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 dm^3 = 1000 cm^3.

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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

(i) Fill the burette with vinegar solution.

(ii) 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.

(iii) Titrate the resulting mixture against vinegar solution.

(iv) Repeat procedure (i) to (iii) to obtain three more readings and record the results in a tabular form.

Question

(a) Calculate:

(i) the concentration of the base in mol/dm^3.

(ii) the molarity of the organic acid.

(iii) the molecular mass of the organic acid.

(b) If **R** in the acid is represented by C_nH_{2n+1}, find the value of n in the formula unit.

(c) Write the structural formula of the acid and give its IUPAC name.

(d) Write the reaction between the organic acid and ethanol in the presence of H_2SO_4.

(e) 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

(a) What are the cation and anion in the sample?

(b) Write the molecular formula of the sample.

(c) Mention two properties of the cation identified.