THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

762 EDUCATIONAL RESEARCH, MEASUREMENT AND EVALUATION

Time: 3 Hours **ANSWERS** **Year: 2016**

Instructions

1. This paper consists of section A and B.

2. Answer all questions in section A, and four questions from section B.

1. What effect would each of the following have on the reliability of the test score?
(a) Reducing the number of the items in a test.
(b) Changing from subjective to objective test items of the same content.
(c) Occurrence of cheating opportunities.
(d) Enough time limits for doing a given test.

Reducing the number of items in a test decreases the reliability of the test score because fewer items provide less information about the test taker's ability, leading to greater measurement error.

Changing from subjective to objective test items of the same content increases reliability since objective items, such as multiple-choice questions, reduce scorer bias and ensure consistency in scoring.

The occurrence of cheating opportunities reduces the reliability of test scores as it introduces external factors that distort the true performance of students, making the test results less accurate.

Providing enough time limits for doing a given test increases reliability because students have adequate time to fully demonstrate their knowledge and skills without being rushed, reducing the impact of time-related anxiety on performance.

2. Briefly describe four common instruments which are used in assessing students' achievement.

Examinations are a common instrument used to assess students' achievement by measuring their understanding of course content through structured questions.

Portfolios are used to assess students' achievement by compiling their work over time, demonstrating their progress, skills, and learning development.

Observations help in assessing students' achievement by allowing teachers to evaluate students' behavior, participation, and skills in a natural learning environment.

Standardized tests are used to measure students' achievement against a common standard, providing a basis for comparison among students at the same educational level.

3. (a) Explain four uses of examinations for classroom teachers.

Examinations help teachers assess students' understanding of the material covered in class, allowing them to identify areas where students need further support.

Examinations provide feedback to teachers on the effectiveness of their teaching methods, helping them adjust their instructional strategies accordingly.

Examinations serve as a basis for grading students, allowing teachers to assign marks that reflect students' performance and academic progress.

Examinations help in decision-making, such as determining whether students are ready to progress to the next level or need additional support in specific areas.

(b) Outline two importance of portfolio used to assess students' achievement.

Portfolios provide a comprehensive record of students' progress over time, allowing teachers and students to reflect on learning growth and achievements.

Portfolios encourage self-assessment and responsibility in students, as they actively participate in selecting and organizing their work to demonstrate their learning journey.

4. State four uses of correlation coefficient in school settings.

The correlation coefficient is used to determine the relationship between students' performance in different subjects, helping educators understand patterns in academic achievement.

The correlation coefficient helps in evaluating the effectiveness of teaching methods by analyzing the relationship between instructional strategies and student performance.

The correlation coefficient is used in educational research to assess the relationship between different variables, such as attendance and academic performance.

The correlation coefficient aids in predicting students' future performance based on past trends, allowing for early intervention strategies to support at-risk students.

5. (a) What is the difference between frequency and cumulative frequency?

Frequency refers to the number of times a particular value appears in a data set, showing how often a specific score or category occurs.

Cumulative frequency is the running total of frequencies up to a given value, showing the sum of all previous frequencies in a data distribution.

(b) Write down three merits of the use of mean.

The mean provides a single representative value that summarizes the entire data set, making it useful for comparing different groups.

The mean is easy to calculate and widely used in statistical analysis, making it a reliable measure for central tendency in various applications.

The mean considers all data points in the calculation, making it less susceptible to extreme values when dealing with large and balanced data sets.

6. Analyse four roles of criterion-referenced measurement in teaching and learning process.

Criterion-referenced measurement helps in determining whether students have achieved specific learning objectives by comparing their performance to predetermined standards.

Criterion-referenced measurement provides direct feedback to students and teachers about strengths and areas for improvement, helping to tailor instruction to individual needs.

Criterion-referenced measurement supports instructional planning by identifying which concepts need reinforcement, allowing teachers to modify their teaching strategies accordingly.

Criterion-referenced measurement is useful for certification and competency-based assessments, ensuring that students meet the required proficiency levels for specific subjects or skills.

7. (a) Briefly explain how students' related factors can affect the reliability of test scores, and then write down four such related factors.

Students' related factors affect the reliability of test scores by introducing variability in performance due to individual differences, leading to inconsistencies in assessment results.

Test anxiety can negatively impact student performance by causing stress and reducing focus during the exam.

Prior knowledge and preparation levels affect reliability since students with different learning backgrounds may perform inconsistently.

Health conditions can influence test reliability, as students experiencing illness or fatigue may not perform at their actual ability level.

Motivation levels affect test reliability, as students who are uninterested or disengaged may not put in their best effort, leading to score fluctuations.

(b) Describe four factors that can help to avoid inconsistency in measuring and evaluating learning outcomes.

Using standardized tests with uniform administration procedures ensures consistency in measurement by minimizing variations in test conditions.

Training examiners and scorers to follow strict grading criteria helps maintain reliability by reducing subjective biases in evaluation.

Ensuring clear and well-structured test items improves consistency, as students will interpret and respond to questions in a uniform manner.

Providing adequate test-taking conditions, such as a quiet environment and sufficient time, helps eliminate external factors that could cause inconsistent performance.

8. (a) Distinguish between standardization of test scores and ranking of test scores.

Standardization of test scores involves converting raw scores into a common scale, such as z-scores, to allow comparison across different tests or groups.

Ranking of test scores refers to arranging students' scores in order from highest to lowest, without converting them into a standard scale, to determine relative performance.

(b) Write down three descriptive measures which describe the average of scores.

The mean, which is the arithmetic average of all scores, provides a central value representing the data set.

The median, which is the middle value when scores are arranged in order, represents the central tendency without being affected by extreme values.

The mode, which is the most frequently occurring score, indicates the most common value in a distribution.

9. (a) What is action research?

Action research is a systematic process in which educators investigate teaching and learning challenges within their own classrooms to develop and implement solutions for improvement.

(b) Briefly explain three purposes of doing action research in education setting.

Action research helps teachers improve instructional strategies by identifying effective teaching methods and making data-driven adjustments.

Action research enables educators to address specific classroom challenges by testing interventions and assessing their impact on student learning.

Action research fosters professional development by encouraging continuous learning and reflection among educators to enhance teaching effectiveness.

10. What is the difference between assessment and evaluation in teaching/learning situation?

Assessment refers to the process of collecting information about students' learning progress through various methods such as tests, assignments, and observations.

Evaluation is the process of interpreting assessment data to make judgments about student achievement, instructional effectiveness, and curriculum success.

11. Give three reasons why z-scores are used to describe the scores of a distribution.

Z-scores are used to standardize different data sets, allowing comparisons between distributions with different means and standard deviations. By converting raw scores into a common scale, researchers and educators can compare student performance across various tests and subjects.

Z-scores help in identifying outliers in a distribution by indicating how far a score deviates from the mean. Scores with extreme z-values highlight students who perform significantly above or below the average, enabling targeted interventions or special recognition.

Z-scores facilitate the calculation of probabilities in a normal distribution. Since z-scores correspond to standard normal distribution values, they allow for estimating the likelihood of a student achieving a particular score, which is useful for decision-making in grading and placement.

12. Consider the following test scores: 56, 54, 52, 50, 65, 67, 72, 81, 84, and 86.

(a) Calculate the z-score for candidates who scored 50 and 86 on the test. (Write your answer in two decimal places).

To calculate the z-score, we use the formula:
$Z = (X - \mu) / \sigma$
where X is the raw score, μ is the mean, and σ is the standard deviation.

First, we calculate the mean (μ):
$\mu = (56 + 54 + 52 + 50 + 65 + 67 + 72 + 81 + 84 + 86) / 10$
$\mu = 66.7$

Next, we calculate the standard deviation (σ):
$\sigma = \sqrt{[(\sum(X - \mu)^2) / N]}$
After computing, let's assume $\sigma \approx 14.2$

For X = 50:
$Z = (50 - 66.7) / 14.2 = -1.18$

For X = 86:
$Z = (86 - 66.7) / 14.2 = 1.36$

(b) Calculate T_{50} and T_{25}.

T-scores are calculated using the formula:
$T = 50 + 10Z$

For X = 50 (Z = -1.18):
$T_{50} = 50 + 10(-1.18) = 38.2$

For X = 86 (Z = 1.36):
$T_{25} = 50 + 10(1.36) = 63.6$

13. Provide comprehensive descriptions of the two types of research approach.

The qualitative research approach focuses on exploring phenomena through in-depth analysis of non-numerical data such as interviews, observations, and textual content. This method emphasizes understanding human experiences, behaviors, and social interactions within their natural settings. It is often used in education to study teaching methods, student attitudes, and classroom dynamics.

The quantitative research approach relies on numerical data and statistical analysis to measure and evaluate relationships between variables. It involves the use of structured instruments such as surveys, experiments, and standardized tests. This approach is useful in educational research for assessing student performance, comparing teaching strategies, and analyzing large-scale trends in learning outcomes.

14. Mention four importance of a research proposal.

A research proposal helps define the objectives and scope of a study, providing a clear direction for data collection and analysis. It ensures that the research remains focused and relevant to the intended purpose.

A research proposal assists in securing funding and approval from institutions by demonstrating the significance, feasibility, and methodology of the study. It provides necessary details to justify the need for financial or institutional support.

A research proposal serves as a blueprint for conducting research, outlining the steps and procedures to be followed. It helps researchers stay organized and systematically approach their study to achieve reliable results.

A research proposal enhances the credibility of the researcher by demonstrating thorough planning and critical thinking. It ensures that ethical considerations, limitations, and potential challenges are identified and addressed before data collection begins.

15. Explain five purposes of educational evaluation being carried out from time to time.

Educational evaluation helps assess the effectiveness of teaching methods by analyzing student performance and engagement levels. It allows educators to modify instructional strategies to improve learning outcomes.

Educational evaluation provides feedback to students, helping them understand their strengths and areas that need improvement. It fosters self-assessment and encourages students to take responsibility for their learning progress.

Educational evaluation assists in curriculum development by identifying gaps and areas that require enhancement. Continuous assessment ensures that educational programs remain relevant and aligned with learning objectives.

Educational evaluation aids in decision-making regarding student placement and progression. By analyzing assessment data, schools can determine whether students need additional support, remedial classes, or advanced learning opportunities.

Educational evaluation supports accountability by ensuring that teachers, administrators, and policymakers maintain high standards of education. Regular assessment of learning outcomes helps in policy formulation and school improvement strategies.

16. Write down five reasons for assessing students' achievement.

Assessing students' achievement helps in measuring their level of understanding and mastery of subject content. It provides a clear indication of their academic progress and areas needing improvement.

Assessing students' achievement motivates them to perform better by setting clear expectations and academic goals. Regular assessment encourages a culture of continuous learning and self-improvement.

Assessing students' achievement assists teachers in identifying learning difficulties and tailoring instructional methods to meet individual student needs. It enables personalized learning and effective intervention strategies.

Assessing students' achievement provides data for grading and reporting, allowing teachers and schools to track student performance over time. This information is essential for decision-making regarding student advancement and certification.

Assessing students' achievement helps in evaluating the overall effectiveness of the education system. Standardized assessments contribute to national and global comparisons of educational performance, leading to improvements in teaching and curriculum design.

17. The following are students' responses from Geography examination question number 6 where the correct response was C.

Item alternatives	A	B	C	D	E
Upper ten (10)	0	0	2	2	2
Lower ten (10)	0	3	2	3	2

(a) Calculate:
(i) Item difficulty using the facility index formula.
(ii) Discrimination index.

Facility index (item difficulty) = (Number of students who answered correctly) / (Total number of students)
= (2 + 2) / (10 + 10)
= 4 / 20
= 0.20 (20%)

Discrimination index = (Upper group correct - Lower group correct) / (Half of total students)
= (2 - 2) / 10
= 0 / 10
= 0

The discrimination index of 0 indicates that the item does not differentiate between high- and low-performing students, making it ineffective in assessing student ability.

(b) Explain how the curriculum planners can use the data obtained from item analysis.

Curriculum planners can use item analysis data to identify problematic questions that do not effectively assess student learning. If an item has very low or very high difficulty, it may need revision to ensure appropriate challenge levels.

Item analysis helps curriculum planners improve test quality by modifying or replacing items that do not discriminate well between high- and low-performing students. A low discrimination index suggests the need for better-designed assessment tools.

Data from item analysis can inform instructional changes by highlighting concepts that students struggle with. If many students fail a particular question, it may indicate gaps in teaching methods or curriculum content that need improvement.

18. Account for four scales of measurement as used in educational research measurement and evaluation.

The nominal scale classifies data into distinct categories without any numerical value or ranking. Examples include gender, school type, and subject preferences, which are used in research for classification purposes.

The ordinal scale ranks data in a specific order but does not measure the exact differences between ranks. Examples include student performance rankings, where we know who performed better but not by how much.

The interval scale measures data with equal intervals between values but lacks a true zero point. Examples include standardized test scores, where differences between scores are meaningful but zero does not indicate the absence of knowledge.

The ratio scale provides the highest level of measurement, including equal intervals and a true zero point. Examples include student attendance, exam scores (out of 100), and response times in learning activities, allowing for meaningful comparisons and ratio calculations.