# THE UNITED REPUBLIC OF TANZANIA
# NATIONAL EXAMINATIONS COUNCIL
# CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

**032/2A**

## CHEMISTRY 2A
## ALTERNATIVE A PRACTICAL
***(For Both School and Private Candidates)***

**Time: 2 Hours 30 Minutes** **Wednesday November 10, 2004 a.m.**

---

***Instructions***

1. This paper consists of **three (3)** questions.
2. Answer **two (2)** questions including question **number 1.**
3. Qualitative analysis guidance pamphlets may be used after a thorough check by the supervisor.
4. Electronic calculators are **not** allowed in the examination room.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).
7. The following atomic masses may be used H = 1, O = 16.

*This paper consists of 3 printed pages.*

1. You are provided with the following:

1.1. Solution AA prepared by diluting 100 $cm^3$ of 1M hydrochloric acid to 1000 $cm^3$ with distilled water.

1.2. Solution BB is sodium hydroxide solution.

1.3. Phenolphthalein indicator.

Procedure.

Pipette 20 $cm^3$ (or 25 $cm^3$) of solution BB into a titration flask. Add two drops of POP indicator. Titrate solution BB against solution AA from the burette until a colour change is observed. Note the burette reading. Repeat the procedure to obtain three more readings. Record your results as shown below.

(a) Table of results.

(i) Burette readings.

| Titration number | Pilot | 1 | 2 | 3 |
|---|---|---|---|---|
| Final reading ($cm^3$) | | | | |
| Initial reading ($cm^3$) | | | | |
| Volume used ($cm^3$) | | | | |

(ii) The volume of pipette used was _____ $cm^3$.

(iii) The colour change at the end point was from _____ to _____.

(vi) _____ $cm^3$ of solution AA were required to neutralize _____ $cm^3$ of solution BB.

(b) Write a balanced chemical equation for the neutralization of the metal hydroxide by hydrochloric acid.

(c) Calculate the:

(i) Morality of solution AA.

(ii) Concentration in moles/$dm^3$ of solution BB.

(iii) Concentration in g/$dm^3$ of solution BB. **(25 marks)**

2. Sample M is a simple salt containing **one** cation and **one** anion. Carry out the experiments described below. Record carefully your observations and appropriate inferences and hence identify the anion and cation present in the sample.

| Experiment | Observation | Inferences |
|---|---|---|
| (a) Appearance of sample M | | |
| (b) Heat a little M in a dry test-tube | | |
| (c) To a little M in a test tube add dilute HCl | | |
| (d) To a little M in a test tube add distilled water and stir it | | |
| (e) To the salt solution of sample M add KOH solution and warm it | | |
| (f) To the salt solution of M add $MgSO_4$ solution | | |

Conclusion.

The cation in M is _____ and the anion is _____.

The molecular formula of salt M is _____. **(25 marks)**

3. Sample E is a simple salt containing **one** cation and **one** anion. Using systematic qualitative analysis procedures, carry out experiments on sample E. Make appropriate observations and inferences to identify the cation and the anion present in sample E. Record your experiments, observations and inferences in a table as shown below.

| Experiment | Observation | Inference |
|---|---|---|
| | | |

Conclusion.

The cation in E is _____ and anion is _____. **(25 marks)**