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

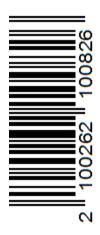
# 732/2C CHEMISTRY 2C

(ACTUAL PRACTICAL 2C)

Time: 3 Hours Year: 2022

### **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 solution containing 6.3 g/dm<sup>3</sup> of oxalic acid as a primary standard solution denoted as TT; solution of sodium hydroxide of unknown concentration denoted as PP and POP (phenolphthalein indicator).

The instruction are as follows:

- (i) Pipette 20 cm<sup>3</sup> (or 25 cm<sup>3</sup>) of solution PP into a conical flask and add 2 to 3 drops of POP. Then transfer TT into the burette and take initial reading.
- (ii) Titrate TT against PP 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 is the volume of the pipette used?
  - (ii) Present your results in an appropriate tabular form.
- (b) Why oxalic acid is considered as primary standard substance in this experiment?
- (c) In which part of the meniscus (lower or upper) of the solution TT in the burette will you read? Briefly, explain.
- (d) Why it is not advised to hold the pipette from its bulb?
- (e) What is the colour change of the indicator for the reaction between sodium hydroxide and oxalic acid.
- (f) Calculate the concentration of solution TT in mol dm3.
- (g) Calculate the concentration of PP in mol dm<sup>3</sup>

2. Study the heat of reaction of different salts when dissolved in water. You are provided with the following materials:

D1: 2.0 g of ammonium nitrate

D2: 2.0 g of calcium chloride

Distilled water

Thermometer 100 cm<sup>3</sup> plastic beaker

Perform the experiment through the given procedure and then answer the questions that follow. Procedure:

- (i) Measure 50 cm<sup>3</sup> of distilled water and transfer it into a plastic beaker.
- (ii) Insert a thermometer into the distilled water in the plastic beaker and record the temperature of the water.
- (iii) Add D1 into the beaker containing distilled water and immediately start a stopwatch while stiring gently with your thermometer to dissolve the salt.
- (iv) Record the temperature of the solution after every 30 seconds for four (4) minutes.
- (v) Repeat steps (i) to (iv) except that instead of D1 in step (iii) use D2.

## Questions

- (a) Present the results in a tabular form.
- (b) Calculate the heat of solution for 2 g of each salt in water (assume that no heat is lost to the surroundings).
- (c) State whether the process of dissolving salt D1 or D2 is endothermic or exothermic. Give one reason to support your answer.
- 3. Perform a systematic qualitative analysis experiment to identify the cation and the anion present in the sample **Q**. Base your experiment on the listed tests and then answer the questions that follow:
  - (i) Appearance of sample Q.
  - (ii) Action of heat on sample Q in a test tube.
  - (iii) Action of dilute sulphuric acid on the solid sample.
  - (iv) Action of concentrated sulphuric acid on the solid sample.
  - (v) Flame test.
  - (vi) Solubility of the sample.

- (vii) Confirmatory test for the anion.
- (viii) Confirmatory test for the cation.

# Questions

- (a) Prepare a relevant Table showing the qualitative analysis results.
- (b) What are the cation and anion present in the sample?
- (c) Write the reaction equation to indicate what took place in test (iv).