

Name

Index No.....

School

Candidate's Signature

Date

233/3

**CHEMISTRY
PAPER 3
(PRACTICAL)
JULY/AUGUST
2- HOURS**

MASINGA DISTRICT JOINT EVALUATION TEST - 2011

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

233/3

**CHEMISTRY
PAPER 3
(PRACTICAL)
JULY / AUGUST
2- HOURS**

INSTRUCTIONS:

- Answer **ALL** questions in the spaces provided.
- You are **NOT** allowed to start working with the apparatus for the first 15minutes of the 2- hours. allowed for this paper. This time will enable you read through the question paper and make sure you have all the chemicals and apparatus required.
- Mathematical tables and electronic calculators may be used.
- All working **must be** clearly shown where necessary.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate's score
1	16	
2	11	
3	13	
TOTAL SCORE	40	

This paper consists of 8 printed pages

Candidates should check to ensure that all pages are printed as indicated and no questions are missing

1. You are provided with the following.

- Solution M which is 0.2M Sodium hydroxide.
- Solution N which is dilute hydrochloric acid.
- 1.0g of solid X which is a carbonate F_2CO_3 .

You are required to;

Standardize solution N.

- Determine the RAM of F in F_2CO_3 .

PROCEDURE I

- i) Fill the burette with dilute hydrochloric acid solution N.
- ii) Pipette 25cm^3 of sodium hydroxide solution M into a conical flask.
- iii) To this add 2-3 drops of methyl orange indicator.
- iv) Titrate this solution with solution N and record your results in table 1 below. Repeat the procedure two more times to complete the table below.

Table 1

	I	II	III
Final burette readings (cm^3)			
Initial burette readings (cm^3)			
Volume of HCl used (cm^3)(solution N)			

(3 Marks)

- a) i) Calculate the average volume of solution N used.

(1 Mark)

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- ii) Determine the moles of Sodium hydroxide in 25cm^3 of the solution M used. (1 Mark)

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iii) Calculate the concentration of HCl solution N in moles per dm³.

(2 Marks)

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PROCEDURE II

- Measure 100cm³ of the hydrochloric acid solution N into a clean beaker. Put all the solid X in the beaker containing 100cm³ of solution N. leave the acid to react with solid X for about 3 minutes.
- Label the resulting solution, solution L.
- Fill the burette with solution L.
- Titrate the solution L with 25.0cm³ portions of sodium hydroxide solution M, using methyl orange indicator. Repeat the procedure two more times and complete the table below.

Table II

	I	II	III
Final burette readings (cm ³)			
Initial burette readings (cm ³)			
Volume of solution L used (cm ³)			

(3 Marks)

b) i. Calculate the average volume of solution L used.

(1 Mark)

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ii. Determine the number of moles of solution L in the average volume.

(1 Mark)

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iii. Find the number of moles of solution L in 100cm³.

(1 Mark)

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iv. Calculate the number of moles of hydrochloric acid in the original solution N.

(1 Mark)

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Determine the number of moles of hydrochloric acid which reacted with solid X

(F₂CO₃.)

(1 Mark)

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vi. From (v) above determine the number of moles of solid X which reacted with the acid.

(1 Mark)

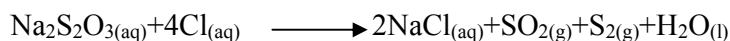
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vii. Find the relative molecular mass of solid X and hence the relative atomic mass of element F.

(1 Mark)

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2. You are required to investigate the effect of change in concentration on the reaction rate between sodium thiosulphate solution C and dilute hydrochloric acid solution D. When hydrochloric acid is added to sodium thiosulphate sulphur is deposited.



The time taken for sulphur to reach a certain amount can be used to indicate the rate of the reaction.

Solution C contains 0.08 moles of sodium thiosulphate in one litre of solution.

Procedure II

- Measure 40cm³ of solution C and pour it into a 100cm³ glass beaker.
- Mark a cross (X) on a white paper. Place the beaker containing solution C over the cross on the paper.
- Measure 10cm³ of solution D and add it to the solution C in the beaker. Start the stopwatch immediately. Observe the cross on the white paper from the top of the beaker and record the time taken for it to be obscured (to disappear from view).

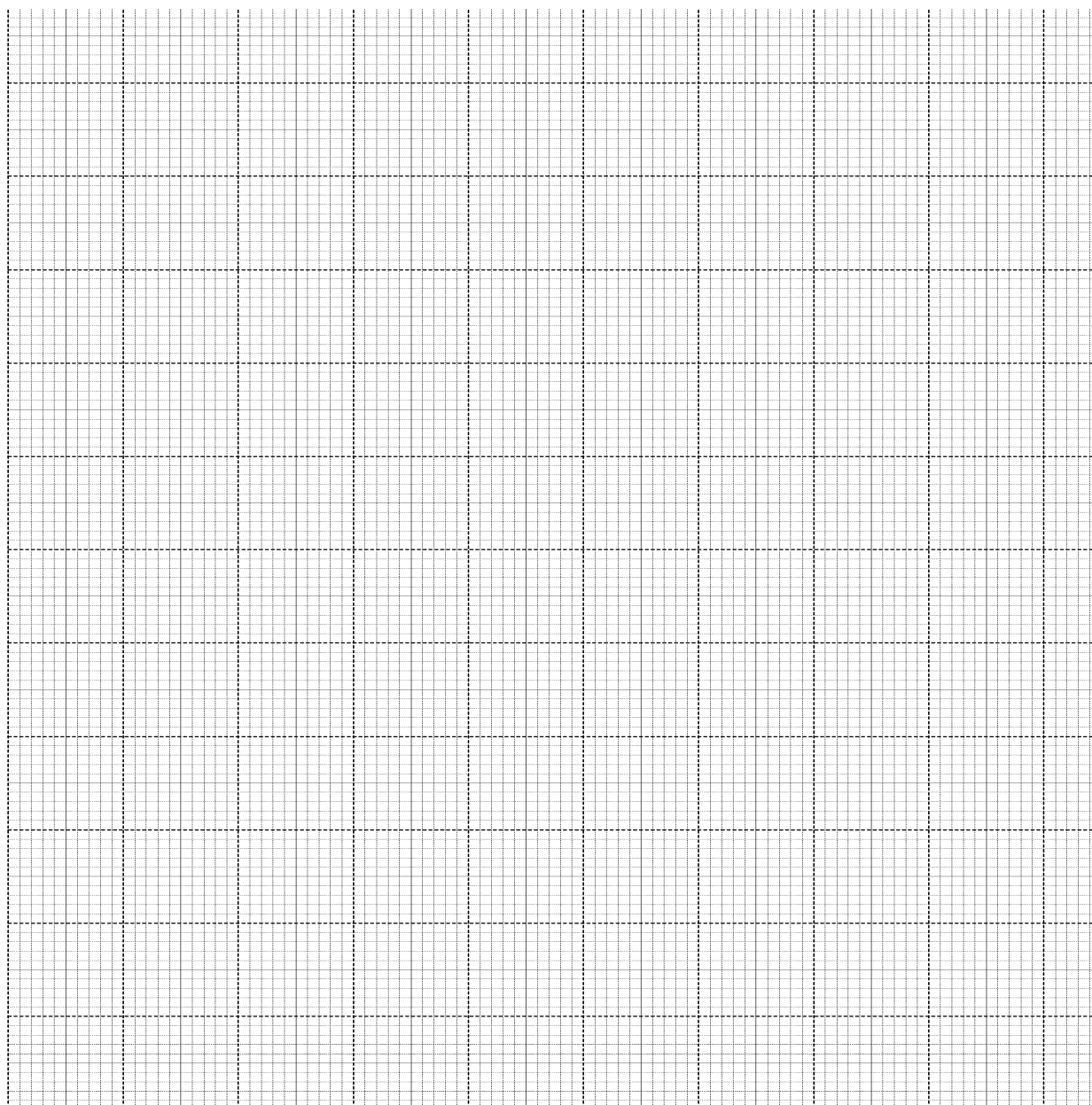
- iv. Repeat the experiment using different volumes of solution C as indicated in the following table and in each case water is added to make a total of volume of 40cm^3 . The same volume of hydrochloric acid is added in each case.

Complete the table below.

(5 Marks)

Volume of HCl used (cm^3)	Volume of $\text{Na}_2\text{S}_2\text{O}_3$ used cm^3 solution.	Volume of water added	Time taken (s)	_____ ()
10	40	0		
10	30	10		
10	25	15		
10	20	20		
10	10	30		

- I. On the grid provided plot a graph of the reciprocal of time — (s^{-1}) y-axis against volume of solution C used. (3Marks)



- II. From the graph determine the time taken for the cross to disappear if 35cm^3 of solution C was used. (2mks)

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- III. Explain the shape of the graph in terms of rates of reaction. (1mk)

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3. Perform the following tests to identify the cations and ions in solid W.

- i. Put all the solid W provided in a boiling tube. Add distilled water till the boiling tube is half way full. Shake well.

Observation	Inference
(½ Mark)	(½ Mark)

- ii. Filter the resultant mixture to obtain both filtrate and residue. Retain both filtrate and residue. Divide the filtrate into 3 portions. To the first portion add sodium hydroxide dropwise until in excess.

Observation	Inference
(2 Marks)	(½ Mark)

- iii. To the second portion add ammonia solution dropwise till in excess.

Observation	Inference
(1 Mark)	(½ Mark)

- iv. To the third portion add a few drops of silver nitrate followed by a few drops of nitric acid.

Observation	Inference
(1 Mark)	(½ Mark)

- b) i) Put all the residue in a boiling tube, add about 1cm^3 of nitric acid and test the gas produced using litmus and lime water by placing a glass rod dipped in lime water at the mouth of the boiling tube. Retain the result for the test below.

Observation	Inference
(1 Mark)	(1 Mark)

- ii. To this solution add distilled water till the boiling tube is half way full. Allow it to settle to get a clear solution. Divide this solution into three portions. To the first portion add sodium hydroxide dropwise until in excess.

Observation	Inference
(1 Mark)	(½ Mark)

- iii. To the second portion add ammonia solution dropwise until in excess.

Observation	Inference
(1 Mark)	(½ Mark)

- iv. To the third portion add a few drops of potassium iodide solution.

Observation	Inference
(1Mark)	(½ Mark)

Cations: and
 (½ Mark) (½ Mark)

Anions: and
 (½ Mark) (½ Mark)