NAME ……..…….. **DATE** ……

INDEX NO. ……..……..……..…..…. **SIGNATURE** ……..……..

233/3
CHEMISTRY
PRACTICAL
PAPER 3
JULY/AUGUST, 2014
TIME: 2¼ HOURS.

MBOONI EAST SUB - COUNTY JOINT EVALUATION TEST

Kenya Certificate of Secondary Education.

233/3
CHEMISTRY
PAPER 3
PRACTICAL
TIME: 2¼ HOURS.

INSTRUCTIONS TO CANDIDATES.

- Write your name and index number in the spaces provided above.
- Sign and write the date of exam in the spaces above.
- Answer **ALL** the questions in the spaces provided.
- You are not allowed to start working with the apparatus for the first 15 minutes of the 2¼ hours allowed time for the paper.
- Use the 15 minutes to read through the question paper and make sure that you have all the chemicals and apparatus that you may require.
- Mathematical tables and electronic calculators may be used.
- All working **MUST** be clearly shown where necessary.
- This paper consists of 8 printed pages. Candidates should check to ensure that all pages are printed as indicated and no questions are missing

FOR EXAMINER'S USE ONLY.

Question	Maximum score	Candidate's score
1	12	
2	11	
3	17	
Total score	40	

1. **(12 Marks)**

You are provided with:-

- A Dibasic acid (H_2A) solution, A containing 8.9g per litre of solution.
- Sodium hydroxide solution B, containing 2.36g in 500cm^3 of solution.

You are required to determine

(i.) Relative molecular mass of the dibasic acid (H_2A)

(ii.)The value of A in the formula of the dibasic acid.

PROCEDURE

Fill the burette with solution A. Pipette 25cm^3 of Sodium Hydroxide solution B into a clean conical flask and add 2 drops of Phenolpthalein indicator and titrate with the Dibasic acid (H_2A) solution A until the pink colour just disappears. Record your results in table I below. Repeat the titration two more times to complete the table below.

TABLE I

	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of solution A used (cm^3)			

(4marks)

(a) Determine the average volume of the Dibasic acid solution A used. (1mark)

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(b) Calculate the,

(i) Molarity of Sodium Hydroxide solution B used. (2 marks)

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(ii) Moles of Dibasic acid (H_2A) solution A used. (2 marks)

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(iii) Molarity of solution A. (1 mark)

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(iv) Relative molecular mass of the dibasic acid (H_2A) solution A. (1 mark)

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(v) Value of A in the formula of the dibasic acid. (1 mark)

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2. (12 MARKS)

(a) You are provided with 2.4g of solid V. Using a burette add $4cm^3$ of distilled water to solid V in the boiling tube. Heat the mixture while stirring with the thermometer to about 70^0C. When all the solid has dissolved allow the solution to cool while stirring with the thermometer. Note the temperature at which crystals of solid V first appear. Record this temperature in table 2.

(b) Using the burette add $2cm^3$ of distilled water to the contents in the boiling tube. Warm the mixture while stirring with the thermometer until all the solid dissolves. Allow the mixture to cool while stirring and record the temperature at which crystals start to appear.

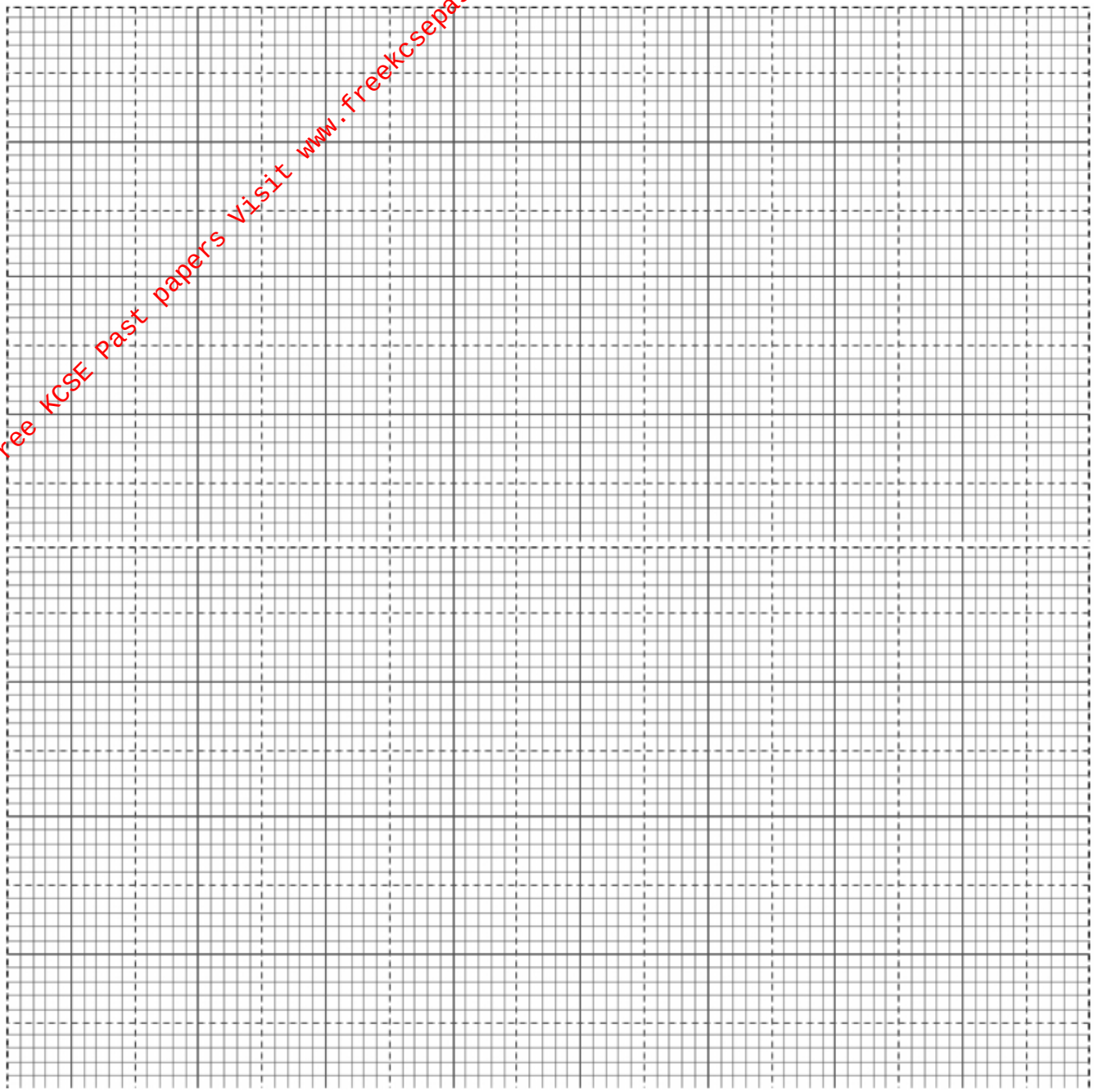
(c) Repeat the procedure in (b) above three more times and record the temperature in the table 2.

(i) Complete table 2 by calculating the solubility of solid V at different temperatures.
The solubility of a substance is the mass of that substance that dissolves in $100cm^3$ (100g) of water at a particular temperature.

TABLE 2

Volume of water in the boiling tube (cm^3)	Temperature at which crystals of V first appears (^oc)	Solubility of solid Vg/100g of water
4		
6		
8		
10		
12		

(ii) On the grid provided plot a graph of solubility of solid V (vertical axis) against temperature. (4 marks)



(iii) Using your graph determine the temperature at which 100g of solid (V) would dissolve in 100cm^3 of water. (1 mark)

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(iv) Using your graph, calculate the solubility of solid V at 30^{0}C. (1 mark)

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3. I (17 MARKS)

You are provided with solid E. Carry out the following tests on E and record your observations and inferences in the spaces provided. Identify any gas (es) evolved.

(a) Place a spatula of solid E into a boiling tube and add 10cm^3 of distilled water. Shake the mixture thoroughly. Filter the mixture and divide the filtrate into four portions. Keep the residue for use in part (b).

Observations	Inferences
(½ mark)	(½ mark)

(ii) To portion one, add Sodium Hydroxide solution dropwise until in excess.

Observations	Inferences
(1mark)	(½ mark)

(ii) To portion 2, add Ammonia solution dropwise until in excess.

Observations	Inferences
(1 mark)	(½ mark)

(iii) To portion three, add four drops of Lead (II) Nitrate solution.

Observations	Inferences
(½ mark)	(1 mark)

(iv) To portion four, add four drops of acidified Barium Nitrate solution.

Observations	Inferences
(½ mark)	(½ mark)

(b) Place the residue in a boiling tube and add dilute Nitric (V) acid little by little until all the solid dissolves. Divide the solution into two parts.

Observations	Inferences
(½ mark)	(½ mark)

(i) To part one, add Sodium Hydroxide solution dropwise until in excess.

Observations	Inferences
(1 mark)	(½ mark)

(ii) To part two, add Ammonia solution dropwise until in excess.

Observations	Inferences
(1 mark)	(½ mark)

3. (II) You are provided with substance K. Carry out the tests below and record your observations and inferences in the table below.

(a) Scoop a little of solid K with a clean metallic spatula and place it at the hottest part of a non-luminous flame.

Observations	Inferences
(½ mark)	(½ mark)

(b) Add about $10cm^3$ of distilled water to the remaining solid K in a boiling tube. Divide the resulting mixture into 4 portions.

(i) To the first portion add 3 drops of acidified K_2CrO_7.

Observations	Inferences
(1 mark)	(½ mark)

(ii) To the second portion add 3 drops of Bromine water and warm.

Observations	Inferences
(1 mark)	(½ mark)

(iii) To the 3rd portion add 2 – 3 drops of universal indicator and determine the PH of the solution.

Observations	Inferences
(½ mark)	(½ mark)

(iv) To the 4th portion add Sodium Carbonate.

Observations	Inferences
(1 mark)	(½ mark)