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 2014 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. During a practical session, you are provided with two solutions:

N1, a solution of ethanoic acid of unknown concentration

N2, a solution of sodium hydroxide containing 4.0 g of NaOH per dm^3

Using phenolphthalein as an indicator, your task is to determine the concentration of **N1** by titrating it against **N2**.

Instructions:

Fill the burette with **N1**

Use a pipette to transfer 25.0 cm^3 of **N2** into a conical flask

Add two drops of phenolphthalein and titrate until the colour changes

Questions

(a) What colour change will be observed at the end point of the titration?

(b) If the average volume of **N1** used was 25.0 cm^3, calculate the number of moles of NaOH in 25.0 cm^3.

(c) Write a balanced chemical equation for the neutralization between ethanoic acid and sodium hydroxide.

(d) Determine the concentration of **N1** in mol/dm^3.

(e) Convert the result in (d) into g/dm^3 (Molar mass of CH_3COOH = 60 g/mol).

(f) What is the role of phenolphthalein in this experiment?

2. In a reaction kinetics experiment, you are provided with:

0.1 M potassium iodide solution labeled **P1**

0.1 M hydrogen peroxide solution labeled **P2**

0.1 M sulfuric acid labeled **P3**

Starch solution

You are instructed to mix equal volumes of **P1**, **P2**, and **P3** in a beaker and add starch solution immediately. The time taken for a blue-black colour to appear is recorded. The experiment is repeated at different temperatures: 30°C, 40°C, 50°C, 60°C, and 70°C.

Questions

(a) State the reason for the appearance of the blue-black colour in this reaction.

(b) Complete the table with appropriate temperatures in Kelvin and sample time values.

Temperature (°C)	Temperature (K)	Time (s)
30		65
40		45
50		30
60		18
70		10

(c) Write the ionic equation showing the role of hydrogen peroxide in this reaction.

(d) Describe how temperature affects the reaction rate.

(e) Plot a graph of temperature (K) on the x-axis against time (s) on the y-axis.

(f) If you were to repeat this experiment at 20°C, what would you expect to happen to the reaction time? Justify your answer.

3. You are given a sample of a salt coded **X**. Perform the following tests to determine the cation and anion in the salt:

Procedure:

(a) Observe and describe the physical appearance of the salt **X**.

(b) Heat a small amount in a dry test tube and note any changes.

(c) Dissolve the salt in water and divide the solution into three portions.

(d) To the first portion, add aqueous sodium hydroxide dropwise, then in excess.

(e) To the second portion, add aqueous ammonia dropwise, then in excess.

(f) To the third portion, add barium chloride followed by dilute HCl.

(g) To another portion, add silver nitrate followed by dilute nitric acid.

Questions

(i) Record your observations and inferences in a table.

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

(iii) Write a balanced chemical equation for the reaction with sodium hydroxide.

(iv) Write the reaction between salt **X** and sodium carbonate.