ASUMBI GIRLS HIGH SCHOOL
TERM 2 – DECEMBER 2021
FORM 4

CHEMISTRY PAPER 3

Name: …… **Adm No**: ……

Class: ……. **Candidate's Sign**: …….

Date: …….

233/3
CHEMISTRY
PAPER 3

TIME: 2 ¼ HOURS

Kenya Certificate of Secondary Education (K.C.S.E.)

FORM FOUR

Chemistry
Practical

INSTRUCTIONS TO THE CANDIDATES:-

- ***Write your name and index number in the spaces provided***
- ***Sign*** *and write the* ***date*** *of examination in the spaces provided*
- ***Answer all the questions in the spaces provided.***
- *Mathematical tables and electronic calculators may be used.*
- *All working* ***MUST*** *be clearly shown where necessary.*
- *Use the first 15minutes of the 2 ¼ hours to ascertain you have all the chemicals and apparatus tha you may need.*

For Examiners use Only

QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	15	
2	11	
3	14	
TOTAL	40	

QUESTION 1

- You are provided with solution **K** and **L**
- **S**olution **K** is 1M H_2SO_4
- Solution **L** contains 8.7g of the hydroxide of metal **M** {with formulae MOH] in 600cm^3 of the solution
- You are required to carry out the experiment to determine;
  - i. Concentration of solution L
  - ii. R.A.M of metal **M**

Procedure

1. Measure 75cm3 of solution K and put into a clean 250cm3 volumetric flask and add distilled water up to the mark -label this solution **W**
2. Fill a clean burette with solution W
3. Pipette 25cm3 of solution L into a clean conical flask and add 2 drops of phenolphthalein indicator
4. Titrate the solution **W** in the burette against solution **L** in the conical flask and record the results in the table below
5. Repeat {3} and {4} above as you fill the table below.

TABLE 1

	I	II	III
Final burette reading {cm^3}			
Initial burette reading {cm^3}			
Volume of solution W used {cm^3}			

[4mks]

{a} Calculate the;

{i} Average volume of solution W used [1mk]

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{ii} Concentration of solution W [1mk]

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{iii} Number of moles of solution W that reacted with each 25cm3 portion of solution L {2mks]

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{b} Calculate the;

{i} Number of moles of the metal hydroxide {MOH} in solution L that reacted with each portion of solution W [2mks]

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{ii} Concentration of solution L [1mk]

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……

{iii} Number of moles of the metal hydroxide [MOH]in 600cm3 of solution L [2mks]

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……

{iv} R.A.M of metal M [2mks]
[0=16, H=1]

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QUESTION 2

You are provided with solution N and P

- Solution N is 2M HCl
- Solution P is 0.16M sodium thiosulphate
- You are required to carry out the experiment below to determine how concentration affects the rate of reaction between HCl and sodium thiosulphate solutions

PROCEDURE

1. Fill a clean burette with solution P.
   Measure 25cm^3 of the solution P from the burette into a clean 100cm^3 glass beaker and place on a white piece of paper with a cross[x] marked on it
2. Add 10cm^3 of solution N into it and immediately start a stop watch and note the time taken for the cross beneath the mixture to become invisible
3. Clean the 100cm^3 beaker and measure into it 20cm^3 of solution P form the burette, and add 5cm^3 of distilled water into the solution solution
4. Repeat step [2] above and note the time taken for the cross to become invisible
5. Repeat the experiment using volumes indicated on the table below and as you record the results

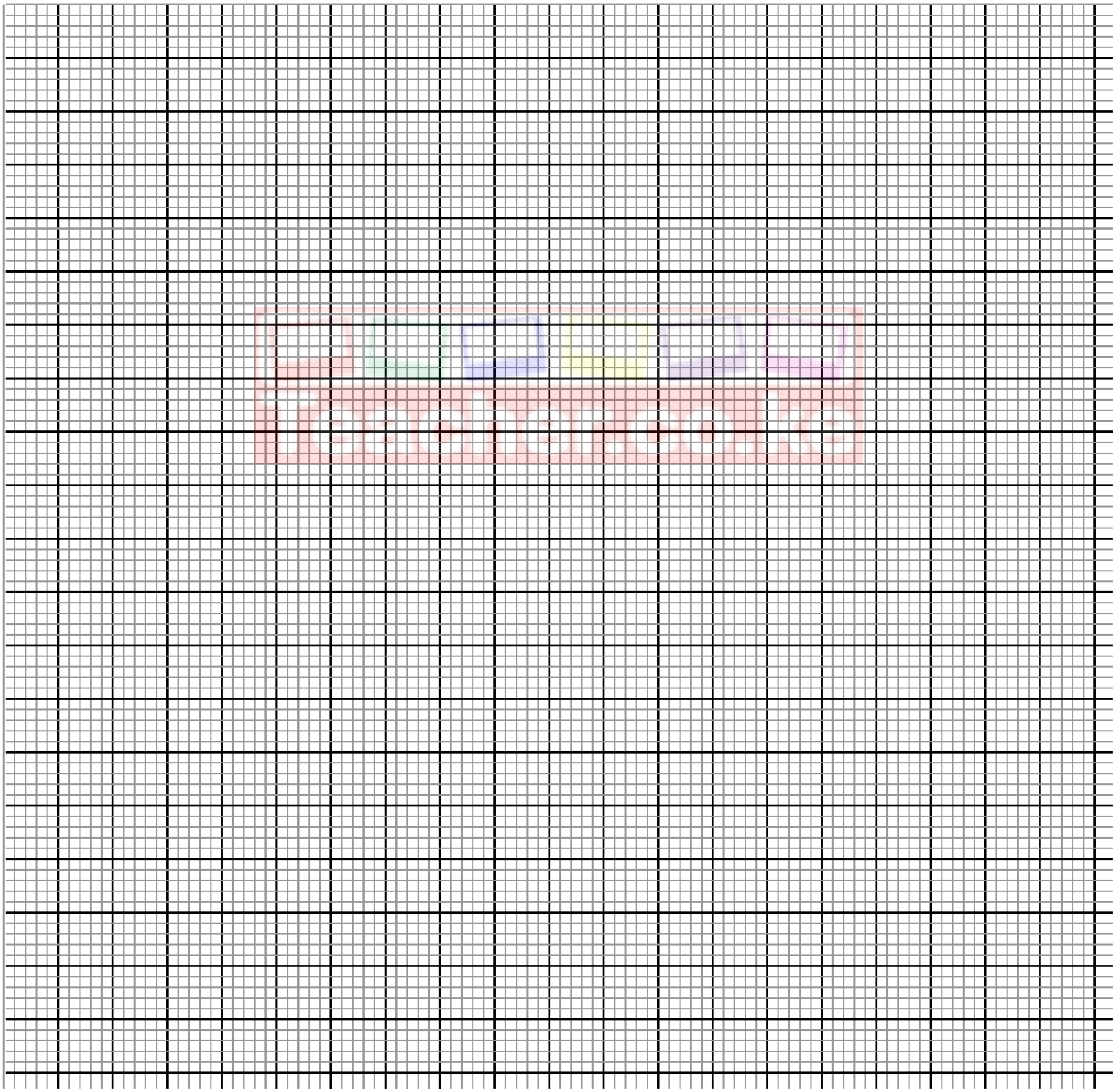
TABLE 2

Expt	1	2	3	4	5

Volume of solution p(cm^3)	25	20	15	10	5
Volume of water added to solution p{cm3}	0	5	10	15	20
Volume of solution N	10	10	10	10	10
Time taken for the cross to become invisible [in seconds]					
$\frac{1}{t}$ S^{-1}					

(4mks**)**

[a] plot a graph of $\frac{1}{t}$ against volume of solution P on the grid provided [3mk]



{b} From the graph

{i} Determine the time taken for the cross to become invisible when 12.5cm^3 of solution P is used [2mks]

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{ii} Explain the effect of concentration on the rate of reaction between HCl and sodium thiosulphate solution [2mks]

……

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QUESTION 3

- You are provided with solids Q and R
- You are required to carry out the tests below as you record your observations and inferences

(i) SOLID Q

-Add about 5cm^3 of distilled water to solid Q, shake the mixture thoroughly for a while and then filter it

NOTE: Retain both the filtrate and the residue for the tests below

	TEST	**OBSERVATIONS**	**INFERENCES**
(a){i}	Divide the filtrate into 4 portion -To the first portion, add 4 drops of NaOH	$\left(\frac{1}{2}mark\right)$	$(1mark)$
{ii}	Scoop the 2nd portion on a metallic spatula and ignite on a non-luminous flame	$\left(\frac{1}{2}mark\right)$	$\left(\frac{1}{2}mark\right)$
{iii}	To the 3rd portion, add 2 drops of $Pb\{NO_3\}_{[aq]}$	$\left(\frac{1}{2}mark\right)$	$(1mark)$
{iv}	To the 4th portion ,add acidified $KmnO_4$	$\left(\frac{1}{2}mark\right)$	$\left(\frac{1}{2}mark\right)$

b{i}	Put the residue in a test tube and add about $2cm^3$ of HNO_3	$\left(\frac{1}{2}mark\right)$	$(1mark)$
{ii}	To the mixture in b{i} above, add 2 drops of KI solution	$\left(\frac{1}{2}mark\right)$	$\left(\frac{1}{2}mark\right)$

{ii}SOLID R

	TEST	OBSERVATIONS	INFERENCES
(a)	Scoop a portion of solid R on a Metallic spatula and burn on a Non-luminous flame	$(1mark)$	$(1mark)$
(b){i]	Put the remaining portion of solid R into a clean test tube and add about $3cm^3$of distilled water, shake and divide into 2 portions	$(1mark)$	$\left(\frac{1}{2}mark\right)$
{ii}	To the 1st portion, add 2 drops of acidified $KMnO_4$ and warm	$\left(\frac{1}{2}mark\right)$	$(1mark)$
{iii}	To the 2nd portion add $NaCO_3$	$\left(\frac{1}{2}mark\right)$	$(1mark)$

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