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, 14th November 2014 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, S = 32.
   1 litre = 1 dm^3 = 1000 cm^3

1. You are provided with the following solutions:
   P: Containing 2 g of pure sodium hydroxide in 500 cm^3 of solution;
   Q: Containing 5.2 g of impure sulphuric acid in 1dm^3 of solution;
   Phenolphthalein and Methyl orange indicators.

Questions

(a) Which is the suitable indicator for the titration of the given solutions? Give a reason for your answer.

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

(c) (i) _____ cm^3 of **P** required _____ cm^3 of **Q** for complete reaction.
(ii) With state symbols, write a balanced chemical equation for the reaction between **P** and **Q**.

(d) Showing your procedures clearly, calculate the percentage purity of sulphuric acid.

2. You are provided with the following;
   X: Containing 20 g of solid sodium thiosulphate per litre;
   Y: 2.0 $moldm^{-3}$ hydrochloric acid;
   Distilled water;
   Stop-watch;
   Thermometer;
   Plain paper.

Procedure

(i) Draw a cross on a white paper.
(ii) Measure 20 cm^3 of solution **X** into 100 cm^3 beaker. Add 20 cm^3 of distilled water and heat the contents with a gentle flame.
(iii) When the temperature reaches 60°C, transfer the beaker on top of a cross and immediately add 5 cm^3 of solution **Y**. At the same time start the stop-watch.
(iv) Stir the mixture with a glass rod, while observing the cross on top view.
(v) Stop the clock immediately as soon as the cross is obscured and record the time.
(vi) Repeat the experiment three times at a temperature of 50°C, 40°C, and room temperature as indicated in Table 1.

Table 1

Experiment number	Temperature (°C)	Concentration of sodium thiosulphate ($moldm^{-3}$)	Time, t (sec)
1	60	0.0635	
2	50	0.0635	
3	40	0.0635	
4	Room temp.	0.0635	

Questions

(a) What is the aim of this experiment?

(b) Complete Table 1.

(c) Giving reason(s), identify the experiment in which the reaction is
(i) fast.
(ii) slow.

(d) With state symbols, write the ionic equation for the reaction between **X** and **Y**.

(e) (i) Draw the graph of temperature against time.
(ii) What conclusion can you draw from the graph? Give a reason for your answer.

Sample **J** contains one cation and one anion. Using systematic qualitative analysis procedures, record carefully your experiments, observations, inferences and finally identify the anion and cation in sample **J**.

Table 2

S/n	Experiment	Observation	Inference

Conclusion

(i) The cation present in sample **J** is _____.
(ii) The anion present in sample **J** is _____.
(iii) The chemical formula of sample **J** is _____.
(iv) The chemical name of sample **J** is _____.