THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

732/2A **CHEMISTRY 2A**

(ACTUAL PRACTICAL 2A)

Time: 3 Hours **Year: 2021**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question number **one (1)** carries **twenty (20)** marks and the rest carry **fifteen (15)** marks each.
4. Cellular phones and any unauthorized materials are not allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet (s)



1. Perform titration using solution X1, X2, using the Phenolphthalein (POP) indicator. Follow systematic procedure as follows: Titrate X1 (from the burette), against 20.00 cm^3 or 25.00 cm^3 of X2 (in a titration flask) using POP until the end point. Record the results including one rough and three accurate volumes in a tabular form. After titration, answer the following questions:

a) (i) What was the colour change observed during this titration experiment?

(ii) What was the volume of the pipette used?

(iii) Calculate the average volume of solution X1 that was used to neutralize solution X2.

b) Write a balanced chemical equation between X2 and X1 with all state symbols and the corresponding ionic equation.

(i) Calculate the concentration of the following:

(ii) Solution X1 in moles/dm^3.

(iii) Solution X1 in g/dm^3 .

2. You are provided with 0.5 M sodium thiosulphate, 1 M hydrochloric acid, distilled water, stop watch and a white sheet of paper marked X. Perform the experiment in following procedure:

(i) Pour 30 cm^3 of B1 into 100 cm^3 beaker.

(ii) Take a white sheet of paper provided with a letter X drawn on it and place it under the 100 cm^3 beaker in such a way that X is seen through the bottom of the beaker.

(iii) Add 10 cm^3 of B2 into the beaker containing 30 cm^3 of B1 and at the same time start the stop watch. Swirl the mixture twice and look through the solution from above.

(iv) Stop the clock when X disappears from the sight and record the time.

(v) Repeat steps (i) to (iv) using the specifications shown in the following table.

Experimental Data

Exp.	Volume of B1 (cm^3)	Volume of water (cm^3)	Volume of B2 (cm^3)	Time, t for X to disappear (s)	1/time (s^{-1})
1	30	0	10		
2	25	5	10		
3	20	10	10		
4	15	15	10		
5	10	20	10		
6	5	25	10		

After the experiment, answer the following questions:

(a) Write a balanced chemical equation for the reaction which took place during the experiment.

(b) (i) Plot a graph of volume of **B1** (cm^3) against 1/time (s^{-1}).

(ii) Interpret the graph.

(iii) What does 1/time represent?

(iv) If temperature was to be the factor affecting the rate of reaction, how would the two relate?

(v) Draw a conclusion about this experiment

3. Sample **J** is a simple salt containing one cation and one anion. Carefully, carry out qualitative analysis experiment to identify the ions present in the salt based on the following tests:

(a) Appearance of the sample.

(b) Action of heat on the sample.

(c) The sample dissolved in the water.

(d) Action of potassium iodide on the solution of the sample then warm.

(e) Action of a freshly prepared iron (II) sulphate on the solution of the sample followed by concentrated sulphuric acid

Questions

(i) Prepare a relevant Table showing the qualitative analysis results.

(ii) Write a balanced chemical equation (with state symbols) for the reaction that took place in experimental test (b)