Name: …………………………… Registration Number: ………… Class … ….

233/3
CHEMISTRY
2 ¼ hours
TRIAL 6

2018

FORM 4 THREE
Kenya Certificate of Secondary Education (KCSE)

233/3
CHEMISTRY
2 ¼ hours

Instructions to Candidates

(a) Write your name and registration number in the spaces provided above.
*(b) Answer **all** the questions in this paper.*
(c) Answers must be written in the space provided.
(d) Additional pages must not be inserted.
(e) ***This paper consists of 6 Printed pages.***
(f) Mathematical tables and electronic calculators may be used.
*(g) All working **MUST** be clearly shown where necessary.*
(h) Use the first 15 minutes of the 2 ¼ hours to ascertain you have all the chemicals and apparatus that you may need.

For Examiners use only.

Questions	Maximum score	Candidates score
1	20	
2	20	
Total		

Q1   You are provided with

- Metal carbonate M_2CO_3 solid Q which weighs exactly 5.0g

- 2M hydrochloric acid solution P
- Sodium hydroxide solution R made by dissolving 40g of the solid in a litre of solution.

You are required to determine
- The relative formula mass (RFM) of M_2CO_3 and hence the relative atomic mass (RAM) of M.

Procedure

- Measure accurately using a measuring cylinder $100cm^3$ of solution P into a clean $250cm^3$ conical flask.
- Add all the 5.0g of solid Q, shake well and wait for effervescence to stop.
- Put the solution into a 250ml clean beaker.
- Label the resulting solution S.
- Pipette $25cm^3$ of solution R into a clean conical flask and add 2-3 drops of phenolphthalein indicator
- Fill the burette with solution S and titrate against solution R.
- Record the results in the table below
- Repeat the titration two more times and record in the table.

(4 marks)

	1	11	111
Final burette reading			
Initial burette reading			
Volume of S used(cm^3)			

(a)   Calculate the average volume of solution S used   (1 mark)

(b)   Calculate
(i)   Moles of sodium hydroxide solution R used   (2 marks)

ii)   Moles of hydrochloric acid solution S in the average volume used   (2 marks)

(iii)   Moles of HCl solution S in 100cm the of solution.   (2 marks)

(iv)   Moles of hydrochloric acid solution P in the $100cm^2$ of the original solution
                                                                                 (2 marks)

(v)   Moles of HCl solution P that reacted with solid Q   (2 marks)

(vi)   Moles of M_2CO_3 solid Q that reacted   (2 marks)

(vii)   The RFM of M_2CO_3 (2 marks)

(viii)   The RAM of metal M   (1 mark)
         (Na = 23   O = 16,   H = 1)

Q2 Carry out the tests on the substances given and record your observations and inferences in the spaces provided.

(a)(i)   Put half of solid A in a boiling tube, add about $3cm^3$ of distilled water shake and retain the solution

Observation	Inference
½ mk	½ mk

(ii)   To the solution above, add a few drops of ammonia solution then add in excess

Observation	Inference
1 mk	1 mk

(III)   Scoop the rest of solid A in a clean metallic spatula and burn on a non-luminous flame.

Observation	Inference
½ mk	½ mk

(b)(i) Put ½ of solid B in a test tube and add about $1cm^3$ of distilled water

Observation	Inference
½ mk	½ mk

(ii)   Put the remaining solid in a test tube and add about $1cm^3$ of dilute hydrochloric acid.

Observation	Inference
½ m k	½ m k

(c) (i) Put ½ of solid C in a test tube, heat gently then strongly observing the colour changes in the solid when heating and after cooling. Test any gas produced with wet litmus papers and a glowing splint.

Observation	Inference
3 m k	1 ½ m k

(ii) Put the remaining solid C in a test tube and add about 2cm^3 of distilled water, shake well. Add ammonia solution drop wise then in excess

Observation	Inference
1 m k	1 m k

(d) Put solid D in a test tube and add 2cm^3 of distilled water. Shake well then add ammonia solution drop wise then in excess.

Observation	Inference
1 m k	1 m k

(e) Repeat procedure in (d) above with solid E.

Observation	Inference
1 m k	1 m k

(f)   Divide solution F into 3 portions.

    (i)   Test the PH of the first portion with universal indicator.

Observation	Inference
½ m k	½ m k

(ii) In the second portion drop a piece of magnesium ribbon and test for any gas produced with a burning splint.

Observation	Inference
1 m k	½ m k

(iii) To the third portion add a ¼ spatula of sodium hydrogen carbonate.

Observation	Inference
½ m k	½ m k