

NAME

RANDOM/PERSONAL No. / SIGNATURE



545/3

CHEMISTRY PRACTICAL

Paper 3

Tuesday 1st August 2023 (Morning)

2 hours

ACHOLI SECONDARY SCHOOLS EXAMINATIONS COMMITTEE*Uganda Certificate of Education*

Joint Mock Examinations, 2023

CHEMISTRY PRACTICAL

Paper 3

2 hours

INSTRUCTIONS TO CANDIDATES:

- ✓ Answer **both** questions. Answers are to be written in the spaces provided in this question paper only.
- ✓ All your work must be in blue or black ink. Any work done in pencil except drawings, will NOT be marked.
- ✓ You are NOT allowed to use any reference books (i.e. text books, booklets on qualitative analysis etc.).
- ✓ All working must be clearly shown.
- ✓ Mathematical tables and silent non-programmable scientific calculators may be used.

For Examiner's Use Only		
Questions	Marks	
1		
2		
Total		

Question 1:

You are provided with the following:

- **BA1** which is a solution made by dissolving 3.45g of a hydrated salt, $R \cdot nH_2O$, in 250 cm^3 of water.
- **BA2** which is a 0.1M hydrochloric acid.

You are required to determine the value of n in the salt.

Procedure:

- Pipette 25.0 cm^3 (or 20.0 cm^3) of BA1 into a conical flask. Add 2 – 3 drops of methyl orange indicator and titrate with BA2 from the burette.
- Repeat the titration until you obtain consistent results.
- Record your results in the table below.

Table of Results:

Volume of the pipette used: cm^3 (½ mark)

Experiment Number / Titre Readings	1	2	3
Final burette reading (cm^3)			
Initial burette reading (cm^3)			
Volume of BA2 used (cm^3)			

(7½ marks)

Values used to calculate average volume of **BA2** used are: and cm^3

(01 mark)

Average volume of **BA2** used: cm^3 (2½ marks)

Questions:

(a) Calculate the:-

- number of moles of hydrochloric acid that reacted. (2½ marks)

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(ii) number of moles of $R.nH_2O$ that reacted (1 mole of $R.nH_2O$ reacts with 2 moles of hydrochloric acid) (02 marks)

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(iii) number of moles of $R.nH_2O$ in 250 cm^3 of BA1. (03 marks)

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(b) Determine the value of n in $R.nH_2O$. [$H = 1$; $O = 16$; $R = 106$] (5½ marks)

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Question 2:

You are provided with substance **K** which contains **two cations** and **one anion**. Carry out the following tests on **K** and identify the cations and the anion present in **K**. Identify any gas(es) that may be evolved. Record your observations and deductions in the table below: (25 marks)

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat one spatula end-full of K strongly in a dry test tube.		
(b) Dissolve two spatula end-full of K in about 5 cm ³ of water and to the resultant solution, add dilute sodium hydroxide solution drop-wise until in excess and filter. Keep both the filtrate and the residue.		
(c) To the filtrate, add dilute nitric acid until the solution is just acidic. Divide the acidified solution into five portions. (i) To the first portion of the acidified solution, add dilute sodium hydroxide solution drop-wise until in excess.		
(ii) To the second portion of the acidified solution, add aqueous ammonia drop-wise until in excess.		
(iii) To the third portion of the acidified solution, add 2 – 3 drops of potassium iodide solution.		

TESTS	OBSERVATIONS	DEDUCTIONS
(iv) To the fourth portion of the acidified solution, add lead (II) nitrate solution and warm.		
(v) Use the fifth portion of the acidified solution to carry out a test of your own to confirm the anion in K. Test:		
(d) Dissolve the residue in minimum amount of dilute sulphuric acid and divide the resultant solution into three parts. (i) To the first part of the solution, add sodium hydroxide solution drop-wise until in excess.		
(ii) To the second of the solution, add aqueous ammonia drop-wise until in excess		
(iii) To the third part of the solution, add zinc granules and leave to stand for 5 minutes.		

(d) (i) The cations in **K** are..... and.....

(ii) The anion in **K** is.....

END

Confidential / Advance Information

- ✓ BA_1 is made by dissolving 4g of Sodium Hydroxide pellets in distilled water to make 1 litre of solution. [Each candidate requires 100cm^3].
- ✓ BA_2 is made by dissolving 8.60cm^3 of Concentrated Hydrochloric acid in distilled water to make 1 litre of solution. [Each candidate needs 100cm^3]
- ✓ Methyl orange indicator.
- ✓ 1 burette 50cm^3
- ✓ 1 pipette
- ✓ 2 Conical flasks
- ✓ 1g of substance K which is a mixture of Copper (II) Sulphate-5-water and aluminium Sulphate-6-water in the ratio of 1:1.
- ✓ Reagents for testing gases, cation and anions.
- ✓ 8 test tubes
- ✓ Heat source.