NAME: …….. INDEX.NO: ……..……

SCHOOL: ……CANDIDATES SIGN: ……..…..…

DATE: ……

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CHEMISTY PAPER 3
PRACTICAL
FORM 4

MURANGA EAST 2021
KENYA CERTIFICATE OF SECONDARY EDUCATION (KCSE)

Instructions to candidates

1. *Write your name, index number and school in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *Answer **ALL** the questions in section in the spaces provided.*
4. ***ALL** working **MUST** be clearly shown.*

FOR EXAMINERS USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE SCORE
1 2 3	18 12 ½ 9 ½	
TOTAL	**40**	

1. You are provided with:
   - Solution A, Dilute hydrochloric acid
   - Solution B, made by dissolving 0.5g of sodium hydroxide in water and made to 250cm^3 of solution
   - Solid C, Magnesium ribbon
   - Phenolphthalein in indicator

   You are required to:

(i) Standardize solution A
(ii) Determine the rate of reaction between solution A and magnesium

PROCEDURE

(i) Measure exactly 10cm^3 of solution A using a burette and transfer into a 250ml volumetric flask. Top up to the mark using distilled water. Label this solution D.
(ii) Drain the remaining solution A in the burette, rinse the burette thoroughly and fill the burette with solution D.
(iii) Pipette 25cm^3 of solution B into a conical flask. Add three drops of phenolphthalein indicator
(iv) Titrate solution D with solution B. Record your results in the table below. Repeat procedure (i) to (iv) to complete the table. (3 marks)

	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution D used (cm^3)			

(a) Calculate the average volume of solution D used (1 mark)

(b) Calculate:
   (i) Number of moles of solution B used (1½ marks)

   (ii) Number of moles of solution D in 250cm3 of solution (1½ marks)

(iii) Morality of solution A (1 mark)

PROCEDURE II

(i) Cut solid C into equal pieces, each 2cm long.

(ii) Using a burette, measure 12cm^3 of solution A, into a clean boiling tube.

(iii) Drop one piece of solid C into the boiling tube containing solution A and start stopwatch immediately. Stop the stopwatch when all solid C has just reacted. Record your results in the table below.

(iv) Repeat steps (ii) and (iii) above using 10cm3, 8cm3, 6cm3 and 4cm3 of solution A. Top up each with distilled water to make 12cm3 of solution and complete the table below. (4 marks)

Volume of solution A (cm^3)	Volume of distilled water (cm^3)	Concentration of solution a (moles/l	Time(s)	$\frac{I}{t}(s^{-1})$
12	0			
10	2			
8	4			
6	6			
4	8			

(a) Plot a graph of $\frac{I}{t}(y-axis)$ against the concentration of solution A (3 marks)

(b) From the graph, determine the time taken for the reaction to reach completion when 1.5 moles of solution A are used (2 marks)

(c) Comment on the shape of the graph (1 mark)

2. You are provided with solid Q. Carry out the tests below and record your observations and inferences in the spaces provided.

(a) Strongly heat a spatula-end full of solid Q in a dry test tube (1 mark)

Observation	Inference

(b) (i) Place the remaining solid Q in a boiling tube. Add 10cm3 of distilled water. Divide the solution into five portions. (2 marks)

Observation	Inference

(ii) To the first portion, add aqueous lead (II) nitrate solution (1 mark)

Observation	Inference

(iii) To the second portion add dilute nitric (V) acid, followed by barium nitrate solution (2marks)

Observation	inference

(iv) To the third portion add a few drops of sodium hydroxide until excess observation (2marks)

Observation	Inference

(v) To the fourth portion, add a few drops of aqueous ammonia until is excess. (2 marks)

Observation	Inference

(vi) To the fifth portion, add a few drops of hydrochloric acid (1½ marks)
Warm the contents.

Observation	Inference

3. You are provided with solid R. carry out the tests below and record your observations and inferences.

(a) Place a spatula-end full of solid R in a dry boiling tube and add about $10cm^3$ of distilled water. Shake thoroughly and heat to boil. Divide the solution into five portions.
(1½ marks)

Observation	inference

(b) (i) Test the first portion with the universal indicator solution provided. (1½ marks)

Observation	Inference

(ii) To the second portion, add a few drops of acidified potassium manganite (VII) solution
(2 marks)

Observation	Inference

(iii) To the third portion, add a few drops of bromine water (2 marks)

Observation	Inference

(iv) To the fourth portion, add half spatula of sodium hydrogen carbonate (1 mark)

Observation	Inference

(v) To the fifth portion in a boiling tube, add 5cm3 of ethanol followed by a few drops of concentrated sulphuric (VI) acid. Warm the mixture. (1 ½ Marks)

Observation	Inference