THE AMKA CHEMISTRY JOINT EXAMINATION

Kenya Certificate of Secondary Education

233/3 **Paper 3**

CHEMISTRY – (Practical)

June 2025

2 ¼hours

Name …… **Index Number**……**Adm. No.**……

School ……..…...…….. **Date** ……

INSTRUCTIONS TO CANDIDATES

(a) Write your name and Admission number in the spaces provided.

(b) Write the Name of the School and the date of examination in the spaces provided.

(c) ALL working MUST be clearly shown where necessary

(d) Mathematical tables and electronic calculators may be used.

FOR EXAMINER'S USE ONLY

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QUESTION	Max. Score	Candidate Score
1	20	
2	08	
3	12	
TOTAL	40	

1. You are provided with;

- ✓ 3.0g of solid P.
- ✓ 0.3M Hydrochloric acid, solution Q.
- ✓ Methyl Orange Indicator.

You are required to determine the;

(i) Solubility of solid P in water.

(ii) Relative formula mass of solid P.

Procedure 1.

(i) Place 200cm^3 of tap water in a 250ml beaker and keep it for use in step (v).

(ii) Place all solid P in a dry boiling tube.

(iii) Using a measuring cylinder, measure 20cm^3 of distilled water and add it to the solid P in the boiling tube.

(iv) While stirring the mixture in the boiling tube with the thermometer, warm the mixture using the Bunsen burner until the Temperature rises to 70^{o}c. Stop the warming and allow it to cool while stirring with the thermometer.

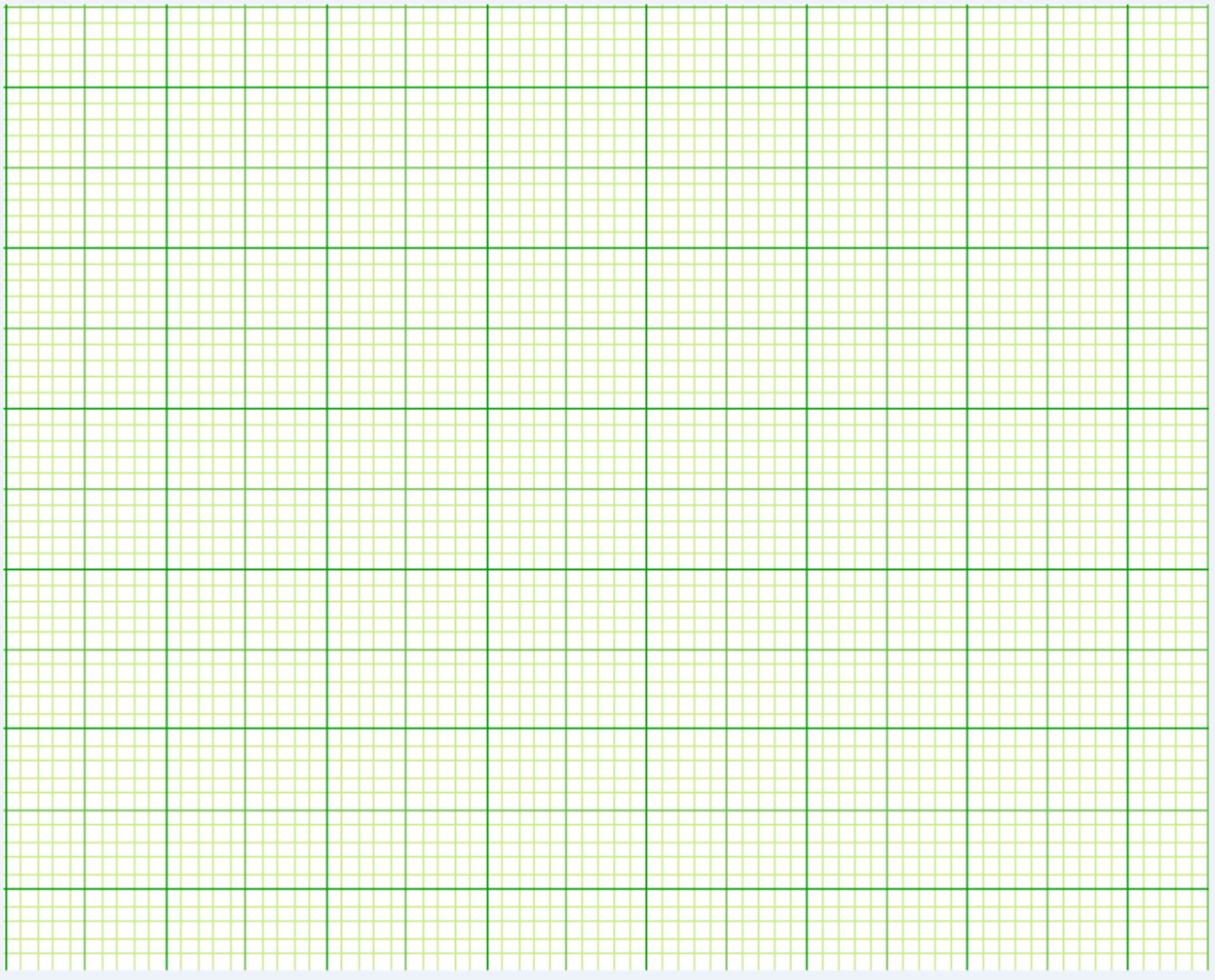
(v) When the temperature drops to 65^{o}c, start the stop watch/clock and place the boiling tube in the beaker with tap water you prepared in step (i) above.

(vi) Continue stirring and record the temperature of the mixture after every one minute interval and complete the table 1 below. RETAIN THE MIXTURE WITH THE THERMOMETER INSIDE FOR USE IN PROCUDRE II below.

(a) Table 1 (4marks)

Time (Min)	0	1	2	3	4	5	6	7	8	9	10
Temp (^{o}c)	65										

(b) On the grid provided, plot a graph of temperature against time. (3marks)



(c) Using the graph, determine the temperature (T) when 3.0g of solid P dissolves completely in 20cm^3 of distilled. (1mark)

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(d) Calculate the solubility of solid P in grams per 100g at the temperature, T. (2marks)

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Procedure II

(i) Transfer all the content of the boiling tube obtained from procedure 1 into a 250ml volumetric flask.

(ii) Rinse the boiling tube and the thermometer with about 20cm^3 of distilled water and add the rinses into the volumetric flask. Repeat the rinsing two more times and add into the volumetric flask. Add about 100cm^3 of distilled to the volumetric flask. Shake until all the solid dissolves.

(iii) Add more distilled water to the mark label this solution as solution P.

(iv) Fill the burette with solution Q.

(v) Using a pipette and a pipette filler, place 25cm^3 of solution P into a clean 250ml conical flask. Add three drops of methyl orange indicator provided and titrate using solution Q. Record your reading in table II below.

(vi) Repeat the titration two more times and complete the table.

Table II (4marks)

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

(e) Calculate the:

(i) Average volume of solution Q used. (1mark)

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(ii) Number of moles of Hydrochloric acid solution Q used. (1mark)

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(f) Given that two moles of Hydrochloric acid, solution Q reacts with one mole of solution P, calculate the;

(i) Number of moles of solution P used. (1mark)

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(ii) Number of moles of solution P in the 250cm^3 of the solution. (1mark)

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(iii) Concentration of solution P in moles per litre. (1mark)

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

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2. You are provided with liquid R. Carry out the tests described below and write your observation and inferences in the spaces provided below each question.

(a) Place about 3 drops of liquid R on a watch glass. Ignite it using a burning wooden splint.

Observations	**Inferences**
(1mark)	(1mark)

(b) To about $2cm^3$ of liquid R, add equal amount of distilled water. Shake

Observations	**Inferences**
(1mark)	(1mark)

(c) To about $2cm^3$ of liquid R in a test tube, add all the solid T, Sodium Carbonate provided

Observations	**Inferences**
(1mark)	(1mark)

(d) To about $2cm^3$ of liquid R, add three drops of acidified Potassium dichromate (vi) and warm.

Observations	**Inferences**
(1mark)	(1mark)

3. You are provided with solid S. Carry out the following tests and record your Observations and Inferences in the spaces provided.

Place ALL the solid S in a boiling tube. Add about $10cm^3$ of distilled water and shake until all the solid dissolves. Divide the resulting solution into six portions.

(a) To the first portion, add 3 drops of dilute nitric (v) acid.

Observations	**Inferences**
(1mark)	(1mark)

(b) To the second portion, add 3 drops of aqueous Barium Chloride.

Observations	**Inferences**
(1mark)	(1mark)

(c) To the third portion, add 3 drops of Lead (ii) nitrate solution.

Observations	**Inferences**
(1mark)	(1mark)

(d) To the forth portion, add Sodium Hydroxide drop wise till in excess.

Observations	**Inferences**
(1mark)	(1mark)

(e) To the fifth portion, add aqueous ammonia drop wise till in excess.

Observations	**Inferences**
(1mark)	(1mark)

(f) To the sixth portion, add 3 drops of aqueous Sodium Carbonate.

Observations	**Inferences**
(1mark)	(1mark)