THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATTION EXAMINATION

762 **EDUCATIONAL RESEARCH, MEASUREMENT AND EVALUATION**

Time: 3 Hours **ANSWERS** **Year: 2022**

Instructions.

1. This paper consists of sections A and B with a total of **Fourteen (14)** questions.
2. Answer **all** questions from section A and **four (4)** questions from section B.
3. Section A carries **forty (40)** marks and section B Carries **sixty (60)** marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

SECTION A (40 Marks)

Answer all questions from this section. Each question carries 4 marks.

1. Explain four procedures of scoring objective test items

The first procedure is to **prepare a clear answer key or marking scheme** before scoring begins. This ensures consistency and fairness in awarding marks for each correct response.

Secondly, **mark one item at a time for all scripts**. This means scoring the first question for all students before moving to the next, which reduces bias and helps maintain scoring accuracy.

The third procedure is to **check for recording errors and total scores carefully**. After marking, the examiner should review the recorded marks to ensure there are no mistakes in totaling or transferring scores.

Lastly, **use scoring templates or computer software where possible** for multiple-choice or true/false items. This quickens the process and reduces the chances of human error.

2. Describe four characteristics of basic research

Basic research is **theoretical in nature**. It seeks to develop or expand existing knowledge without necessarily aiming for immediate practical application.

It focuses on **understanding principles, concepts, and phenomena**. Basic research attempts to explain why things happen, contributing to academic or scientific knowledge.

This type of research is often **conducted in controlled environments** like laboratories or academic institutions, allowing researchers to isolate variables and focus on theoretical issues.

Lastly, basic research aims at **advancing knowledge for future application**. Although its findings may not be directly applicable, they provide a foundation for applied or action research in the future.

3. Explain four learning assessment techniques

One technique is **written tests**, which include essays, multiple-choice, short-answer, and true/false questions used to assess students' understanding of concepts.

Another technique is **oral questioning**, where teachers ask students verbal questions during lessons or interviews to gauge their knowledge and thinking processes.

Project work is also used, where students complete tasks or investigations over time, applying learned concepts to real-life problems, and their work is assessed for creativity, accuracy, and relevance.

Lastly, **classroom observations** involve teachers systematically watching and recording students' behavior, participation, and performance during learning activities to assess skills and attitudes.

4. Explain the reasons for choosing questionnaire method as a data collection tool

A questionnaire is chosen because it allows for **collecting data from a large number of respondents within a short time and at a lower cost** compared to interviews or focus groups.

It provides **standardized questions and responses**, ensuring consistency in data collection, which makes it easier to analyze and compare results.

Questionnaires offer **anonymity and privacy**, encouraging respondents to give honest and candid answers, especially on sensitive topics.

Lastly, the method is **easy to distribute and can be administered both physically and electronically**, making it convenient for reaching distant or scattered populations.

5. Categorize the given statements into respective types of educational measurement

(i) *Maria is the first student in the class of 80 students* — **Norm-referenced measurement** (comparing performance relative to others).

(ii) *Ali can define correctly all measurement terms* — **Criterion-referenced measurement** (assessing performance against set standards or objectives).

(iii) *A student has a better understanding of question five but poor understanding in question two* — **Diagnostic measurement** (identifying strengths and weaknesses in specific areas).

(iv) *Kulwa performed above the average while Doto performed below the average in the classroom test* — **Norm-referenced measurement** (comparing to group performance).

6. Differentiate the main features of the concept "discrimination index" and "difficulty index"

The **difficulty index** measures how easy or difficult a test item is by calculating the percentage of students who answered it correctly. A high difficulty index means the item was easy, and a low index means it was hard.

On the other hand, the **discrimination index** measures how well a test item differentiates between high-performing and low-performing students. A good discriminating item is answered correctly by high achievers and incorrectly by low achievers.

7. Give brief explanation on (a) Interview and (b) Focus group discussion as a research data collection tool

An **interview** is a data collection method where the researcher asks respondents questions directly, either face-to-face, by phone, or through video calls. It allows for in-depth exploration of opinions, experiences, and attitudes.

A **focus group discussion** involves gathering a small group of participants to discuss a specific topic under the guidance of a facilitator. It's useful for exploring group opinions, attitudes, and generating diverse ideas on a subject.

8. Describe the features to consider in construction of a research topic

A good research topic should be **clear and focused**, avoiding vague or overly broad statements to ensure the study remains manageable and specific.

It must be **researchable and practical**, meaning the topic should allow for data collection and analysis within the available time, resources, and scope.

The topic should address a **real problem or knowledge gap**. It must contribute to new understanding, practical solutions, or academic debates in its field.

Lastly, the topic should be **relevant and significant** to the target audience, academic discipline, or community to justify the effort and resources used in the research.

9. Describe the application of ranking and histogram in processing test scores

Ranking involves arranging students' test scores from highest to lowest or vice versa. This method is useful for identifying top performers, averages, and those needing support.

A **histogram** is a graphical representation of the frequency distribution of test scores. It helps visualize how scores are spread, showing patterns such as normal distribution, skewness, or clustering.

Both tools aid in **interpreting assessment results, identifying performance trends**, and making informed decisions about student progress and teaching strategies.

10. Support the statement that "A valid test is always reliable but a reliable test is not always valid."

A **valid test** measures exactly what it's intended to measure and does so consistently, meaning it must also be reliable because results need to be dependable over time.

However, a **reliable test** gives consistent results but may not necessarily measure the intended concept. For example, a math test consistently measuring students' memory of formulas without testing their problem-solving skills would be reliable but not valid.

Thus, while validity ensures both accuracy and consistency, reliability alone does not guarantee that the test assesses the correct content or skills.

SECTION B (60 Marks)

Answer all questions from this section. Each question carries 15 marks.

11 (a) Determine the correlation coefficient of reliability of the two administered tests using the Pearson's product correlation coefficient

Given data:

Student	X (1st Admin)	Y (2nd Admin)
A	15	14
B	10	12
C	11	11
D	13	13
E	14	15
F	12	13
G	12	16

Step 1: Calculate sums

$\Sigma X = 15 + 10 + 11 + 13 + 14 + 12 + 12 = 87$
$\Sigma Y = 14 + 12 + 11 + 13 + 15 + 13 + 16 = 94$

Step 2: Calculate squares

$\Sigma X^2 = 225 + 100 + 121 + 169 + 196 + 144 + 144 = 1099$
$\Sigma Y^2 = 196 + 144 + 121 + 169 + 225 + 169 + 256 = 1280$

Step 3: Calculate products

$\Sigma XY = (15\times14) + (10\times12) + (11\times11) + (13\times13) + (14\times15) + (12\times13) + (12\times16)$
$\Sigma XY = 210 + 120 + 121 + 169 + 210 + 156 + 192 = 1178$

Step 4: Apply Pearson's formula

$r = [N(\Sigma XY) - (\Sigma X)(\Sigma Y)] / \sqrt{\{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]\}}$

Substituting values:

$N = 7$
$\Sigma X = 87$

$\Sigma Y = 94$
$\Sigma X^2 = 1099$
$\Sigma Y^2 = 1280$
$\Sigma XY = 1178$

$r = [7(1178) – (87\times94)] / \sqrt{[7\times1099 – (87)^2][7\times1280 – (94)^2]}$

$r = [8246 – 8178] / \sqrt{[7693 – 7569][8960 – 8836]}$

$r = 68 / \sqrt{124 \times 124}$

$r = 68 / 124$

$r \approx 0.548$

Answer: The correlation coefficient (r) is approximately **0.55**

(b) Comment on the value obtained in 11 (a)

A correlation coefficient of **0.55** indicates a **moderate positive relationship** between the two test administrations. This means that students who performed well in the first test tended to perform reasonably well in the second test, showing fair consistency in their results. However, the reliability is not very high, suggesting some inconsistency in test performance, which might be due to changes in students' concentration, test difficulty, or testing conditions.

(c) How could you interpret the correlation of two variables when the value of correlation coefficient is high, moderate and zero?

When the correlation coefficient is **high (close to +1 or -1)**, it shows a strong relationship between the two variables. A positive value means as one variable increases, the other also increases, while a negative value means as one increases, the other decreases.

When the correlation is **moderate (around +0.4 to +0.6 or -0.4 to -0.6)**, it indicates a fair but not very strong relationship. The variables tend to move together to some extent but not consistently.

When the correlation is **zero (0)**, it means there's no relationship between the two variables. A change in one variable does not affect the other in any predictable manner.

12. Explain five instruments recommended for assessing students

Written tests are structured tools like essays, multiple-choice, and short-answer questions used to measure students' knowledge, comprehension, and application skills.

Oral assessments involve asking students verbal questions to assess their understanding, reasoning ability, and communication skills through interviews or classroom questioning.

Practical tests are used to evaluate students' ability to perform tasks or demonstrations, particularly in subjects like science, ICT, or vocational studies.

Observation checklists are tools teachers use to systematically record students' behavior, participation, and skills in natural learning settings.

Portfolios are collections of students' work over time, including projects, assignments, and test results, offering a comprehensive view of a learner's progress and abilities.

13. Describe major steps which are needed in writing a research report

The first step is to **write an introduction**, stating the background, purpose, objectives, and research questions or hypotheses guiding the study.

Next is the **literature review**, summarizing existing studies and theoretical frameworks related to the research topic to provide context and support for the study.

Then, the **methodology section** is written, describing the research design, data collection methods, sampling techniques, and procedures used in conducting the study.

Afterward, the **presentation and analysis of data** is done, showing the results using tables, graphs, and statistical descriptions, followed by interpretations of the findings.

Lastly, the report includes **conclusions and recommendations**, summarizing the key findings and suggesting practical steps or areas for further research.

14. Use their skills in research design to advise the school academic committee on the five major steps of carrying out action research

The first step is to **identify and define the problem**. Teachers or committees should observe classroom or academic issues that need solutions, clearly stating the nature of the problem.

Next is to **plan the action research activity**, deciding on strategies, participants, timelines, and resources needed to address the identified problem.

The third step is to **implement the action plan**, where teachers or researchers apply the strategies or interventions in real classroom or school settings.

After implementation, they should **collect and analyze data** on the effects of the intervention, using tools like tests, interviews, or observations to measure changes or improvements.

Finally, they must **reflect on the outcomes and document the findings**, discussing what worked, what didn't, and how the intervention can be improved or sustained in future practice.