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 : 2:3 Hours **ANSWERS** **Year : 2022**

Instructions

1. This paper consists of **two (2)** questions. Answer all questions.
2. Each question carries **twenty five (25)** marks.
3. Communication devices and any unauthorised materials are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).

1. You are provided with solutions UU and VV…

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

The volume of the pipette used was 25 cm^3.

(ii) Calculate the average titre volume.

From the three concordant readings, suppose values were 24.5, 24.7, and 24.6 cm^3.

Average titre volume = (24.5 + 24.7 + 24.6) ÷ 3 = 24.6 cm^3.

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

(i) Concentration of Na_2CO_3 in mol/dm^3 and g/dm^3.

Given: 2.65 g in 0.5 dm^3 → 5.3 g/dm^3.

Moles = 5.3 ÷ 106 = 0.05 mol/dm^3.

(ii) Molecular mass of Na_2CO_3.

Na = 23, C = 12, O_3 = 48 → 106 g/mol.

(iii) The value of x and hence replace it in the formula Na_xCO_3.

Since molar mass corresponds to Na_2CO_3 (106 g/mol), x = 2.

Thus formula is Na_2CO_3.

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

$Na_2CO_3(aq) + 2HNO_3(aq) \rightarrow 2NaNO_3(aq) + H_2O(l) + CO_2(g)$.

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

The indicator (methyl orange) shows the end point of the titration by changing colour, which indicates complete neutralization.

2. Determine the effect of concentration on the rate of chemical reaction…

(a) Complete filling the table.

Volume of C (cm^3)	Distilled water (cm^3)	Volume of H (cm^3)	Time for cross to disappear (s)
25	0	5	40
20	5	5	55
15	10	5	70
10	15	5	100
5	20	5	140

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

The shape indicates that as concentration of C increases, the time decreases, showing the reaction rate increases.

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

$S_2O_3^{2-}(aq) + 2H^+(aq) \rightarrow SO_2(g) + S(s) + H_2O(l)$.

(d) Why did the cross X disappear?

The cross disappeared because sulphur precipitate formed during the reaction made the solution cloudy and obscured visibility.

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

Increasing the concentration of sodium thiosulphate increases the rate of reaction, because particles collide more frequently, producing sulphur faster and making the cross disappear sooner.