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: 2001 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 educational measurement.

Educational measurement is the process of assigning numbers, symbols, or values to learners' abilities, achievements, attitudes, or skills according to set rules. This process makes it possible to quantify learning outcomes in a way that allows for analysis and comparison.

It helps teachers and researchers to determine how well a student has understood and mastered the content taught.

It is also important for making decisions on promotion, placement, and certification of learners.

Educational measurement relies on standardized tools and procedures to ensure accuracy and fairness.

2. Mention four characteristics of a good hypothesis in educational research.

A good hypothesis is clear and specific so that it can be easily understood and tested without confusion.

It must be testable, meaning it can be examined through the collection and analysis of data.

It should be based on existing theory or knowledge, giving it a solid foundation in prior research.

It must predict the relationship between variables, guiding the researcher toward the kind of data to collect.

3. State four purposes of conducting educational research.

Educational research helps in solving specific problems in teaching and learning by providing evidence-based solutions.

It contributes to the improvement of educational policies by offering data and insights for decision-making.

It advances knowledge in the field of education by testing theories and generating new ones.

It evaluates the effectiveness of educational programs, methods, and materials to ensure quality education.

4. Give four limitations of using questionnaires as a data collection method.

Respondents may give false or socially desirable answers, which can lead to inaccurate data.

Some respondents may misunderstand questions, especially if the language is complex.

Low return rates can occur, especially in self-administered questionnaires, reducing the sample size.

They do not allow the researcher to probe for more detailed answers as interviews do.

5. List three reasons for conducting a literature review in a research study.

A literature review helps identify gaps in existing knowledge so the new research can address them.

It provides a theoretical foundation for the study by connecting it to previous work in the same field.

It helps refine research questions and methodology by learning from the strengths and weaknesses of earlier studies.

6. State four ways of improving the validity of a test.

Ensure that the test items are directly linked to the learning objectives to measure the intended skills or knowledge.

Cover the full range of content taught so that the test represents the syllabus fairly.

Use clear and precise wording to avoid ambiguity that may confuse learners.

Pilot the test to detect and correct problems before it is administered to the target group.

7. Mention four factors that can influence the reliability of a test.

Poorly written test items can cause inconsistent results because learners may interpret them differently.

Variations in test administration conditions, such as noise or lighting, can affect scores.

Scoring inconsistencies, especially in subjective items, can lower reliability.

The length of the test matters, as very short tests may not give stable and consistent results.

8. Explain four functions of assessment in the teaching and learning process.

Assessment monitors learners' progress to determine whether they are meeting set objectives.

It provides feedback to students, helping them understand their strengths and areas needing improvement.

It guides teachers in adjusting teaching methods and materials to suit learner needs.

It is used for certification, selection, or promotion decisions within the education system.

9. Give two reasons why standard deviation is more useful than range in describing variability.

Standard deviation uses all data points in its calculation, giving a more complete picture of how scores vary.

It is less affected by extreme values than range, which depends only on the highest and lowest scores.

10. (a) Define predictive validity and concurrent validity.

Predictive validity is the extent to which a test can forecast future performance in a related task or activity. For example, an entrance exam predicting success in college.

Concurrent validity is the extent to which a test correlates with another established test measuring the same thing, administered at the same time. For example, a new reading test being compared to an existing standardized reading test.

(b) Give four differences between the two, with examples.

Predictive validity focuses on future outcomes, while concurrent validity deals with present performance.

Predictive validity requires a time gap between the test and the outcome measure, while concurrent validity measures both at the same time.

An example of predictive validity is a job aptitude test predicting future job performance, while an example of concurrent validity is comparing a new math test with a well-established math test taken on the same day.

Predictive validity is useful for selection and placement, while concurrent validity is useful for validating new tests against existing standards.

11. (a) The following are Geography scores for 12 students:

35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90

(i) Calculate the mean score (nearest whole number).

The first step is to sum all the scores: 35 + 40 + 45 + 50 + 55 + 60 + 65 + 70 + 75 + 80 + 85 + 90 = 750.

The second step is to divide the total sum by the number of students: 750 ÷ 12 = 62.5.

When rounded to the nearest whole number, the mean score is 63.

(ii) Calculate the variance and standard deviation (nearest whole number).

To find the variance, subtract the mean (63) from each score, square the result, and sum all the squared deviations. The squared deviations add up to 3850.

Divide the sum of squared deviations by the number of scores: 3850 ÷ 12 = 320.83, which rounds to 321. This is the variance.

To find the standard deviation, take the square root of the variance: $\sqrt{321} \approx 17.91$, which rounds to 18.

(iii) Using a mean of 60 and a standard deviation of 15, compute the z-scores for the highest and lowest scores.

For the highest score (90): $Z = (90 - 60) \div 15 = 30 \div 15 = 2.00$.

For the lowest score (35): $Z = (35 - 60) \div 15 = -25 \div 15 \approx -1.67$.

(iv) Interpret these z-scores in the context of student performance.

The highest score's z-score of 2.00 shows the student performed two standard deviations above the mean, indicating excellent performance compared to the group.

The lowest score's z-score of −1.67 shows the student performed 1.67 standard deviations below the mean, indicating weaker performance compared to the group.

(b) State three advantages of using standard scores in reporting results.

Standard scores allow comparison of results from different tests that may have different scales.

They make it easier to see how far a score is above or below the average.
They help identify exceptional performances that may require recognition or intervention.

12. A researcher is investigating the effect of school leadership style on teacher motivation in public secondary schools.

(a) State one general objective and three specific objectives for this study.
The general objective is to determine the influence of school leadership style on teacher motivation in public secondary schools.
One specific objective is to assess the relationship between democratic leadership and teacher job satisfaction.
Another specific objective is to examine the impact of autocratic leadership on teacher turnover rates.
A third specific objective is to evaluate the effect of transformational leadership on teacher productivity.

(b) Identify four possible challenges the researcher may face in collecting data and explain how each can be overcome.
Some school leaders may be unwilling to participate due to fear of criticism. This can be overcome by assuring confidentiality and anonymity.
Teachers may give socially desirable answers rather than truthful responses. This can be minimized by using anonymous questionnaires.
Time constraints may make it hard to collect data from many schools. This can be overcome by careful scheduling and possibly using research assistants.
Language barriers may occur if some respondents are not fluent in the questionnaire language. This can be addressed by translating the instrument into the appropriate languages.

13. Discuss four ways of ensuring fairness when developing and administering a national examination.
Ensure the content of the examination is aligned with the national curriculum so that all students are tested on what they have been taught.
Use language that is clear and free from cultural bias so that no group of students is disadvantaged.
Standardize administration procedures, including timing and instructions, so all students take the exam under similar conditions.
Moderate the marking process by having multiple examiners and clear marking schemes to avoid scorer bias.

14. A national assessment shows consistent performance gaps between boys and girls in science subjects.

(a) Suggest four possible causes of this gap.

Cultural beliefs and gender stereotypes may discourage girls from pursuing science subjects.

Differences in access to science learning materials between boys and girls can affect performance.

Teaching methods that do not consider gender differences in learning styles can create gaps.

Lower confidence among girls in science subjects due to societal expectations can reduce performance.

(b) Propose four strategies to close the gap in future.

Encourage equal participation in science activities for both boys and girls in the classroom.

Provide science learning materials and laboratory access equally to all students.

Train teachers in gender-sensitive teaching methods to engage all learners effectively.

Organize mentorship programs where female role models in science motivate and guide girls.

15. Explain four advantages and four disadvantages of using essay tests in assessing students' learning outcomes.

Advantages:

Essay tests encourage students to organize and express their ideas in a logical manner.

They allow the assessment of higher-order thinking skills such as analysis, synthesis, and evaluation.

They give students an opportunity to demonstrate their depth of understanding on a topic.

They can measure complex learning outcomes that cannot be assessed through objective items.

Disadvantages:

They are time-consuming to mark, especially with large groups of students.

They are prone to scorer bias, where different markers may award different scores for the same response.

They cover less content because of the time students need to write detailed answers.

They may disadvantage students with weaker writing skills even if they understand the content.

16. Identify and explain four ethical principles that should guide a researcher when working with vulnerable populations in education.

Informed consent is necessary, meaning researchers must obtain permission from participants or their guardians after explaining the study clearly.

Confidentiality must be maintained by protecting participants' personal information and using codes

instead of names.

Protection from harm is essential, ensuring the study does not cause emotional, psychological, or academic damage to participants.

The right to withdraw must be respected, meaning participants can leave the study at any stage without penalty or negative consequences.