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

732/2B **CHEMISTRY 2B**

(ACTUAL PRACTICAL B)

Time: 3 Hours **Wednesday, 14th May 2015 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 two solutions:

R1: A solution of potassium hydroxide of unknown concentration

R2: A standard solution of sulphuric acid containing 0.05 mol/dm³

You are required to determine the concentration of **R1** using titration and phenolphthalein as the indicator.

Instructions:

Pipette 25.0 cm³ of **R1** into a clean conical flask. Add 2–3 drops of phenolphthalein. Titrate against **R2** from the burette. Repeat the process and record all readings including a rough titration and three accurate ones.

Questions

(a) What was the colour change at the end point of the titration?

(b) From your burette readings, determine the average volume of **R2** used. (Use 25.0 cm³ if not given)

(c) Write a balanced chemical equation between potassium hydroxide and sulphuric acid.

(d) Determine the number of moles of **R2** used in the average titre.

(e) Use the mole ratio to find the moles of **R1** in 25.0 cm³.

(f) Hence calculate the concentration of **R1** in mol/dm³.

(g) Calculate the concentration of **R1** in g/dm³ (Molar mass of KOH = 56 g/mol).

2. In a reaction involving the effect of concentration on rate, a student was given:

- Solution **T1**: 0.5 M sodium thiosulphate
- Solution **T2**: 2 M hydrochloric acid
- A white paper marked "+"
- Stopwatch and other apparatus

Instructions:

The student added 10 cm³ of **T1** and 10 cm³ of **T2** in a beaker placed over the paper with "+" mark. The time taken for the mark to disappear was recorded. This was repeated using more dilute **T1** each time (diluted with distilled water), keeping the total volume constant at 20 cm³.

Questions

(a) Why does the mark "+" disappear during the reaction?

(b) Complete the following table with sample times:

Experiment	T1 (cm³)	Water (cm³)	T2 (cm³)	Time (s)
1	10	0	10	22
2	8	2	10	28
3	6	4	10	35
4	4	6	10	48
5	2	8	10	70

(c) Write the balanced chemical and ionic equations for this reaction.

(d) What conclusion can be drawn about the effect of concentration on rate of reaction?

(e) State two precautions that must be observed during this experiment.

3. You are given a salt labeled **Z**, which contains a single cation and a single anion. Perform tests to identify them.

Tests to perform:

(a) Record the appearance of the salt.

(b) Heat the dry salt in a test tube and observe any changes.

(c) Dissolve a portion in distilled water and divide into three test tubes.

(d) Add aqueous sodium hydroxide dropwise, then in excess, to the first portion.

(e) Add aqueous ammonia dropwise, then in excess, to the second portion.

(f) Add barium chloride followed by dilute hydrochloric acid to the third portion.

(g) Add silver nitrate followed by dilute nitric acid to a fresh portion.

Questions

(i) Create a table showing your observations and inferences.

(ii) Identify the cation and anion present in the salt.

(iii) Write two balanced equations for any two positive tests observed.

(iv) State one confirmatory test that distinguishes this salt from a chloride.