

FOCUS A365

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Name.....

Index No...../.....

School.....

Candidates Signature.....

Date

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

CHEMISTRY

Paper 3

PRACTICAL

2 ¼

Instructions to candidates

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** 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 to read the question paper and make sure you have all the chemicals and apparatus that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	12	
3	16	
TOTAL SCORE	40	

1. You are provided with the following:
- Solution M which is 0.2 M sodium hydrochloric acid.
 - Solution N which is a Hydrochloric acid
 - 1.0g 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

- Fill the burette with dilute Hydrochloric acid (Solution N)
- Pipette 25cm^3 of sodium hydroxide solution M into a conical flask
- To this solution add 2-3 drops of methyl orange indicator
- Titrate this solution with solution N and record your result in table I below. Repeat the procedure two more times to complete the table.

Table	1	2	3
Final burette readings(cm^3)			
Initial burette readings(cm^3)			
Volume of HCl used cm^3 (solution N)			

(3 mks)

- Determine the average volume of solution N used. (1 mk)
 - How many moles of sodium Hydroxide are there in 25cm^3 of solution M used. (1 mk)
 - Calculate the concentration of HCl (solution N) in moles per dm^3 (1 mk)

Procedure II

- Measure 100cm^3 of Hydrochloric acid(solution N) into a clean beaker. Put all solid X in the beaker containing 100cm^3 of solution N. Leave the acid to react with solid X for 3 minutes.
- Label the resulting solution as L.
- Fill the burette with solution L.
- Titrate this solution with 25.0cm^3 portions of sodium Hydroxide solution M.
- In the conical flask using methyl orange indicator. Repeat the procedure to complete the table II below.

Table II	1	2	3
Final burette readings(cm^3)			
Initial burette readings(cm^3)			
Volume of solution L used cm^3			

(3 mks)

- Calculate the average volume of solution L used. (1 mk)
 - Find the number of moles of solution L in the average volume. (1 mk)

- iii) Find the number of moles of solution L in 100cm³. (1 mk)
- iv) Number of moles of Hydrochloric acid in the original solution N. (1 mk)
- v) Find the number of moles of HCl which reacted with solid X (F₂CO₃) (1 mk)
- vi) Find the number of moles of solid X which reacted with acid. (1 mk)
- vii) Find the reactive molecular mass of solid X and hence the relative atomic mass of F. (2 mks)

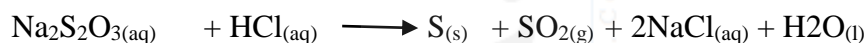
2. You are provided with the following:

- i) Solution D, which is 2 M Hydrochloric acid
- ii) Solution B, which is 0.1 M sodium Thiosulphate (Na₂S₂O₃)

You are required to find out the effect of change of temperature on the rate of reaction between Sodium thiosulphate and hydrochloric acid.

NB: The end result of this reaction is the formation of a yellow/ white precipitate of colloidal sulphur.

Equation:



Procedure:

- i) Measure 5 cm³ of solution D into a clean 100cm³ glass beaker.
- ii) Place it together with its contents on a white piece of paper with the word CHEM written on it in bold print.
- iii) Measure the temperature of the solution D
- iv) Record it as shown below in the Table
- v) Measure 100cm³ of solution B
- vi) Add this to the contents of the beaker in(i) above set off the stop watch or clock immediately.
- vii) Record the time taken for the printed word CHEM to become invisible when viewed above the reaction mixture in the 100cm³ beaker
- viii) Thoroughly wash the beaker used in (i) above

ix) Repeat the experiment using HCl solution D at the temperature indicated in the table.

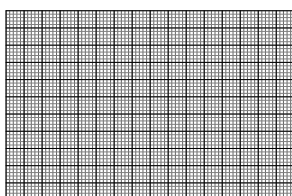
Test No.	Volume of solution	Volume of Na ₂ S ₂ O ₃	Temperature °C	Time in (s)	Reciprical of time 1/t

	D(HCl) in cm ³	solution B cm ³			s ⁻¹
1	5	10	Room temperature		
2	5	10	30		
3	5	10	35		
4	5	10	40		
5	5	10	45		
6	5	10	50		
7	5	10	55		
8	5	10	60		

(6 mks)

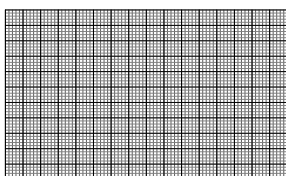
On the grids provided plot a graph of:

- i) Time (sec) on x axis against Temperature °C y axis



- ii) Reciprocal of time $1/t$ s⁻¹ x axis against Temperature °C (y axis)

(3 mks)



- b) Comment on the effect of change of temperature on the rate of the reaction between sodium thiosulphate and hydrochloric acid.
- c) Use the graph of temperature against the reciprocal of time in a) (ii) above to estimate the time that the reaction would take at 58 °C
- d) Use the graph of time against temperature in a(i) above to calculate the rate of reaction at 43°C
3. a) You are provided with solid L. Use it to carry out the tests below and record your results in the table provided.

TEST	OBSERVATION	INFERENCES
a) Transfer all solid L into a boiling tube. Add 10cm ³ of 1M HNO ₃ and shake Dip a glass rod into calcium Hydroxide solution and place it at the mouth of the boiling tube.		1 mk ½ mk
b) To about 2 cm ³ of the solution in a test tube add 3 drops of lead II Nitrate solution and warm		1 mk ½ mk
c) To about 2 cm ³ of the solution in another test tube add 2M sodium Hydroxide solution drop wise till in excess		½ mk ½ mk
d) To about 2 cm ³ of solution in another test tube dip a clean		

metallic spatula in the solution and place it on a burner flame.	½ mk	½ mk
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- b) You are provided with solid Q, you are required to:
- Carry out the tests described below on solid Q
 - Record your observations and inference accordingly
 - Test any gases provided.

Procedure:

- Place a spatula full of solid Q in a boiling tube
- Add about 15 cm³ of distilled water and shake
- Divide the resulting solution into four portions
- Use a universal indicator paper to test portion one of the solution

Observation	Inference
½ mk	½ mk

- v) Add a spatula full of sodium carbonate to the second portion.

Observation	Inference
½ mk	½ mk

- vi) Add three drops of acidified Potassium Manganate (vii) solution to the third portion.

Observation	Inference

½ mk

½ mk

- vii) Place 4 cm³ of Ethanol in a test tube Add two drops of concentrated Sulphuric (vi) acid and then a spatula full of solid Q shakes well and warm the mixture carefully. Pour the warm mixture into the smell.

Observation

Inference

½ mk

½ mk

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