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 ***Wednesday 15th October 2008 a.m.***

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. Electronic calculators are **not** allowed in the examination room.
6. Cellular phones 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:

   Atomic masses: H = 1, C = 12, O = 16, Na = 23, K = 39, 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:

Solution M containing 9.0 g of H_2X per dm^3 of the solution.

Solution N containing 4.91 g of sodium hydroxide per dm^3 of the solution.

Solution P is phenolphthalein indicator.

Procedure

Put solution M into the burette. Pipette 25 cm^3 (or 20 cm^3) of solution N into the titration flask. Put two to three drops of P into the titration flask. Titrate solution M from the burette against solution N in the titration flask until a colour change is observed. Note the burette reading. Repeat the procedure to obtain three more readings. Record your results as shown in Table 1.

Results

Table 1: Burette readings

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

(a) Give the volume of the pipette used.

(b) Give the volume of solution M needed for complete neutralization of solution N.

(c) Tell the colour change of the indicator at the end point of the titration.

(d) Write the balanced chemical equation for the reaction between solution M and N.

(e) Calculate the

(i) molarity of solution M

(ii) molar mass of H_2X

(iii) mass of X in H_2X.

(25 marks)

2. Sample D is a simple salt containing one cation and one anion. Carry out carefully the experiments described below recording all your observations and appropriate inferences as shown in Table 2 to identify the cation and anion present in D.

Table 2

	Experiment	Observation	Inference
(a)	Observe the appearance of salt D.		
(b)	Put a little solid sample D in a clean and dry test tube and heat.		
(c)	Put a spatulaful of sample D in a test tube, add distilled water, stir and divide the obtained solution into four portions in different test tubes. To the		
	(i) first portion of the solution of sample D in a state tube add aqueous ammonia slowly till excess.		
	(ii) second portion of the solution of sample D in a test tube add aqueous ammonia slowly till excess.		
	(iii) third portion of the solution of sample D in a test tube add potassium hexacyanoferrate (II).		
	(iv) fourth portion of the solution of sample D in a test tube add dilute HCl followed by $BaCl_2$ solution.		

39.20
19.30
18.90

Conclusion:

The cation in sample D is _____ and the anion is _____.

The molecular formula of salt D is _____.

(25 marks)

39.70
19.30
20.40

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

Experiment	Observation	Inference

19.10
5.30
0.80

Conclusion:

The cation in sample Y is _____ and the anion is _____. **(25 marks)**