NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF SCIENCE AND TECHNOLOGY EDUCATION
DEPARTMENT OF SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION

ASSESSMENT IN SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION
PST6205

Special Examination Paper **August 2024**

Time Allowed:	**3 hours**
Total Marks:	**100**
Special Requirements:	**1. Statistical Tables** **2. Drawing instruments**
Internal Examiner:	**Prof N Phuthi**
External Examiner:	

INSTRUCTIONS AND INFORMATION

1. **Answer ALL Questions in Section A and any THREE questions in Section B.**
2. **This Examination Paper consists of 5 printed pages and 19 questions.**
3. **It is to your best interest to use neat and legible handwriting.**

MARK ALLOCATION

	QUESTION NUMBER	ALLOCATED MARKS
Section A	1 – 15	25
Section B	16	25
	17	25
	18	25
	19	25

SECTION A

1. **Answer all questions in this section**
2. **Questions 1 – 13 are multiple choice, while Questions 14 and 15 are objective short answer questions.**

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1. The instrument used for measuring a sample of behaviour is .....?
   A. a test
   B. measurement
   C. an essay
   D. evaluation

2. The purpose of the evaluation is to make a judgment about educational...
   A. age
   B. quality
   C. quantity
   D. effectiveness

3. Evaluation that monitors the process and progress of learning is .....
   A. formative
   B. placement
   C. summative
   D. progressive

4. Which of these tools does not seem to be good for formative assessment?
   A. criterion-referenced testing
   B. conversation
   C. quizzes
   D. group discussion

5. The first step in a test assessment is .....
   A. implementing the measurement
   B. making a decision on what to measure
   C. marking the test
   D. none of the above

6. Which of these tools could be used for assessing the performance details of students in a school debating competition?
   A. checklist
   B. anecdotal record
   C. rating scale
   D. a stop watch

7. Which of the following cannot be part of a continuous and comprehensive evaluation of student performance?
   A. cumulative records of students' achievements
   B. Assignments and tests
   C. parent-teacher meetings
   D. essay writing competitions

8. The reason for my answer to Question 7 is .....
   A. these are regularly administered
   B. they cover broad learning content
   C. they occur very rarely
   D. they are easy to organise

9. Hand-written long answer and essay type questions have the following disadvantages except .....
    A. different evaluators evaluate in different ways
    B. handwriting may influence the score
    C. reliability of the score is low
    D. performance may be high due to through preparation
10. Construct validity is .....
    A. the degree to which an instrument can forecast an outcome
    B. how well an instrument compares with a second assessment concurrently done
    C. a logic link between research instrument and objective
    D. statistical procedures establish the contribution of each important factor
11. Test/retest and parallel forms are .....
    A. external measures to test validity
    B. internal measures to test validity
    C. external measures to test reliability
    D. internal measures to test reliability
12. Which the following is/are not a property of the normal distribution curve?
    A. mean = median = 0, standard deviation = 1
    B. symmetry about the standard deviation of 1
    C. about 48% of the area under the curve is between the mean and standard deviations of ± 1
    D. mean ≠ mode
13. Reliability, objectivity, validity and aptitude. What is the best way to describe these?
    A. All are qualities of a good test
    B. One is not a quality of a good test
    C. All require measurement
    D. None can predict future performance [15]

14. The heights of adult females in a class are normally distributed with a mean of 160 cm and a standard deviation of 8 cm. Find the probability that a randomly selected member of the class has a height above 168 cm. [5]

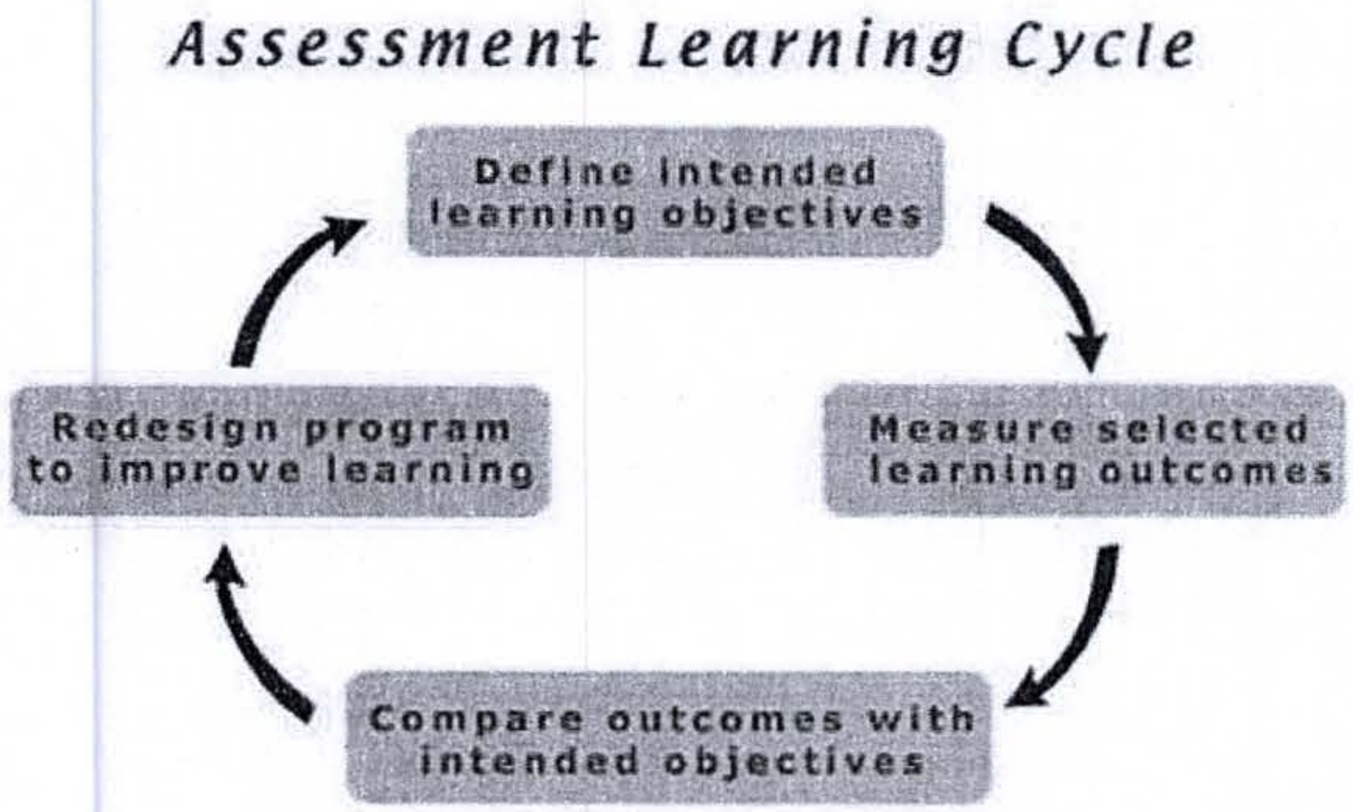
15. Write down five important sentences about 'diagnostic' assessment. [5]

SECTION B

1. **Answer any THREE questions in this section.**
2. **All questions carry equal marks.**
3. **Begin each question on a fresh page and keep all parts of the same question together.**

Question 16

Study the diagram of one of the models for monitoring teaching and learning in higher education, the Assessment Learning Cycle below and answer the questions that follow it.



(a) Analyse the name of the model, and explain the cyclical nature of its phases. [6]
(b) Where is the main focus of the cycle? Explain who carries out the tasks of the main focus, and what is achieved by such activity. [10]
(c) Create your own cycle to show how you use in-class tests and assignments. [10]

Question 17

Read the passage below and answer the questions below it.

Assessment in science promotes scientific enquiry. When a teacher plans assessment activities in science, its key focus is that it should promote scientific enquiry. Assessment in science should not be based on rote memory. Mere memorization of facts, principles or theories will not serve the purpose of science teaching-learning. If as a teacher, you plan and use such tools and techniques, which involve problem solving, investigation, active thinking and reasoning, your assessment will promote scientific enquiry.

a) Define the terms in **bold** letters in the passage. [8]
b) Make a detailed comparison between teaching for scientific enquiry and teaching for rote memory in a typical science, technology, STEM or STEAM classroom. [12]
c) Briefly discuss the assessment of practical skills in your subject area. [5]

Question 18

Table 1 is a progress report for a college student in a science programme.

Table 1: Student Performance report

Subject	Possible score	Class Average	Standard Deviation	Student's score
Mathematics I	100	65	8	65
Applied Physics	100	72	9	70
Computer Science	100	80	8	73

a) Describe and explain the comparative performance of the class in the 3 subjects. [6]
b) Calculate the student's z-scores and percentile ranks in the 3 subjects. [6]
c) Comment on the student's performance, stating his relative strength in each subject. [13]

QUESTION 19

Figure Q2 is one version of the normal distribution curve describing a standardised population parameter such as the performance of students who wrote a particular test at national level.

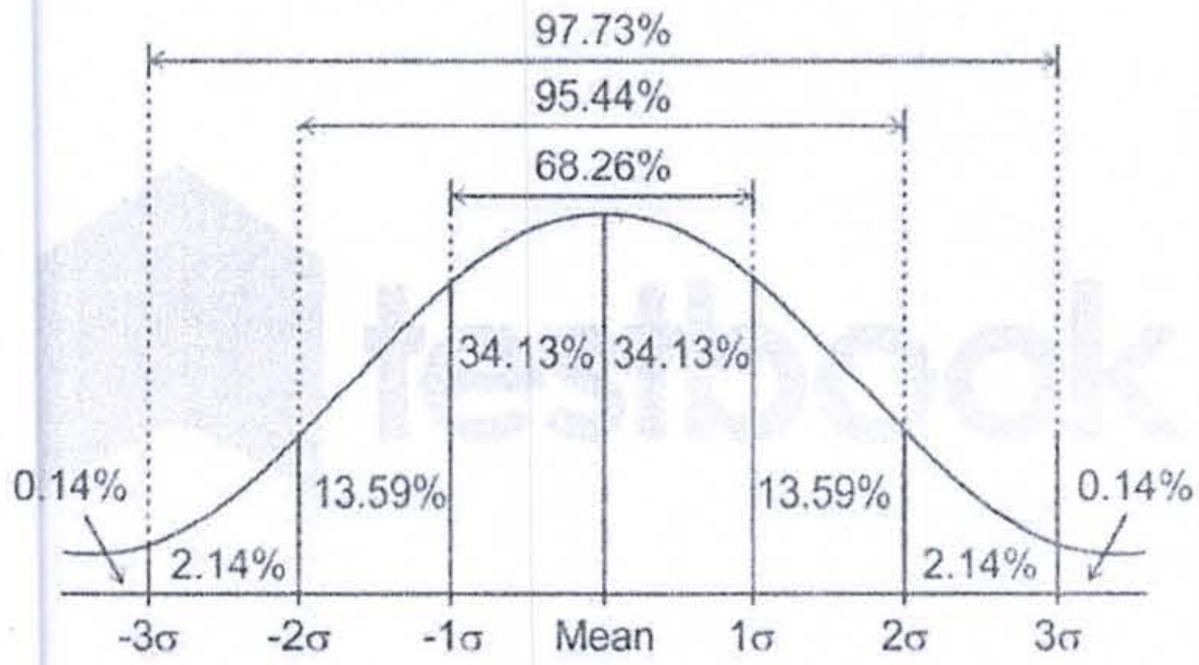


Figure Q2 Standard normal curve

(a) What percentages of the population fell:
  i. between z = -2 and z = 2 [2]
  ii. between minus infinity and z = 1 [2]
  iii. above 2 standard deviations [2]
(b) How many standard deviations are there between the percentile ranks of 50 and 97.72? [2]
(c) If the test had a mean score of 64 and a standard deviation of 7, re-draw a sketch of the above diagram, and on it, insert and label accurately the positions of scores between ±3 standard deviations. [8]
(d) Discuss the setting of examinations in the Zimbabwe secondary school system. [9]

END OF EXAMINATION PAPER