

NAME..... Index number:.....

Signature:.....

545/3
Chemistry
Paper 3
2 Hours

MOCK EXAMINATIONS 2019
Uganda Certificate of Education

CHEMISTRY PRACTICAL

Paper 3

2 hours

INSTRUCTIONS TO CANDIDATES:

- Answer *all* the questions.
- All questions carry equal marks.
- Answers are to be written in the spaces provided **ONLY**.
- You are not allowed to use any reference books.
- Mathematical tables, slide rulers and non-programmable silent electronic calculators may be used.
- You will be penalized for untidy work.

Q.1	Q.2	TOTAL

1. You are provided with the following:

BA1, which is a solution containing **3.8g** of a **metal hydroxide**, $M(OH)_2$ in $1dm^3$ of water.

BA2, which is hydrochloric acid of concentration **3.68 gdm⁻³**

You are required to determine the atomic mass of M in $M(OH)_2$

Procedure

Pipette **20.0** or **25.0 cm³** of **BA1** into a clean conical flask, add 2-3 drops of methyl orange indicator and titrate the contents with **BA2** from the burette until the indicator changes colour. Repeat the titration 2 -3 times to obtain consistent results. Record your results in the table below.

Table of results:

Volume of pipette used.....cm³

	1	2	3
Final burette reading (cm ³)			
Initial burette reading(cm ³)			
Volume of BA2 used (cm ³)			

Titre values used for calculating the average volume of **BA2** used:

.....

Average volume of **BA2** used cm³

Question:

(a) Calculate the :

(i) Concentration of **BA2** in $mol\ dm^{-3}$. ($H=1, Cl=35.5$)

.....

.....

.....

.....

.....

.....

.....

(ii). Number of moles of **BA2** that reacted.

.....

.....

.....

(iii). Number of moles of **BA1** that reacted with **BA2**.

(2 moles of BA2 reacts with 1mole of BA1)

.....

.....

.....

.....

(iv). Number of moles of **M(OH)₂** in 1dm³ of **BA2**.

.....

.....

.....

(b).Determine the;

(i). Formula mass of **M(OH)₂**.

.....

.....

.....

(ii). Value of **M** in **M(OH)₂**. (**H=1 ,O=16**)

.....

.....

.....

2. You are provided with substance **Q** which contains **two cations** and **one anion**. Carry out the following tests on **Q** to identify the cations and anion. Identify any gases evolved. Record your results in the table below.

TESTS	OBSERVATIONS	DEDUCTIONS
(a) Heat one spatula endful of Q in a dry test tube, first gently then strongly until there is no further change.		
(b) To two spatula endfuls of Q in a test tube, add about 5cm ³ of dilute nitric acid. To the resultant solution add sodium hydroxide solution drop wise until in excess and filter. Keep both the 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 portions.		
(i). To the first portion of the acidic solution, add dilute sodium hydroxide		

<p>solution drop- wise until in excess.</p>		
TESTS	OBSERVATIONS	DEDUCTIONS
<p>(ii). To the second portion of the acidic solution, add dilute ammonia solution drop- wise until in excess</p>		
<p>(d). Wash the residue from (b) and dry it. Dissolve the dry residue in a minimum amount of nitric acid. Divide the resulting solution into three portions</p>		
<p>(i). To the first portion, add dilute sodium hydroxide solution drop- wise until in excess.</p>		
<p>(ii). To the second portion, add dilute ammonia solution drop- wise until in excess.</p>		
<p>(iii). To the third portion, add a spatula endful of zinc powder and shake. Allow to stand.</p>		

(e) (i) The **cations in Q** are:.....and.....

(ii) The **anion in Q** is:.....

END