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

12/2A

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

Time: **2:30 Hours** **Tuesday, 12th 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, O = 16, Cl = 35.5, Na = 23, K = 39.
1 litre = 1 dm^3 = 1000 cm^3.

1. You are provided with the following:

Solution **D** containing 6.90 g of T_2CO_3 per 0.50 dm^3 of solution

Solution **N** containing 1.55 g of hydrochloric acid per 200 cm^3 of solution

Methyl orange indicator solution.

Procedure

Put solution N in the burette. Pipette 20 cm^3 (or 25 cm^3) of D into a titration flask. Add drops of methyl orange indicator. Titrate solution N from the burette against solution D titration flask to the end point. Note the burette reading. Repeat the procedure to obtain more values and record the results as shown in the following table.

(a) Table of results

(i) Burette readings

Titration	**Pilot**	**1**	**2**	**3**
Final reading (cm^3)				
Initial reading (cm^3)				
Volume used (cm^3)				

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

(iii) The volume of the burette used was _____ cm^3.

(iv) _____cm^3 of solution D required _____ cm^3 of solution N for complete reaction.

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

(b) Write a balanced equation for the above neutralization reaction.

(c) Calculate the following:

(i) molarity of acid solution N

(ii) molarity of the base solution D

(iii) molecular weight of T_2CO_3

(iv) atomic mass of element T.

(d) Identify element T in T_2CO_3. **(25 marks)**

2. Sample **B** is a simple salt containing **one** cation and **one** anion. Carry out the experiments described in the following table carefully and record all your observations and appropriate inferences. Identify the cation and anion present in sample **B**.

	Experiment	Observation	Inference
(a)	Appearance of sample B.		
(b)	Put a spatulaful of sample B in a test-tube. Add water until half test-tubeful. Stir and divide the solution into five portions in different test tubes and then do the following:		
	(i) add fresh zinc metal granules to the first portion. Heat for a while. Decant the result. Pour the solid material onto a filter paper and observe. Let it dry, then observe again.		
	(ii) add NaOH solution until excess to the second portion then heat and observe again.		
	(iii) add ammonia solution dropwise to the third portion until excess.		
	(iv) add $AgNO_3$ solution to the fourth portion followed by dil. HNO_3.		
	(v) add $AgNO_3$ solution to the fifth portion followed by ammonia solution.		

Conclusion

(a) The cation present in the sample B is _____ and the anion is _____.

(b) What has been happening in the experiments (b) (i) and (b)(ii)? Use reaction equations where possible. **(25 marks)**

3. Substance Z contains **one** basic radical and **one** acidic radical. Using systematic qualitative analysis procedures carry out experiments on sample Z and make appropriate observations and inferences to identify the radicals.

Experiment	Observation	Inference

Conclusion

The Basic radical in sample Z is _____ and acidic radical is _____.

(25 marks)