545/3
UCE Chemistry
Paper 3
August, 2023
2 hours

# UNNASE MOCK EXAMINATIONS

Name.....

## UGANDA CERTIFICATE OF EDUCATION

## Uganda Certificate of Education

## CHEMISTRY

## PAPER 3

## 2 HOURS

**INSTRUCTIONS TO CANDIDATES**

- *This paper consist of two questions*
- *All questions are compulsory. Answers are to be written in the spaces provided* ***ONLY.***
- *You are not allowed to use any reference books (i.e text books, booklets on qualitative analysis etc)*
- *All working must be clearly shown*
- *Answers must be written using* ***blue*** *or* ***black*** *ink* ***only***

| For Examiner's use only | | | |
|---|---|---|---|
| **Q.1** | | | |
| **Q.2** | | | |
| **TOTAL** | | | |

1. You are provided with the following:-

BA1, which is a solution made by dissolving 2g of sodium hydroxide in 500cm$^3$ of water

BA2, which is a 0.05M solution of a strong acid W

You are required to determine the basicity of W by finding the moles of sodium hydroxide that reacted with one mole of W.

**Procedure:-**

Pipette 20 or 25cm$^3$ of BA1 into a clean conical flask. Then add 2 – 3 drops of phenolphthalein indicator and titrate the solution with solution BA2 from the burette until the end point. Repeat the titration 2 – 3 times to obtain consistent results. Enter your results in the table below:-

Results

**Volume of pipette used** .....**cm$^3$** ($\frac{1}{2}$ *mark*)

| | 1 | 2 | 3 |
|---|---|---|---|
| Final burette reading (cm$^3$) | | | |
| Initial burette reading (cm$^3$) | | | |
| Volume of BA2 used (cm$^3$) | | | |

($7\frac{1}{2}$ *marks*)

Titrate values to calculate the average volume of BA2 used

($\frac{1}{2}$ *mark*)

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Average volume of BA2 used cm$^3$

($2\frac{1}{2}$ *mark*)

**Questions:-**

(a) Calculate the:-

(i) Molarity for BA1 (Na = 23, O = 16, H = 1) (5 marks)

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(ii) Number of moles of Sodium hydroxide in BA1 that reacted

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(iii) Number of moles of BA2 that reacted (3 marks)

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(b) Determine the number of moles of sodium hydroxide that reacted with one mole of W

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2. You are provided with substance M which contains two cations and one anion. Carry out the following test on M to identify the cations and anion. Identify any gases evolved. Record your observations and deductions in the table below:-

| TESTS | OBSERVATIONS | DEDUCTIONS |
|---|---|---|
| (a) Heat two spatula endfuls of M strongly until there is no further change | | |
| (b) Dissolve two spatula endfuls of M in about 5cm$^3$of water. Divide the resultant solution into six portions | | |
| (i) To the first portion add Sodium hydroxide solution drop wise until in excess and warm. | | |
| (ii) to the second portion, add ammonia solution drop wise until excess | | |

| | | |
|---|---|---|
| (iii) To the third portion, add 2 – 3 drops of sodium sulphate solution and warm | | |
| (iv) Use the fourth position to carry out a test of your own to confirm one of the cations in M<br>Test:.....<br>..... | | |
| (v) To the fifth portion, add an equal volume of dilute nitric acid followed by 3 – 4 drops of lead(ll) nitrate solution | | |
| (vi) Use the sixth portion to carry out a test of your own to confirm the anion in M<br>Test.....<br>..... | | |

(c) (i) Cations in M ..... and.....

(ii) Anion in M.....and.....

***END***

# UNNASE MOCK EXAMINATIONS

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## CHEMISTRY

Chemistry Confidential S.4 UNNASE 2023

**Each candidate should be provided with:**

- 1 pipette (20 or 25cm$^3$)
- 1 burette (50cm$^3$)
- 2 conical flasks
- 2 beakers(250cm$^3$)
- 6 test tubes
- 1 boiling tube
- 100cm$^3$ of BA1
- 60cm$^3$ of BA2
- 2g of M
- Phenolphthalein indicator
- Easy access to reagents for identifying cations and anions.
- Easy access to heat source
- BA1 is a solution made by dissolving 4g of sodium hydroxide in 1000cm$^3$ of water.
- BA2 is 0.15M hydrochloric acid.

- M is aluminum ammonium sulphate