Name…………………………………… ………………………….…..… Index No:………………………….

233/3
CHEMISTRY
PAPER 3
PRACTICAL
JULY/AUGUST 2014
TIME: 2 ¼ HOURS

Candidate's Signature…………..……………
Date: …………………………

HOMA-BAY SUB-COUNTY JOINT EVALUATION EXAM

Kenya Certificate of Secondary Education (K.C.S.E.)

233/3
Chemistry
Paper 3
2 ¼ hours

INSTRUCTIONS TO CANDIDATES

- Write your **name** and **index number** in the spaces provided.
- **Sign** and write the **date** of examination in the spaces provided.
- Answer ***all*** the questions in the spaces provided in the question paper.
- 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 you need.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators may be used.

For examiners use only

Question	Maximum Score	Candidate's Score
1	12	
2	7	
3	21	
TOTAL	40	

This paper consists of 4printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. You are provided with:
- 3.0g of dibasic acid H_2X, solid **W**
- Aqueous Sodium hydroxide solution **K**
- Aqueous hydrochloric acid containing 7.3g per litre, solution M

You are required to:
Determine the concentration of sodium hydroxide, solution **K** in moles per litre. Work out the concentration of solution **W**

Procedure I

Fill the burette with solution **M**. pipette 25cm^3 of solution **K** and pour into a conical flask. Add 2 drops of phenolphthalein indicator and titrate against solution M from burette. Repeat two more times and complete table 1

Table 1

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

(5mks)

(a)(i) Work out the average volume of solution **M**

(ii) Calculate the concentration of solution **M** in mole per litre (2mks)

(iii) Calculate the number of moles of solution **K** present in one litre of its solution (2mks)

Procedure II

Using a 100ml measuring cylinder, measure 40cm^3 of distilled water and add the whole of solid **W** to the water in a measuring cylinder. Shake to dissolve solid **W** and add more distilled water to make a total volume of 50cm^3 of the solution. Transfer the solution into an empty beaker. Measure accurately 25.0cm^3 of the solution using a 100ml measuring cylinder and then add distilled water to make 100ml of the solution and label it solution **W.** pipette 25.0cm^3 of solution **K** into a conical flask and add two drops of Methyl orange indicator. Titrate against solution W from burette. Repeat two more times and record your results in table II below

Table II

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

(5mks)

(a) What is the average volume of solution W used?

……………………………………………………………………………………

(b) Calculate the:

(i) Mole of solution **W** that reacted with solution K(reaction ratio=2:1,2 mole of K react with 1 mole of **W**) (2mks)

(ii) Mole of solution W in $100cm^3$ of solution (2mks)

(iii) Moles per litre of the original solution made when solid **W** was dissolved (2mks)

2. You are provided with solid **D** weighed exactly of 4.0g

You are required to determine the solubility of solid **D** at difference temperatures

Procedure

(i) Fill a clean burette of distilled water to a boiling tube containing all the solid provide

(ii) Transfer $4cm^3$ of distilled water to a boiling tube containing all the solid **D** provided

(iii) Heat the mixture while stirring with the thermometer to a temperature of about 80^oC when the entire solid will have dissolved

(iv) Allow the solution to cool while stirring with thermometer. Note the temperature at which crystals start to appear and record the temperature in the table below.

(v) To the same solution, add $2cm^3$ of distilled water from the burette, heat the mixture while stirring with the thermometer to a temperature of about 80^oC when the entire solid will have dissolved.

(vi) Allow the mixture to cool and record the temperature at which crystals first appear in the table below

(vii) Repeat procedure (v) and (vi) three more times and record the temperature in the table

(viii) Complete the table of solubility of solid **D** at different temperatures

Volume of water in boiling tube (cm3)	Temperature at which crystals first appear (oC)	Solubility of solid D in g/100g of water
4		
6		
8		
10		
12		

(a) On the grid provided plot a graph of solubility of solid **D** against temperature (3mks)

(b) Hence determine the mass of solid deposited when solution is cooled from 55°C to 50°C (1mk)

(c) Use your graph to determine the temperature at which 80g of solid **D** would dissolve in 100g of water. (1mk)

3. (a) You are provided with solid **N**. Carry out the tests below. Write your observations and inferences in the spaces provided

(i) Heat about one third of solid **N** in a clean dry test-tube. Test the gases produced with both blue and red litmus papers.

Observations	**Inferences**
(1mk)	**(1mk)**

(ii) Using a boiling tube, dissolve the rest of solid N in about 10cm**3** of distilled water and use the solution for the tests below.

(I) To about 2cm^3 of the solution, add 5cm3 of solution P (Aqueous sodium carbonate)

Observations	**Inferences**
(1mk)	**(1mk)**

(II) To 2cm^3 of the solution, add about 4cm^3 of aqueous ammonia drop wise until in excess

Observations	**Inferences**
(1mk)	**(1mk)**

(III) To 2cm^3 of the solution, add about 4cm^3 of aqueous barium nitrate

Observations	**Inferences**
(1mk)	**(1mk)**

(IV) To the mixture obtained in III above, add about 2cm^3 of dilute hydrochloric acid

Observations	**Inferences**
(1mk)	**(1mk)**