**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: 2004 a.m.**

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**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 measurement in the context of education.**

Measurement in education is the process of assigning numbers, symbols, or values to learners' abilities, knowledge, skills, or attitudes according to established rules.

It is used to quantify learning outcomes so they can be compared, analyzed, and interpreted objectively.

It provides a basis for making informed educational decisions, such as promotion, placement, or curriculum adjustments.

It ensures that assessment results are not based on guesswork but on structured and standardized procedures.

**2. Mention four differences between qualitative and quantitative research approaches.**

Qualitative research focuses on exploring phenomena in depth using non-numerical data, while quantitative research deals with measurable data expressed in numbers.

Qualitative research often uses open-ended instruments like interviews, while quantitative research uses structured tools like tests or questionnaires.

Qualitative research aims at understanding meanings and experiences, while quantitative research aims at testing hypotheses and measuring relationships between variables.

Qualitative findings are usually descriptive and thematic, whereas quantitative findings are statistical and numerical.

**3. State four factors that can influence the validity of a test.**

Poorly constructed test items can lower validity by failing to measure the intended learning outcomes.

Inadequate sampling of content can reduce validity if the test does not cover the full range of the syllabus.

Ambiguous wording of questions can confuse learners, leading to inaccurate measurement.

External factors such as noise, lighting, or temperature during testing can affect learners' performance and thus the validity of results.

**4. Give four purposes of setting clear research objectives in an educational study.**

Clear objectives guide the research process by focusing on what needs to be studied.

They help in selecting the appropriate methodology and instruments for data collection.

They provide a basis for analyzing results and determining whether the study goals have been achieved.

They ensure the study remains relevant and avoids collecting unnecessary or unrelated data.

**5. List three limitations of using achievement tests as the sole measure of learning outcomes.**

They may not capture non-academic skills such as creativity, teamwork, or problem-solving.

They can encourage rote memorization instead of deep understanding and critical thinking.

They may disadvantage learners with test anxiety, language barriers, or other factors unrelated to their true abilities.

**6. State four characteristics of a well-constructed questionnaire.**

It should have clear and concise questions to avoid misinterpretation by respondents.

It should be logically organized so that questions flow in a sequence that is easy to follow.

It should use language appropriate to the respondents' level of understanding.

It should be designed to collect relevant data that addresses the research objectives.

**7. Mention four roles of educational statistics in policy formulation.**

Statistics help identify trends in student performance, guiding policy decisions on curriculum and teaching methods.

They provide evidence for allocating resources effectively to areas of greatest need.

They help in evaluating the impact of educational reforms or programs.

They allow comparison of performance between different regions, schools, or groups, supporting equitable policy development.

**8. Explain four functions of pilot studies in educational research.**

Pilot studies help test the feasibility of the research design before the main study.

They identify weaknesses in instruments, such as unclear questions, so they can be corrected.

They provide preliminary data to refine the sampling strategy and methodology.

They allow the researcher to estimate the time and resources needed for the main study.

**9. Give two reasons why the mode might be preferred over the mean in certain educational data analyses.**

The mode is useful when analyzing categorical data, such as the most chosen career option by students, where the mean is meaningless.

It is not affected by extreme scores, making it more representative in skewed distributions.

**10. (a) Define the term criterion-related validity.**

Criterion-related validity is the extent to which test scores are related to an external criterion that measures the same skill or ability.

It shows how well a test predicts or reflects actual performance in a related area.

**(b) Differentiate between concurrent validity and predictive validity, giving one example for each.**

Concurrent validity measures how well a test correlates with another established measure taken at the same time. For example, comparing a new reading comprehension test with an existing standardized reading test administered in the same week.

Predictive validity measures how well a test forecasts future performance. For example, using an entrance exam to predict success in a degree program.

**11. (a) The table below shows the Chemistry test scores of 15 students:**
42, 48, 56, 60, 65, 68, 72, 75, 78, 80, 83, 85, 88, 90, 94

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

Step 1: Sum of all scores = 42 + 48 + 56 + 60 + 65 + 68 + 72 + 75 + 78 + 80 + 83 + 85 + 88 + 90 + 94 = 1084

Step 2: Mean = 1084 ÷ 15 = 72.27 ≈ 72

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

Step 1: Find squared deviations from the mean:

$(42-72)^2 = 900$

$(48-72)^2 = 576$

$(56-72)^2 = 256$

$(60-72)^2 = 144$

$(65-72)^2 = 49$

$(68-72)^2 = 16$

$(72-72)^2 = 0$

$(75-72)^2 = 9$

$(78-72)^2 = 36$

$(80-72)^2 = 64$

$(83-72)^2 = 121$

$(85-72)^2 = 169$

$(88-72)^2 = 256$

$(90-72)^2 = 324$

$(94-72)^2 = 484$

Step 2: Sum of squared deviations = 3404

Step 3: Variance = $3404 \div 15 = 226.93 \approx 227$

Step 4: Standard deviation = $\sqrt{227} \approx 15.07 \approx 15$

**(iii) Using a mean of 70 and a standard deviation of 12, calculate the z-scores for the highest and lowest marks.**

Highest score = 94

$Z = (94 - 72) \div 15 = 22 \div 15 \approx 1.47$

Standard score = $(1.47 \times 12) + 70 = 17.64 + 70 = 87.64 \approx 88$

Lowest score = 42

$Z = (42 - 72) \div 15 = -30 \div 15 = -2.00$

Standard score = $(-2.00 \times 12) + 70 = -24 + 70 = 46$

**(b) Explain three reasons why standard deviation is considered a more informative measure of spread than range.**

Standard deviation considers all data points, giving a complete picture of variation.

It shows how far scores deviate from the mean, making interpretation of results more meaningful.

It is less affected by extreme values than range, which depends only on the two most extreme scores.

**12. A researcher is investigating the impact of teacher motivation on student performance in rural secondary schools.**

**(a) State one general objective and three specific objectives for the study.**

General objective: To determine the influence of teacher motivation on students' academic achievement in rural secondary schools.

Specific objective 1: To assess the relationship between teacher salaries and student performance.

Specific objective 2: To examine how recognition and rewards for teachers affect learner achievement.

Specific objective 3: To investigate how opportunities for professional development influence students' academic results.

**(b) Discuss four challenges the researcher is likely to face in collecting data and explain how each challenge could be overcome.**

Limited access to remote schools could make data collection difficult. This can be overcome by proper planning and arranging transport in advance.

Teachers may give biased responses due to fear of criticism. This can be addressed by assuring confidentiality and anonymity.

Language barriers may arise if the researcher and respondents do not share a common language. This can be minimized by using interpreters or translating instruments.

Time constraints may limit the depth of data collection. This can be addressed by scheduling visits during times that do not interfere with school activities.

**13. Discuss four limitations of using mean as a measure of central tendency in educational research and suggest ways of addressing each limitation.**

The mean is affected by extreme values, which can distort results. This can be addressed by using median when data is skewed.

It is not suitable for categorical data such as gender or subject choice. In such cases, mode should be used.

It may not represent the true center when data distribution is uneven. This can be addressed by checking data distribution before analysis.

It does not provide information about data spread. This limitation can be addressed by calculating standard deviation alongside the mean.

**14. (a) Suggest four possible reasons for the inconsistency of a newly designed aptitude test across schools.**

Differences in test administration conditions, such as lighting or noise levels.

Variation in how examiners explain instructions to students.

Differences in preparation or familiarity with test formats among students.

Poorly designed test items that measure unintended skills.

**(b) Propose four strategies that could improve the reliability of the test.**

Standardize administration procedures in all schools.

Train all examiners to follow the same marking guidelines.

Revise and pilot test items before final administration.

Increase the number of quality test items to improve consistency.

**15. Examine four positive and four negative effects of implementing high-stakes assessments in Tanzania.**

Positive: They encourage schools to improve teaching quality.

Positive: They provide data for comparing performance across schools and regions.

Positive: They help identify top-performing students for scholarships and awards.

Positive: They inform government policy on curriculum and resources.

Negative: They can cause stress and anxiety among students.

Negative: They may lead teachers to focus only on test content, neglecting broader skills.

Negative: They can disadvantage schools in poorer areas with fewer resources.

Negative: They may promote cheating or unethical practices to achieve high scores.

**16. Critically analyze four ethical issues that can arise when using human subjects in experimental educational research, and suggest practical measures to address each.**

Informed consent: Participants must understand and agree to take part. This can be ensured through clear, written consent forms.

Confidentiality: Personal information must be kept private. This can be done by coding data and storing it securely.

Protection from harm: Research should not cause physical or emotional harm. This can be achieved by minimizing risks in the study design.

Right to withdraw: Participants should be free to leave the study at any time without penalty. This should be stated clearly at the start of the research.