NAME:.....IGNATURE.....

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			

1. You are provided with the following:

BA_1 which is a solution containing 6.26g of a metal sulphate $MSO4.nH_2O$ in $250cm^3$ of solution.

BA_2 which is a solution of a 0.2M Hydrochloric acid.

BA_3 which is sodium hydroxide solution.(O=16, S=32, H=1, M=64)

The metal salt in BA_1 reacts with sodium hydroxide in BA_3 according to the following equation.

$$MSO_4(aq) + 2NOH(aq) \longrightarrow M(OH)_2(s) + Na_2SO_4(aq)$$

Procedure:

Pipette 25.0 or $20.0cm^3$ of BA_1 into a clean conical flask.

By use of a suitable measuring cylinder, add an equal volume of BA_3 to the solution in the conical flask. Shake the contents of the conical flask thoroughly and allow to stand. Label the resultant solution BA_4

Titrate the mixture BA_4 using solution BA_2 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^3) (½mark)

Experiment number	1	2	3
Final burette reading(cm^3)			
Initial burette reading(cm^3)			
Volume of BA_2used(cm^3)			

(4½marks)

Volume used to calculate average titre

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

Average titre value (2½marks)

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

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

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

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

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

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e) Determine the value of n in $MSO_4.n\ H_2O$ (2marks)

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2. You are provided with substance K which contains two contains 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 $5cm^3$ 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 ($50cm^3$)
   - 1 pipette ($25.0/20.0cm^3$)
   - 2 conical flasks (each $250cm^3$)
   - 1 filter paper
   - 3g of K
   - $100cm^3$ of BA_1
   - $100cm^3$ of BA_2
   - $100cm^3$ of BA_3
   - Phenolphthalein and methyl orange indicator
   - Easy access to:
     - Heat source
     - Common reagents for identifying cations and anions
     - Distilled water

BA_1 is made by dissolving 18.75g of $CuSO_4.5H_2O$ in $750cm^3$ of distilled water

BA_2 is prepared by dissolving $17.24cm^3$ of 36% HCl in distilled water to make to make 1 litre of solution

BA_3 is made by dissolving 8g of NaOH to make 1 litre of solution.

K is a mixture of $(NH_4)_2CO_3$ and $PbCO_3$ in the ratio of 1:2