

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

032/2C

**CHEMISTRY 2C
ACTUAL PRACTICAL C
(For Both School and Private Candidates)**

Time: 2:30 Hours

Wednesday, 19th November 2014 a.m.

Instructions

1. This paper consists of **three (3)** questions. Answer **all** the questions.
2. Question 1 carries **twenty (20)** marks and the rest carry **fifteen (15)** marks each.
3. Qualitative Analysis Guidance Pamphlets may be used after a thorough check by the supervisor.
4. Cellular phones and calculators are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. You may use the following constants:
Atomic masses:
H = 1, C = 12, O = 16, Na = 23, Cl = 35.5, S = 32.
1 litre = 1 dm³ = 1000 cm³.

1. You are provided with the following solutions:
D: Containing 1.46 g of hydrochloric acid in 0.40 dm³ of solution;
F: Containing 2.0 g of impure sodium hydroxide contaminated with sodium chloride, in 0.5 dm³;
 Phenolphthalein and methyl orange indicators.

Questions

- (a) Which is the suitable indicator for the titration of the given solutions? Give a reason for your answer.
- (b) Titrate the acid (in a burette) against the base (in a conical flask) using two drops of your indicator and obtain three titre values.
- (c) (i) _____ cm³ of **F** required _____ cm³ of **D** for complete reaction.
 (ii) Write a balanced chemical equation for the reaction between **D** and **F**.
- (d) Showing your procedures clearly, calculate the percentage by mass of sodium chloride in impure base.
2. You are provided with the following:
 Solution **C** containing 0.5 M sodium thiosulphate (Na₂S₂O₃);
 Solution **E** containing 0.1 M nitric acid (HNO₃);
 Distilled water;
 Plain paper marked **X**;
 Stopwatch.

Procedure

- (i) Measure 10 cm³ of solution **C** and put into 100 cm³ beaker provided.
- (ii) Measure 10 cm³ of solution **E** and put into 100 cm³ beaker containing solution **C**, and immediately start the stopwatch.
- (iii) Swirl the contents and place the beaker on top of letter **X** on the plain paper provided. Watch from above and observe the changes.
- (iv) Switch off the stopwatch when the mark **X** disappears.
- (v) Record the time taken for the letter **X** to disappear.
- (vi) Repeat the experiment using different data as shown in Table 1.

Table 1: Table of Results

Experiment	Vol. of E (cm ³)	Vol. of C (cm ³)	Vol. of Distilled water (cm ³)	Time (s)
1	10	10	0	
2	10	8	2	
3	10	6	4	
4	10	4	6	

Questions

- (a) What is the aim of the whole experiment?
- (b) Complete Table 1.
- (c) Giving reason(s), identify the experiment in which the reaction was:
 - (i) fast
 - (ii) slow.
- (d) With state symbols, write the ionic equation for the reaction between **C** and **E**.
- (e) List any three factors affecting the reaction in 2(d).
- (f)
 - (i) Plot a graph of volume of **C** against time.
 - (ii) What can you conclude from the graph?

Sample **Y** contains one cation and one anion. Using systematic qualitative analysis procedures record carefully your experiments, observations, inferences and finally identify the anion and cation in sample **Y**.

Table 2: Table of results

S/n	Experiment	Observation	Inference

Conclusion:

- (i) The cation in sample **Y** is _____.
- (ii) The anion in sample **Y** is _____.
- (iii) The chemical formula of sample **Y** is _____.