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.

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 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 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)**