iii) Put about 2cm^3 of bromine water into a test-tube. Add the remaining portion to the bromine water in the test-tube.

Observations	Inferences
(½ mark)	(½ mark)

NAME ..... INDEX NO. .....

SCHOOL ..... SIGNATURE .....

DATE .....

233/3
CHEMISTRY
PAPER 3
July / August 2015
2 Hours 15 minutes

NAROK SOUTH DISTRICT JOINT EVALUATION EXAMINATION
Kenya Certificate of Secondary Education (K.C.S.E)
CHEMISTRY
PAPER 3

INSTRUCTIONS TO CANDIDATES

a) Write the name of your school, your name and index number in the spaces provided above
b) Sign and write date of examination in the spaces provided above.
*c) Answer **ALL** questions in the spaces provided after each question.*
*d) All working **MUST** be clearly shown where necessary.*
e) Mathematical tables and silent calculators may be used.
*f) You are **NOT** allowed to start working with the apparatus for the first 15 minutes of the 2¼ hours allowed for this paper. This time will enable you to read the question paper and make sure you have all the chemicals and apparatus you may need.*

FOR EXAMINER'S ONLY

Question	Maximum	Candidates Score
1	21	
2	8	
3	11	
Total Marks	**40**	

This paper consists of 8 printed pages
Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

1. You are provided with.

- Solution A 2M hydrochloric acid for use in procedure I and II
- 1cm Magnesium ribbon labeled solid B
- Solution C containing a metal carbonate M_2CO_3

You are required to:

- Prepare dilute solution of hydrochloric acid solution A and determine their concentrations
- Determine the concentration of solution C.

Procedure

1. Label four test tubes as 1, 2, 3 and 4
2. Using a clean 10ml measuring cylinder, measuring the volumes of hydrochloric acid solution A as shown in the table below
3. Using 10ml measuring cylinder again measuring the volumes of distilled water as shown in table I into each of the test tubes.
4. Put the solid labelled B (Magnesium ribbon) into the test tube number 1 and immediately start a stop watch. Shake the contents of the test tube.
5. Record the time taken for the solid to be completely consumed and record it in table I below.
6. Repeat procedure 4 and 5 with the remaining solids B into test-tubes 2,3 and 4.
7. Complete table 1 by computing concentrations in moles per litre of each solution in the test tubes.

a) Table 1 **(6 marks)**

Test tube number	1	2	3	4
Volume of acid solution A (cm^3)	10	9	8	7
Volume of distilled water (cm^3)	0	1	2	3
Concentration of solutions (Mol dm^{-3})				
Time taken (t sec.)				

iii) To the second portion, add one half of the solid sodium hydrogen carbonate provided.

Observations	Inferences
(1 mark)	(1 mark)

b) Place the remaining amount of solid F in a boiling tube. Add 10cm3 of distilled water and shake. Boil the mixture and divide it into three portions while still warm.

i) To the first portion, add the remaining amount of solid sodium hydrogen carbonate

Observations	Inferences
(1 mark)	(1 mark)

ii) To the second portion, add three drops of acidified potassium dichromate (VI) solution and warm.

Observations	Inferences
(1 mark)	(1 mark)

iii) To a third portion, add two drops of aqueous lead (II) nitrate and heat the mixture to boiling

Observations	Inferences
(1 mark)	(1 mark))

3. You are provided with solid **F.** Carry out the following tests and record your observations and inferences in the spaces provided.

a) i) Place about one half of solid **F** in a dry test-tube. Retain the other half of solid F for use in (b) below. Add all of the absolute ethanol provided to solid F in the test-tube. Shake the mixture.

Observations	Inferences
(1 mark)	(1 mark)

Divide the mixture into two portions.

ii) Determine the PH of the first portion using universal indicator paper and a PH chart

Observations	Inferences
(1 mark)	(1 mark)

b) Plot a graph of concentration of solutions against time. (3 marks)

c) What time would be take for the Magnesium ribbon (Solid B) to be completely consumed if the experiment was repeated using $8.5cm^3$ of solution A and $1.5cm^3$ of distilled water? (2 marks)

Procedure II

1. Using a pipette and pipette filler, place 25cm^3 of solution A (Hydrochloric acid) into a 250ml volumetric flask. Add 200cm^3 of distilled water shake the mixture well and add distilled water to make upto the mark. Label this as solution D.

2. Fill a burette with solution C. Using a pipette and pipette filler, place 25cm^3 of solution D into a 250ml conical flask. Add 2 drops of phenolphthalein indicator provided and titrate solution D with solution C until the colour just turn pink. Record your results in table II. Repeat the titration two times and complete table II.

	I	II	III
Final burette reading			
Initial burette rearing			
Volume of solution K used (cm^3)			

(4 marks)

b) Calculate:
The average volume of solution C used. (1 mark)

c) i) Concentration of Solution D used (2 marks)

ii) The number of moles of solution D in 25cm^3 of the solution used (1 mark)

iii) The number of moles of solution C used in the averaged volume used (1 mark)

iv) The concentration in moles per litre of solution C (1 mark)

Q2. You are provided with solid **E.** Carry out the following tests and write your observations and inferences in the spaces provided.

a) Place about one-half of solid **E** in a dry test-tube. heat it strongly and test any gas produced using hydrochloric acid, solution **B** on a glass rod.

Observations	Inferences
(1 mark)	(1 mark)

b) Place the rest of solid E in a boiling tube. Add about 10cm^3 of distilled water. Shake well and use 2cm^3 portions for each of the tests below.

I) To one portion, add aqueous ammonia dropwise until in excess.

Observations	Inferences
(1 mark)	(1 mark)

ii) To a second portion, add about 1cm^3 of hydrochloric acid solution B

Observations	Inferences
(1 mark)	(1 mark)