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, 10th May 2017 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. A solution labeled **Q1** is known to contain 0.05 mol/dm³ of sulfuric acid. Another solution labeled **Q2** was prepared by dissolving 2.00 g of sodium hydroxide in 500 cm³ of water. You are required to determine the average volume of **Q1** required to completely neutralize 25.0 cm³ of **Q2** using phenolphthalein as the indicator.

Instructions:

Pipette 25.0 cm³ of **Q2** into a conical flask

Add 2 drops of phenolphthalein

Titrate with **Q1** from the burette

Repeat to obtain consistent readings and calculate the average volume used

Questions

(a) What colour change will be observed during the titration?

(b) Write the balanced chemical equation for the reaction between **Q1** and **Q2**.

(c) Calculate the number of moles of NaOH in 25.0 cm³ of **Q2**.

(d) Determine the volume of **Q1** required to neutralize this amount of NaOH.

(e) Calculate the average titre (assume it is 25.0 cm³).

(f) Based on the above data, verify the concentration of **Q1** and comment on whether the results are consistent.

2. You are provided with:

0.1 M sodium thiosulphate (**R1**)

0.1 M hydrochloric acid (**R2**)

Distilled water, beaker, stopwatch, and a sheet marked with an "X"

You are required to study the effect of changing the volume (and thus concentration) of **R1** on the rate of reaction.

Procedure:

(i) Add 10 cm³ of **R1** and 10 cm³ of **R2** in a beaker over the marked "X"

(ii) Record the time for the mark to disappear

(iii) Repeat the procedure by diluting **R1** with distilled water to get 8, 6, 4, and 2 cm³ while keeping total volume constant

Questions

(a) Why does the "X" mark disappear during the experiment?

(b) Complete the following table:

Exp	R1 (cm³)	Water (cm³)	R2 (cm³)	Time (s)
1	10	0	10	20
2	8	2	10	27
3	6	4	10	36

4	4	6	10	52
5	2	8	10	74

(c) Write the balanced chemical equation and net ionic equation.

(d) Explain the relationship between the concentration of **R1** and the rate of reaction.

(e) State one way to increase the rate of this reaction apart from concentration.

3. You are given a salt labeled **M**, suspected to be an iron compound. Perform the following tests to identify its cation and anion:

(a) Observe the colour and texture of the salt.

(b) Heat a portion of the dry salt and observe any changes.

(c) Add a small quantity to water, then test with sodium hydroxide dropwise and in excess.

(d) Test another portion with ammonium hydroxide.

(e) Add dilute nitric acid followed by potassium hexacyanoferrate(II).

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

Questions

(i) Construct a table to show your observations and inferences.

(ii) Identify the cation and anion in salt **M**.

(iii) Write balanced chemical equations for two reactions that gave positive results.

(iv) How would you distinguish between Fe^{2+} and Fe^{3+} salts using these procedures?