THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/2B CHEMISTRY 2C

(ACTUAL PRACTICAL B)

(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 BB and CC. One solution is acidic, while the other solution is basic…

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

The volume of the pipette used was 25 cm³.

(ii) Calculate the average volume of the acid used to neutralize the base.

The average volume of acid is obtained from the titre values recorded after three concordant readings.
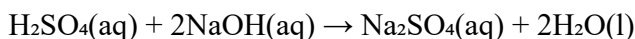
Suppose the titres were 24.8 cm³, 25.0 cm³, and 25.1 cm³, the average volume would be:

$(24.8 + 25.0 + 25.1) \div 3 = 24.97$ cm³ ≈ 25.0 cm³.

(iii) What was the colour change at the end point?

The solution changed from yellow to orange-red when using methyl orange indicator.

(b) Write a balanced chemical equation for the reaction between solutions BB and CC.

$H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(l)$

(c) Calculate the percentage of impurity of sodium hydroxide.

Moles of H_2SO_4 = concentration × volume = (3.06 g/dm³ ÷ 98 g/mol) × (25 ÷ 1000) = 0.00078 mol.

From the equation, 1 mol H_2SO_4 reacts with 2 mol NaOH, so moles of NaOH = 0.00078 × 2 = 0.00156 mol.

In 25 cm³ of NaOH solution, there are 0.00156 mol.

In 500 cm³, total moles = (0.00156 ÷ 25) × 500 = 0.0312 mol.

Mass of pure NaOH = moles × molar mass = 0.0312 × 40 = 1.25 g.

Percentage purity = (1.25 ÷ 2) × 100 = 62.5%.

Percentage impurity = 100 – 62.5 = 37.5%.

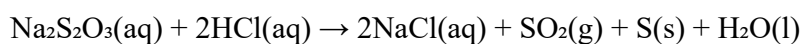**2. Determine the effect of temperature on the rate of chemical reaction…**

(a) Complete filling the table.

Temperature (°C)	Time (sec)	1/time (s⁻¹)
40	60	0.0167
50	45	0.0222
60	30	0.0333
70	20	0.0500

(b) What does 1/time in the table represent?
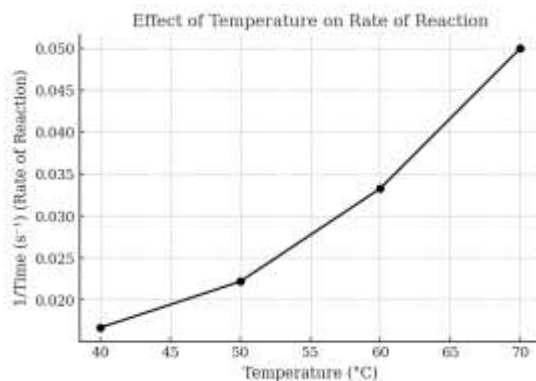
It represents the rate of reaction.

(c) Write a balanced chemical equation for the reaction between EE and FF.

$Na_2S_2O_3(aq) + 2HCl(aq) \rightarrow 2NaCl(aq) + SO_2(g) + S(s) + H_2O(l)$

(d) What is the name of the product causing the solution to turn cloudy making the letter X disappear?

The product is sulphur (S).

(e) Plot graph of temperature against 1/time.

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(f) From the graph what do you conclude about the effect of increasing temperature on the rate of reaction?

As temperature increases, the rate of reaction also increases. This is because higher temperatures provide more kinetic energy to particles, leading to more frequent and effective collisions.

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