545/3

CHEMISTRY

Paper 3

July - August 2022

2 Hours

UGANDA MUSLIM TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS – 2022

NAME.....

INDEX NO.....SIGNATURE.....

UGANDA CERTIFICATE OF EDUCATION

CHEMISTRY

Paper 3

2 Hours

INSTRUCTIONS TO CANDIDATES

Answer **both** *questions .Answers are to be written in the spaces provided in this book let.*

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 calculators may be used.

For Examiners' Use Only		
Q.1		
Q.2		
Total		

Qn.1 You are provided with the following:

- **BA1** solution which is a solution of an acid H_nA, prepared by dissolving **4.9 g** of the acid in a litre of distilled water to have a **0.05 M** acid solution.

- **BA2** solution which is a sodium hydroxide solution containing **2.0 gdm^{-3}** of the base in distilled water.

You are required to carry out the experiment **to determine the value of n** (the basicity of the acid H_nA); **and thereafter, the value of A** in the acid.

(H = 1; O = 16; Na = 23).

Procedure:

- Pipette accurately 25 cm^3 (or 20 cm^3) of **BA2** into a clean conical flask.
- Add **1-2** drops of methyl orange indicator and shake gently.
- Titrate the solution with **BA1** from the burette until the solution just changes colour.
- Repeat the titration until you get consistent readings.
- Record your results in the table below.

(a). **Results:**

Capacity of pipette used.....cm^3.

Table of results:

Experiment no.	1	2	3
Final burette reading / cm^3			
Initial burette reading / cm^3			
Volume of **BA1** used / cm^3			

Titre values used for calculating the average volume of **BA1** used:

..... cm^3.

Average volume of **BA1** used.

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(b). Calculate the:

(i). number of moles of **BA1** that reacted.

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(ii) Molarity of **BA2** solution.

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(iii) The number of moles of **BA2** that reacted.

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(iv) The number of moles of BA2 required to react with 1 mole of BA1 (= value of **n**).

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(v) The value of **A** in the H_nA acid.

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Qn 2. You are provided with substance **V** which contains **one cation** and **two anions.**

You are required to carry out the following tests and identify the **cation** and **anions** in **V.**

Identify any gas (es) that may be evolved.

TEST	OBSERVATIONS	DEDUCTIONS
a). Heat a spatula endful of **V** in a hard dry test tube , first gently and then strongly until there is no further change		
b). Add a spatula endful of **V** in about 10 cm^3 of distilled water. Shake very well and then filter. Keep both the residue and the filtrate. Divide the filtrate into four portions.		
(i) To first portion in a test tube, add sodium hydroxide solution, drop wise, until in excess.		
(ii) To the second portion, add ammonia solution, drop wise, until in excess.		
(iii) To the third portion, add Lead (II) nitrate solution.		

(iv) Use the forth portion, to carry out a test of your own to confirm the anion in filtrate of V. **Test:**.....		
(v) Heat some of the residue in a test tube, first gently and then strongly until there is no further change.		
(vi) To a part of the remaining residue in a clean test tube, add dilute nitric acid solution		

Identify the:

(i) Cation in V.

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(ii) Anion in the filtrate.

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(iii) The anion in the residue.

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END