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: 2½ Hours **12 November 2001 a.m.**

Instructions

1. This paper consists of **THREE** (3) questions.
2. Answer **TWO** (2) questions including question Number 1.
3. Record **ALL** your answers in the answer booklet(s) provided.
4. Qualitative guidance pamphlets may be used after a thorough check by the supervisor.
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 4 printed pages.

1. You are provided with the following:

(a) Solution A which contains 4.90 g of sulphuric acid per dm^3.

(b) Solution B of monovalent metal X hydroxide. Solution B is made by dissolving 2.00 g of X hydroxide in distilled water and making up to 1000 cm^3.

(c) Methyl orange indicator.

Procedure:

Put the acid solution in the burette. Pipette 20 cm^3 (or 25 cm^3) of solution B into the titration flask. Add a few drops of methyl orange indicator. Titrate this base against solution A until an end point is reached. Record your titration results in a table as shown below.

(d) Table of results

Volume of pipette used was _____ cm^3 (01 mark)

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

(07 marks)

(e) The colour change at the end point was from _____ to _____. (02 marks)

(f) The volume of acid solution A needed for complete neutralisation was _____ cm^3.

(01 mark)

(g) Write a balanced equation for the reaction. (02 marks)

(h) Calculate

(i) the molarity of acid solution (02 marks)

(ii) the molarity of the base solution (03 marks)

(iii) the molar mass of monovalent metal X hydroxide (03 marks)

(iv) the atomic mass of metal X. (03 marks)

(i) Metal X is most likely _____. (01 mark)

2. Sample X is a simple salt containing ONE cation and ONE anion. Carry out the experiments described below carefully and record all your observations. Make appropriate inferences and identify the cation and anion present in sample X.

	Experiment	Observation	Inference
(i)	Appearance		
(ii)	Put a spatulaful of sample X in a test tube and heat		
(iii)	Add three drops of sodium hydroxide solution to the solid sample X. Warm and test the gas evolved		
(iv)	Put a spatulaful of sample X in a dry test-tube, add conc. H_2SO_4 acid. Warm the mixture. Test for any gas evolved		
(v)	Put a spatulaful of sample X in a test tube, add conc. H_2SO_4 acid and MnO_2. Warm the mixture. Test for any gas(es) evolved		
(vi)	Place a spatulaful of sample X in a test tube and add water until half test tube. Shake to dissolve		
(vii)	To a portion of the solution from no. 6, add aqeous silver nitrate solution and then aqeous ammonia solution and shake		

CONCLUSION:

The cation is _____ and the anion is _____.

(a) Give balanced chemical equations for the reactions taking place in experiments (ii) and (iv).

(b) Write the confirmatory test for the anion present in sample X. (25 marks)

3. Sample Z contains ONE cation and ONE anion. Using systematic qualitative analysis procedures, carry out tests on Z and make appropriate observations and inferences and hence identify the cation and anion present in sample Z. Record your experiments, observations and inferences in tabular form as shown below.

Experiment	Observation	Inference

CONCLUSION:

The cation present in Z is _____ and the anion is _____.

(25 marks)