THE UNITED REPUBLIC OF TANZANIA NATIONAL EXAMINATIONS COUNCIL OF TANZANIA DIPLOMA IN SECONDARY EDUCATION EXAMINATION

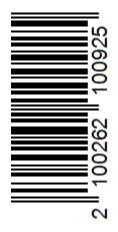
732/2C CHEMISTRY 2C

(ACTUAL PRACTICAL 2C)

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.** You are provided with the following solutions: A 43.99 g of contaminated anhydrous sodium carbonate in 1 dm³ of solution, denoted as A; 7.30 g of hydrochloric acid per 1 dm³ of solution denoted as B and MO, methyl orange indicator. The instruction are:
 - (i) Measure 20 cm³ of A and pour into 100 cm³ measuring cylinder. Carefully, add distilled water up to 100 cm³ mark, then stir. Name the resulting solution as L. Pipette 20 cm³ or 25 cm³ of L and pour it into a titration flask.
 - (ii) Titrate B against L using two drops of the indicator to the end point.

 Repeat the procedure to obtain three more titre value and record the results in a tabular form.

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 B that was used to neutralize solution L.
- (b) Write a balanced chemical equation for the reaction between L and B.
- (c) Showing your procedures clearly, calculate the percentage purity of A.
- **2.** You are provided with the following: A solution AA containing 0.3 M sodium thiosulphate (Na₂S₂O₃); solution BB containing 2 M nitric acid (HNO₃); distillated water, white sheet of paper marked X and Stopwatch. Perform the experiment by using procedures:
 - (i) Measure 5 cm³ of solution AA and put it into the 100 cm3 beaker. Add 15 cm³ of distilled water and place the beaker on top of the letter X marked on the sheet of paper provided.
 - (ii) Measure 5 cm³ of BB and place it into the 100 cm³ beaker containing AA and distilled water, immediately start the stopwatch.

- (iii) Swirl the contents, watch from above and observe the changes.
- (iv) Switch off the stop watch when the mark X disappears.
- (v) Record the time taken for the letter X to disappear.
- (vi) Repeat the experiment using different data as shown in the following table.

Table: Experimental Data

Experiment Number	1	2	3	4
Volume of AA (cm ³)	20	15	10	5
Volume of Distilled water (cm ³)	0	5	10	15
Volume of BB (cm ³)	5	5	5	5
Time (s)				
1/Time (s ⁻¹)				

Questions

- (a) Complete filling the table.
- (b) Why mark X disappeared in this experiment?
- (c) (i) Indicating the states of the reactants and the products, write a balanced chemical equation for the reaction between AA and BB
 - (ii) Write the corresponding ionic equation for the reaction between AA and BB.
- (d) Plot a graph of volume of AA (cm3) against 1/time (S⁻¹). Explain the shape of your graph.
- (e) How would the rate of reaction vary if the concentration of BB is increased while the concentration of AA is kept constant? Explain.
- (f) What does the value 1/time an?

- **3.** Sample **Z** 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) Action of concentrated sulphuric acid on the sample.
 - (d) Solubility.
 - (e) Action of aqueous sodium hydroxide on solution of sample Z.
 - (f) Flame test on sample Z.
 - (g) Action of dilute nitric acid on solution of sample Z followed by silver nitrate solution.

Qestions:

- (i) Prepare a relevant Table showing the qualitative analysis results.
- (ii) Write the reaction equation for the test at experiment (c).
- (iii) Write the electronic configuration of the cation in sample Z.
- (iv) How is Z prepared in the laboratory? Support your answer with chemical reaction.
- (v) What are the two uses of sample Z? Briefly, explain.