THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

032/2B

CHEMISTRY 2B
ACTUAL PRACTICAL B
(For Both School and Private Candidates)

Time: 2:30 Hours **Friday, 13th November 2015 a.m.**

Instructions

1. This paper consists of **three (3)** questions. Answer **all** the questions.
2. Question 1 carries **twenty (20)** marks and the rest carry **fifteen (15)** marks each.
3. Qualitative Analysis Guidance Pamphlets may be used after a thorough check by the supervisor.
4. Cellular phones and calculators are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).
6. You may use the following constants:
   Atomic masses:
   H = 1, K = 39, C = 12, O = 16, S = 32.
   1 litre = 1 dm^3 = 1000 cm^3.

1. You are provided with the following solutions:
   R_1: Containing 5.6 g of TOH in 1 dm^3 of solution;
   R_2: Containing 4.9 g of sulphuric acid dissolved in 1 dm^3 of solution;
   Methyl orange indicator.

Questions

(a) Titrate the acid (in burette) against the base (in a conical flask) using tv drops of your indicator and obtain three titre values.

(b) (i) _____ cm^3 of R_2 required _____ cm^3 of R_1 for complete reaction.

(ii) Write a balanced chemical equation for the reaction in this experiment.

(iii) Showing your procedures clearly, identify element T in the TOH compound.

2. You are provided with the following:
   Solution **M**: 0.2 M sodium thiosulphate;
   Solution **N**: 2 M hydrochloric acid;
   A piece of white paper marked **X**;
   Stop-watch;
   Distilled water.

Procedure

(i) Using a measuring cylinder, measure 50 cm^3 of solution **M** and pour into a 100 cm beaker.

(ii) Measure 10 cm^3 of solution **N** and put into a 100 cm^3 beaker containing solution M and immediately start the stop – watch.

(iii) Swirl the contents in the 100 cm^3 beaker and put on top of mark **X** on a piece of paper.

(iv) Switch off the stop-watch when the mark **X** disappears.

(v) Record the time taken for the mark **X** to disappear.

(vi) Repeat the experiment as shown in Table 1.

Table 1

Volume of M	Volume of distilled water in cm^3	Volume of N in cm^3	Conc. of M after adding water in $moldm^{-3}$	Time for the cross to disappear in sec.	Rate of reaction
50	00	10	0.127		
40	10	10	0.104		
30	20	10	0.078		
20	30	10	0.052		
10	40	10	0.026		

Questions

(a) Complete Table 1 by filling the last two columns.

(b) Write down a balanced chemical equation for the reaction between sodium thiosulphate and hydrochloric acid.

(c) What substance was produced during the reaction which obscured the cross?

(d) Use the data in the Table 1 to draw a concentration-time graph, time on the X-axis and concentration on the Y-axis.

(e) What conclusion can you draw from the graph of the experiment?

3. Sample **L** is a simple salt. Carry out the experiments described below. Record your observations and make appropriate inferences and hence identify the anion and cation present in sample **L**.

Table 2

S/n	Experiment	Observation	Inference
(a)	Appearance		
(b)	Heat a little sample **L** in a dry test tube.		
(c)	Dissolve a little sample **L** in water and divide the solution into five portions:		
	(i) To one portion add NaOH till excess.		
	(ii) To the second portion add dilute HCl then heat.		
	(iii) To the third portion add freshly prepared $FeSO_4$ solution followed by concentrated H_2SO_4 slowly added through the sides of the test tube.		
	(iv) To the fourth portion add ammonia solution till in excess.		
	(v) To the fifth portion add dilute silver nitrate solution followed by ammonia solution.		

Conclusion

(i) The cation in **L** was _____.

(ii) The anion in **L** was _____.