NYAMBARIA HIGH SCHOOL

END OF YEAR EXAMS

Paving Way For Kenya Certificate of Secondary Education Success

Name …….. Admission no…….
Candidate's Signature…… Date…….

FORM 3
CHEMISTRY
PAPER 3
TIME: 2Hours

INSTRUCTIONS TO CANDIDATES

- ✓ *Write your **name**, **stream** and **other details** in the spaces provided above.*
- ✓ *Answer all the questions in the spaces provided.*
- ✓ *Mathematical tables and electronic calculators may be used.*
- ✓ *In the first 15 minutes read through the questions and ensure that you have all the apparatus and other substances you need.*

FOR EXAMINER'S USE ONLY

Questions	Maximum score	Candidate's Score
1	21	
2	11	
3	08	
Total	**40**	

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1. You are provide with

- **Solution A**, Hydrochloric acid
- **Solution B**, containing 8.0g per litre of sodium hydroxide
- 0.4g of an impure carbonate **solid C (M_2CO_3)**

Procedure I.

(i) Fill the burette with sodium hydroxide, **Solution B**

(ii) Pipette 25cm^3 of hydrochloric acid, **Solution A** into a conical flask

(iii) Add 2-3 drops of phenolphthalein indicator and titrate until a permanent pink colour appears

(iv) Repeat the titration two more times and complete the table

Table 1

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

(4mks)

(a) Find the average volume of **solution B** used? **(1mk)**

(b) Determine the

(i) Concentration of **solution B** in moles per litre (Na=23.0, O=16.0, H=1.0) **(1mk)**

(ii) Concentration of **solution A** in moles per litre **(2mks)**

Procedure II

(i) Using a measuring cylinder, measure out 100cm^3 of **Solution A** into a 250cm^3 beaker

(ii) Add all of solid C into the beaker containing **Solution A**

(iii) Transfer all the solution into a 250ml volumetric flask and top up to the mark using distilled water. Label this as solution D

(iv) Fill the burette with sodium hydroxide solution, B

(v) Pipette 25cm^3 of solution D into a conical flask

(vi) Add 2-3 drops of phenolphthalein indicator and titrate until a permanent pink colour appears

(vii) Record your results in table II below

(viii) Repeat the titration two more times and complete

Table II

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

(4mks)

(a) Find the average volume of solution B used? **(1mk)**

(b) Calculate the;

(i) moles of hydrochloric acid in 25.0cm^3 of solution D **(2mks)**

(ii) Moles of hydrochloric acid in 250cm^3 of solution D **(1mk)**

(iii) Moles of hydrochloric acid in 100cm^3 of the original hydrochloric acid **Solution A** **(1mk)**

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(iv) Moles of hydrochloric acid that were used up in the reaction with **solid C** **(1mk)**

(v) Moles of the carbonate (M_2CO_3) that reacted with hydrochloric acid **(1mk)**

(c) Given that the relative formula mass of the carbonate is 106, calculate the;

(i) mass of the carbonate that reacted **(1mk)**

(ii) percentage purity of the carbonate, solid C **(1mk)**

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

(a) Describe the appearance of **solid E**. **(1 mark)**

……

(b) Place a spatulaful of **solid E** in a boiling tube and add about 8 cm^3 distilled water. Shake well and divide the resulting mixture into four portions for tests (i) to (iv) that follow.

Observations	Inferences
(1 mark)	(1 mark)

(i) To the first portion, add aqueous sodium hydroxide dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

(ii) To the second portion, add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

(iii) To the third portion, add a 4 drops of sodium chloride solution.

Observations	Inferences
(1 mark)	(1 mark)

(iv) To the last portion, add 4 drops of aqueous barium nitrate followed by dilute nitric (V)acid.

Observations	Inferences
(1 mark)	(1 mark)

3. You are provided with:

- Solid J
- Litmus papers (red/blue)
- Lead (II)nitrate solution

(a) Describe the appearance of **solid J**. **(1 mark)**

……..

(b) Place a spatulaful of solid J in a boiling tube and add distilled water to fill about half the tube. Shake well and divide the resulting mixture into two 2 cm^3 portions for tests (I) and (II) that follow.

(c) To the first portion, add drops of sodium hydroxide solution and warm. Test the gas evolved with moist red and blue litmus papers.

Effect gas on	
Red litmus paper	**Blue litmus paper**
(1 mk)	(1 mk)

I. Identify the gas evolved. **(1 mk)**

……

II. Identify the cation (positive ion) in solid J. **(1 mk)**

……

(ii) To the second portion, add drops of lead (II)nitrate solution and warm.

Observations: **(2 mks)**

…….

……..

(iii) Identify the anion (negative ion) present in the solution of J. **(1 mk)**

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