

Name: Index no
School: Candidate's sign
Date:

233/3
CHEMISTRY
PRACTICAL
PAPER 3
JULY/AUGUST 2011
TIME: 2 ¼ HOURS.

MUMIAS DISTRICT JOINT EVALUATION EXAM

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

Chemistry
Paper 3

INSTRUCTIONS TO CANDIDATES:

- Answer **all** the questions in the spaces provided in the question paper.
- You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All working **MUST** be clearly shown where necessary.
- Mathematical tables and electronic calculators may be used.

For Examiner's Use Only:

Question	Maximum score	Candidates score
1	13	
2	12	
3	15	
Total score	40	

This paper consists of 7 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are Missing

1. **You are provided with**

- Solid **A**: 0.31 g of a carbonate (MCO_3).
- Solution **B**: 1.1M hydrochloric acid
- Solution **C**: 0.2M sodium hydroxide.
- Methyl orange indicator.

You are required to:

- Determine the molar mass of the carbonate
- Determine the relative formula mass and hence formula of the carbonate.

PROCEDURE

- Measure 50 cm^3 of solution **B** using a measuring cylinder. Transfer all the solid **A** provided into a 250 cm^3 volumetric flask. Transfer 50 cm^3 solution **B** into 250 cm^3 volumetric flask containing solid **A** and stir the contents until the entire Solid dissolves and no more effervescence occurs. Add more distilled water up to the 250 cm^3 mark and label this solution **D**.
- Pipette 25.0 cm^3 of solution **D** and transfer to a conical flask. Add two drops of methyl orange indicator and titrate with solution **C**. Record your results in table I below.
- Repeat the titration to get two more concordant values.

TABLE 1

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

(4 mks)

(a) Calculate;

(i) The average volume of solution **C** used.

(1mk)

(ii) The moles of solution **C** in the volume in (i) above.

(1mk)

(iii) The moles of **D** that reacted with **C**.

(1mk)

(iv) The moles of hydrochloric acid remaining after reaction with the carbonate.

(1mk)

(v) The moles of hydrochloric acid that reacted with the carbonate.

(1mk)

(vi) The moles of carbonate that reacted.

(1mk)

(b) Determine the relative formula mass of the carbonate and the value of M.

(2 mks)

2. You are provided with.

- Sodium thiosulphate $\text{Na}_2\text{S}_2\text{O}_3$ solution S.
- 2 M hydrochloric acid

You are required to determine the rate of reaction between the two solutions at different temperature.

PROCEDURE

- Measure 25.0cm^3 portions of solution S and transfer into five conical flask. Record initial temperature of the solution in one flask and record in the table below at the place written room temperature. Measure 2.5cm^3 of the 2M hydrochloric acid and add to the conical flask of which you have recorded temperature. Stir the mixture and place over a cross (x) marked on a white paper. Record the time when the cross becomes invisible.
- Repeat the experiment using the remaining solutions at temperature 30, 40, 50 and 60 using 25cm^3 of solution S and 2.5cm^3 portions hydrochloric acid in each case.
- To attain the temperature, warm the solutions in the conical flask to the desired temperature.
- **Note:** Rinse the conical flask immediately after each experiment to avoid staining of the flask.

(a) Record your results in the table below.

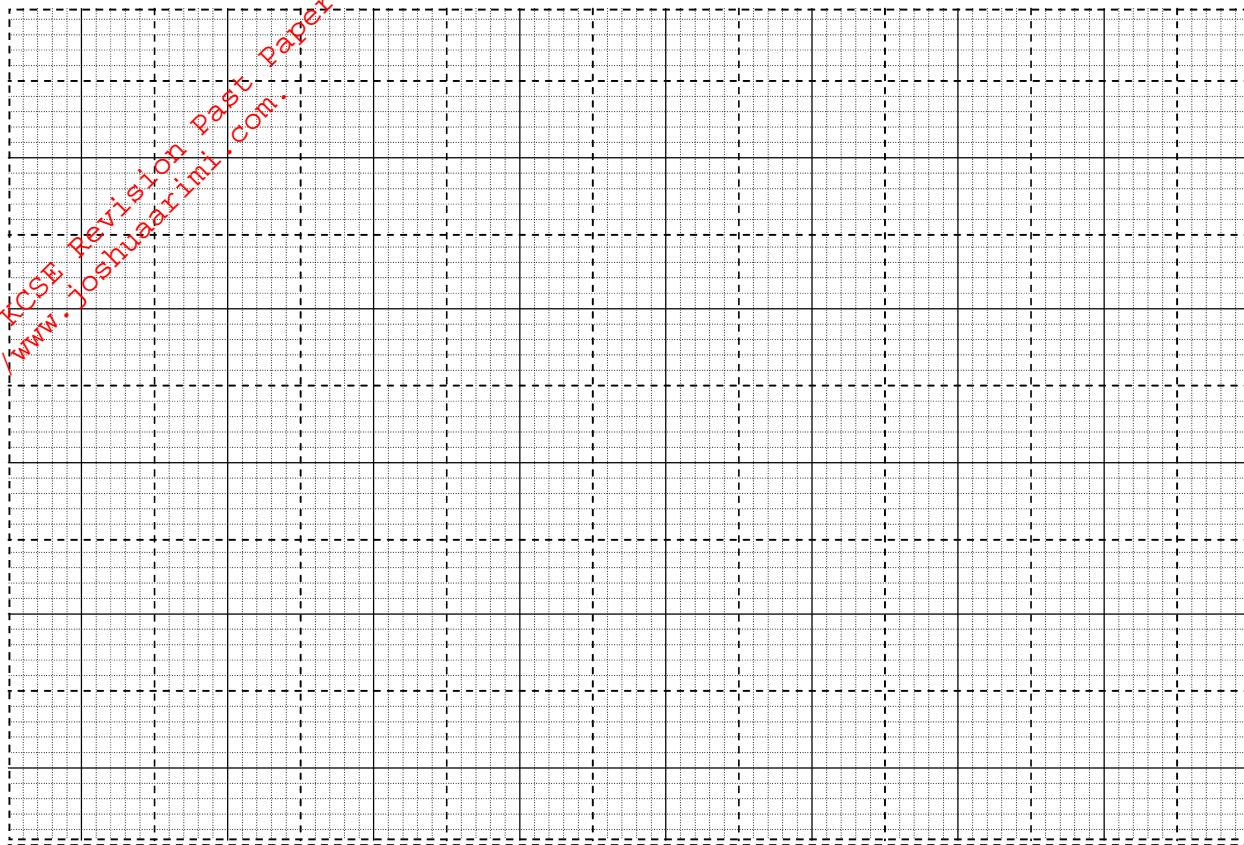
TABLE II

	Rom temperature				
I Temperature of solution S ($^{\circ}\text{C}$)		30	40	50	60
Time for cross x to become invisible (seconds).					
$\frac{1}{t}(\text{S}^{-1})$					

(5 mks)

(b) On the grid provided, plot a graph of $\frac{1}{t}$ (y-axis) against temperature T ($^{\circ}\text{C}$) x-axis.

(4 mks)



(c) From your graph, determine the time taken for the cross to become invisible at 45°C temperature.

(1mk)

(d) What is the effect of temperature on the rate of reaction? Explain.

(2mks)

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3. (I) You are provided with solid M. You are required to carry out the tests below and write your

observations in the spaces provided. Identify any gas or gasses produced.

- (a) Place solid M into a boiling tube. Add distilled water while shaking until the boiling tube is half-full. Divide the resultant mixture into three portions.

Observations	Inferences
(1mk)	(1mk)

- (b) To the portion, add Nitric acid followed by Barium (ii) nitrate solution.

Observations	inferences
(1 mk)	(1 mk)

- (c) Dip one end of the filter paper strip into potassium dichromate solution and then remove it. Place the dipped end of the filter paper at the mouth of the test tube and warm the contents of the test tube gently.

Observations	Deductions
(1mk)	(1mk)

- (d) Clean a metallic spatula and rinse with distilled water. Place a little of the solution on the spatula and burn it with a non-luminous flame.

Observations	Deductions
(1mk)	(1 mk)

- (II) You are provided with solid V. You are required to carry out the tests indicated below.

- Place a spatula and full of solid V in a boiling tube. Add about 6 cm³ of distilled water and shake well. Divide the mixture into four portions in tests tubes.

(a) To the first portion, add three drops of potassium permanganate solution.

Observations	Inferences
(1 mk)	(1 mk)

(b) To the second portion, add few drops of bromine water.

Observations	Inferences
(1mk)	(1mk)

(c) To the third portion, add one spatula and full of sodium carbonate.

Observations	Inferences
(1mk)	(1mk)

(d) Test the pH of the solution using universal indicator solution provided.

Observations	Inferences
(1 mk)	(1 mk)