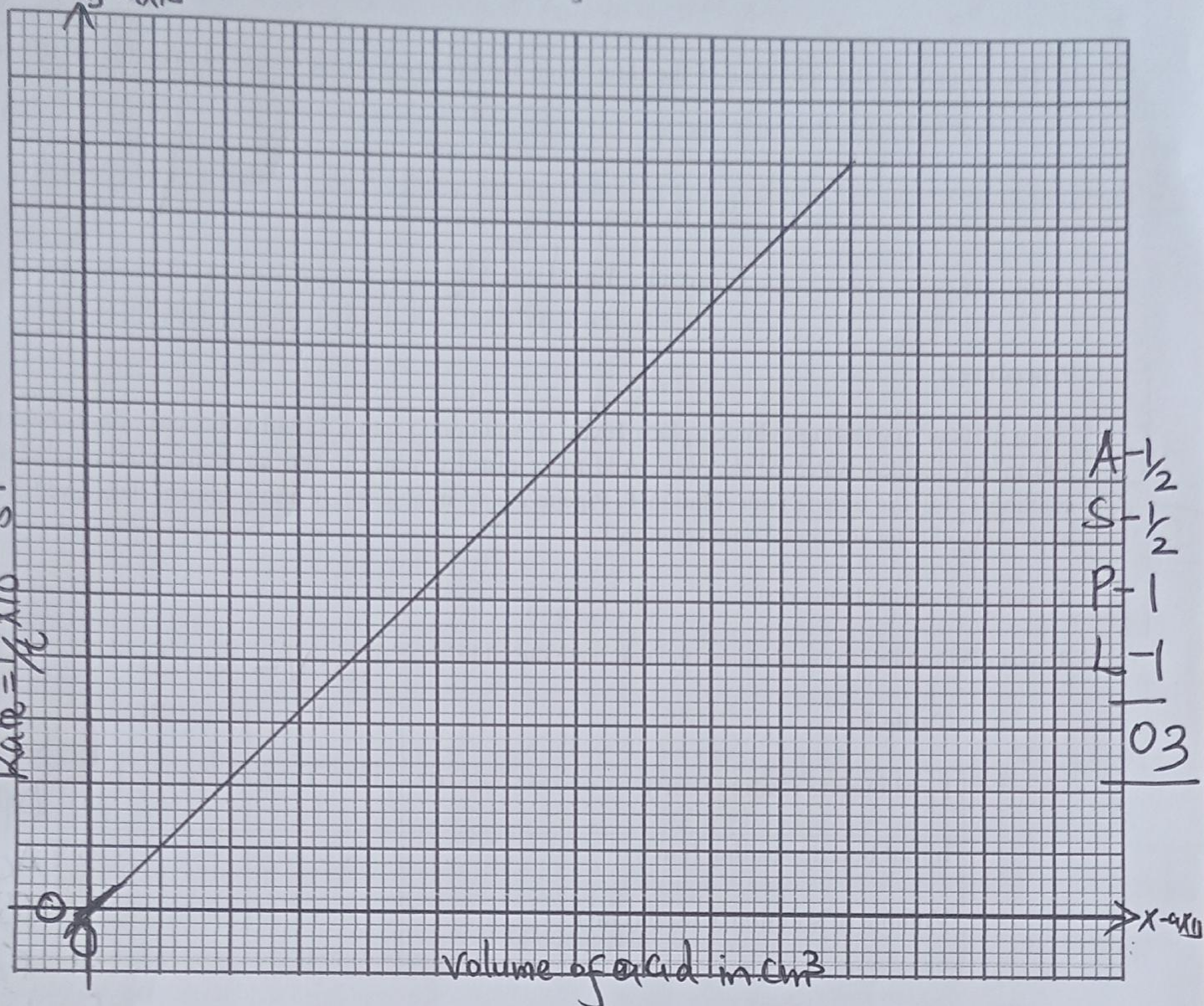
06

Dr. Malala.



$$\text{Rate} = \frac{1}{t} \times 10^{-3} \text{ s}^{-1}$$

A- $\frac{1}{2}$
S- $\frac{1}{2}$
P-1
L-1
03



c) Explain the shape of your graph

(1mk)

Increase in concentration leads to increase in the rate of reaction

d) From the graph determine;

I. Time taken for the cross to be obscured/invisible when the volume of the acid is: 15 cm^3

(1mk)

Showing - $\frac{1}{2}$
Correct Reading - $\frac{1}{2}$



II. The volume of the acid used if the time taken for the cross to be obscured/invisible is: 40seconds
(1mk)

shaving $-\frac{1}{2}$
Correct Reading $-\frac{1}{2}$

Procedure 2

Using a 10cm^3 measuring cylinder, place 10cm^3 of solution Q into a 250ml volumetric flask. Add about 200cm^3 of distilled water. Shake well. Add more distilled water to top up to the mark. Labeled this solution T. Fill the burette with solution T. Pipette 25cm^3 of solution R into a conical flask. Add 3 drops of phenolphthalein and titrate with solution T.

Record your results in the table.

Repeat the titration two more times and complete the table

$$S \cdot V = 6.5$$

Table 2

	I	II	III
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution T used (cm^3)			

CT-1

Dp-1

Ac-1

PA-1

FA-1

05

Determine the:

a) average volume of solution T used

(1 mark)

$\frac{1}{2}$

$\frac{1}{2}$

b) Moles of the acid in the average volume of solution T used.

(1 marks)

$$C_1 V_1 = C_2 V_2$$

$$10 \times 2 = 250 \times C_2$$

$$C_2 = 0.08$$

$$\text{moles} = \frac{C_2 \times V}{1000}$$

Correct Ans $\frac{1}{2}$



Joshua.

c) Concentration of solution R in moles per litre.

(2 marks)

Mole ratio = 1:2

Moles of R = $\frac{\text{Ans (b)}}{2}$

= Ans

Molarity = $\frac{\text{Ans} \times 1000}{25}$
= Correct Ans

2. You are provided with solid V. Carry out the following tests and record your results in the spaces provided.

A. Put all of solid V in a boiling tube. Add 10cm³ of distilled water and shake, filter the solution and divide the filtrate into three portions. **RETAIN THE RESIDUE.**

Observations	Inferences
White residue Colourless filtrate	- Mixture of soluble salt and insoluble salt / solid is sparingly or slightly soluble. - Cu ²⁺ , Fe ²⁺ , Fe ³⁺ absent.
(1 mark)	(1 mark)

I. To the first portion of the filtrate, add aqueous sodium hydroxide dropwise then in excess.

Observations	Inferences
No white precipitate	Zn ²⁺ , Al ³⁺ , Pb ²⁺ , Ca ²⁺ , Mg ²⁺ Ba ²⁺ absent
(1/2 mark)	(1/2 mark)

II. Dip a clean spatula into the second portion of the filtrate and ignite it on a Bunsen burner flame.

Observations	Inferences
Burns with yellow/golden yellow flame.	Na ⁺ present
(1/2 mark)	(1/2 mark)

Edwine / Seth.



III. To the second portion of the filtrate, add lead (II) nitrate then warm gently

Observations	Inferences
White precipitate $\checkmark$ soluble $\checkmark$ on warming (1 mark)	Cl^- / Br^- $\checkmark$ present. ($\frac{1}{2}$ mark)

B. Heat the first portion of the residue in a test tube gently then strongly. Test the gases produced with both red and blue litmus papers.

Observations	Inferences
Colourless gas which changes moist blue litmus paper red $\checkmark$ and red litmus remains red $\checkmark$ Yellow residue when hot and white when cold. (1 mark)	Acidic gas $\checkmark$ ($\frac{1}{2}$ mark)

I. To the second portion of the residue, add dilute nitric (V) acid then divide the resulting solution into three parts. Use the three parts in the subsequent procedure tests that follow.

Observations	Inferences
Bubbles $\checkmark$ of a colourless gas ($\frac{1}{2}$ mark)	SO_3^{2-} , CO_3^{2-} $\checkmark$ present 2 ins - $\frac{1}{2}$ 1 ins - 0. ($\frac{1}{2}$ mark)

II. To the first portion, add sodium hydroxide solution dropwise then in excess.

Observations	Inferences
White precipitate $\checkmark$ soluble $\checkmark$ in excess (1 mark)	Zn^{2+} , Pb^{2+} present Penalise for ink any contradictory in to a max of 1mk. Σ 3 ins - 1mk 2 ins - $\frac{1}{2}$ (1 mark)

Brian



III. To the second portion, add aqueous ammonia solution dropwise until in excess.

Observations	Inferences
White precipitate soluble in excess	Zn^{2+} (aq) ✓ 1
(1 mark)	(1 mark)

IV. To the third portion, add a few drops of acidified potassium dichromate (VI) solution

Observations	Inferences
Orange acidified potassium dichromate (VI) does not change to green / remains orange	CO_3^{2-} present ✓ 2 HSO_3^{2-} absent.
(1 mark) 2	(1 mark) 2

3. You are provided with liquid A. Carry out the tests below and record your observations and inferences in the spaces provided.

i) To about 1cm³ of liquid A in a test tube, add about 1cm³ of distilled water

Observations	Inferences
Miscible / forms homogeneous mixture / uniform layer.	Polar / organic substance
(1/2 mark)	(1/2 mark)

ii) To about 1cm³ of liquid A in a test tube, add about 1cm³ of acidified potassium manganate (VII) and shake thoroughly.

Observations	Inferences
Purple acidified potassium manganate (VII) changes to colourless	$C=C$, $C\equiv C$, $R-OH$ present
(1/2 mark)	(1/2 mark)

Sarah.



iii) To about 2cm³ of liquid A in a test tube, add 1 to 3 drops of bromine water.

Observations	Inferences
Yellow bromine water remains Yellow does not change to Colourless (1/2 mark)	$\begin{array}{c} \text{C}=\text{C} \\ \quad \end{array} - \text{C}=\text{C} -$ absent 1/2 (1/2 mark)

iv) To about 2cm³ of liquid A in a test tube, add about 1cm³ of acidified potassium dichromate (VI). Warm gently and allow it to stand for a minute.

Observations	Inferences
Orange acidified potassium dichromate (VI) changes to green. 1/2 (1/2 mark)	R-OH 1/2 present (1/2 mark)

v) To about 2cm³ of liquid A in a test tube. Add a small amount of solid sodium hydrogen carbonate.

Observations	Inferences
No bubbles 1/2 of a gas (1/2 mark)	R-COOH absent 1/2 (1/2 mark)

vi) You are provided with the universal indicator paper, describe how you can test the pH of liquid A.

Description	Observation	Inferences
To 2cm ³ portion of liquid A add dip universal indicator paper and match with the pH Chart 1/2 (1 mark)	pH = 4.0 / 5.0 / 6.0 1/2 (1/2 mark)	Weakly acidic 1/2 (1/2 mark)

Rose
THIS IS THE LAST PRINTED PAGE

07

