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, 19th October 2012 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, C = 12, O = 16, Na = 23, Cl = 35.5.
   1 litre = 1 dm^3 = 1000 cm^3.

1. **You are provided with the following solutions:**
   C: Containing 9.13g/dm^3 of HX acid;
   D: Containing 1.00 g of sodium hydroxide in 0.25 dm^3 of solution;
   Methyl orange indicator.

Questions:

(a) With state symbols, write a balanced chemical equation for the reaction between solution **C** and **D**.

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

(c) (i) _____ cm^3 of acid required _____ cm^3 of base for complete reaction.
(ii) Showing your procedures clearly, identify element X in acid HX.
(20 marks)

2. You are provided with the following:
   E: 0.1 M sodium thiosulphate ($Na_2S_2O_3$);
   G: 2 M Hydrochloric acid (HCl);
   Stop watch and thermometer.

Procedure:
(i) Use a measuring cylinder to measure out 10.00cm^3 portion of solution **E** and 10.00 cm^3 of solution **G** into two separate test tubes.
(ii) Put solution **E** in a hot water bath (use a beaker of 250 cm^3 or 300 cm^3 containing tap water as hot water bath).
(iii) When solution **E** attain a temperature of 60°C, pour solution **E** and **G** into 100 cm^3 empty beaker and immediately start the stop watch.
(iv) Place the beaker with the contents on top of a piece of paper marked **X**.
(v) Note the time taken for the mark **X** to disappear.
(vi) Repeat procedure (i) to (v) at temperature 70°C, 80°C and 90°C.
(vii) Record your results as in Table 1.

Table 1

Experiment	Temperature	Time (s)
1	60°C	
2	70°C	
3	80°C	
4	90°C	

Questions:

(a) Why solution **E** was put into water bath?

(b) Write a balanced equation for reaction between **E** and **G**.

(c) What is the product which causes the solution to cloud the letter **X?**

(d) Draw a graph of time against temperature.

(e) Comment on the shape of the graph in relation to the rate of this reaction.

(15 marks)

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

S/n	Experiment	Observation	Inference
(a)	Observe the appearance of sample **J**.		
(b)	Perform a flame test.		
(c)	Dissolve a little amount of sample **J** in a test tube and shake.		
(d)	Heat a little amount of **J** in a dry test tube.		
(e)	Put a little amount of solid sample in a test tube and add concentrated sulphuric acid drop wise.		
(f)	To a little amount of **J** in a test tube add dilute nitric acid. Divide the resulting solution into three portions and add the following: (i) Sodium hydroxide solution until in excess to the first portion.		
	(ii) Excess ammonia solution to the second portion.		
	(iii) Barium chloride solution followed by dilute hydrochloric acid to the third portion.		

Conclusion:

(i) The cation in sample **J** is _____ and anion is _____.

(ii) Show the reaction taken place in (f) (i).

(15 marks)