THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
LINDI REGION
FORM FOUR MOCK EXAMINATION
032/2A **CHEMISTRY 2A**

Time 3:00 Hrs **MAY, 2023**

Instructions

1. This paper consists of section A, B & c with a total of eleven (11) questions.
2. Answer all questions in section A & B and TWO (2) question from section C. Question number 9 is compulsory
3. Cellular phones and any unauthorized materials are not allowed in the examination room.
4. Write your examination number on every page of your answer booklet(s).
5. The following constants may be used
   Atomic masses: H=1, O=16, S=32, Ca=40, Zn=65, Cl=35.5, Na=23, C=12, Ag=108

   Avogadro's number = 6.02×10^{23}
   GMV at s.t.p = $22.4dm^3$
   1 faraday = 96,500 coulombs
   1 litre = $1dm^3 = 1000cm^3$

1. You have been provided with the following solutions
   X: A solution prepared by dissolving 0.73g of hydrochloric acid (HCl) in $200cm^3$ of distilled water.
   Y: A solution prepared by dissolving 1.1g of impure sodium hydroxide to make $250cm^3$ of solution Phenolphthalein indicator **(POP).**
   Procedure
   Pipette $20cm^3$ or $25cm^3$ of solution Y into a titration flask. Add 2 or 3 drops of phenolphthalein (POP) indicator into the titration flask. Titrate solution Y against solution X drop wise from burette until the indicator signals the end point, note the burette reading. Repeat the procedure to obtain three more reading.
   a) i. Record your result in a tabula form
      ii. The volume of pipette was …….Cm^3
      ii.. The colour change at the end point was from ……..to …….
      iv. ……...cm^3 of solution **X** was required to neutralize …….cm^3 of solution **Y**

   b) i. Why is it important to clean a conical flask at the end of each titration before starting the subsequent titration?
      ii. State the role of white tile or white paper during titration.

   c) Write the balanced chemical equation for the reaction between X and **Y.**
   d) Calculate the:

i. Morality of solution **X**

ii. Concentration in mole/dm^3 of solution **Y**

iii. Percentage purity of Y

iv. If the impurity in solution Y caused by sodium chloride. Calculate the Percentage impurity by mass of sodium chloride.

2. You have been provided with the following

A: A solution containing 79g/dm^3 of $Na_2S_2O_3$

B: Asolution containing 0.1 mol/dm^3 of dilute HCL

C: Distilled water

A Stop watch / clock;

A white plain paper

Procedures

i Write clear letter **X** on a white piece of paper.

ii Place a small beaker (100cm^3) on top of the letter **X** such that the letter is visible when viewed from above.

iii Measure 10cm^3 of **A** using measuring cylinder and pour it into the beaker in (ii) above.

iv Using another measuring cylinder measure 10cm^3 of **B** and pour it into a beaker containing solution **A** in (iii) above and simultaneously start the stop watch/clock.

v Stir the mixture with a glass rod while you keep on observing letter **X** from above, note the time taken for the letter **X** to disappear completely.

vii Repeat procedure (iii) to (v) for different concentration of **A** by taking 8cm^3, 6 cm^3, 4cm^3 and 2cm^3 of the original **A** and making the total volume up to 10cm^3 by adding **C**

Table 1

Number of experiment	Volume of solution A (cm^3)	Volume of distilled water (cm^3)	Volume of solution B (cm^3)	Time (t) for the letter X to disappear	Rate 1/t S^{-1}
1	10	0	10		
2	08	2	10		
3	06	04	10		
4	04	06	10		
5	02	10	10		

Questions

a) i. What is the aim of the whole experiment?

ii. Complete Table 1 above.

b) Write the ionic equation of the reaction between **A** and **B**

c) i. Which product causes the solution to cloud letter X

ii.Write the electronic configuration of the product which causes the solution to cloud letter X.

iii. Why did letter X disappear?

d) What are the other two factors affecting the rate of chemical reaction.

e) What can you conclude from the data obtained