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: 2021**

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. (a) Describe extended response items as used in educational measurement and evaluation.

Extended response items are types of test questions that give students the freedom to organize, select, and present their ideas in their own words.

In educational measurement and evaluation, these items require learners to write long and detailed answers where they can demonstrate their understanding, reasoning ability, and capacity to express themselves clearly.

The teacher provides a broad question or prompt, and the student is expected to construct a response using their knowledge, personal interpretation, and critical thinking skills. Such items are commonly used in essay examinations and subjects that involve explanation, argument, or analysis, like history and literature.

(b) Describe restricted response items as used in educational measurement and evaluation.

Restricted response items are test questions that limit the scope and structure of the student's answer. In educational measurement and evaluation, these items require students to respond within specific guidelines, usually in a few sentences or paragraphs, directly addressing particular aspects of a topic.

The teacher defines the content, form, and sometimes even the length of the expected answer. These items are suitable when the aim is to assess students' factual knowledge, specific concepts, or understanding of limited content within a controlled framework, reducing the influence of writing skills on the evaluation outcome.

2. (a) Define taxonomy of educational objectives as used in educational measurement and evaluation.

The taxonomy of educational objectives refers to a structured classification system used to organize learning goals, instructional objectives, and educational outcomes. In educational measurement and evaluation, this system helps educators design and evaluate learning activities according to various levels of complexity and expected student performance.

Developed by Benjamin Bloom and his colleagues, the taxonomy groups objectives into hierarchical categories that guide teachers in formulating instructional goals and assessing whether students achieve desired learning outcomes.

(b) Explain three domains of instructional objectives as proposed by Benjamin Bloom.

The first domain is the **Cognitive domain**, which involves intellectual skills and knowledge-based learning. It ranges from basic recall of facts to higher-order thinking like analysis, synthesis, and evaluation. This domain is often structured from simple to complex levels, including knowledge, comprehension, application, analysis, synthesis, and evaluation.

The second domain is the **Affective domain**, which focuses on attitudes, emotions, interests, values, and feelings. It addresses how students receive, respond to, and internalize values. Its levels include receiving, responding, valuing, organization, and characterization by a value system.

The third domain is the **Psychomotor domain**, which involves physical movement, coordination, and motor-skill development. Though Bloom did not fully develop this domain, later educators expanded it to include levels like perception, set, guided response, mechanism, complex overt response, adaptation, and origination. It measures skills like writing, typing, operating equipment, or playing musical instruments.

3. Identify four physical environmental factors that can affect an individual's performance.

One factor is **lighting conditions**. Poor lighting can strain the eyes, cause headaches, and reduce concentration, leading to lower performance in tasks that require visual attention.

A second factor is **noise levels**. Excessive or disruptive noise in the environment can distract individuals, disturb concentration, and affect their ability to perform tasks accurately and efficiently.

The third factor is **temperature and ventilation**. Uncomfortable room temperatures, whether too hot or too cold, can make individuals uneasy and fatigued, negatively affecting productivity and focus.

The fourth factor is **seating arrangement and space**. Crowded or poorly organized working spaces can cause discomfort, limit movement, and make it difficult for individuals to engage fully with tasks, affecting performance outcomes.

4. Explain the given concepts as used in assessing student's achievement in education.

(a) Rating scales are tools used to assess the degree to which a student possesses certain qualities, skills, or behaviors. They consist of a continuum of possible responses where teachers or evaluators rate a student's performance against set criteria, often ranging from poor to excellent.

(b) Checklist is an assessment tool that provides a list of specific behaviors, skills, or tasks that students are expected to demonstrate. The teacher marks whether each item is present or absent, offering a simple way to track competencies and progress.

(c) Socio-metric techniques involve assessing social relationships within a group. In educational settings, these techniques help identify patterns of friendship, peer acceptance, and group dynamics by asking students to select peers for certain activities or positions, revealing social structures.

(d) Attitude tests are instruments designed to measure students' feelings, beliefs, or dispositions toward certain subjects, concepts, or situations. They help educators understand learners' emotional and psychological reactions that may influence their learning.

(e) Guess Who techniques are informal assessment methods where students are asked to guess which of their classmates fits a particular description or displays certain behaviors. This technique helps in identifying peer perceptions and social relationships in a classroom.

(f) Anecdotal record is a narrative account of observed student behaviors, incidents, or performances recorded by a teacher. It is qualitative in nature and provides detailed, contextual descriptions of significant events that reflect a student's abilities, attitudes, or challenges.

5. Examine four characteristics of an action research.

One characteristic is that **action research is problem-centered**. It focuses on addressing immediate, practical problems within a specific classroom, school, or educational setting, aiming to improve practices through direct intervention.

Another characteristic is that **it is participatory in nature**. Teachers, administrators, and sometimes students actively engage in identifying problems, implementing solutions, and reflecting on outcomes, making the process collaborative.

The third characteristic is that **it is cyclical and ongoing**. Action research involves repeated cycles of planning, acting, observing, and reflecting. Each cycle builds upon the findings of the previous one, leading to continuous improvement.

The fourth characteristic is that **it emphasizes practical outcomes**. Unlike pure research, the goal is not to develop general theories but to solve specific issues, improve instructional strategies, or enhance learning environments directly within the practitioner's context.

6. Give your understanding on the four concepts used in educational research:

(a) Longitudinal study is a research method where data is collected from the same subjects repeatedly over an extended period. It helps researchers track changes and developments over time within a particular group.

(b) Cross-sectional study involves collecting data from different individuals at a single point in time. It is useful for comparing different groups or identifying relationships between variables without the need for long-term observation.

(c) Type I error occurs in hypothesis testing when a true null hypothesis is incorrectly rejected. In educational research, it means concluding that a teaching method or intervention has an effect when, in reality, it does not.

(d) Type II error happens when a false null hypothesis is not rejected. In educational research, it means failing to detect a real effect or relationship, such as overlooking the benefits of a new teaching method that actually works.

7. Examine four qualities of a good evaluation in teaching and learning process.

A good evaluation should be **valid**. This means it accurately measures what it is intended to measure. If an evaluation is designed to assess problem-solving skills, it should not merely test memorization.

It should also be **reliable**. This implies that the evaluation consistently yields the same results under similar conditions. A reliable test would give similar outcomes if administered to the same students under the same circumstances.

The third quality is **objectivity**. A good evaluation should minimize personal bias and subjectivity from the examiner. The scoring and interpretation of results should be based on clear, standardized criteria.

Lastly, it should be **comprehensive**. This means it covers all intended learning objectives and outcomes. A good evaluation should assess a range of skills and knowledge areas rather than focusing narrowly on one aspect.

8. Give four strategies that examiners may use to control cheating in examinations.

One strategy is **proper spacing of candidates**. Ensuring that students are seated far enough apart reduces the opportunity for copying or signaling answers.

Another strategy is **assigning different versions of the same exam**. By varying the order of questions or providing alternate questions, the chances of students sharing answers are reduced.

The third strategy is **strict invigilation and supervision**. Having vigilant and active supervisors moving around the examination room discourages students from attempting to cheat.

The fourth strategy is **using technology-based measures** such as surveillance cameras or electronic devices to monitor candidates and detect unauthorized materials or suspicious behavior during exams.

9. Outline eight sources of literature review in research.

- Textbooks
- Academic journals
- Dissertations and theses
- Conference proceedings
- Government publications
- Institutional reports
- Online scholarly databases
- Newspaper and magazine articles

10. Examine four factors to be considered by a teacher to ensure objectivity in scoring essay items.

A teacher should first **prepare a detailed marking scheme**. This ensures that specific points are awarded for particular content, reducing personal judgment.

Secondly, the teacher should **score all answers to one question before moving to the next**. This technique helps maintain consistency and fairness across all scripts.

The third factor is **concealing the identity of students** during marking. By marking anonymously, the teacher avoids biases that might arise from knowing the candidate.

Lastly, the teacher should **conduct moderation with colleagues**. Discussing sample scripts and marking guidelines with fellow educators ensures that scoring is aligned and objective across evaluators.

SECTION B (60 Marks)

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

11. Study the frequency distribution table representing English Language test results for 100 students from a certain Secondary School.

Scores: 0-10, 11-21, 22-32, 33-43, 44-54, 55-65, 66-76, 77-87, 88-98
Frequency: 2, 8, 10, 12, 18, 20, 15, 10, 5

From the table, compute the following:

(a) The mean score of the distribution.

First, find the midpoints for each class interval:

0-10 = 5
11-21 = 16
22-32 = 27
33-43 = 38
44-54 = 49
55-65 = 60
66-76 = 71
77-87 = 82
88-98 = 93

Now multiply each midpoint by its frequency:

5 × 2 = 10
16 × 8 = 128
27 × 10 = 270
38 × 12 = 456
49 × 18 = 882
60 × 20 = 1200
71 × 15 = 1065
82 × 10 = 820
93 × 5 = 465

Now, find the sum of these products:

10 + 128 + 270 + 456 + 882 + 1200 + 1065 + 820 + 465 = 5296

Then, divide the total by the number of students (100):

Mean = 5296 ÷ 100 = 52.96

Answer: The mean score is **52.96**

(b) The class interval size for the distribution.

To get the class interval size, subtract the lower limit of any class from the lower limit of the next class.

Example:

11 - 0 = 11

Answer: The class interval size is **11**

(c) The highest and lowest score in the distribution.

The lowest score is the lower limit of the first class: 0
The highest score is the upper limit of the last class: 98

Answer: The lowest score is **0** and the highest score is **98**

(d) The modal class interval of the distribution.

The modal class is the one with the highest frequency.

From the table:

Highest frequency = 20

Occurs in class 55-65

Answer: The modal class interval is **55-65**

(e) The variance of the distribution.

Variance formula:
Variance = $(\Sigma fx^2 \div N) - (\text{Mean})^2$

First, square each midpoint:

$5^2 = 25$
$16^2 = 256$
$27^2 = 729$
$38^2 = 1444$
$49^2 = 2401$
$60^2 = 3600$
$71^2 = 5041$

$82^2 = 6724$
$93^2 = 8649$

Now multiply each squared midpoint by its frequency:

$25 \times 2 = 50$
$256 \times 8 = 2048$
$729 \times 10 = 7290$
$1444 \times 12 = 17328$
$2401 \times 18 = 43218$
$3600 \times 20 = 72000$
$5041 \times 15 = 75615$
$6724 \times 10 = 67240$
$8649 \times 5 = 43245$

Now, sum these products:

$50 + 2048 + 7290 + 17328 + 43218 + 72000 + 75615 + 67240 + 43245 = 328034$

Now apply the variance formula:

Variance = $(328034 \div 100) - (52.96)^2$
Variance = $3280.34 - 2804.16$
Variance = 476.18

Answer: The variance is **476.18**

12. Study the results obtained from 40 students taken as a sample for item X analysis where letter 'B' was the correct answer.

Possible Responses	Omit	A	B	C	D	E	Total
High Achievers	2	11	5	1	1	0	20
Low Achievers	0	12	2	2	4	0	20

(a) Compute

(i) The item difficulty index (P)

P = (Total number of students selecting correct answer ÷ Total number of students)

$= (5 + 2) \div 40 = 7 \div 40 = 0.175$

Answer: The item difficulty index is **0.175**

(ii) The discrimination index (D)

D = (Number of correct in high group - Number of correct in low group) ÷ (½ of total students)

= (5 - 2) ÷ 20 = 3 ÷ 20 = 0.15

Answer: The discrimination index is **0.15**

(b) State the level of difficulty of the item and give two reasons based on the (a)(i) and (ii) results.

The item is **difficult** because the difficulty index is 0.175, which is below 0.3. Items with indices below 0.3 are considered difficult since only a small portion of students answered it correctly.

First, the low item difficulty index of 0.175 shows that very few students managed to select the correct answer, indicating the question was hard for both high and low achievers.

Second, the discrimination index of 0.15 is relatively low, suggesting the item has weak power in distinguishing between high and low achievers. A good item should have a higher discrimination index, preferably above 0.3.

13. By using examples from own experience, explain five roles of measurement in education.

First, **measurement helps in assessing student progress**. For example, by giving monthly mathematics tests, a teacher can track how well students are mastering specific topics over time.

Second, **it aids in identifying learning difficulties**. If a student consistently scores below average in English, the teacher can investigate and provide targeted support or remedial instruction.

Third, **measurement assists in evaluating the effectiveness of teaching methods**. For instance, after introducing group discussions in science classes, a teacher might measure student performance to determine if this approach improves understanding.

Fourth, **it supports educational placement decisions**. Schools often use entrance exam scores to place students into appropriate streams or classes based on their performance levels.

Fifth, **measurement guides curriculum improvement**. Consistently low performance in certain topics might indicate a need to revise or enhance the curriculum content or instructional strategies.

14. Identify five characteristics which qualify educational research as a scientific process.

First, **educational research is systematic**. It follows an organized procedure involving problem identification, data collection, analysis, and conclusion drawing.

Second, **it is empirical**. Educational research relies on observable and measurable evidence gathered through experience and experimentation, not on personal opinions.

Third, **it is objective**. Researchers avoid personal bias, ensuring that conclusions are based on factual data and verifiable observations.

Fourth, **it is replicable**. The research methods and procedures are documented in detail so other researchers can repeat the study to verify or challenge the findings.

Fifth, **it is analytical**. Educational research involves careful examination and interpretation of data to uncover patterns, relationships, and underlying principles affecting educational practices.