

NAME..... DATE

INDEX NO. SIGNATURE.....

233/3

CHEMISTRY

PRACTICAL

PAPER 3

JULY/AUGUST, 2018

TIME: 2¼ HOURS.

LANY 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 9 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	23	
2	10	
3	07	
Total score	40	

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Chemistry

Practical

1. You are provided with:-

- Solid T, hydrated ethanedioic acid $\text{H}_2\text{C}_2\text{O}_4 \cdot n\text{H}_2\text{O}$.
- Solution Q, a 0.2M solution of sodium hydroxide.

You are required to determine:

- (i) Solubility of solid T.
- (ii) The value of n in the formula $\text{H}_2\text{C}_2\text{O}_4 \cdot n\text{H}_2\text{O}$.

Procedure I

- (i) Fill the burette with distilled water.
- (ii) Place solid T in the boiling tube.
- (iii) Transfer 4cm^3 of distilled water from the burette into the boiling tube containing solid T. Heat the mixture while stirring with the thermometer to a temperature at which crystals start to form in the table 1 below.
- (iv) Add a further 2cm^3 of distilled water from the burette to the mixture. Repeat the procedure (iv) above and record the crystallization temperature. Complete the table I below by adding the volumes of distilled water as indicated.

(Preserve the contents of the boiling tube for procedure II)

TABLE I

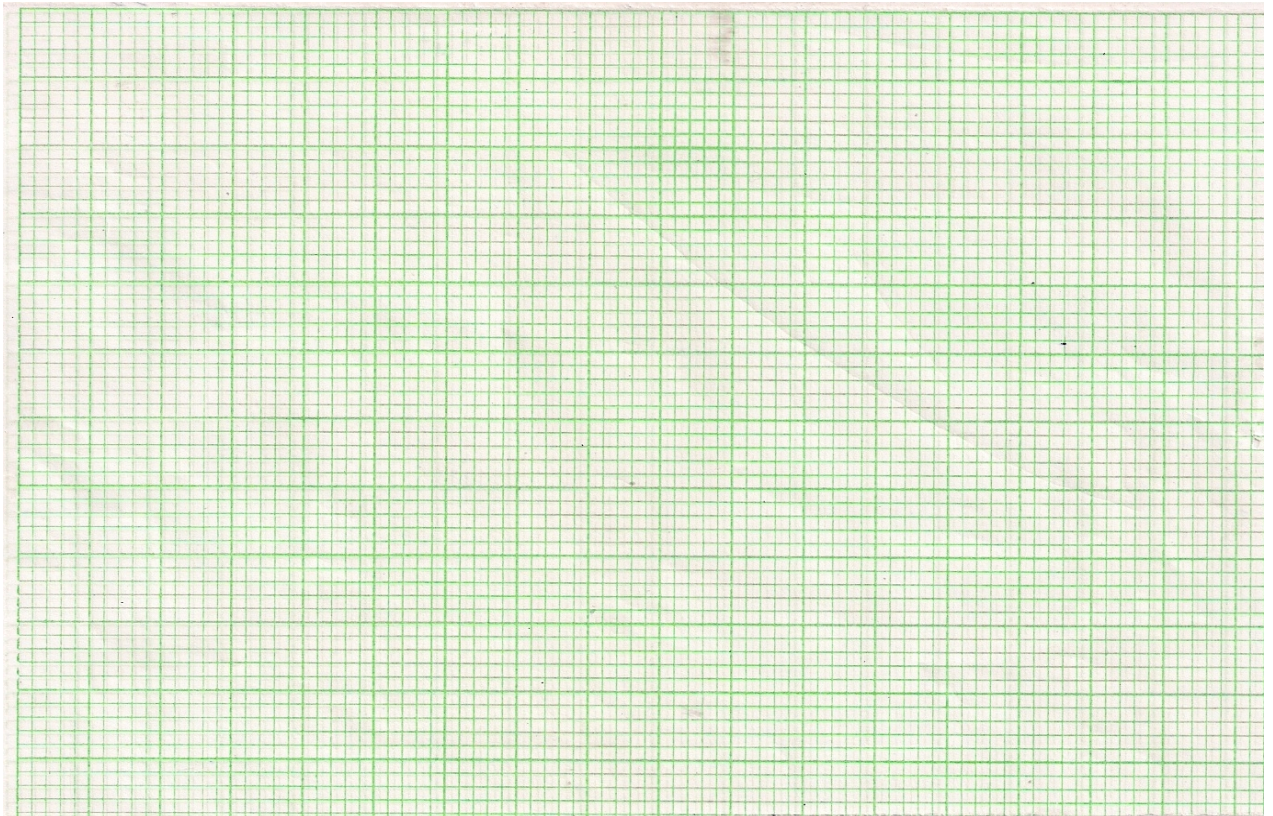
Volume of distilled water in boiling tube	Crystallization temperature	Solubility of solid T in 100g / water
4		
6		
8		
12		

(6mks)

(a) On the grid provided, plot a graph of solubility of solid T (y-axis) against crystallization

temperature.

(3mks)



From the graph determine:

(i) Solubility of T at 55°C

(1mk)

(ii) The temperature at which 80g of T dissolve in 100g of water.

(2mks)

Procedure II

- Transfer the contents of the boiling tube in procedure I to a clean 200ml volumetric flask. Add distilled water to the mark. Label the resulting solution T.
- Fill the burette with solution T. Pipette 25cm³ of Q into a clean 200ml conical flask. Add 3 drops of phenolphthalein indicator.
- Titrate T against Q to an accurate end point. Record your results in the table II below.
- Repeat the experiment two more times and complete the table II below.

Table II

	I	II	III
Final burette reading cm ³			
Initial burette reading cm ³			
Volume of T used cm ³			

(4mks)

Calculate:

(a) Average volume of T used. (1mk)

(b) (i) Moles of Q used. (1mk)

(ii) Moles of T used. (1mk)

(iii) Concentration of T in moles per dm³. (2mk)

(c) Determine the value of n in the formula $\text{H}_2\text{C}_2\text{O}_4 \cdot n\text{H}_2\text{O}$. (2mks)

2. 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) (i) 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).

Observation	Inferences
($\frac{1}{2}$ mk)	($\frac{1}{2}$ mk)

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

Observation	Inferences
(1mk)	($\frac{1}{2}$ mk)

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

Observation	Inferences
(1mk)	$(\frac{1}{2}\text{mk})$

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

Observation	Inferences
$(\frac{1}{2}\text{mk})$	(1mk)

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

Observation	Inferences
$(\frac{1}{2}\text{mk})$	$(\frac{1}{2}\text{mk})$

(b) (i) 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.

Observation	Inferences
(1/2mk)	(1/2mk)

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

Observation	Inferences
(1mk)	(1/2mk)

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

Observation	Inferences
(1mk)	(1/2mk)

3. 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.

Observation	Inferences
($\frac{1}{2}$ mk)	($\frac{1}{2}$ mk)

- (b) Add about 5cm³ 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 K₂CrO₇.

Observation	Inferences
(1mk)	($\frac{1}{2}$ mk)

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

Observation	Inferences
(1mk)	($\frac{1}{2}$ mk)

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

solution.

Observation	Inferences
(1/2mk)	(1/2mk)

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

Observation	Inferences
(1mk)	(1/2mk)