NAME ……..…….. **DATE** ……

INDEX NO. ……..……..……..…..…. **SIGNATURE** ……..……..

233/3
CHEMISTRY
PRACTICAL
PAPER 3
MARCH/APRIL 2015
TIME: 2¼ HOURS.

CROSS COUNTRY EXAMS 2015

Kenya Certificate of Secondary Education.

233/3
CHEMISTRY
PAPER 3
PRACTICAL
TIME: 2¼ HOURS.

INSTRUCTIONS TO CANDIDATES.

- Write your name and index number 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 2¼ hours allowed time for the paper.
- Use the 15 minutes to read through the question paper and note the chemicals you require
- Mathematical tables and electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.
- This paper consists of 8 printed pages.
  Candidates should check to ensure that all pages are printed as indicated and no questions are missing

FOR EXAMINER'S USE ONLY.

Question	Maximum score	Candidate's score
1	21	
2	19	
Total score	40	

1. You are provided with:-

- Solution A, Hydrochloric acid.
- Solution B, 0.024 M Sodium hydroxide.
- Solution C, containing 15.74g of Na_2CO_3. x H_20 in 250ml of the solution.

You are required to:-

(a) Prepare a dilute solution of the hydrated sodium carbonate, C.

(b) Determine:-

(i) The concentration of solution A.

(ii) The value of x in the carbonate.

Procedure a

– Using a pipette and pipette filler, place 25.0 cm^3 of solution C into a 250ml volumetric flask.
– Add about 200cm^3 of distilled water. Shake well.
– Add more distilled water to make upto the mark.
– Label this solution D.
– Retain solution D for use in procedure b and c.

Procedure b

– Fill a burette with solution A.
– Using a clean pipette and pipette filler, place 25.0 cm^3 of solution B into a 250ml conical flask.
– Add two drops of phenolphthalein indicator and titrate with solution A.
– Record your results in table 1.
– Repeat the titration two more times and complete the table.

Table 1

	I	II	III
Final burette reading			
Initial burette reading			
Volume of solution A (cm^3) added			

(4 marks)

(a) Determine the:-

(I) Average volume of solution A used. (1mark)

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(II) Number of moles of sodium hydroxide in 25cm^3 of solution B used. (1 mark)

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(III) Number of moles of acid in volume of solution A used. (1mark)

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(IV) Concentration of solution A in moles per litre. (1mark)

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Procedure C

- Fill the burette with solution A. Using a pipette and pipette filler, pipette 25.0cm^3 of solution D into a conical flask. Add 2 drops of methyl orange indicator and titrate with solution A.
- Record your results in the table.
- Repeat the titration two more times and complete the table.

Table 2

	I	II	III
Final burette reading			
Initial burette reading			
Volume of solution A (cm^3) added			

(4 marks)

(b) (i) Determine the:-

(I) Average volume of solution A used. (1 mark)

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(II) Moles of the acid in the average volume of solution A used. (1mark)

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(III) Concentration in grammes per litre of the carbonate in solution C. (1mark)

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(ii Write an equation for the reaction that occurred between the acid and the carbonate. (1mark)

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(iii) Determine:-

(I) number of moles of the carbonate in 25cm^3 of solution D used. (1 mark)

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(II) Number of moles of carbonate in 250cm^3 of solution D. (1 mark)

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(III) Concentration of solution C in moles per litre. (1mark)

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(IV) Value of x in $Na_2CO_3.xH_2O$. (h = 1.0, C = 12.0, O = 16.0 Na = 23.0) (2 marks)

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2. You are provided with 2.5g of solid S in a boiling tube. Carry out the following tests and record your observations and inferences in the spaces provided.

(a)

- Add 10.0cm^3 of distilled water to solid S in the boiling tube.
- Shake well.
- Filter the mixture into a clean boiling tube.
- Label the filtrate as solution S and residue as R.
- Retain both the filtrate and the residue.

Observations	Inferences
(½ mark)	(1mark)

(i) Place about $2cm^3$ of solution S in a test tube, add 3 drops of 2M sodium chloride.

Observations	Inferences
(½ mark)	(1mark)

(ii) Place about $2cm^3$ of solution S in a test tube, add 2M ammonia solution dropwise till in excess.

Observations	Inferences
(1 mark)	(½ mark)

(iii) Place about 2cm3 of solution S in a test tube, add 3 drops of 0.5M Nitric Acid.

Observations	Inferences
(1 mark)	(1 mark)

(iv) Place about $2cm^3$ of Solution S in a test tube, add 3 drops of Lead (II) Nitrate solution and warm.

Observations	Inferences

(1 mark)	(1mark)

(v) Place about $2cm^3$ of the solution in a test tube, add Barium Nitrate then excess 0.5M Nitric acid.

Observations	Inferences
(1 mark)	(½ mark)

(b) Dry the solid residue R in between 2 filter papers. Divide the residue into two.

(i) Place one portion of the residue R in a test tube. Heat gently then strongly. Test any gas with a PH indicator paper.

Observations	Inferences
(1 mark)	(½ mark)

(ii) To the other half residue R add few drops of 2M Nitric (v) acid. Test any gas produced with lime water – using the glass rod.

Observations	Inferences
(1 mark)	(1 mark)

(c) You are provided with solid P. Carry out the following tests and record your observations and inferences in the spaces provided.
Divide solid P into two portions.

(i) Place one portion of solid P in a metallic spatula.
Heat using a non-luminous flame.

Observations	Inferences
(1 mark)	(1 mark)

(ii) Place one portion in a boiling tube. Add 5 cm^3 of distilled water. Shake well. Label this (boiling tube) as solution P.

Observations
(½ mark)

(iii) Place about 2cm^3 of solution P in a test tube. Test with litmus papers.

Observations	Inferences
(1mark)	(½ mark)

(iv) Place about 2cm3 of solution P in a test tube. Add one drop of acidified Potassium Chromate (VI) and warm.

Observations	Inferences
(1 mark)	(1 mark)