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, 13rd May 2009 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 coded **G1** (a solution of hydrochloric acid with unknown concentration)

Solution **G2**, a standard sodium carbonate solution containing 2.65 g of Na_2CO_3 per dm^3

Methyl orange indicator

Instruction:

Titrate **G2** (from the burette) against **G1** (in the titration flask) using methyl orange as the indicator. Record your results including one rough and three accurate titrations in a tabular form.

Questions

(a) (i) State the colour change observed during the titration.

(ii) What volume of the pipette was used in this titration?

(iii) Determine the average volume of solution G2 used to neutralize G1.

(iv) Write a balanced chemical equation for the reaction between G1 and G2, including state symbols.

(v) Write the ionic equation for the reaction.

(vi) Calculate the concentration of solution G1 in mol/dm^3.

2. You are provided with:

- 0.1 M sodium thiosulphate labeled **TQ**
- 0.1 M hydrochloric acid labeled **TR**
- Distilled water
- A stopwatch, beaker, test tubes, thermometer, and a sheet of paper with a black letter "Z"

Follow the procedure below:

(i) Pour 10 cm^3 of **TQ** and 10 cm^3 of **TR** into separate test tubes.

(ii) Warm both test tubes in a water bath until the solution reaches 50°C.

(iii) Mix the two solutions quickly into a 50 cm^3 beaker placed on the paper with letter "Z" and start the stopwatch.

(iv) Record the time it takes for the letter "Z" to disappear.

(v) Repeat the experiment at different temperatures using the same volumes and procedures.

Questions

(a) Record the room temperature in Kelvin.

(b) Explain why the mark "Z" disappeared.

(c) Complete the table by adding time and temperature values from your trials.

(d) (i) Write a balanced chemical equation for the reaction between TQ and TR, showing all state symbols.

(ii) Write the net ionic equation.

(e) Plot a graph of temperature (K) against time (s).

(f) What does the shape of the graph suggest about the effect of temperature on reaction rate?

3. You are given a salt coded **Q**. It contains one cation and one anion. Carry out a qualitative analysis to identify both ions. Use the following tests:

(a) Record the appearance of salt **Q**.

(b) Test the action of heat on dry **Q**.

(c) Dissolve the salt in distilled water.

(d) Add aqueous sodium hydroxide dropwise, then in excess, to the solution of **Q**.

(e) Add aqueous ammonia to the solution of **Q**.

(f) Add barium chloride solution followed by dilute hydrochloric acid.

(g) Add silver nitrate solution followed by dilute nitric acid.

Questions

(i) Prepare a table showing your observations and inferences for each test.

(ii) Write the balanced chemical equation for the test in step (d).

(iii) Identify the cation and anion in salt **Q**.

(iv) Write a balanced chemical equation for the reaction between salt **Q** and sodium carbonate solution.