NAME.. ADM NO.............................

SCHOOL... CANDIDATES SIGN..............

DATE ....

233/3
CHEMISTRY
FORM 3
TIME: 2 ¼ HOURS

END OF TERM (III) EXAMINATION -2019
Kenya Certificate of Secondary Education (K.C.S.E)

233/3
CHEMISTRY
FORM 3
TIME: 2 HOURS

For examiners use only

SECTION	QUESTION	CANDIDATE'S SCORE
1	22	
2	12	
3	6	

1. **You are provided with**:

   - Solution K monobasic and HX

   - Solution L is sodium hydroxide containing 0.8g solute in 200cm³ of solution

   - Solution M in anhydrous metal carbonate Mg CO₃ (R.f.m. 106) containing 5.3g of the carbonate dissolved in 500cm₃ solution

   You are required to:-

   Standardize the monobasic acid and experimentally determine the equation for the reaction

   Between the acid HX and the carbonate M₂CO₃

   Procedure I

   - Fill the burette with solution K using pipette and pipette filler transfer 25cm³ of solution L into a clean dry conical flask add 2 drops of methyl orange indicator and Titrate with solution K in the burette. Repeat the procedure two more times to complete the table   (4mks)

Table 1

Experiment	1	2	3
Final burette reading (cm³)			
Initial burette reading (cm³)			
Volume of solution K (cm³)			

   (a) Determine the average volume of solution K used in cm³   (1mk)

   ....

   ....

   (b) (i) Calculate the concentration of solution L in moles per litre   (1mk)

   ....

   ....

   (ii) Calculate the moles solution L that reacted with K   (1mk)

   ....

   ....

   (iii) Calculate the concentration of solution K in moles per litre   (1mk)

   ....

   ....

Procedure II

Using a pipette and pipette filler, transfer $25cm^3$ of solution M into a clean dry conical flask. Titrate with solution K in the burette using methyl orange as the indicator. Record your results in the table II. Repeat the procedure two more times to complete the table.   (4mks)

Table II

Experiment	1	2	3
Final burette reading(cm^3)			
Initial burette reading(cm^3)			
Volume of K used (cm^3)			

(a) Determine the average volume of solution K used   (1mk)

....

....

(b) Calculate the concentration of solution M in moles per litre   (2mks)

....

....

(c) Calculate the moles of solution M that reacted   (2mks)

....

....

(d) Calculate the number of moles of solution K in the average volume   (2mks)

....

....

(e) From your answers in parts (c) and (d) above how many moles of solution
K reacted with 1 mole of solution M   (2mks)

....

....

....

....

(f) Hence write an equation for the reaction between M and K   (1mk)

....

....

2.   You are provided with solid P, carry out the following tests

(a) Scoop half a spatula full of solid P and put it in a dry test tube. Heat strongly and test for the gases produced

Observation	Inferences
(1mk)	(1mk)

(b) Put the remaining solid P in a boiling tube, add $5cm^3$ of distilled water and shake thoroughly. Divide the resulting solution into 5 portions.

(i) To the first portion add lead (II) nitrate solution

Observation	Inferences
(1mk)	(1mk)

(ii)   To the 2nd portion add Barium nitrate solution followed by addition of dilute nitric acid

Observation	Inferences
(1mk)	(1mk)

(iii) To the 3rd portion add Sodium Hydroxide solution dropwise until in excess

Observation	Inferences
(1mk)	(1mk)

(iv) To the 4th portion add aqueous ammonia solution until in excess

Observation	Inferences
(1mk)	(1mk)

(v) To the 5th portion add Sodium Sulphate Solution

Observation	Inferences
(1mk)	(1mk)

3. You are provided with Solid G. Carry out the tests indicated below

(a) Scoop half a spatula end full of solid G and burn it over the Bunsen burner flame

Observation	Inferences
(1mk)	(1mk)

(b) Place the remaining Solid G in a boiling tube, add 4cm^3 of distilled water and shake
Thoroughly

Observation	Inferences
(1mk)	(1mk)

(c) To the resulting solution in (b) above add 3 drops of acidified potassium Manganate (VII)
Solution

Observation	Inferences
(1mk)	(1mk)

(1 mark)

(½ mark)

(½ mark)

(1 mark)