

NAME:.....SIGNATURE.....

545/4  
CHEMISTRY  
PRACTICAL  
Paper 4  
2 hours  
July/August 2023

**KANUNGU DISTRICT JOINT MOCK EXAMINATIONS**

**UGANDA CERTIFICATE OF EDUCATION**

**CHEMISTRY PRACTICAL**

**PAPER 4**

**2 HOURS**

**INSTRUCTIONS TO CANDIDATES**

- *This paper consists of two questions*
- *Answer both questions in the space provided in this booklet*
- *All working MUST be clearly shown.*
- *Mathematical tables slide rules and non-programmable electronic calculators may be used*

**FOR EXAMINER'S USE ONLY**

Q1			
Q2			
TOTAL			

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Turn Over

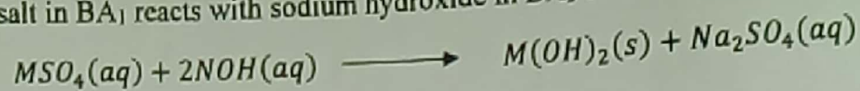
1. You are provided with the following:

BA<sub>1</sub> which is a solution containing 6.26g of a metal sulphate M<sub>2</sub>SO<sub>4</sub>.nH<sub>2</sub>O in 250cm<sup>3</sup> of solution.

BA<sub>2</sub> which is a solution of a 0.2M Hydrochloric acid.

BA<sub>3</sub> which is sodium hydroxide solution. (O=16, S=32, H=1, M=64)

The metal salt in BA<sub>1</sub> reacts with sodium hydroxide in BA<sub>3</sub> according to the following equation.



**Procedure:**

Pipette 25.0 or 20.0cm<sup>3</sup> of BA<sub>1</sub> into a clean conical flask.

By use of a suitable measuring cylinder, add an equal volume of BA<sub>3</sub> to the solution in the conical flask. Shake the contents of the conical flask thoroughly and allow to stand. Label the resultant solution BA<sub>4</sub>.

Titrate the mixture BA<sub>4</sub> using solution BA<sub>2</sub> from the burette with gentle shaking until the precipitate just dissolves.

Repeat procedure (1) to (3) until you obtain consistent readings, record your results in the table below.

Volume of pipette used.....(cm<sup>3</sup>) (½mark)

Experiment number	1	2	3
Final burette reading(cm <sup>3</sup> )			
Initial burette reading(cm <sup>3</sup> )			
Volume of BA <sub>2</sub> used(cm <sup>3</sup> )			

(4½marks)

Volume used to calculate average titre

.....and..... (1mark)

Average titre value (2½marks)

.....  
 .....  
 .....

Calculate the number of moles of hydrochloric acid in  $BA_2$  that reacted with the precipitate in  $BA_4$  (2½marks)

b) Write an equation of the reaction between the precipitate in  $BA_4$  and Hydrochloric acid (1½marks)

c) Calculate the number of moles of the precipitate in  $BA_4$  that reacted with Hydrochloric acid in  $BA_2$  (2½marks)

d) Calculate the number of moles of  $MSO_4$  per liter of  $BA_1$  (3marks)

ii) Mass of one mole of  $MnSO_4 \cdot nH_2O$  (3marks)

e) Determine the value of  $n$  in  $\text{MSO}_4 \cdot n \text{H}_2\text{O}$

(2marks)

2. You are provided with substance K which contains two cations and one anion. You are required to identify the cations and anion in the substance. Carry out the following tests to identify the ions and gases evolved. Write your observations and deductions clearly and precisely in the table below (25marks)

TESTS	OBSERVATIONS	DEDUCTIONS
a) Heat a spatula endful of K in a dry test tube strongly until no further change.		
b) Shake two spatula endful of K with about $5\text{cm}^3$ of distilled water. Filter and keep both the filtrate and residue. Divide the filtrate into three portions.		
i) To the first portion, add sodium hydroxide solution and heat the mixture.		
ii) To the second portion, add 3-4 drops of lead (II) nitrate solution and boil.		
iii) To the third portion, add 3-4 drops of Barium nitrate followed by dilute nitric acid.		



c) Wash the residue with distilled water and dissolve it in dilute Nitric acid. Divide the resultant solution into three portions.		
i) To the first portion, add sodium hydroxide solution dropwise until in excess.		
ii) To the second part add ammonia solution dropwise until excess.		
iii) To the third portion add potassium iodide solution		

d) Cations in K are ..... and .....

Anion in K is .....

END

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Chemistry Practical  
Instruction

JULY/AUGUST 2023

5 HOURS

**KANUNGU DISTRICT JOINT MOCK EXAMINATIONS**  
**UGANDA CERTIFICATE OF EDUCATION**  
**CHEMISTRY**

Paper four

**CONFIDENTIAL**

Great care must be taken, that the information given below does not reach the candidates either directly or indirectly.

**Instructions for preparing apparatus.**

***NB:*** The teacher responsible for preparing apparatus should hand in his/her trial results.

1. The description of the reagents and chemicals specified below does not necessarily correspond with that in question paper
2. Candidates are not allowed to use references of books (text books and booklets)
3. In addition to fittings and substances ordinarily found in a chemistry laboratory, each candidate will require
  - 1 burette ( $50\text{cm}^3$ )
  - 1 pipette ( $25.0/20.0\text{cm}^3$ )
  - 2 conical flasks (each  $25\text{cm}^3$ )
  - 1 filter paper
  - 3g of K
  - $100\text{cm}^3$  of  $\text{BA}_1$
  - $100\text{cm}^3$  of  $\text{BA}_2$
  - $100\text{cm}^3$  of  $\text{BA}_3$
  - Phenolphthalein and methyl orange indicator
  - Easy access to:
    - Heat source
    - Common reagents for identifying cations and anions
    - Distilled water

$\text{BA}_1$  is made by dissolving 18.5g of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in  $750\text{cm}^3$  of distilled water

$\text{BA}_2$  is prepared by dissolving  $17.24\text{cm}^3$  of 36% HCl in distilled water to make to make 1 litre of solution

$\text{BA}_3$  is made by dissolving 8g of NaOH to make 1 litre of solution.

K is a mixture of  $(\text{NH}_4)_2\text{CO}_3$  and  $\text{PbCO}_3$  in the ratio of 1:2

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