NAME: _____ INDEX NO. _____

CANDIDATES SIGNATURE: _____

DATE: _____

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY/AUGUST 2016
2 ¼ HOURS

GATUNDU SUB-COUNTY SECONDARY SCHOOL JOINT EXAMINATION

INSTRUCTIONS TO CANDIDATE:-

(a) Write your name and index No. in the space provided.
(b) Answer all the questions in the spaces provided in the question paper.
(c) You are NOT allowed to start working with the apparatus for the first 15 minutes of the 2 ¼ hours allowed for this paper. This time is to enable you to read the Question paper and make sure you have all the chemicals and apparatus that you may need.
(d) Mathematical tables and silent electronic calculators may be used.

FOR EXAMINER'S USE ONLY.

Question	Maximum Score	Candidates Score
1	21	
2	12	
3	7	
	Total	

1. You are provided with:-
   - Solution K
   - A monobasic acid solution N.
   - Sodium hydroxide solution B prepared by dissolving 8g of sodium hydroxide in 1 litre of distilled water.

   You are required to determine:-

   - The rate of reaction between solution N and solution K
   - The molarity of the monobasic acid solution N.

PROCEDURE 1

Using a measuring cylinder, measure 20cm^3 of solution k into an empty 100cm^3 beaker.

Place it on a mark 'X' on a white plain paper.

Rinse the measuring cylinder and use it to measure another 20.0cm^3 of solution N.

Add solution N into solution K and start off the stop watch.

Then record the time taken for the mark 'X' to become invisible from above.

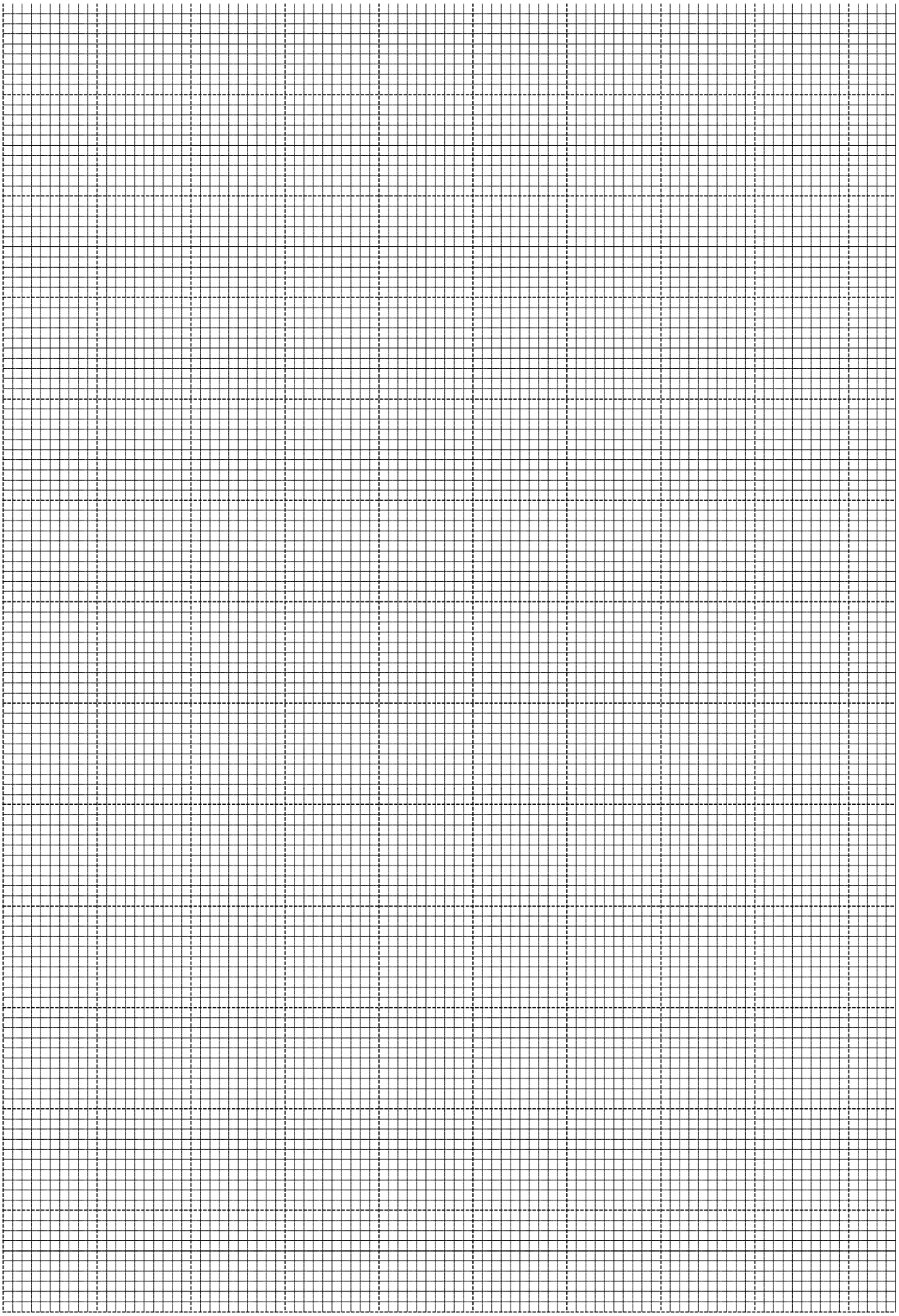
Repeat the procedure by measuring 17.5cm^3 of solution N and adding 2.5cm^3 of water and complete the table 1

Table 1

Experiment	1	2	3	4	5
Volume of solution K (cm^3)	20	20	20	20	20
Volume of solution N (cm^3)	20.0	17.5	15.0	12.5	10.0
Volume of water (cm^3)	0.0	2.5	5.0	7.5	10.0
Time taken for x to become invisible(sec)					
1/time (sec $^{-1}$)					

(5 Mks)

(a) Draw a graph of reciprocal of time (1/t) against volume of solution N. (3 Mks)



(b) From the graph:

(i) Determine the time taken for the cross 'X' to be invisible at 16.5cm^3 of solution N (2mks)

(ii) Determine the rate of reaction when 16.5cm^3 of solution N is used. (1 Mk)

PROCEDURE 11

Measure 50cm^3 of solution N into a 250ml volumetric flask. Add more distilled water to make 25.0cm^3 of solution. Label this as solution J. Fill a burette with solution J. Using a pipette and pipette filler, place 25.0cm^3 of solution B in to a 250ml conical flask. Add two to three drops of phenolphthalein indicator. Titrate solution B against solution J until the pink colour disappears. Record your results in table 2 below. Repeat the titration two more times and complete the table.

Table 2.

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

(4 Mks)

(a) Determine the average volume of solution J used. (1 Mk)

(b) Determine the number of moles of;

(i) Sodium hydroxide in 25.0cm^3 of solution B. (1 Mk)

(ii) The monobasic acid solution J in the average titre. (1 Mk)

(iii) The monobasic acid solution J in 250.0cm^3 of the solution. (1 Mk)

2. You are provided with solid D. Carry out the following tests and write your observations and inferences in the spaces provided.

(a) Place all of solid D in a boiling tube. Add about 6.0cm^3 of distilled water and shake thoroughly. Filter the mixture into a test tube. Dry the residue using pieces of filter papers. Retain the residue for use in test 2 (b) below. Divide the filtrate into three portions

(i) To 2cm^3 of the filtrate, add sodium hydroxide solution drop wise until in excess.

Observations	Inferences
(1mk)	(1mk)

(ii) To 2cm^3 of the filtrate, add one to two drops of sodium sulphate solution.

Observations	Inferences
(1mk)	(1mk)

(iii)To 2cm^3 of the filtrate, add aqueous ammonia drop wise until in excess.

Observations	inferences
(1mk)	(1mk)

(b) (i) Put a spatula end full of the residue obtained in (a) above in a test tube. Add about 6cm^3 of nitric (v) acid into the test tube. Retain the mixture for tests b(ii) and (iii) below.

Observations	inferences
(1mk)	(1mk)

(iii) To 2cm^3 of the mixture obtained in b(i) above, add aqueous sodium hydroxide drop wise until in excess.

Observations	inferences
(1mk)	(1mk)

(iii)To 2 cm^3 of the mixture obtained in b(i) above, add aqueous ammonia solution drop wise until in excess.

Observations	inferences
(1mk)	(1mk)

3. You are provided with solid E. Use it to carry out the tests below. Write your observations and inferences in the spaces provided.
   (a) Place one third of solid E on a metallic spatula and burn it using a Bunsen burner.

Observations	Inferences
(1mk)	(1mk)

(b) Place the remaining solid E in a test-tube. Add about $6cm^3$ of distilled water and shake the mixture.

(i) To $2cm^3$ of the mixture, add a spatula end full of solid sodium hydrogen carbonate.

Observations	inferences
(1mk)	(1mk)

(ii) To $2cm^3$ of the mixture, add $2cm^3$ of acidified potassium dichromate (vi) and warm.

Observations	inferences
(1mk)	(1mk)

(iii) To $2cm^3$ of the mixture add two drops of acidified potassium manganate (vii) and shake well.

Observations	inferences
(½mk)	(½mk)