

233/3

NAME..... INDEX NUMBER.....

CANDIDATE'S SIGNATURE..... DATE.....

**ASUMBI GIRLS HIGH SCHOOL
POST -MOCK 1
AUGUST/SEPTEMBER
2022**

AUGUST / SEPTEMBER - 2022

**CHEMISTRY PAPER 3
PRACTICAL
2¹/₄ HOURS**

Instructions to candidates.

- (a). Write your name and index number in the spaces provided above.
- (b). Sign and write the date of the examination in the spaces provided above.
- (c). Answer **ALL** question in the spaces provided in the question paper.
- (d). You are not allowed to start working with the apparatus for the first 15 minutes of the 2¹/₄ hours allowed for this paper. This time is to enable you read the question paper and make sure you have all the chemicals and apparatus you may need.
- (e). Mathematical tables and silent electronic calculators may be used.
- (f). All workings **MUST** be clearly shown where necessary.
- (g). This paper consists of 5 printed pages.
- (h). Candidates must check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For examiner's use only

Questions	Maximum score	Candidates score
1	18	
2	6	
3	16	
	40	

1. You are provided with:

- Solution A, containing 4.0gdm^{-3} of sodium hydroxide
- Solution B, hydrochloric acid
- 2.5 g of a mixture of two salts, XCl (RFM 58.5) and X_2CO_3 (RFM 106)

You are required to:

- (i) Standardize solution B, hydrochloric acid.
- (ii) Determine the mass composition of the salt mixture

PROCEDURE 1

1. Fill the burette with solution B
2. Pipette 25 cm^3 of solution A into a clean dry conical flask. Then add 2 -3 drops of phenolphthalein indicator.
3. Titrate solution A solution with solution B. Record your results in the table below.
4. Repeat the procedure two more times to retain concord and values.

TABLE 1

(3 marks)

Titration number	1	2	3
Final burette reading (cm^3)			
Initial burette reading(cm^3)			
Volume of acid used (cm^3)			

(a) Calculate the average volume of solution B used.

(1 mark)

(b) Find;

(i) Moles of sodium hydroxide that reacted with the acid.

(2 marks)

(ii) Moles of hydrochloric acid present in the average volume.

(1 mark)

(iii) Molarity of the acid

(1 mark)

PROCEDURE II

1. Put about 100cm^3 of water in a 250ml volumetric flask add all the 2.5g of salt mixture. Shake the mixture to dissolve and the solid. Top up the solution to the mark with distilled water Label this solution C

2. Fill this burette with solution B.
3. Pipette 25 cm³ of solution C and put it into a clean conical flask. Add 3 drops of methyl orange indicator.
4. Titrate solution C with solution B. Record your results in the table below.
5. Repeat the titration two more times

TABLE II

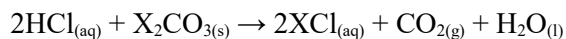
(3 marks)

TITRATION	1	2	3
Final burette reading (cm ³)			
Initial burette reading (cm ³)			
Volume of solution B used (cm ³)			

(c) Calculate the average volume of solution B (1 mark)

(d) Calculate the number of moles in the hydrochloric acid used (1 mark)

(e) The equation for the reaction of the acid with one of the salts in the mixture is:



Calculate;

(i) Moles of X₂CO₃ that reacted with the acid in the experiment (1 mark)

(ii) Molarity of X₂CO₃ (2 marks)

(f) Calculate the mass of the salt mixture in g dm⁻³. (1 mark)

(g) Calculate the percentage of XCl in this mixture (2 marks)

2. In this experiment, you're required to determine the time takes for a precipitate to be formed when S₃ which is sodium thiosulphate solution, reacts with dilute hydrochloric acid.

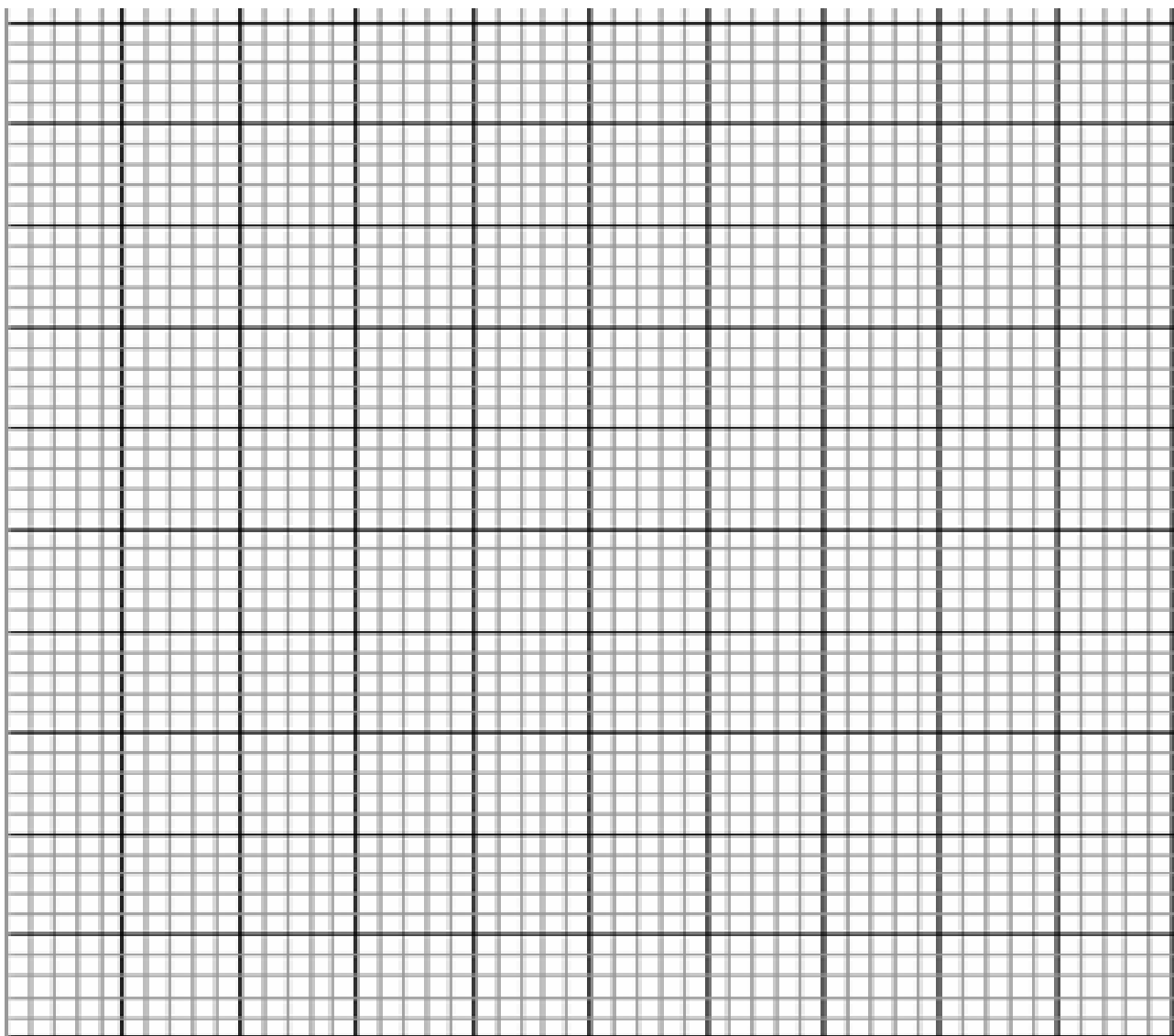
PROCEDURE

1. Using a measuring cylinder measure 50cm³ of S₃ into a 100ml beaker.
2. Make a pencil cross on a white piece of paper so that when a beaker is placed top of the paper , the cross can be seen through the bottom of the beaker.
3. To solution A add 10 cm³ of 2M hydrochloric acid and at the same time start a stop watch / stop clock. Swirl the contents of the beaker twice and then place it over the cross on the paper. Look at the cross from above the beaker through the mixture. Stop the stop watch immediately the precipitate makes the cross invisible. Record time taken for the cross to become invisible in the table below, rinse beaker.
4. Repeat the procedure with solutions B, C, D and E as per the table.

SOLUTION	Volume of solution S3 in the beaker (cm³)	Volume of water added (cm³)	Volume of 2M HCl	Time taken in seconds
A	50	0	10	
B	40	10	10	
C	30	20	10	
D	20	30	10	
E	10	40	10	

(a) Plot the graph of volume of solution S3 (y – axis) against time

(4 marks)



(b) From the graph state the relationship between concentration of solution S₃ and time. (1 mark)

(c) Why is water added to the solution S₃? (1 mark)

3. You're provided with solid D. Carry out the tests shown below on the solid.

(a) Heat a spatula full of D in A clean dry test – tube.	
OBSERVATIONS	INFERENCES

