

NAME: ADM NO:

SCHOOL :DATE :

CANDIDATE'S SIGNATURE.....

233/3

CHEMISTRY

PAPER 3

TIME: 2 HOURS



KCSE ACHIEVERS PREDICTION



Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES:

- (i) Write your **name** and **index number** in the spaces provided **above**.
- (ii) **Sign** and write the **date** of examination in the spaces provided **above**.
- (iii) Answer **ALL** the questions in the spaces provided.
- (iv) Mathematical tables and silent electronic calculators **may be** used.
- (v) All working **must be** clearly shown where necessary.
- (vi) 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	Candidate's Score
1	15	
2	12	
3	13	
Total Score	40	



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QUESTION 1

- You are provided with solution **K** and **L**
- Solution **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 75cm^3 of solution **K** and put into a clean 250cm^3 volumetric flask and add distilled water up to the mark
-label this solution **W**
2. Fill a clean burette with solution **W**
3. Pipette 25cm^3 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 $\{\text{cm}^3\}$			
Initial burette reading $\{\text{cm}^3\}$			
Volume of solution W used $\{\text{cm}^3\}$			

(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 [0=16, H=1] (2mks)

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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 25cm³ of the solution P from the burette into a clean 100cm³ glass beaker and place on a white piece of paper with a cross[x] marked on it
2. Add 10cm³ 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 100cm³ beaker and measure into it 20cm³ of solution P from the burette, and add 5cm³ 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

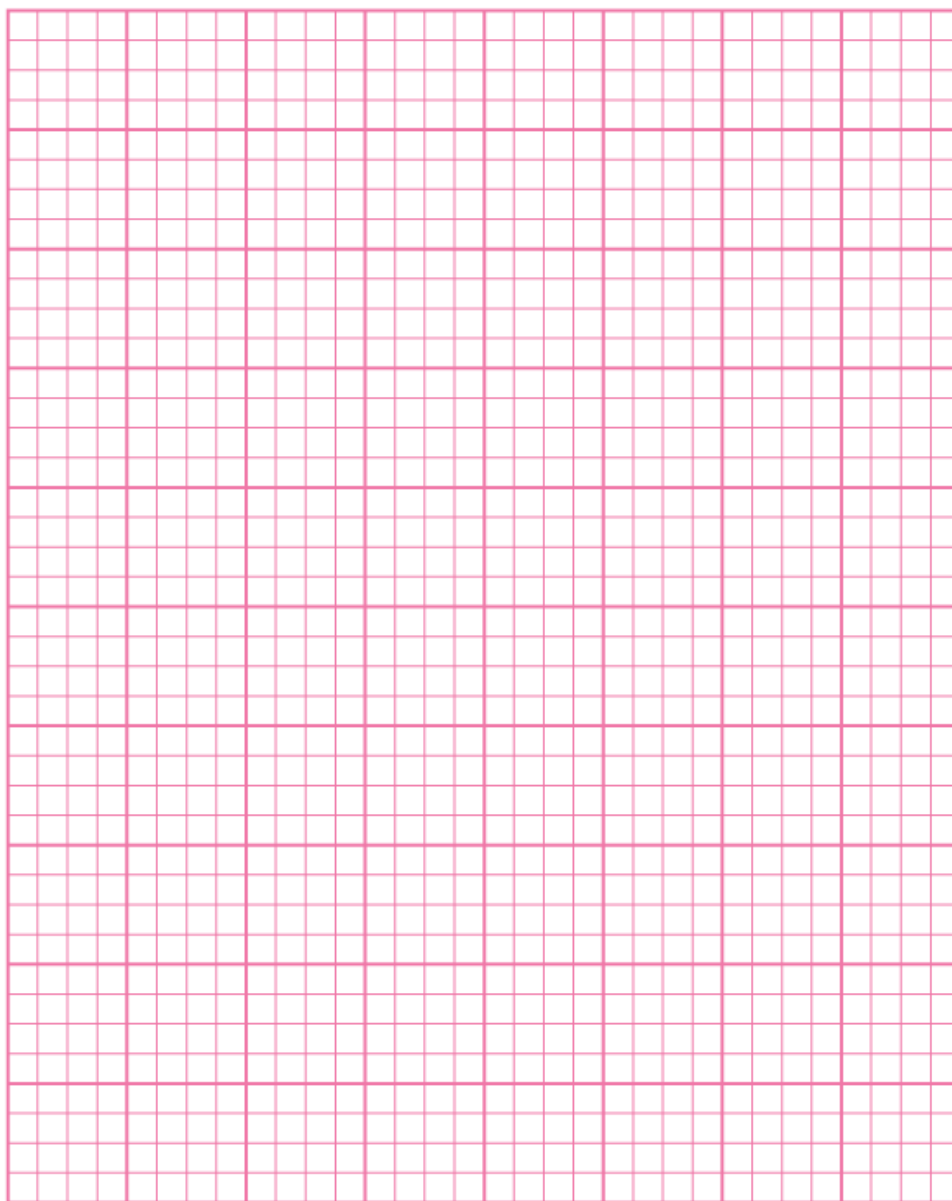
Expt	1	2	3	4	5
Volume of solution p(cm ³)	25	20	15	10	5
Volume of water added to solution p{cm3}	0	5	10	15	20
Volume of solution N	10	10	10	10	10



Time taken for the cross to become invisible [in seconds]					
$\frac{1}{t} \text{ s}^{-1}$					

(4mks)

- (a) Plot a graph of $\frac{1}{t}$ against volume of solution P on the grid provided (4mks)



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{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
- 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

Divide the filtrate into 4 portion

- A) (i) To the first portion, add 4 drops of NaOH

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(1mk)	(2mk)
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- ii) Scoop the 2nd portion on a metallic spatula and ignite on a non-luminous flame

OBSERVATIONS	INFERENCES
(1mk)	(1mk)

- iii) To the 3rd portion, add 2 drops of $\text{Pb}\{\text{NO}_3\}_{[\text{aq}]}$

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(1mk)	(1mk)

iv) To the 4th portion, add acidified KmnO_4

OBSERVATIONS	INFERENCES
(1mk)	(1mk)

B (i) Put the residue in a test tube and add about 2cm^3 of HNO_3

OBSERVATIONS	INFERENCES
(1mk)	(1mk)



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(ii) To the mixture in b{i} above, add 2 drops of KI solution

OBSERVATIONS	INFERENCES
(1mk)	(1mk)

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