THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/2A **CHEMISTRY 2A**

(ACTUAL PRACTICAL A)

Time: 3 Hours **Thursday, 12 May 2016 a.m.**

Instructions.

1. This paper consists of **three (3)** questions.
2. Answer **all** questions
3. Question number 1 carries 20 marks and the rest carry 30 marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

1. You are provided with the following:

Solution A: 0.1 M hydrochloric acid

Solution B: A solution prepared by dissolving 0.720 g of an unknown metallic hydroxide MOH in 250 cm^3 of solution

Indicator: Methyl orange

(a) Pipette 25.0 cm^3 of solution B into a conical flask and add 3 drops of methyl orange indicator. Titrate it against solution A until a permanent colour change is observed. Repeat the titration three times.

(i) Tabulate your titration results clearly and determine the average volume of hydrochloric acid used.

(ii) Write the balanced chemical equation for the neutralization reaction between MOH and HCl.

(iii) Calculate the number of moles of HCl used in the average titration.

(iv) Using your result, calculate the number of moles of MOH present in the pipetted volume.

(v) Determine the concentration of solution B in mol/dm^3.

(vi) From the mass of MOH used to prepare the 250 cm^3 solution, calculate the molar mass of MOH.

(vii) Deduce the identity of element M, given that it is a common reactive metal.

2. You are provided with:

T1: 40 g/dm^3 sodium thiosulphate solution

T2: 0.5 M sulphuric acid

T3: Distilled water

A white paper marked "X", a beaker, and stopwatch

(a) Place the white paper marked "X" on the bench and a clean 50 cm^3 beaker over it. Mix the given volumes of T1 and T3 (distilled water) in the beaker. Then add 10 cm^3 of T2 quickly and start the stopwatch. Record the time taken for the "X" to disappear from view. Use the volumes below:

Experiment	**Volume of T1 (cm^3)**	**Volume of T3 (cm^3)**	**Volume of T2 (cm^3)**
1	2	8	10
2	4	6	10
3	6	4	10
4	8	2	10

(b) Record your results in the table provided and calculate the rate of reaction for each.

(c) Plot a graph of rate (1/t) against volume of T1.

(d) What is the shape of the graph and what does it indicate about the reaction?

(e) Determine the order of reaction with respect to sodium thiosulphate.

(f) Write the balanced ionic equation for the reaction that occurred.

(g) State one observable change that confirms the reaction has taken place.

(h) Suggest one experimental factor that must be kept constant to ensure fair comparison.

3. You are provided with a white crystalline solid labeled Sample N. Carry out the following tests and record both observations and inferences.

Test	Observation	Inference
(a) Appearance of the sample		
(b) Solubility of the sample in cold water		
(c) Flame test		
(d) Add dilute HCl to a portion of the solid		
(e) Add barium chloride to the solution of N		
(f) Add sodium hydroxide dropwise, then in excess		
(g) Add ammonia solution dropwise, then in excess		

(a) Complete the table above with your observations and inferences.

(b) Identify the anion and the cation present in Sample N.

(c) Write two balanced chemical equations to confirm the presence of the ions.