



ZIMBABWE

**MINISTRY OF HIGHER AND TERTIARY EDUCATION,
INNOVATION, SCIENCE AND TECHNOLOGY DEVELOPMENT**

**HIGHER EDUCATION EXAMINATIONS COUNCIL
(HEXCO)**

NATIONAL DIPLOMA

IN

APPLIED CHEMICAL TECHNOLOGY

MODULE: Chemical Analysis 1

PAPER NO: 501/23/M01

DURATION: 3 hours

JUNE 2026 EXAMINATION

REQUIREMENTS

1. Non-programmable scientific calculator
2. Chemistry data booklet

INSTRUCTIONS TO CANDIDATE

1. Answer any five (5) questions.
2. Each question carries a total of twenty (20) marks.

This paper consists of 3 printed page.

QUESTION 1

- a) Describe three (3) types of sampling techniques and provide an example for each technique. (12 marks)
- b) State any four (4) errors that can occur during sampling. (8 marks)

QUESTION 2

Calculate:

- a) milligrams in 0.250mmol of Fe_2O_3 (Ferric Oxide). (4 marks)
- b) the number of grams in one mole of $CaSO_4 \cdot 7H_2O$. (4 marks)
- c) the number of moles in 500mg of Na_2SO_4 . (4 marks)
- d) the concentration of Potassium ion in grams per litre after mixing 100ml of 0.250M KCl and 200ml of 0.100M K_2SO_4 . (8 marks)

QUESTION 3

- a) State four (4) characteristics of a primary standard. (4 marks)
- b) Describe how you would prepare a 1 000ppm stock solution of Iron (Fe) using $FeCl_3$. (6 marks)
- c) Explain three (3) key precautions to take when preparing and storing standard solutions. (10 marks)

QUESTION 4

Discuss the role of Standard Operating Procedures (SOPs), Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMPs) in sampling and sample preparation for chemical analysis. (20 marks)

QUESTION 5

Examine any five (5) key features of an ideal chemical store room. (20 marks)

QUESTION 6

With reference to Le Chatelier's principles discuss factors that affect chemical equilibrium. (20 marks)

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