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

2/2C

# CHEMISTRY 2C
## ALTERNATIVE C PRACTICAL
(For both School and Private Candidates)

me: 2:30 Hours | Thursday, 21st October 2010 a.m.

### Instructions

This paper consists of **three (3)** questions.

Answer **two (2)** questions including question **number 1**.

Qualitative Analysis Guidance Pamphlets may be used after a thorough check by the Supervisor.

Calculators and cellular phones are **not** allowed in the examination room.

Write your **Examination Number** on every page of your answer booklet(s).

The following constants may be used:

Atomic masses : H = 1, C = 12, N = 14, O = 16, Na = 23, S = 32,
Cl = 35.5, K = 39, Ca = 40.

1 litre = 1 $dm^3$ = 1000 $cm^3$.

This paper consists of 3 printed pages.

1. You are provided with the following:

**B1:** a solution made by dissolving 21.2 g of a metal carbonate in 1000 $cm^3$ of solution.

**B2:** an acid which contains 3.6 g of HCl per litre of solution.

**B3:** Methyl orange indicator.

**Procedure:**
Pipette 20.0 $cm^3$ or 25 $cm^3$ of B1 into a clean conical flask and add 2 – 3 drops of B3. Put I into the burette. Titrate the solution B1 against B2. The reaction equation is given as
$X_2CO_3 + 2HCl \rightarrow 2XCL + H_2O + CO_2$.
The end point is when you get a colourless solution. Note the burette reading. Repeat t procedure to obtain three more readings and record the results as in the following table.

(a) Results
(i) Burette readings:

| Titration | Pilot | 1 | 2 | 3 |
|---|---|---|---|---|
| Final volume /$cm^3$ | | | | |
| Initial volume /$cm^3$ | | | | |
| Volume used /$cm^3$ | | | | |

(ii) The volume of the pipette used is _____ $cm^3$
(iii) _____$cm^3$ of B1 reacted completely with _____ $cm^3$ of B2.

(b) Calculate the mass concentration of B1 in grams per litre.

(c) Calculate the
(i) molarity of B1
(ii) molarity of B2.

(d) Calculate the relative formula mass of $X_2CO_3$. **(25 marks)**

You are provided with substance **W**. Substance **W** contains **one** cation and **one** anion. Carry out the following experiments on **W** and identify the cation and anion. Record all your observations and appropriate inferences in the space as shown in the following Table:

| S/N | Experiment | Observation | Inference |
|---|---|---|---|
| (a) | Appearance of sample W | | |
| (b) | Heat a little of sample W and identify the gas given out. | | |
| (c) | To a little sample W add dilute HCl. | | |
| (d) | Dissolve W in water. Divide the solution into four portions and do the following: (i) add silver nitrate till excess to the first portion. | | |
| | (ii) add NaOH till excess to the second portion. | | |
| | (iii) add $MgSO_4$ till excess to the third portion. | | |
| | (iv) add $NH_4OH$ solution till excess to the fourth portion. | | |

**Conclusion**

(a) (i) The cation in substance W is _____ and the anion is _____.
(ii) Substance W is _____.

(b) Write balanced chemical equations for the reaction taking place in (c), (d) (ii) and (d) (iv). **(25 marks)**

You are provided with substance **R**. Substance **R** contains **one** cation and **one** anion. Analyse substance **R** systematically and identify the anion and the cation.
Present your results as shown in the following Table:

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

**Conclusion**

(a) The cation in R is _____ and the anion is _____.

(b) The compound R is _____. **(25 marks)**