

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

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

Candidate's Signature
Date.....

MIGORI 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 **indexnumber** 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	22	
2	11	
3	07	
Total		

This paper consists of 6 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. **You are provided with:**

- Solid T₁, 3.2 of hydrated ethanedioic acid $H_2C_2O_4 \cdot nH_2O$
- Solution Q, a 0.2M solution of sodium hydroxide.

You are required to determine:-

- Solubility of solid T₁
- The value of n in the formula $H_2C_2O_4 \cdot nH_2O$

Procedure I

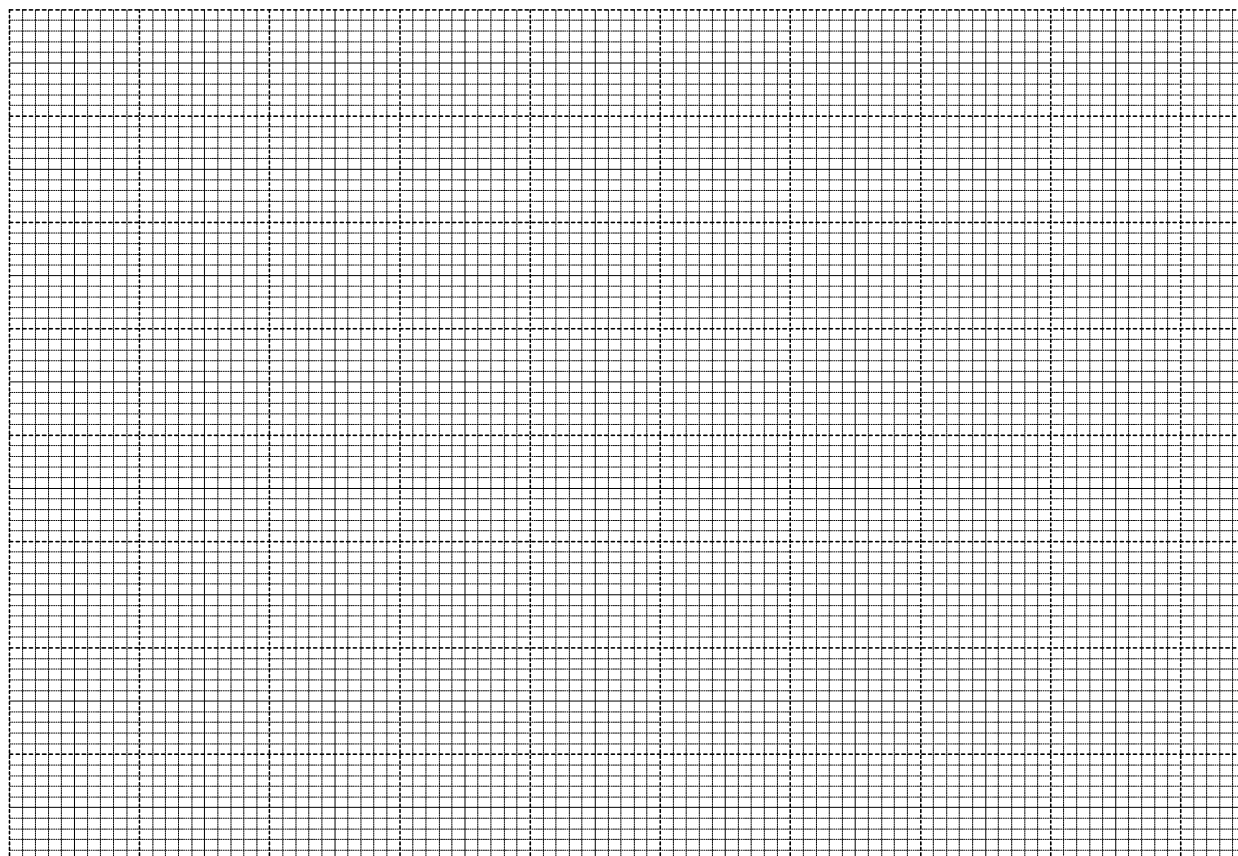
- Fill the burette with distilled water
- Place all solid T₁ provided in a boiling tube.
- Transfer 4cm³ of distilled water from the burette into the boiling tube containing solid T₁. Heat the mixture while stirring with the thermometer to a temperature of 80°C
- Allow the solution to cool while stirring with the thermometer. Record the temperature at which crystals start to form in table I below.
- Add further 2cm³ of distilled water from the burette to the mixture. Repeat procedure (iii) and (iv) above and record crystallization temperature complete table I below by adding the volumes of distilled water indicated.

NB: Preserve the contents of the boiling tube for procedure II

TABLE I

Volume of distilled water in boiling tube	Crystallization temperature	Solubility of solid T ₁ in 100g of water
4		
6		
8		
10		
12		

(b) On the grid provided, plot a graph of solubility of solid T₁(y-axis) against crystallization temperature (3mks)



(I) From the graph, determine:-

(i) Solubility of T1 at 55°C (1mk)

(ii) (the temperature at which 70g of T1 dissolves in 100g of water (density of water 1gcm⁻³) (1mk)

PROCEDURE II

Transfer the contents of the boiling tube in procedure I to a clean 250ml conical flask. Add 3 drops of phenolphthalein indicator.

Titrate T₂ against Q to an accurate end point. Record your results in table II below.

Repeat the experiment two more times and complete table II below

Table II

	1	2	3
Final burette reading;			
Initial burette reading;			
Volume used			

(4mks)

Calculate :

(a) The average volume of T₂ used. (1mk)

(b) The moles of Q used (1mk)

(c) The moles of T₂ in the volume used (if 2 moles of Q react with 1 mole of T) (1mk)

(d) The concentration of T₂ in mol-l⁻¹ (1mk)

(e) The concentration of T₂ in g l⁻¹ (1mk)

(f) The value of n in H₂C₂. (2mks)

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

(a) Place all of solid R in a boiling tube. Add about 10cm³ of distilled water and shake thoroughly.

Observations

(½ mk)

Inferences

(½ mk)

Divide the mixture in (a) above into five (5) portions of almost equal volumes and carry out the following tests:-

(i) To the first portion, add 2M NaOH solution dropwise till excess.

Observations

(1 mk)

Inferences

(1 mk)

(ii) To the second portion, add 2-3 drops of sodium carbonate solution.

Observations

(1 mk)

Inferences

(1 mk)

(iii) To the third portion, add 2 – 3 drops of sodium sulphate solution.

Observations

(1 mk)

Inferences

(1 mk)

- (iv) To the fourth portion, add 2-3 drops silver (I) nitrate solution followed by 2-3 drops of dilute nitric (V) acid.

Observations

Inferences

(1 mk)

(1 mk)

- (v) To the last portion, add 2 -3 drops of Barium nitrate solution followed by 2-3 drops of dilute nitric (V) acid.

Observations

Inferences

(1 mk)

(1 mk)

3. You are provided with solid M. Carry out the following tests and write your observations and inferences.

- (a) Place about one third of solid M on a metallic spatula and burn it in a Bunsen burner flame.

Observations

Inferences

(1 mk)

(1 mk)

- (b) Dissolve all the remaining solid M in about 6cm³ of distilled water and divide the resulting solution into three portions.

Observations

Inferences

(½ mk)

(½ mk)

(c) To the first portion add 2 drops of acidified potassium manganate (VII) solution wait for 2-3 minutes and then write the observation.

Observations

(1 mk)

Inferences

(1 mk)

(d) To the second portion add all sodium carbonate provided.

Observations

(½ mk)

Inferences

(½ mk)

(e) To the third portion dip universal indicator paper.

Observations

(½ mk)

Inferences

(½ mk)