GENIUS EXAM FINAL PREDICTION 2024

NAME…… INDEX NO…….

SIGNATURE…… DATE……..

OCTOBER

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

CHEMISTRY

PAPER 233/3

(PRACTICAL)

Instructions to Candidates:

1. Write your name and index number in the spaces provided.

2. Sign and write the date of examination in the spaces provided above.

*3. Answer **ALL** questions in the spaces provided.*

4. You are required to spend the first 15 minutes of the 2 $^{1}/_{4}$ hours allowed for this Paper reading the whole paper carefully before commencing your work.

5. Additional pages must not be inserted.

6. Candidates should check the question paper to ascertain that all the pages are Printed as indicated and that no questions are missing.

For the Examiner's Use Only

Question	*Maximum score*	*Candidate's Score*
1	*21*	
2	*13*	
3	*06*	
TOTAL SCORE	***40***	

This paper consists of 7 printed pages

1. You are provided with;
   - 3.6 g of solid P in a boiling tube. Solid P is a hydrated dibasic acid with the formula $H_2C_2O_4.nH_2O$
   - Solution L which is a 0.2 M sodium hydroxide solution.

   You are required to determine;

   (i) Solubility of solid P

   (ii) The value of n in the formula $H_2C_2O_4.nH2O$

Procedure I

I. Using a burette, add 4cm^3 of distilled water to solid P in the boiling tube. Heat the mixture while stirring with the thermometer to about 70 ºC. When all of solid has dissolved, allow the solution to cool while stirring with the thermometer. Note the temperature at which crystals of solid P first appear. Record the temperature in **table 1** below.

II. Using the burette, add 2 cm^3 of distilled water to the contents of the boiling tube. Warm the mixture while stirring with the thermometer until all the solid dissolves again. Allow the mixture to cool while stirring. Note the temperature at which crystals of solid P appears.

III. Repeat procedure (II) three more times and record the temperatures in **table 1**. **RETAIN the contents of the boiling tube for use in PROCEDURE II**

TABLE 1

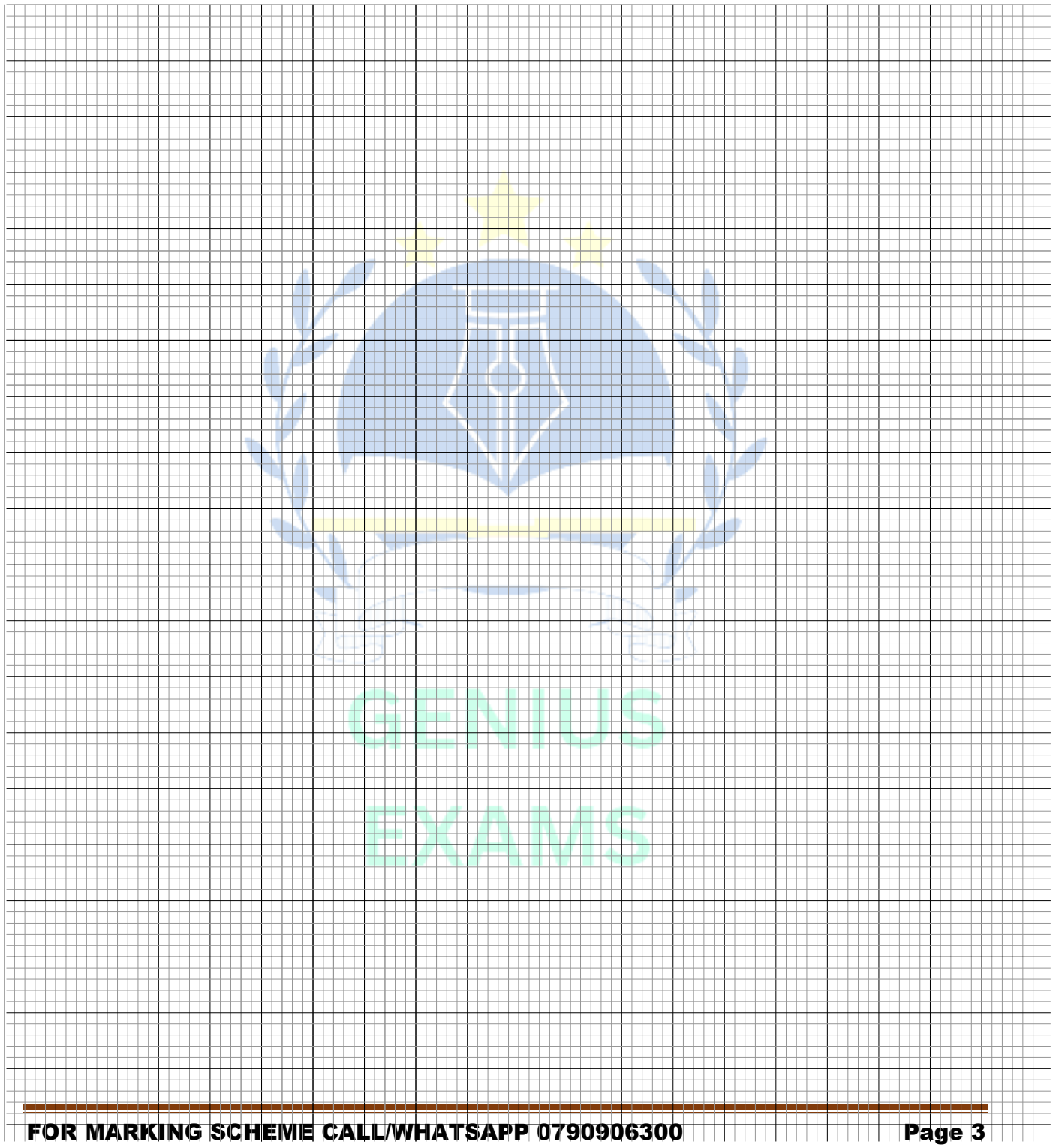
Volume of water in the boiling tube (cm^3)	**Crystallization temperature (ºC)**	**Solubility of solid P in g/100 g of water**
4		
6		
8		
10		
12		

(4marks)

(a) Complete **table 1** above by working out the solubility. (1 mark)

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(b) On the graph provided, plot a graph of solubility of solid P against crystallization temperature. (3marks)



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(c) From the graph, determine;

(i) The solubility of solid P at 50 ˚C (1 mark)

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(ii) The temperature at which 65 g of solid P would dissolve in 100 g of water (1 mark)

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Procedure II

(i) Transfer the contents of the boiling tube from **PROCEDURE I** into a clean 250 ml volumetric flask.

(ii) Add distilled water up to the mark

(iii) Label the resulting solution as solution P

(iv) Fill the burette with solution P

(v) Pipette 25cm^3 of solution L into a conical flask. Add three drops of phenolphthalein indicator

(vi) Titrate solution P against solution L to an accurate end point.

Record your results in **table 2** below.

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

(4 marks)

a) Calculate Average volume of solution P used. (1mark)

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b) **(i)** Moles of solution L used. (1 mark)

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(ii) Moles of solution P used. (1 mark)

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(iii) Moles of solution P in 250 cm^3 of solution P (1 mark)

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(iv)The relative formula mass of P. (1 mark)

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(c) Determine the value of n in the formula; $H_2C_2O_4.nH2O$ (H = 1, C = 12, O = 16) (2marks)

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2. You are provided with solid E. Carry out the experiments below. Write your observations and inferences in the spaces provided.

Place all solid E into a boiling tube. Add about $20cm^3$ of distilled water and shake. Retain the contents of the boiling tube.

Observations	inferences
1 mark	1 mark

Use $2cm^3$ of solution E, in a test tube in each experiment i, ii,iii,iv and v

i. To experiment i, Add two drops of aqueous Sulphuric vi acid

Observations	inferences
1mark	1mark

ii. To experiment ii, add NaOH solution drop wise till in excess.

Observations	inferences
1mark	1mark

iii. To experiment iii, dip a stirring rod into the solution, place the rod in a non-luminous flame..

Observations	inferences

1mark 1mark

iv. To experiment iv, add two drops of lead (ii) nitrate solution.

Observations	inferences
1mark	1mark

v. To experiment v, add a piece of aluminium foil followed by sodium hydroxide solution and warm . Test the gas given out with litmus papers.

Observations	inferences
2marks	1mark

3). You are provided with liquid Q. carry out the tests below. Write your observations and inferences in the spaces provided.

i). To 2 cm^3 of liquid Q in a test tube, add universal indicator

Observations	inferences
1 mark	1 mark

ii). Place 3 drops of liquid Q on a watch glass and ignite.

Observations	inferences
1mark	1mark

iii). To 2 cm^3 of liquid Q in a test tube , add two or three drops of acidified potassium dichromate VI and warm

Observations	inferences
1mark	1mark

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