

Candidate's Index Number



**THE UNITED REPUBLIC OF TANZANIA
THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL
GOVERNMENT
TANGANYIKA DISTRICT COUNCIL
FORM FOUR MOCK EXAMINATIONS**



**CHEMISTRY 2A
ACTUAL PRACTICE 2A**

032/2

Time: 2:30 Hours

April, 2023

INSTRUCTIONS

1. This paper consists of two questions. Answer all questions.
2. Each question carries 25 marks.
3. Cellular phones and other unauthorized materials are not allowed in the examination room.
4. Write your index number on every page of your answer booklet(s).
5. The following constants may be used.

Atomic masses: H=1, C=12, N=14, O=16, Na= 23, S= 32, Ca= 40, Cl = 35.5.

GMV at s.t.p = 22.4 dm^3

Standard pressure = 760 mm Hg

1 litre = $1 \text{ dm}^3 = 1000 \text{ cm}^3$

FOR EXAMINERS' USE ONLY

QUESTION NUMBER	SCORE	EXAMINER'S INITIALS
01		
02		
TOTAL		
CHECKER'S INITIALS		

1. You are provided with the following solutions:
- Solution AA: containing 3.65g of hydrochloric acid per dm^3 of solution.
 - Solution MM: containing 3.575g of pure hydrated solution carbonate, $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$ per 0.25 dm^3 of solution.
 - Methyl orange indicator solution.

Procedures:

- (i) Put the acid solution into the burette.
- (ii) Pipette 20cm^3 or 25cm^3 of solution MM into a titration flask.
- (iii) Add few drops of methyl orange indicator.
- (iv) Titrate this base solution against the acid solution until end point is reached.
- (v) Record your results as shown below:

(a) Table of results

Titration	Pilot	1	2	3
Final reading (cm^3)				
Initial reading (cm^3)				
Volume used (cm^3)				

- (i) The volume of pipette used was _____ cm^3 .
- (ii) The colour change at the end point was from _____ to _____.
- (iii) The volume of solution AA needed to complete neutralization was _____.
- (iv) Write down the balanced chemical equation for the reaction.

(b) Calculate

- (i) The molarity of solution AA.
- (ii) Molarity of solution MM.
- (iii) Find the value of water of crystallization, X, in $\text{Na}_2\text{CO}_3 \cdot \text{XH}_2\text{O}$.

2. You are provided with the following:

E: A solution containing 79g of $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ in 1 litre of solution.

F: A solution containing 1.0 mol/dm^3 of dilute HCl.

G: Distilled water.

A: Stop watch, white plain paper, thermometer.

Procedures:

- (i) Put a beaker (100 ml) on top of a cross on the given sheet of paper.
- (ii) Measure 25 cm^3 of E using measuring cylinder and pour into a beaker in (i).
- (iii) Measure the zero volume of G and add into a beaker containing E.
- (iv) Using another measuring cylinder, measure 5 cm^3 of F and pour it into a beaker containing E making the total volume up to 30cm^3 and instantly start a stop watch.
- (v) Stir the mixture with a glass rod while you keep on observing the cross (X) from above. Record the time taken for the cross to disappear.

Candidate's Index Number

- (vi) Repeat this procedure with the remaining four solutions, as shown in the table below:

Volume of E (cm ³)	Volume of G (cm ³)	Volume of F (cm ³)	Total volume (cm ³)	Time taken for the cross to disappear (sec)
25	0	5		
20	5	5		
15	10	5		
10	15	5		
5	20	5		

Questions

- (a) Complete by filling the table above.
(b) (i) Using the data in the table, plot a graph of volume of E against time.
(ii) What does the shape of the graph indicate?
(c) Write down the ionic equation of the reaction between E and F.
(d) Why did the cross disappear?
(e) Write two uses of the product which obscured the cross.

