

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

032/2A

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

Time: 2:30 Hours

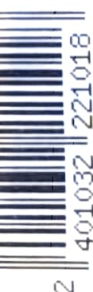
Year: 2024

Instructions

1. This paper consists of **two (2)** questions. Answer **all** questions.
2. Each question carries **twenty five (25)** marks.
3. All writing must be in **blue** or **black** ink, **except** drawings which must be in pencil.
4. Communication devices and any unauthorised materials 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.

1 litre = 1 dm³ = 1000 cm³.



2

1. A sample of 500 cm^3 of vinegar solution consists 3 g of organic acid with a general formula R-COOH where R is an alkyl group. The amount of the acid in vinegar is determined through titration with a standard solution of a base made by dissolving 1.2 g of NaOH with distilled water to make 500 cm^3 solution. Use phenolphthalein (POP) indicator to carry out the experiment using the given procedure, then answer the questions that follow.

Procedure

- Fill the burette with vinegar solution.
- Use the pipette to transfer 25 cm^3 or 20 cm^3 of the base solution into a clean and dry conical flask and add three drops of POP.
- Titrate the resulting mixture against vinegar solution.
- Repeat procedure (i) to (iii) to obtain three more readings and record the results in a tabular form.

Question

- Calculate:
 - the concentration of the base in mol/dm^3 .
 - the molarity of the organic acid.
 - the molecular mass of the organic acid.
 - If **R** in the acid is represented by $\text{C}_n\text{H}_{2n+1}$, find the value of n in the formula unit.
 - Write the structural formula of the acid and give its IUPAC name.
 - Write the reaction between the organic acid and ethanol in the presence of H_2SO_4 .
 - Give two natural sources of the organic acid presents in vinegar.
2. Sample **PP** contains one cation and one anion. Carry out systematic qualitative analysis procedures, to identify the cation and anion in sample **PP**. Record carefully your experiments, observations and inferences as indicated in the experimental table.

Experimental Table

S/N	Experiments	Observations	Inferences

Questions

- What are the cation and anion in the sample?
- Write the molecular formula of the sample.
- Mention two properties of the cation identified.