THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/2C **CHEMISTRY 2C**

(ACTUAL PRACTICAL C)

(For Both School and Private candidates)

Time: 2:30 Hours **Year: 2022**

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.

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



1. You are provided with solutions **UU** and **VV**: Pour about 2 cm^3 of solution **UU** into a test tube; add 2 to 3 drops of methyl orange (**MO**) indicator to test whether it is an acidic or basic solution. Empty the test tube and wash it. Repeat the procedure using solution **VV**.

   The acidic solution you have identified is a solution of 0.1 M nitric acid. The basic solution was made by dissolving 2.65 g of Na_XCO_3 in a 0.5 dm^3 of a solution. Titrate the acid solution (from the burrete) against the base solution (in titration flask) using methyl orange (**MO**) as an indicator up to the end point. Repeat the procedure to obtain three more burrete readings. Record your results in a tabular form.

   Questions

   (a) (i) What was the volume of the pipette used?

   (ii) Calculate the average titre volume.

   (b) If the mole ratio between the base and acid for the reaction is 1:2 respectively, determine the following:

   (i) Concentration of Na_XCO_3 in mol/dm^3 and g/dm^3

   (ii) Molecular mass of Na_XCO_3

   (iii) The value of x and hence replace it in the formula Na_XCO_3.

   (c) Write a balanced chemical equation for the reaction between **UU** and **VV**.

   (d) What is the significance of the indicator in this experiment?

2. Determine the effect of concentration on the rate of chemical reaction. The chemicals provided are C which contained 10.0 g of sodium thiosulphate in 500 cm^3 litre of solution and **H** which contained 2 M nitric acid solution. You are also given a stopwatch and a piece of white paper marked X and distilled water.

   Provided as follows

   (i) Place a 100 cm^3 beaker on top of cross X on the plain paper such that the cross X is visible through the mouth of the beaker when viewed form above.

   (ii) Measure 25 cm^3 of C and pour it into a beaker in step (i).

(iii) Measure 5 cm^3 of H and pour it into a beaker containing C in step (ii) and instantly start the stop watch.

(iv) Stear the mixture with a glass rod while keep on observing the cross from above: record the time taken for the cross to dissapear completely.

(v) Repeat the procedures (ii) – (iv) for different concentration of C as indicated in the following table.

Table: Experimental Data

Volume of C (cm^3)	**Distilled water (cm^3)**	**Volume of H (cm^3)**	**Time taken for the cross to disappear (sec).**
25	0	5	
20	5	5	
15	10	5	
10	15	5	
5	20	5	

(a) Complete filling the Table.

(b) (i) Using the data in the table, plot a graph of volume (cm^3) against time (s).

(ii) What does the shape of the graph indicate?

(c) Write the ionic equation for the reaction between **C** and **H.**

(d) Why did the cross **X** disappear?

(e) From the graph, what do you conclude about the effect of increasing concentration on the rate of reaction?