THE UNITED REPUBLIC OF TANZANIA

DODOMA REGION

FORM FOUR MOCK EXAMINATION

032/2A CHEMISTRY 2A (ACTUAL PRACTICAL)

Time: 2:30 Hours. **August, 2023**

Instructions

1. This paper consists of two (2) questions. Answer all questions.
2. Each question carries 25 marks, making total of 50 marks.
3. Qualitative analysis guide sheets and non-programmable calculators may be used after a thoroughly checked by the supervisor
4. Cellular phones and any other unauthorized materials are not allowed in the examination room.
5. Write your examination number on every page of your answer sheet
6. You may use the following constant
   H = 1, Na = 23, O = 16, S = 32, Cl = 35.5, C =12
   1litre = 1dm^3 = 1000cm^3

1. You are provided with the following solutions
   RR: Containing 3.65g of pure hydrochloric acid in 1 dm^3 of solution

   Q Q: Containing 14.30g of hydrated sodium carbonate [$Na_2C0_3.XH_20$] in 1dm^3 of solution

   MO - Methyl orange indicator

   (a)Pipette 25cm^3 or 20cm^3 of solution **QQ** and titrate with the acid from the burette using two drops of the indicator and obtain three titre values, tabulate your results.

   (b) i. The volume of pipette used was…….cm^3
   ii. The volume solution Q needed for complete neutralization was……..
   iii.The color change at the end point was from……to……..
   (c) i. Write down a balanced chemical equation for the reaction between solution Q and R
   ii. Calculate the morality of Solution R
   iii. Calculate the molarity of Solution Q
   (d) Calculate the value of x in the formula $Na_2CO_3.XH_2O$

2. You are provided with the following
   Solution BB: 0.25 M sodium thiosulphate ($Na_2S_2O_3$)

   Solution AA: 2 M hydrochloric acid (HCl)

Stop watch, distilled water and **a white paper with a mark X**

Procedures:

(i) Use 10 cm^3 measuring cylinder to measure 5cm^3 of solution AA and put it into 100cm^3 beaker, then place the beaker on the mark X

(ii) Measure 50 cm^3 of solution BB and put it into 100 cm^3 beaker containing solution AA and immediately start the stop watch

(iii) Stop the stop watch immediately after the disappearance of mark X. Then record the time taken for mark X to disappear.

(iv) Repeat procedures (i) to (iii) using the data shown in the table below

Experiment	Volume of AA	Volume of BB	Volume of distilled water	Time in second(t)	Rate (1/t)
1	5	50	0		
2	5	40	10		
3	5	30	20		
4	5	20	30		
5	5	10	40		

Questions

(a) Complete the table above

(b) Write a balanced chemical equation for the reaction between BB and AA

(c) Write a net ionic reaction for the molecular reaction in (b) above

(d) What make mark X to be obscured

(e) Plot the graph of volume of sodium thiosulphate against 1/t

(f) Use the graph to explain how concentration affects the rate of chemical reaction.

(g) Explain how to separate the substance obscured mark X from other products