**THE UNITED REPUBLIC OF TANZANIA**

**NATIONAL EXAMINATION COUNCIL OF TANZANIA**

**DIPLOMA IN TECHNICAL EDUCATION EXAMINATION**

**732** **CHEMISTRY TEACHING METHODS**

**Time: 3 Hour.** **Monday, 03rd May 2002, p.m.**

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**Instructions**

1. This paper consists of sections **A**, **B** and **C.**
2. Answer all questions in sections **A** and **B**, and **two (2)** questions from section **C.**
3. Section **A** carries **36 marks**, section **B** carries **40 marks** and section **C** carries **24 marks**.
4. Cellular phones and other unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s).

**SECTION A (36 marks)**

Answer all questions in this section.

1. Explain four (4) reasons why teaching chemical bonding is essential in developing students' understanding of matter and chemical reactions.

2. Describe four (4) classroom-based techniques that a Chemistry teacher can use to identify misconceptions among Form II students studying changes of state.

3. Outline four (4) reasons why it is important to include practical activities in the teaching of concepts such as acids, bases, and indicators.

4. Define the following terms as applied in Chemistry education:
   (a) Instructional objective
   (b) Syllabus
   (c) Evaluation
   (d) Assessment

5. Highlight four (4) common safety breaches that may occur during Chemistry practical sessions and suggest preventive measures for each.

6. Mention four (4) advantages of using simulations or computer-based models when teaching abstract Chemistry concepts like atomic structure and radioactivity.

7. List four (4) key factors to consider when selecting teaching methods for a Form III class during a topic involving quantitative analysis.

8. Explain four (4) ways in which a Chemistry teacher can motivate students who are underperforming in theoretical Chemistry topics.

9. Give four (4) challenges a teacher may face when using performance-based assessment in Chemistry and suggest a practical solution to each.

## SECTION B (40 marks)

Answer both questions in this section.

10. A Chemistry teacher plans to teach the topic "Neutralization" using a problem-solving approach.

    (a) Define the problem-solving method and explain its relevance in Chemistry teaching.

    (b) Describe how the teacher would introduce the lesson, facilitate student exploration, and conclude the session.

    (c) Identify four (4) possible real-life problems that can be solved using neutralization and explain how to relate them to classroom learning.

11. In an experiment, 50 $cm^3$ of 1.0 M sodium hydroxide solution was mixed with 50 $cm^3$ of 1.0 M hydrochloric acid solution in a calorimeter. The temperature rose from 25.0°C to 31.7°C. (Specific heat capacity of water = 4.2 J/g°C, Density of solution = 1.0 $g/cm^3$)

    (a) Calculate the heat evolved in the reaction.

    (b) Calculate the number of moles of water formed.

    (c) Calculate the enthalpy change per mole of water formed (in kJ/mol).

    (d) Suggest two (2) sources of error in this experiment and how to minimize them.

## SECTION C (24 marks)

Answer two (2) questions from this section.

12. (a) Explain the concept of backward design in Chemistry lesson planning.

    (b) Identify and describe three (3) stages of backward design with reference to a topic like "Electrolysis."

    (c) Suggest two (2) benefits and one (1) challenge of using backward design in Chemistry education.

13. Discuss six (6) key roles of a Chemistry teacher in promoting ethical scientific behavior during practical work and experiments in secondary schools.

14. A teacher administered a Chemistry test to Form IV students. The mean score was 55, with a standard deviation of 10. One student scored 35.

(a) Calculate the z-score for this student.

(b) Interpret this score.

(c) Suggest three (3) supportive teaching strategies for helping low-performing students in Chemistry.

(d) Identify two (2) limitations of using z-scores to evaluate student progress.

15. Using the topic "Types of Chemical Reactions," construct a detailed lesson plan outline for Form III students.

Your plan should include:

(a) Specific objectives

(b) Teaching/learning materials

(c) Lesson introduction strategy

(d) Learning activities for students

(e) Assessment methods

(f) Reflection/evaluation questions for the teacher.