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

032/2B **CHEMISTRY 2B**

ALTERNATIVE B PRACTICAL

(For both School and Private Candidates)

Time: 2:30 Hours **Tuesday, 19th October 2010 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. Calculators and cellular phones are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. The following constants may be used:

   Atomic masses: H = 1, C = 12, O = 16, Na = 23, S = 32, Cl = 35.5

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

This paper consists of 3 printed pages.

1. You are provided with the following solutions:

Solution **W** – containing 3.0 g of acetic acid (CH_2COOH) per 0.5 dm^3 of solution.

Solution **Q** – containing 2.2 g of impure sodium bicarbonate per 0.25 dm^3 of solution.

Methyl orange indicator solution.

Procedure

Put solution W in the burette. Pipette 20 cm^3 (or 25 cm^3) of solution Q into a titration flas Add a few drops of methyl orange indicator in the titration flask. Titrate solution Q against V until an end-point is reached. Note the burette reading. Repeat the titration to obtain thre more titre values. Record your titre 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) Volume of pipette used was _____ cm^3.

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

(iv) The volume of solution W needed for complete neutralization reaction wa _____ cm^3.

(b) If the balanced equation for the above neutralization reaction is

$NaHCO_3 + CH_3COOH \longrightarrow CH_3COONa + H_2O + CO_2$,

calculate the

(i) molarity of the acid solution W

(ii) molarity of the base solution Q

(iii) concentration of $NaHCO_3$ in solution Q in g/dm^3.

(c) The impurity in the sodium hydrogen carbonate does not react with the acid. Calculat the percentage by weight of the unreactive material (impurity in the sodiur bicarbonate solution).

(25 marks)

Sample **A** 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. Make appropriate inferences and identify the cation and anion present in the salt.

S/N	Experiment	Observation	Inference
(a)	Appearance of sample A		
(b)	Put a spatulaful of the sample in a test-tube. Add water until the test-tube is three quarters full. Shake to dissolve the salt. Divide the solution into six portions and then do the following to the portions of the solution of sample:		
	(i) add potassium iodide solution to the first portion.		
	(ii) add sodium hydroxide solution till excess to the second portion.		
	(iii) add ammonia solution till the ammonia is in excess to the third portion.		
	(iv) add potassium ferrocyanide solution to the fourth portion.		
	(v) add dilute hydrochloric acid followed by barium chloride solution to the fifth portion.		
	(vi) add lead acetate solution to the sixth portion.		
	(vii) into the resulting reaction mixture in (vi) add ammonium acetate solution till excess.		

Conclusion

The cation in the sample A is _____and the anion is _____. **(25 marks)**

Sample **L** is a salt containing **one** cation and **one** anion. Using systematic qualitative analysis procedures carry out tests on L and make appropriate observations and inferences to identify the cation and anion respectively.

Experiment	Observation	Inference

Conclusion

The cation present in L is _____ and the anion is _____. **(25 marks)**