

THE UNITED REPUBLIC OF TANZANIA  
PRESIDENT'S OFFICE  
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT



FORM FOUR JOINT MOCK EXAMINATION  
(TANGA, IRINGA, SINGIDA, MOROGORO, DODOMA,  
TABORA, LINDI AND MTWARA)

032/2A

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

Time: 2:30 Hours

Year: 2025

**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:
  - Atomic masses:  
 $H = 1, C = 12, O = 16, Na = 23, Cl = 35$
  - $1 \text{ Litre} = 1 \text{ dm}^3 = 1000 \text{ cm}^3$

This paper consists of 3 printed pages

1. A sample of 250 cm<sup>3</sup> of acetic acid solution (MM) consists 1.5 g of organic acid with a general formula R – COOH where R is an alkyl group. The amount of the acid in acetic acid is determined through titration with a standard solution of a base made by dissolving 0.3125 g of Caustic soda (QQ) with distilled water to make 250 cm<sup>3</sup> 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 acetic acid.
- (ii) Use the pipette to transfer 25 cm<sup>3</sup> or 20 cm<sup>3</sup> of the base solution into a clean and dry conical flask and add three drops of POP.
- (iii) Titrate the resulting mixture against acetic acid solution.
- (iv) Repeat procedure (i) to (iii) to obtain three more readings and record the results in a tabular form.

Experiment	Pilot	1	2	3
Final reading (cm <sup>3</sup> )				
Initial reading (cm <sup>3</sup> )				
Volume used (cm <sup>3</sup> )				

### Questions

- (a) Calculate:
    - (i) The molecular mass of the organic acid MM
    - (ii) The molarity of the organic acid MM
    - (iii) The concentration of the base QQ in mol/dm<sup>3</sup>
  - (b) Write a balanced chemical equation for the reaction.
  - (c) If R in the acid is represented by C<sub>n</sub>H<sub>2n+1</sub>, find the value of n in the formula unit.
  - (d) Write the structural formula of the acid MM and give its IUPAC name.
  - (e) Write the reaction between the organic acid and ethanol in the presence of H<sub>2</sub>SO<sub>4</sub>.
  - (f) Give two natural sources of the organic acid present in MM.
2. Sample AA contains one cation and one anion. Carry out systematic qualitative analysis procedures to identify the cation and anion in sample AA. Record carefully your experiments, observations, and inferences as indicated in the 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 sample AA identified.
- (d) What are uses of sample AA identified in daily life? (Two points)