

NAME: INDEX:DATE.....

SCHOOL:.....SIGN.....

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY / AUGUST 2010
2¼ HOURS

JOINT INTER SCHOOLS EVALUATION TEST (JISSET) Kenya Certificate of Secondary Education

233 / 3
CHEMISTRY
PAPER 3

INSTRUCTIONS TO CANDIDATES

- ❖ 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 2¼hours allowed for this paper.
- ❖ This time is to enable you read through the question paper and make sure you have all the chemicals and apparatus that you may need
- ❖ All the working **must** be clearly shown where necessary.
- ❖ Electronic calculators and mathematical tables may be used.

For Examiners Use Only

Questions	Maximum Score	Candidates Score
1	18	
2	14	
3	08	
Total	40	

1. You are provided with
 - Solution S containing 8.5g of an impure hydroxide per litre
 - Solution S₂, dilute hydrochloric acid.
 - Solution S₃, 0.04M anhydrous sodium carbonate

You are required to

- a) Standardize the hydrochloric acid solution S_2
- b) Determine the percentage purity of the hydroxide

PROCEDURE I:

- Pipette 25.0cm^3 of sodium carbonate solution S_3 into a conical flask. Add 3 drops of methyl orange indicator. Fill the burette with hydrochloric acid, solution S_2 and titrate with solution S_3 .
- Record your result in table (1) below. Repeat the procedure one more time to complete table (1)

TABLE (1)

	(1)	(11)
Final burette reading (cm^3)		
Initial burette reading (cm^3)		
Volume of acid used (cm^3)		

(4mks)

- a) Calculate the average volume of solution S_2 used. (1mk)

- b) Calculate the number of moles of sodium carbonate, solution S_3 that were used. (1mk)

- c) Determine;

- (i) The number of moles of hydrochloric acid solution S_2 that were used. (1mk)

(ii) The concentration in moles per litre of hydrochloric acid, solution S₂.

(1mk)

PROCEDURE II

Fill the burette with hydrochloric acid, solution S₂. Pipette 25.0cm³ drops of solution S₁ (Impure hydroxide) into a conical flask and add three (3) drops of methyl orange indicator. Titrate with solution S₁. Record your results in table (2) below. Repeat the titration one more time and complete the table below.

TABLE (2)

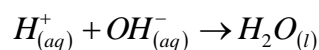
	(1)	(11)
Final burette reading (cm ³)		
Initial burette reading (cm ³)		
Volume of solution S ₂ used (cm ³)		

(4mks)

d) Determine the average volume of solution S₂ used

(1mk)

e) Given that the ionic equation for the reaction is



Determine

(i) The number of moles of hydrochloric acid, solution S₂, used.

(1mk)

(ii) The concentration in moles per litre of the hydroxide solution S_1 (1mk)

f) Given that the relative formula mass of the hydroxide is 56, calculate the

(i) Mass of the hydroxide in grammes per litre. (1mk)

(ii) Percentage purity of the hydroxide. (2mks)

2. You are provided with;

- Solution F, 2M hydrochloric acid
- Solution G, 0.16M sodium thiosulphate

You are required to determine the factor which determines the rate of reaction between solution F and G.

PROCEDURE III:-

- Measure 30 cm³ of solution G into a 100ml glass beaker placed over a white piece of paper on which a cross (X) is drawn on it (draw the cross using a pencil)
- Measure 10cm³ of solution F, add to the beaker, swirl it and start the stop watch immediately.
- View the cross from above the mixture in the beaker. Stop the clock when the cross just disappears. Record the time taken in the table below.
- Repeat the above procedure using volumes of solutions as instructed in the table below.

TABLE (3)

Experiment	Volume of solution G (cm ³)	Volume of water (cm ³)	Volume of solution F,(cm ³)	Time for cross to disappear (seconds)	$Rate = \frac{1}{time} (s^{-1})$
1	30	0	10		
2	25	5	10		
3	20	10	10		
4	15	15	10		
5	10	20	10		
6	5	25	10		

(6mks)

- a) Plot a graph of volume of solution G (cm³) against the Rate (S⁻¹). (5mks)

b) Determine the time taken if 17.5 cm^3 of solution G was used (2mks)

c) How does the rate of reaction between solution F and G, Compare. (1mk)

3. You are provided with solid Z. Carry out the tests below and write your observations and inferences in the spaces provided.

Dissolve solid W in 10cm^3 of distilled water in a boiling tube. Divide the solution into 4 separate test-tubes.

- (i) To the first portion, add sodium hydroxide drop-wise until in excess.

Observation	Inferences
(1mk)	(1mk)

- (ii) To the second portion, add 3 drops of lead (II) nitrate solution

Observation	Inferences
(1mk)	(1mk)

- (iii) To the third portion, add 1cm^3 of barium (II) chloride followed by 2M hydrochloric acid solution F then shake the mixture.

Observation	Inferences
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(1mk)	(1mk)
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(iv) To the fourth portion, add 3 drops of acidified manganate (IV)

Observation	Inferences
(1mk)	(1mk)