Name.....Centre/Index No.....

School..... ..... Signature.....

545/3
CHEMISTRY
(PRACTICAL)
Paper 3
July/August
2hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2hours

INSTRUCTIONS TO CANDIDATES.

- *Answer **both** questions. All answers must be written in the spaces provided.*
- *You are **not** allowed to use any reference books (i.e text books or handouts 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		
Q.1	Q.2	Total

1. You are provided with solutions **BA1** and **BA2**.
BA1 was prepared by dissolving 1.0g of sodium hydroxide to make 250cm^3 of solution while **BA2** is a solution containing 3.15g of acid $H_2R.nH_2O$ per 250cm^3 of solution.
You are required to determine the percentage of water of crystillisation, n, in the acid $H_2R.nH_2O$.

Procedure
Transfer 20/25 cm^3 of **BA1** into a clean conical flask using a clean pipette. Add 3 drops of phenolphthalein indicator to the contents of the flask then titrate with **BA2** from the burette.

Repeat the titration to obtain at least 3 consistent results.

Record your results in the table 1 below.

Volume of pipette used = ... cm^3 (1 mark)

	1	2	3
Final Burette reading (cm^3)			
Initial Burette reading (cm^3)			
Volume of **BA2** used (cm^3)			

(4½ marks)

Values for calculating average volume of **BA2** used:..... :.....and ..... (3 marks)

Average volume of **BA2** used = ... (02 marks)

.....

.....

(a) Calculate the number of moles of:

(i) **BA1** used: (03 marks)

.....

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(ii) **BA2** that reacted with **BA1** (02½ marks)

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(b) Determine the:

(i) mass of one mole of the acid, $H_2R.nH_2O$.

(05 marks)

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(ii) Value of n, hence percentage of water of crystallization in the $H_2R.nH_2O$. (R = 88)

(04 marks)

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2. You are provided with substance M which contains **two** cations and a common anion.
Carry out the following tests on M to identify the cations and anion.
Test for any gas evolved.
Record your results in the table 2 below. (25 marks)

TEST	OBSERVATION	DEDUCTION
a) To **one** spatula endful of M in a clean test tube, add dilute nitric acid drop by drop until all the solid has dissolved.		
b) To $3cm^3$ of the solution from (a) above add aqueous sodium hydroxide solution drop wise until in excess. Filter the mixture and keep both filtrate and residue.		

c) To the filtrate from (b) add dilute nitric acid drop wise until the solution is just acidic. Divide the resultant solution into two equal portions.		
(i) To the **first** potion from (c) above add aqueous sodium hydroxide solution drop wise until in excess.		
(ii) To the **second** portion add aqueous ammonia solution drop wise until in excess		
(d) To the residue from (b), put in a clean test tube, add dilute nitric acid drop by drop as you shake until the solid just dissolves.		
(i) To 1 cm^3 of the resultant solution from (d) above, add aqueous sodium hydroxide solution until in excess.		
(ii) Use 1cm^3 of the resultant solution from (d) above to carry out a test of your own choice to confirm one of the cations in M. _____ _____ _____ _____		

(e) Identify the

(i) Cations :..... and ..... (1 mark)

(ii) Anion ..... ($\frac{1}{2}$ mark)

END

In addition to the common laboratory reagent, each candidate should be provided with the following:

- **One** retort stand.
- **One** Burette (50ml).
- **One** pipette (20/25ml).
- **One** conical flask.
- $100cm^3$ of BA1
- $100cm^3$ of BA2
- Phenolpthalein indicator
- 1g of M
- Heat source
- **One** filter paper
- **Seven** test tubes
- Blue and Red litmus papers.
- Reagents for identifying cations and Anions

  (i) BA1 is 0.1M NaOH

  (ii) BA2 is 0.1M H_2SO_4

  (iii) Substance M is a mixture of copper (II) Carbonate and zinc carbonate in the ratio 1:1

END