

NAME:.....

INDEX NO.....

SCHOOL:.....

CANDIDATE'S SIGN:.....

DATE:.....

233/3

CHEMISTRY

PAPER 3

(PRACTICAL)

JULY/AUGUST - 2014

TIME: 2 ¼ HOURS

MERU COUNTY JOINT EVALUATION EXAM - 2014

Kenya Certificate of Secondary Examination K.C.S.E

233/3

CHEMISTRY

PAPER 3

(PRACTICAL)

JULY/AUGUST - 2014

TIME: 2 ¼ HOURS

INSTRUCTIONS TO CANDIDATES

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

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	21	
2	11	
3	08	
TOTAL SCORE	40	

*This paper consists of 8 printed pages.
Candidates must check to ascertain that all pages are printed as indicated
and that no question(s) is/are missing.*

1. You are provided with:

Solution A - A mixture of sodium Hydroxide and Sodium Carbonate dissolved in a litre of solution.

Solution B - 0.2M Hydrochloric acid

Solution C - Barium Chloride solution

Phenolphthalein indicator

Methyl Orange indicator

Required:

Determine concentration of Sodium Carbonate and Sodium Hydroxide in the mixture.

Procedure I

1. Fill the burette with solution B
2. Using a pipette and a pipette filler, place 25.0cm^3 of solution A into a 250ml conical flask
3. Add three drops of methyl orange indicator to the solution in the conical flask.
4. Titrate solution A with solution B until the yellow colour just changes to pink. Record your results in table I below.
5. Repeat the procedure two more times and complete table I

NOTE: Retain solution B for use in procedure II

Table I

(4mks)

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

(a) Calculate:

(i) the average volume of solution B used. (1mk)

(ii) the number of moles of hydrochloric acid that reacted. (1mk)

Procedure II

1. Re-fill the burette with solution B.
 2. Using a pipette and pipette filler, transfer 25.0cm³ of solution A into a clean 250ml conical flask.
 3. Measure 15.0cm³ of barium chloride solution C using a clean measuring cylinder. Add it into the solution A in the conical flask. Shake it gently and add 2 drops of phenolphthalein indicator.
 4. Titrate solution B into the conical flask until the pink colour just changes to colourless.
- NOTE: The white precipitate should remain in the flask
5. Record your results in table II below.
 6. Repeat the procedure to obtain at least two more readings.

Table I

(4mks)

	I	II	III
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of solution B used (cm ³)			

- (b) Find the average volume of solution B used. Show your working

(1mk)

- (c) During titration in procedure II a white precipitate is formed as a result of reaction between Sodium carbonate and Barium Chloride solutions as follows.



The white precipitate does not take part in the titration but all the hydroxide ions (OH⁻) in the solution are neutralized.

- (i) Calculate the moles of hydrochloric acid, solution B reacting in procedure II.

(1mk)

- (ii) Calculate the moles of Sodium Hydroxide reacting in procedure II.

(1mk)

(d) Calculate the moles of Hydrochloric acid that reacted with Sodium Carbonate in the mixture. (2mks)

(e) Calculate the Molarity of Sodium Hydroxide in the mixture. (2mks)

(f) (i) Calculate the number of moles of Sodium carbonate in the mixture. (2mks)

(ii) Determine the Molarity of Sodium Carbonate solution in the mixture. (2mks)

2. You are provided with solid E. Carry out the following tests and write your observations and inferences in the spaces provided.

- (a) Place about one half of solid E in a test tube and heat it strongly. Test any gases provided with both red and blue litmus papers.

Observation	Inferences
(2mks)	(1mk)

- (b) Place the rest of solid E in a boiling tube. Add about 10cm^3 of distilled water. Shake well. Divide the resulting solution into three portions.

- (i) To the first portion add aqueous Sodium Hydroxide dropwise until in excess.

Observation	Inferences
(1mk)	(1mk)

- (ii) To the second portion add about 2cm^3 of hydrogen peroxide and shake well. To the resulting mixture, add aqueous sodium hydroxide dropwise until in excess.

Observation	Inferences
(1mk)	(1mk)

- (iii) To the third portion add three (3) drops of barium nitrate. Retain the mixture for the use in test (IV) below.

Observation	Inferences
(1mk)	(1mk)

- (iv) To the mixture obtained in (iii) above, add about 5cm³ of 2M nitric (V) acid.

Observation	Inferences
(1mk)	(1mk)

3. You are provided with solid F. Carry out the following tests. Write your observations and inferences in the spaces provided.

- (a) Place about one third of solid F on a metallic spatula and burn it in a Bunsen burner flame

Observation	Inferences
(1mk)	(1mk)

- (b) Place all the remaining solid F in a boiling tube. Add about 10cm³ of distilled water and shake until all the solid dissolves. Divide the resulting solution into three positions.
- (i) To the first portion add two drops of acidified Potassium dichromate (VI) solution and warm the mixture.

Observation	Inferences
(1mk)	(1mk)

- (ii) To the second portion add all Sodium Hydrogen Carbonate provided.

Observation	Inferences
(1mk)	(1mk)

- (iii) Determine the pH of the third portion.

Observation	Inferences
(1mk)	(1mk)