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 ***Thursday morning 18/10/2007***

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **two (2)** questions including question **number 1**.
3. All questions carry equal marks.
4. Qualitative Analysis Guidance Pamphlets may be used after a thorough check by the supervisor.
5. Cellular phones are **not** allowed in the examination room.
6. Electronic calculators are **not** allowed in the examination room.
7. Write your **Examination Number** on every page of your answer booklet(s).
8. The following constants may be used:
   H = 1, O = 16, Na = 23, S = 32.
   1 dm^3 = 1 litre = 1000 cm^3.

This paper consists of 4 printed pages.

1. You are provided with the following:

Solution **G** containing 0.05 M sulphuric acid.

Solution **H** containing 2 g of **X**OH in 500 cm^3 of the solution.

Solution **F**, methyl orange indicator.

Determine the atomic mass of **X** in **X**OH.

Procedure:

Put solution **G** in the burette. Pipette 20 cm^3 or (25 cm^3) of solution **H** into the conical flask. Add two or three drops of methyl orange indicator. Titrate solution **H** against solution **G** from the burette until a colour change is observed. Note the burette reading. Repeat the procedure to obtain three more readings.

(a) Record your results in a table as shown below.

(i) Burette readings.

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

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

(iii) Calculate the mean titre volume.

(iv) The volume of solution **H** needed for complete neutralization of _____ cm^3 of solution **G** was _____ cm^3.

(b) Write a balanced chemical equation for the reaction between solution **G** and **H**.

(c) Calculate the

(i) molarity of **H**.

(ii) concentration of **H** in g/dm^3.

(iii) molar mass of **X**OH.

(iv) atomic mass of **X** in compound **X**OH.

(25 marks)

2. Sample **B** is a simple salt containing one cation and one anion. Carry out carefully the experiments described below 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) To half a spatulaful of sample **B** in a test tube, add concentrated sulphuric acid and warm.		
(c) To a spatulaful of sample **B** in a test tube, add 10 cm^3 of distilled water and stir to obtain a stock solution then divide it into three portions.		
(d) To the first portion of the stock solution, add sodium hydroxide till excess.		
(e) To the second portion of the stock solution, add barium chloride solution.		
(f) To the third portion of the stock solution, add freshly prepared acidified ferrous sulphate solution followed by concentrated sulphuric acid added slowly along the walls of the test tube.		
(g) Perform a flame test on sample **B**.		

Conclusion

The cation in sample **B** is _____ and the anion is _____.

(25 marks)

3. **Sample N** is a simple salt containing one cation and one anion. Using systematic qualitative analysis procedures, carry out tests on the sample and make appropriate observations and inferences to identify the cation and anion in sample **N**.

Experiment	Observation	Inference

Conclusion

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

(25 marks)