

FOCUS A365

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Name.....

Index No...../.....

School.....

Candidates Signature.....

Date

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

CHEMISTRY

Paper 3

PRACTICAL

2 ¼

Instructions to candidates

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** 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 that you may need.
- All workings **MUST** be clearly shown where necessary.
- Mathematical tables and silent electronic calculators may be used.

For Examiners use only.

Question	Maximum Score	Candidates Score
1	12	
2	12	
3	16	
TOTAL SCORE	40	

1. You are provided with:

- Solid T₁, 3.2 of hydrated ethanedioic acid H₂C₂O₄.nH₂O
- 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 H₂C₂O₄. nH₂O

Procedure I

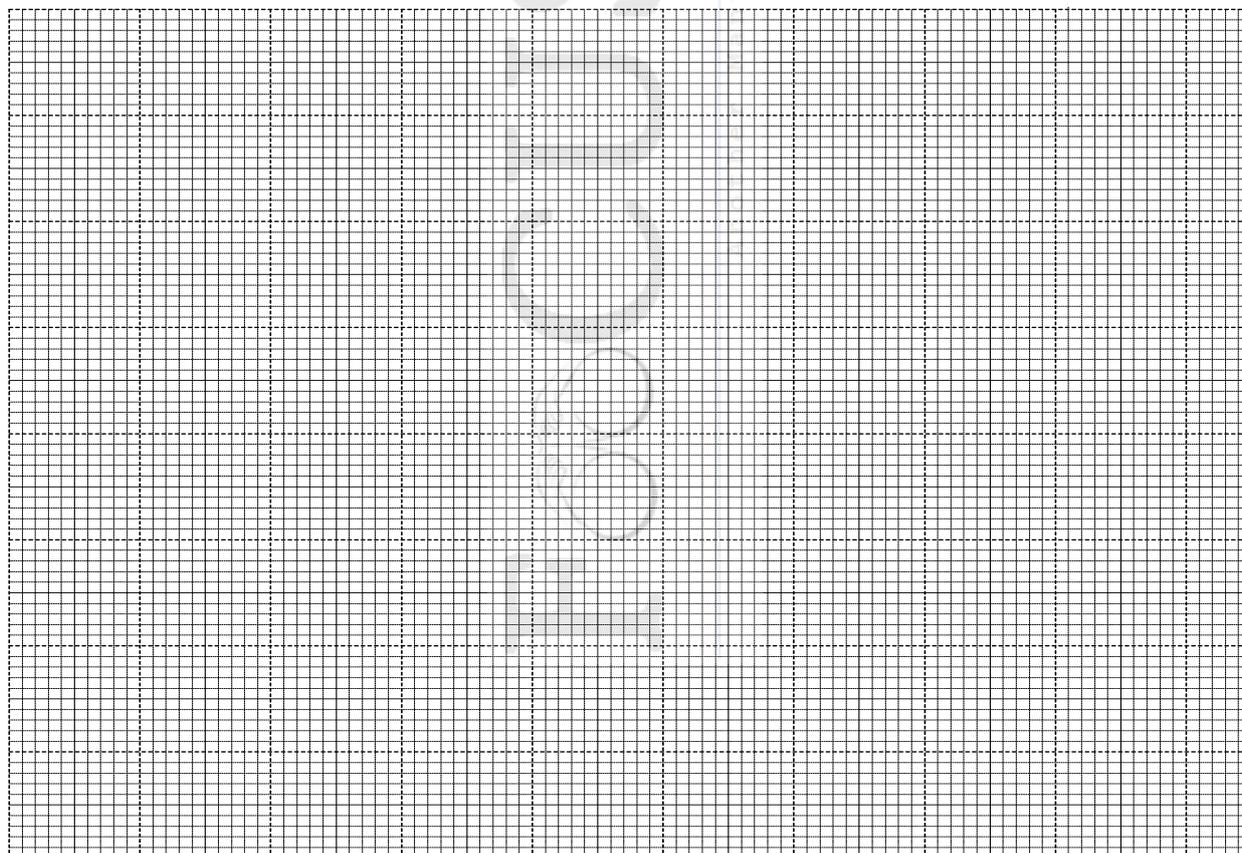
- Fill the burette with distilled water
- Place all solid T₁ provided in a boiling tube.
- Transfer 4cm³ of distilled water from the burette into the boiling tube containing solid T₁. Heat the mixture while stirring with the thermometer to a temperature of 80°C
- Allow the solution to cool while stirring 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 T_2 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 T_2 used.

(1mk)

- (b) The moles of Q used

(1mk)

- (c) The moles of T_2 in the volume used (if 2 moles of Q react with 1 mole of T)

(1mk)

- (d) The concentration of T_2 in mol l^{-1}

(1mk)

- (e) The concentration of T_2 in g l^{-1}

(1mk)

- (f) The value of n in H_2C_2 .

(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 10cm^3 of distilled water and shake thoroughly.

Observations

Inferences

(½ mk)

(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

Inferences

(1 mk)

(1 mk)

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

Observations

Inferences

(1 mk)

(1 mk)

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

Observations

Inferences

(1 mk)

(1 mk)

Observations

Inferences

(iv)	T	(1 mk)	(1 mk)
	o	the fourth portion, add 2-3 drops silver (I) nitrate solution followed by 2-3 drops of dilute nitric (V) acid.	

(v) To the last portion, add 2 -3 drops of Brium 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 distill 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 manganite (VII) solution wait for 2-3 minutes and then write the observation.

Observations	Inferences
(1 mk)	(1 mk)

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

Observations	Inferences
(½ mk)	(½ mk)

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

Observations	Inferences
(½ mk)	(½ mk)

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