Name: ..... *Index No.:* .....

School: ..... *Stream:* .....

Candidate's Signature: ..... *Date:* .....

233/3
CHEMISTRY
Paper 3
(Practical)
MAY – 2016
TIME: 2 ¼ Hours

KANGA – KISII – NYABURURU – NYAMBARIA JOINT EXAM

Kenya Certificate of Secondary Education (KCSE)

INSTRUCTIONS TO CANDIDATES

- *Answer ALL the questions in the spaces provided in the question paper.*
- *You are not allowed to start working with apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you read the question paper and make sure you have ALL the chemicals and apparatus that you may need.*
- *All working MUST be clearly shown where necessary.*
- *Mathematical tables and electronic calculators may be used.*

FOR EXAMINER'S USE ONLY

Section	*Maximum Score*	*Candidate's Score*
1	*21*	
2	*13*	
3	*06*	
Total	*40*	

You are provided with:
- 1.0 g of an impure calcium carbonate, solid A.
- Monobasic acid, solution B.
- 0.18 M sodium carbonate, solution C.

You are required to:
i) Standardise solution B.
ii) Determine the percentage purity of calcium carbonate in the mixture.

Procedure 1

Pipette 25.0 cm^3 of solution C into a conical flask. Add 2 – 3 drops of methyl orange indicator. Titrate with the monobasic acid, solution B. Record your results in the table 1 below. Repeat the procedure to obtain three concordant results.

Table 1	*I*	*II*	*III*
Final burette reading.			
Initial burette reading.			
Volume of solution B used (cm^3)			

(4 mks)

a) Calculate the average volume of monobasic acid, solution B, used. (1 mk)

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b) How many moles of sodium carbonate are in 25.0 cm^3 of solution C? (1 mk)

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c) Calculate the number of moles of monobasic acid that reacted with 25.0 cm^3 of solution C. (1 mk)

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d) Determine the molarity of the monobasic acid, solution B. (1 mk)

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Procedure II

Place the 1.0 g of the solid A provided into a conical flask and add 100 cm^3 of the monobasic acid, solution B. Swirl the contents of the flask vigorously until effervescence stops. Label this as solution D.

- Using a clean pipette, transfer 25.0 cm^3 of solution D into a clean conical flask and titrate it with solution C from the burette using 2 – 3 drops of methyl orange indicator. Repeat the titration two more times and record your results in the table 2 below.

Table 2

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

(4

Calculate:

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

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ii) the number of moles of solution C used. (1 mk)

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iii) the number of moles of the acid in solution D used. (1 mk)

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iv) the number of moles of the acid in 100 cm^3 of solution D. (1 mk)

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v) the number of moles of the acid in 100 cm^3 of the original solution B. (1 mk)

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vi) the number of moles of the acid that reacted with calcium carbonate in solid A. (1 mk)

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vii) the number of moles of calcium carbonate that reacted with the acid, solution B. (1 mk)

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vii) the mass of calcium carbonate present in 1.0 g of solid A. (Ca = 40.0, O = 16.0, C = 12.0).
(1 mk)

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.....

viii) the percentage of calcium carbonate in solid A. (1 mk)

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2. You are provided with solid T. Carry out the tests below and record your observations and inferences in the spaces provided.

a) Place all the solid T into a clean boiling tube and add about 10 cm^3 of distilled water and shake.

Observations	*Inferences*
(1 mk)	(1 mk)

b) Take about 2 cm^3 portion of the solution and add 2 M NaOH drop wise until in excess.

Observations	*Inferences*
(1 mk)	(1 mk)

c) To another 2 cm^3 portion of the solution, add aqueous ammonia drop wise until in excess.

Observations	*Inferences*
(1 mk)	(1 mk)

To another 2 cm^3 portion of the solution, add 5 drops of 2M H_2SO_4.

Observations	*Inferences*
(1 mk)	(1 mk)

e) To another 2 cm^3 portion of the solution, add five drops of Lead (II) nitrate solution.

Observations	*Inferences*
(1 mk)	(2 mks)

f) To the remaining portion of the solution, add 5 drops of acidified Barium chloride solution.

Observations	*Inferences*
(1 mk)	(1 mk)

3. You are provided with liquid L. Carry out the tests below and record your observations and inferences in the spaces provided.

a) Put about 2 cm^3 of liquid L in a test tube. Add about 2 cm^3 of distilled water.

Observations	*Inferences*
(1 mk)	(1 mk)

b) Place another 2 cm^3 of liquid L into a test tube and add 3 drops of acidified potassium manganate (VII) solution. Warm the mixture gently.

Observations	*Inferences*
(1 mk)	(1 mk)

c) To another 2 cm^3 of liquid L, add 3 drops of acidified potassium dichromate (VI) solution.

Observations	*Inferences*
(1 mk)	

END