THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN TECHNICAL EDUCATION EXAMINATION

732 CHEMISTRY TEACHING METHODS

Time: 3 Hour. **Monday,14th May 2001, p.m.**

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. Describe four (4) common errors students make when writing and balancing chemical equations and explain how a teacher can help address each error.

2. Explain four (4) roles of a Chemistry scheme of work in guiding daily classroom instruction and assessment.

3. Mention four (4) reasons why a Chemistry teacher must understand learner characteristics when planning lessons.

4. Define the following terms in the context of Chemistry education:
   (a) Inquiry-based learning
   (b) Competency-based curriculum
   (c) Concept mapping
   (d) Peer instruction

5. Give four (4) pedagogical justifications for introducing organic Chemistry at the Form III level in Tanzanian secondary schools.

6. Highlight four (4) disadvantages of relying solely on textbooks as teaching materials in the delivery of Chemistry content.

7. State four (4) ways in which a Chemistry teacher can apply continuous assessment strategies during the teaching of volumetric analysis.

8. Outline four (4) risks associated with poor classroom management during Chemistry practical lessons and suggest how each can be prevented.

9. Briefly explain four (4) ways in which integrating environmental issues into Chemistry topics enhances learner understanding and civic responsibility.

SECTION B (40 marks)

Answer both questions in this section.

10. A teacher plans to assess Form IV students using a practical activity on the preparation of oxygen gas from hydrogen peroxide.

    (a) Write the balanced chemical equation for the reaction.

    (b) Describe how you would guide students to perform the experiment safely.

    (c) Outline four (4) observational skills students should demonstrate during the experiment.

    (d) Develop an assessment rubric with four (4) performance indicators and describe how each would be graded.

11. A 1.0 g sample of calcium carbonate was reacted with excess hydrochloric acid, and 250 cm^3 of carbon dioxide gas was collected at room temperature and pressure.

    (a) Write a balanced chemical equation for the reaction.

    (b) Calculate the number of moles of carbon dioxide gas collected. (Molar volume at r.t.p. = 24 dm^3/mol)

    (c) Determine the percentage purity of the calcium carbonate sample. (Molar mass of $CaCO_3$ = 100 g/mol)

    (d) Explain two (2) practical sources of error in this experiment and how they can be minimized.

SECTION C (24 marks)

Answer two (2) questions from this section.

12. Discuss six (6) reasons why Chemistry teachers should integrate cross-cutting issues such as health, environment, and gender into their Chemistry lessons.

13. (a) What is a Chemistry lesson plan?

    (b) Describe five (5) components that must appear in a good Chemistry lesson plan.

    (c) Briefly explain how a teacher can use reflection to improve future lesson plans.

14. Explain the importance of laboratory layout and organization in promoting effective Chemistry teaching and learning. Provide six (6) specific points.

15. A teacher notices that students are consistently scoring poorly in test questions involving mole ratios.

(a) Identify three (3) possible causes of this challenge.

(b) Suggest three (3) instructional interventions to improve students' understanding.

(c) Design two (2) sample test questions that the teacher can use to evaluate learner progress on mole concept.

(d) Propose a marking scheme for the test questions designed in (c).