THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

762 EDUCATIONAL RESEARCH, MEASUREMENT AND EVALUATION

Time: 3 Hours. **ANSWER** **Year: 2006 a.m.**

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in sections A, **two (2)** questions from section B and **one (1)** question from section C.
3. Question **11** is **compulsory**.
4. Section A carries 36 marks, section B carries 40 marks and section C carries 24 marks
5. Cellular phones and unauthorized materials are **not allowed** in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. Define the term educational measurement.

Educational measurement is the process of assigning numbers, symbols, or values to learning outcomes, abilities, or attributes of students according to set rules.

It involves using tools such as tests, assessments, and observations to quantify student performance in specific learning objectives.

It provides data that can be analyzed to determine a learner's strengths, weaknesses, and level of achievement.

It ensures that teaching and learning can be evaluated objectively to improve educational outcomes.

2. Mention four characteristics of a good research problem.

A good research problem is clearly stated, meaning it is written in precise and understandable language so that there is no confusion about what is being studied.

It must be researchable, which means it can be investigated using available research methods, tools, and resources.

It should be significant, addressing an important gap in knowledge or a real-life issue whose solution has practical benefits.

It must be feasible, meaning it can be studied within the researcher's time, budget, and skill limitations.

3. State four objectives of educational evaluation.

One objective is to determine whether learning objectives have been achieved by measuring student performance against set standards.

Another is to provide feedback to both teachers and learners, helping them improve teaching and learning processes.

It helps in diagnosing learning difficulties so that appropriate remedial measures can be taken.

It is used to make decisions about promotion, placement, and certification of learners based on their performance.

4. Give four reasons for pre-testing research instruments.

Pre-testing helps detect errors, unclear wording, or confusing instructions in the instrument before the main study.

It allows the researcher to check whether the instrument measures the intended variables accurately, ensuring validity.

It gives an estimate of the time respondents will take to complete the instrument, aiding in planning.

It helps identify weaknesses that might affect reliability so that necessary adjustments can be made.

5. List three advantages of using questionnaires in data collection.

Questionnaires are cost-effective since they can be distributed to many people at the same time with minimal expense.

They save time because responses can be gathered quickly, especially if using digital forms.

They allow respondents to answer at their convenience, which may lead to more thoughtful and honest responses.

6. State four importance of hypothesis in research.

A hypothesis gives the research a clear direction by specifying the expected relationship between variables.

It guides the selection of the research design and methods to be used in data collection and analysis.

It helps in focusing the study on specific objectives, avoiding unnecessary data collection.

It provides a basis for analyzing results and determining whether the evidence supports the expected outcomes.

7. Mention four principles of constructing test items.

Test items should match the learning objectives to ensure they measure what was taught.

They should be clear and free from ambiguous words so that all learners understand them the same way.

They should be appropriate for the learners' level, neither too difficult nor too easy.

They should allow for objective scoring by having a definite correct answer or clear scoring criteria.

8. Briefly explain four functions of the table of specifications in test construction.

It ensures that the test covers all important topics from the syllabus in the right proportions.

It guides the balance between different levels of thinking skills, such as recall, understanding, and application.

It helps teachers plan the number of questions for each topic and skill level, avoiding bias toward one area.

It increases validity by linking test items directly to the intended learning outcomes.

9. Give two advantages of using median over mean in data analysis.

The median is not affected by extreme scores, making it a better measure when the data contains outliers.

It is easier to determine in ordered data and gives a more accurate representation of the middle value in skewed distributions.

10. (a) What is validity in testing?

Validity is the extent to which a test measures what it is intended to measure.

It ensures that the interpretations made from test scores are accurate and meaningful for their intended purpose.

(b) State four types of validity with brief explanations.

Content validity checks whether the test items represent the full content of the subject being assessed.

Construct validity determines whether the test truly measures the theoretical concept it claims to measure.

Criterion-related validity measures how well the test predicts performance in related future tasks or correlates with another established measure.

Face validity refers to whether the test appears appropriate and relevant to the learners and other stakeholders on the surface.

11. (a) Differentiate between norm-referenced and criterion-referenced tests.

Norm-referenced tests compare a learner's performance with that of a larger reference group. The focus is on ranking students to see who performed better or worse. For example, a student's percentile rank on a national exam shows how they performed relative to others.

Criterion-referenced tests measure a learner's performance against fixed learning objectives or standards. The focus is on whether the learner has mastered specific skills or content. For example, a driving test checks whether a person meets the set criteria to obtain a license, not how they compare to others.

(b) The following are test scores for 8 students: 20, 25, 30, 35, 25, 40, 30, 20. Calculate:

(i) Range

Range = Highest score − Lowest score

Range = 40 − 20 = 20

(ii) Mean (nearest whole number)

Sum of scores = 20 + 25 + 30 + 35 + 25 + 40 + 30 + 20 = 225

Mean = 225 ÷ 8 = 28.125 ≈ 28

(iii) Standard deviation (nearest whole number)

Step 1: Find deviations from the mean and square them:

$(20 - 28)^2 = 64$

$(25 - 28)^2 = 9$

$(30 - 28)^2 = 4$

$(35 - 28)^2 = 49$

$(25 - 28)^2 = 9$

$(40 - 28)^2 = 144$

$(30 - 28)^2 = 4$

$(20 - 28)^2 = 64$

Step 2: Sum of squared deviations = 64 + 9 + 4 + 49 + 9 + 144 + 4 + 64 = 347

Step 3: Variance = 347 ÷ 8 = 43.375

Step 4: Standard deviation = $\sqrt{43.375} \approx 6.59 \approx 7$

(c) Convert the highest and lowest scores to z-scores.

Formula: Z = (X − Mean) ÷ SD

Highest score: $X = 40$

$Z = (40 - 28) \div 7 = 12 \div 7 \approx 1.71$

Lowest score: $X = 20$

$Z = (20 - 28) \div 7 = -8 \div 7 \approx -1.14$

12. Outline four steps in formulating research objectives.

The first step is identifying the research problem clearly so that objectives directly address it.

The second step is reviewing existing literature to understand gaps and refine the objectives.

The third step is defining broad objectives, which outline the general aim of the study.

The fourth step is breaking down broad objectives into specific objectives, which are measurable and achievable within the study's scope.

13. Discuss four advantages and four disadvantages of multiple-choice test items.

One advantage is that they can cover a wide range of content in a short time, allowing efficient testing.

Another advantage is that scoring is objective since each item has a single correct answer.

They can test different cognitive levels, from basic recall to application and analysis.

They reduce guessing compared to true-false items because there are more than two answer options.

One disadvantage is that they take a long time to construct well, requiring careful thought for plausible distractors.

Another disadvantage is that they encourage recognition of answers rather than recall, which may not reflect deep understanding.

They can sometimes be guessed correctly without full knowledge if distractors are weak.

They may not effectively measure complex skills like problem-solving or creativity.

14. (a) State four characteristics of reliable tests.

Reliable tests produce consistent results when administered at different times to the same group under similar conditions.

They minimize the influence of random errors, ensuring accuracy in measurement.

They have stable scoring methods, meaning results do not vary between different markers.

They yield results that can be trusted for decision-making in education.

(b) Explain four methods of estimating test reliability.

Test-retest method involves administering the same test twice to the same group and comparing the results.

Split-half method divides the test into two halves and compares the scores from each half for consistency.

Parallel forms method uses two equivalent versions of a test and compares scores from both.

Internal consistency method checks the correlation between items within the same test, often using statistical formulas like Cronbach's alpha.

15. Discuss the first five components of a research report.

The title page contains the research title, author's name, institution, and date of submission.

The abstract is a brief summary of the research, including objectives, methods, findings, and conclusions.

The introduction outlines the background, problem statement, objectives, and significance of the study.

The literature review summarizes existing research relevant to the topic, identifying gaps the study addresses.

The methodology section describes the research design, participants, instruments, and procedures used for data collection and analysis.

16. Explain four roles of assessment in the teaching and learning process.

Assessment helps monitor student progress, showing how well learners are meeting set objectives.

It provides feedback to learners and teachers, highlighting strengths and areas needing improvement.

It aids in identifying learning difficulties so that corrective measures can be applied.

It informs decisions about curriculum planning, instructional methods, and resource allocation.