THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/2B **CHEMISTRY 2B**

(ACTUAL PRACTICAL B)

(For Both School and Private candidates)

Time: 2:30 Hours **Year: 2020**

Instructions

1. This paper consists of **two (2)** questions**.**
2. Answer **all** questions**.**
3. Each question carries twenty **five (25)** marks**.**
4. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil.
5. Cellular phones, and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet (s)

Atomic masses: H=1, C=12, 0=16, Na=23.

$1litre = 1dm^3 = 1000cm^3$

1. Determine the purity of sulphuric acid made by dissolving 7.0 g of impure acid in distilled water to make 1 dm^3 of solution (labelled **K**) by reacting it with solution **L** made by dissolving 4.0 g of sodium hydroxide in distilled water to make 1 dm^3 . Carry out the titration using either phenolphthalein (**POP**) or methyl orange (**MO**) indicator, obtain three titre volumes and tabulate the results.

   Questions:

   (a) Why both phenolphthalein (**POP**) and methyl orange (**MO**) indicators are suitable for the titration?

   (b) How much volume of the acid was required for complete neutralization with 20 cm^3 or 25 cm^3 of the base?

   (c) Write a balanced chemical equation for the reaction.

   (d) Calculate the molarity of the acid and the base.

   (e) Calculate the percentage purity of the acid.

2. Study the reaction between sodium thiosulphate and hydrochloric acid. The chemicals provided are labelled as $\mathbf{N_1}$, $\mathbf{N_2}$, and $\mathbf{N_3}$ for 0.13 M sodium thiosulphate, 2.0 M hydrochloric acid and distilled water respectively. You are also provided with a piece of white paper marked X on which a 100 cm^3 beaker containing the reaction mixture. Mix volumes of $\mathbf{N_1}$, $\mathbf{N_2}$, and $\mathbf{N_3}$ and at the same time record the time taken for the reaction as shown in the following table.

Table: Experimental Data

Volume of N1 (cm^3)	Volume of N3 (cm^3)	Volume of N2 (cm^3)	Time (s)
2	8	10	
4	6	10	
6	4	10	
8	2	10	
10	0	10	

(a) Complete filling the table.

(b) (i) plot a graph of volume $\mathbf{N_1}$ (vertical axis) against time (horizontal axis) taken for the letter X to disappear completely.

(ii) comment on the shape of the graph.

(c) Explain why did the letter X disappear.

(d) Write the electronic configuration of the product which causes the solution to be cloudy (milky).

(e) Write the ionic equation for the reaction between $\mathbf{N_1}$ and $\mathbf{N_2}$.

(f) Explain why $\mathbf{N_3}$ was added to $\mathbf{N_1}$.