ZANZIBAR EXAMINATIONS COUNCIL



## CANDIDATES' ITEMS RESPONSE ANALYSIS REPORT FOR THE FORM ONE ENTRANCE EXAMINATION 2023

**104 MATHEMATICS** 

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#### FOREWORD

The Zanzibar Examinations Council has prepared the Item Response Analysis Report for the 2023 Form One Entrance Examination in Mathematics Subject. The purpose of this report is to provide feedback to students, teachers, parents, policy makers, curriculum developers and other educational stakeholders about the performance of the candidates in this subject.

Form One Entrance Examination intends to measure to what the extent the candidates have learnt in their three years of Upper Primary Education. Through examination results, the candidates receive a grade that indicates their level of performance which help to make decisions whether they may proceed to Lower Secondary Education or not.

The analysis presented in this report is intended to contribute towards the understanding of possible reasons behind the candidates' responses in Mathematics. The report mentions some of the factors that contribute towards the candidates to perform well or bad. The possible factors that lead the candidates to perform better include application of correct formulae, sufficient knowledge and skills to manipulate equations, good knowledge and skills on the examined topics and identification of the demands of the questions.

The factors that may cause the candidates to perform badly such as failure to use basic concept and application of correct formulae, insufficient knowledge and skills to manipulate equations and poor computation skills, lack of knowledge and skills on the examined topics, failure of candidates to identify the demands of the questions and English language barrier to understand the questions.

The detailed analysis displays, samples from the candidates' scripts that show poor and good responses has been inserted. Finally, various tables with three different colours that reveals how individual question was performed have been attached.

Hence, the feedback and recommendations provided in this report will enable various stakeholders to take appropriate measures to enhance the performance of the future candidates in Mathematic through the National Examinations prepared in Zanzibar by ZEC.

Finally, Zanzibar Examinations Council would like to express sincere appreciation to the Examination officers and all who participated in the completion of this task.

Dr. RASHID .A. MUKKI

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## **1.0 INTRODUCTION**

This report in Mathematics performance is based on the analysis of the candidates' performance for Form One Entrance Examination of 2023. The report covered the 2009 and 2022 syllabus and adhered to 2022 Zanzibar Standard Seven Examination Format of Zanzibar Examinations Council.

Form One Entrance Examination in mathematics had sixteen (16) questions distributed in section A and B. Questions from section A were ten (10) compulsory. The section B comprised six (6) questions where by the candidates were required to attempt any four (4) questions. In general, the candidates were required to answer fourteen questions.

## 2.0 SAMPLED CANDIDATES

The numbers of candidates who have been analyzed were **4,823** equal to **11.03%** to all candidates (**43,707**) who sat for this paper. In this analysis, the candidates' scores for each question are interpreted as follows: from 00 to 20 percent is considered as poor, average if the scores range from 21 to 60 percent and good if the candidates' score from 61 to 100 percent.

These performance are shown by using different coloured table and table. The colour presented are green colour means good performance, yellow colour means average performance and red colour means for poor performance.

# 3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER QUESTION

This section identifies the questions set for candidates in sections A and B. Also it identifies the percentage of candidates who attempted the questions with those who got poor, average and good marks. Finally, the extracts of poor and good responses have been inserted.

## 3.1 SECTION A:

This section consists of ten (10) compulsory questions. The candidate was required to answer all ten (10) questions where by each question carried six (06) marks, thus, making a total of sixty (60) marks. In analysis the candidates' scores categorized as 0 to 1.5 marks which is poor, 2 to 3.5 marks is average and 4 to 6 marks is good.

## 3.1.1 Question 1: Whole Numbers

This question had two parts, namely (a) and (b). Part (a) required the candidate to write the given numeral in to words. Part (b) required the candidate to find the sum of two given numbers in words.

Generally, this question was attempted by **4,046** (**83.89%**) of the candidates. The analysis shows that **2,133** (**52.72%**) candidates scored poor, **845** (**20.88%**) scored average and **1,068** (**26.40%**) scored well. The overall performance of candidates' in this question is poor, only **1913** (**47.29%**) of candidates got 2 to 6 marks as illustrated in table 1a.

## Table 1a: Candidates' performance in question 1

	OVER	ALL					
POOR SCORE         AVERAGE SCORE         GOOD SCORE					PERFORM	1ANCE	
0 - 1	.5	2 - 3.	5	4 -	6		
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,133	52.72	845 20.88		1,068	26.40	1,913	47.28

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidate was required to write the numerals in to words, the candidates who abled to write the numerals in to words and got the correct answer, that candidate had adequate knowledge and skills on the topic of whole numbers. On the other hand the majority of the candidates who were unable to solve the question, this indicates the limited knowledge and skills about the topic being measured.

The candidate who performed good and scored high marks in question 1 had required knowledge and skills to solve the question correctly. Extract 1.1 indicates the candidate who performed well.

#### **Extract 1.1: Good Extract**

1 a) Write 2,458,619 in words. WORK SPACE station Piety eight they 1 000 Pour indred and Sana o ordere ano b) Find the sum of four thousand, one hundred and thirty eight and one thousand two hundred and eleven. Write your answer in words. WORK SPACE olution 128 The trousand Atre fourty three hundred and nine

Extract 1.1.Indicates a sample answer of a candidate who attempted correctly for question1. This indicates that the candidate had good mastery of knowledge and skills about the topic of multiples.

On the other hand, majority of the candidates failed to respond as required correctly due to lack of knowledge and skills needed about the topic being measured in this question. Extract 1.2: Indicates a candidate who performed poor

#### **Extract 1.2: Poor Extract**

1. a) Write 2,458,619 in words.

WORK SPACE Two thonsond, thundred, fifty eight thousand, six hundred and ninety.

b) Find the sum of four thousand, one hundred and thirty eight and one thousand two hundred and eleven. Write your answer in words.

#### WORK SPACE

4,000 + 100 + 38 + 1,000 + 200 + 12 5,000 + 300 + 50 Four thousand three hundred and fiftgen

Extract 1.2 in (a) shows a candidate who lacked in understanding the place value of the digit in a number. In (b) the candidate had miscalculated the question instead of writing the numbers in numerals and then added, the candidate misinterpreted the question by adding all numbers mentioned in the question. This candidate had lacked of knowledge of place value of digit and English language which led him/her to the wrong answers.

## 3.1.2 Question 2: Perimeters

This question had two parts, namely party (a) and (b). The question required candidate part (a) to find the perimeter of the rectangle of length 9 cm and width of 8 cm. part (b) to find a perimeter of the square of length of side 20 cm.

Generally, this question was attempted by **3,947** (**81.84%**) of the candidates. The analysis shows that **2,923** (**74.06%**) scored poor, **490** (**12.41%**) scored average and **534**(**13.53%**) scored well. The overall performance of candidates' in this question is poor, only **1,024** (**25.94%**) of candidates got 2 to 6 marks as illustrated in table 1b.

	OVERAL	L					
POOR SCORE		AVERAGE		GOOD SCORE		PERFORMA	NCE
		SCO	RE				
0 - 1.5	5	2-3	3.5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,923	74.06	490	12.41	534 13.53		1,024	25.94

## Table 1b: Candidates' performance in question 2

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidates were required to find the perimeter of different shapes such as perimeter of rectangle and perimeter of square. The candidate who abled to calculate the perimeter of the given length of sides and got the correct answer had sufficient knowledge and skills on drawing number line and presenting the integers on the line.

On the other hand the candidates who were unable to find the values of perimeter of different shapes had insufficient knowledge and skills about the topic being measured.

The candidates who performed good and scored high marks in question 2 had required knowledge and skills to solve the question correctly. Extract 2.1 indicates a candidate who performed well.

#### **Extract 2.1: Good Extract**



Extract 2.1. Indicates a sample answer of candidate's who got good responses for this question. This indicates had good mastery of knowledge and skills about the topic of types of numbers.

Most of the candidates failed to respond as required correctly due to lack of knowledge and skills needed about the topic being measured in this question. Extract 2.2 indicates a candidate who performed poorly.

#### **Extract 2.2: Poor Extract**

- 2. Find the perimeter of each of the following:
  - a) A rectangle with length of 9cm and width of 8cm

#### WORK SPACE

The perimeter 
$$= a + b$$
  
= 9cm + 8cm  
= 17cm

b) A square with side of 20cm.

WORK SPACE

The square = 
$$20^2$$
  
=  $20 \times 20$   
=  $400 \text{ cm}^2$ 

Extract 2.2 shows a sample answer of a candidate who performed poorly. For instance the candidate wrote the incomplete formula for finding the perimeter of the quadrilaterals. In (a) the candidate had written incorrect formula of finding the perimeter of rectangle which was pp = 2(aa + bb). In (b) the candidate used the area of square to find the perimeter of the square. The correct formula for square was = 4. This implies that candidate had poor knowledge of the assessed topics, failed to comprehend the question.

#### 3.1.3 Question 3: Angles

This question had only one part. The candidate required to calculate the value of xx from the given straight line.

Generally, this question was attempted by 4,103 (85.07%) of the candidates. The analysis shows that 2,716 (66.20%) scored poor, 433 (10.55%) scored average while 954 (23.25%) scored well. The overall performance of candidates' in this question is poor, only 1,287 (33.80%) candidates got 2 to 6 marks as illustrated in table 1c.

	PER	OVERALL					
POOR SO	CORE	AVERAGE SCORE		GOOD SCORE		PERFORM	ANCE
0 – 1	.5	2 - 3.	.5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,716	66.20	433	10.55	954 23.25		1,387	33.80

#### Table 1c: Candidates' performance in question 3

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidates were required to calculate the value of xx which was unknown to the given angles. The candidates who abled to calculate the value of xx and got the answer correctly, that candidates had satisfactory knowledge and skills about the topic being measured.

On the other hand the candidates who were unable to solve the question; this indicates the limited knowledge and skills about this topic.

The candidates who performed good in question 3 had required knowledge and skills to solve the question correctly. Extract 3.1 shows a candidate who scored well.

#### Extract 3.1: Good Extract

3. Find the value of x in the figure below



Extract 3.1 indicates a sample answer of candidate who got good responses for question 2. This indicates that he/she had good mastery of knowledge and skills about the topic of angles.

Similarly, the candidates failed to respond as required correctly due to lack of knowledge and skills needed about the topic being measured. Extract 3.2 indicates a candidate who performed poorly.

#### Extract 3.2: Poor Extract

#### 3. Find the value of x in the figure below



WORK SPACE



Extract 3.2 shows a sample of candidate who performed poorly. The candidate remembered and wrote the correct rule of sum of angles on the straight line. Unfortunately the candidate added all terms including the constant term which led the candidate in the wrong answer. This implies that candidate had poor knowledge and skills of the algebra also failed to understand the demand of the question.

#### 3.1.4 Question 4: Factors

The question had only one part. The candidate required to make arrangement of 32 pupils in the class in the group of at least 2 pupils in each group.

This question was attempted by **2,800(58.06%)** of the candidates. The analysis shows that 2,438 (**87.07%**) scored poor, **224(8.00%**) scored average and **138 (4.93%**) scored good. In general the performance of candidates' in this question is poor, only **362 (12.91%**) candidates 2 to 6 marks as shown in table 1d.

	OVER	ALL					
POOR SCORE AVERA			AGE E	GOOD SCORE		PERFOR	MANCE
0 – 1	.5	2 - 3	.5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,438	87.07	224	8.00	138 4.93		362	12.93

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidate was required to calculate the number of arrangement that can be made in 32 pupils, the candidate who abled to make arrangement correctly had adequate knowledge and skills on the mathematics.

On the other side **87.07** percent of the candidates were unable to solve the question and got incorrect solution, had insufficient knowledge and skills about this topic.

The candidates who performed good and scored high marks in question 4 had essential knowledge and skills to solve the question correctly. Extract 4.1 indicates a candidate who performed well.

#### **Extract 4.1: Good Extract**

4. There are 32 pupils in the class. Teacher wants to arrange them in equal groups of at least 2 pupils per group with equal assignment. Write three ways the pupils can be arranged.

		Solution WORK SPACE	
16 X 7	= 37	16 groups with 2 pupils	
8× 4	= 32	8 groups with 4 popular	
ax 16	= 32	2 groups with 16 pupils	

Extract 4.1 indicates a sample of candidate who got good responses for question 4. This indicates that he/she had good mastery of knowledge and skills about the topic of arrangement.

On the other hand, majority of the candidates failed to respond as required correctly due to lack of knowledge and skills needed about the topic being measured. Extract 4.2 indicates a candidate who performed poorly.

#### Extract 4.2: Poor Extract

4. There are 32 pupils in the class. Teacher wants to arrange the in equal groups of at least 2 pupils per group with equal assignment. V : e three ways the pupils can be arranged.



Extract 4.2 shows a candidate lacked skills and knowledge of calculating the number. The candidate wrote a wrong way of the answer by dividing the total number of pupils in the class by 2. Instead the candidate was asked to find the factors of 32 and finally the candidate got the answer incorrect. This implies that the candidate had lack of knowledge of factors of numbers.

#### 3.1.5 Question 5: Average

The question was divided in to two parts, namely part (a) and (b). In part (a), the candidate required to define the term 'mean'.in part (b) the candidate asked to find the value of unknown data xx from the given set of data.

This question was attempted by **3,430** (**71.12%**) of the candidates. The analysis shows that **2,682** (**78.22%**) scored poor, **334** (**9.74%**) scored average and **414** (**12.04%**) scored well. The overall performance of candidates' in this question is poor, only **748** (**21.78%**) of candidates got from 2 to 6 marks as shown in table 1e.

	OVER	ALL					
POOR S	CORE	AVERAGE SCORE		GOOD SCORE		PERFORM	MANCE
0 - 1	.5	2 - 3.5	5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,682	78.22	334	9.74	414 12.04		748	21.78

#### Table 1e: Candidate's performance in question 5

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidates were required to define the term mean and to calculate the value of unknown data, the candidate who had an ability to define the term and was able to find the value of xx and got the answer correctly. This implies that he/she had satisfactory knowledge and skills about the average.

On the other hand candidates who did not manage to define and solve the question correctly, indicates the limited knowledge and skills about this topic.

The candidates who performed good and scored high marks in this question managed to apply the knowledge and skills correctly to solve the question. Extract 5.1 indicates a candidate who performed well.

#### **Extract 5.1: Good Extract**



Extract 5.1. Indicates a sample of candidate answered correctly for this q tion. This indicates had a clear understanding of the question and apply the procedure of define the m and apply the formula of finding the mean average of a given data.

On the other hand, **78.22** percent of the candidates failed to respond required correctly due to deficiency of knowledge and skills needed about the topic being measured in this question. Extract 5.2: Indicates a candidate who performed poorly.

#### Extract 5.2: Poor Extract

5. a) Define the term 'mean'.

WORK SPACE

Mean is the sum of total items

b) The mean of 6, 4, 7 and x is 9. Find x.WORK SPACE

$$6 + 4 + 7 + x = 9$$
$$17 + x = 9$$
$$x = 9 - 17$$
$$x = 8$$

Extract 5.2 shows a sample of candidate who performed poorly. In (a), the candidate failed to remember and defined the term that was asked correctly. In (b), the candidate was unable to remember the formula of the mean correctly. Therefore insufficient knowledge and skills of the assessed topics also failed to comprehend the question to achieve the correct answers.

#### 3.1.6 Question 6: Algebra

The question had only one part. The candidate was required to simplify the algebraic expression.

Generally, this question was attempted by **4,020** (**83.350%**) of the candidates. The analysis shows that **3,370** (**83.83%**) scored poor, **118** (**2.94%**) scored average and **532** (**13.23%**) scored good. The overall performance of candidates' in this question is poor, only **650** (**16.17%**) of candidates got from 2 to 6 marks as shown in table 1f.

#### Table 1f: Candidate's performance in question 6

	OVER	ALL					
POOR S	CORE	AVERAGE		GOOD SCORE		PERFORMANCE	
SCORE							
0 - 1	.5	2-3.5		4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
3370	83.83	118 2.94		532	13.23	650	16.17

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

From the data analysis shows that this question was failed totally by 100%. The candidates were supposed to simplify the algebraic expression by finding LCM of the denominator; the candidate who was unable to solve the question and failed to get correct answer; this indicates that they had no idea about the question also had lack of the knowledge and skills about the topic being measured. Extract 6.2: Indicates a candidate who performed poor.

#### Extract 6.2: Poor Extract



Extract 6.2 shows the candidate lacked the knowledge and skills of finding the simplification in this question. The candidate was unable to remember the LCM of 4 and 6 and applied incorrectly way of finding the LCM of denominator by adding 4 and 6.

#### 3.1.7 Question 7: Conversion of units

The question had one part only. The candidate was asked to find the sum of different lengths in different units of length. Only if the lengths are on the same unit, can the candidate be able to sum.

This question was attempted by **3,256** (67.51%) of the candidates. The analysis shows that **3,132** (96.19%) scored poor, 43 (1.32%) scored average and 81 (2.49%) scored good. In general the performance of candidates' in this question was poor, only 124 (3.81%) of candidates got from 2 to 6 marks as presented in table 1g.

	OVER	ALL					
POOR SC	ORE	AVERAGE SCORE		GOOD SC	ORE	PERFOR	MANCE
0 - 1.	5	2 - 3	.5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
3,132	96.19	43	1.32	81 2.49		124	3.81

#### Table 1g: Candidate's performance in question 7

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidates were required to change the given length and then to sum so as to get correct answer. The candidate who abled to change units and find the sum correctly is the one who got correct answer had adequate knowledge and skills on the topic of units.

On the other hand, **96.19** of the candidate was unable to solve the question had insufficient knowledge and skills about the topic being measured.

The candidate who performed good and scored high marks in this question had required knowledge and skills to solve the question correctly. Extract 7.1 indicates a sample answer of candidate who performed well.

#### Extract 7.1: Good Extract

 Find the sum of 3000m, 47cm and 200mm, write your answer in meter.



Extract 7.1. Indicates a sample answer of candidate's who got best solution for this question. This indicates that he/she had good mastery of knowledge and skills about the topic of units.

On the other hand, some of the candidates failed to respond as required correctly due to lack of knowledge and skills needed about the topic being measured. Extract 7.2, indicates a candidate who performed poorly

#### Extract 7.2: Poor Extract



Extract 7.2 shows a candidate who lacked skills and knowledge of convection of unity. The candidate converted all units in to meters and then by mistake wrote 47cm as 0.407m which led to the wrong answer instead of writing the correct answer which was 47cm = 0.47 m.

#### 3.1.8 Question 8: Areas

The question had one part only. The candidate required to calculate the number of tiles needed in the room from the given dimension of the floor (1200 cm by 400 cm) and the size of tiles needed.

This question was attempted by **2,964** (**61.46%**) of the candidates. The analysis shows that **2,790** (**94.13%**) scored poor, **132(4.45%**) scored average while **42** (**1.42%**) scored well. The overall performance of candidates in this question is poor, only **174** (**5.87%**) of candidates got from 2 to 6 marks as illustrated in table 1h.

	OVER	ALL					
POOR SO	CORE	AVERAGE SCORE		GOOD SCORE		PERFOR	MANCE
0 - 1	.5	2 – 3	.5	4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,790	94.13	132	4.45	42 1.42		174	5.87

#### Table 1h: Candidate's performance in question 8

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidate was required to calculate the number of tiles needed for floor. The candidate who managed to solve the question and got the correct answer had adequate knowledge and skills about the topic being measured.

On the other hand the candidate who was unable to solve the question; this indicates the limited knowledge and skills about this topic.

The candidates who scored well in this question had required knowledge and skills of areas and also had ability to use the knowledge of mathematics to solve the question correctly. Extract 8.1 shows a sample answer of a candidate who performed good.

#### Extract 8.1: Good Extract

## 8. A room has floor of length 1200cm and width 400cm. How many

square tiles of side 40cm can fit the floor without left over?

WORK SPACE 2400 Area of rectangle - L x W titles = <u>1800 outors</u> = 1200 cm × 4000 <u>18000000</u><sup>2</sup> = <u>300</u> Area of square = ordexsid. 4000 × 4000 <u>160000</u><sup>2</sup>

Extract 8.1 indicates a sample answer of candidate who got good responses for this question. This indicates that he/she had good mastery of knowledge and skills about the topic of conversion of unit.

On the other hand, most of candidates failed to respond as the demand of question due to the insufficient knowledge and skills needed about the topic being measured. Extract 8.2 indicates a sample answer of a candidate who performed poorly.

#### Extract 8.2: Poor Extract



Extract 8.2 shows a sample answer of a candidate who performed poorly. The candidate wrote a formula of volume and worked on it. The candidate found the volume of room while the question wanted the number of tiles. The answer could be obtained by area of floor divided by area of a square tile. Therefore, this implies that the candidate had inadequate knowledge and skills of the assessed topic also failed to understand the demand of the question.

#### 3.1.9. Question 9: Simple Interest

The question had one part only. The candidate was required to calculate the amount of money deposited at the bank after 12 years and 6 months.

The question was attempted by **3,225** (**66.87%**) of the candidates. The statistic shows that **2,776** (**86.08%**) of the candidates scored poor. **292** (**9.05%**) scored average marks and few of the candidates **157**(**4.87%**) scored high marks. In general the performance of this question was very poor by **449** (**13.92%**) got from 2 to 6 marks as illustrated by table 1i.

	OVER	ALL					
POOR SO	AVERA SCORE	AVERAGE GOOD SCORE SCORE		PERFOR	MANCE		
0 - 1	.5	2 - 3.5	3.5 4 - 6				
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,776	86.08	292	9.05	157 4.87		449	13.92

#### Table 1i: Candidates' performance in question 9

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In this question, the candidate was required to find the amount of money deposited at the bank after 12 years and 6 months by using the formula of simple interest. The candidate was required to use the knowledge of simple interest to solve the question.

The candidate who scored high marks had sufficient knowledge of the subject matter as he/she was able to find the correctly answer as asked by the examiner. Extract 9.1 is a sample answer from one of the candidates who scored full marks.

#### Extract 9.1: Good extract

9. Hapsa deposited sh. 140,000 in a bank which gives a simple interest of 25% per annum. How much will she gain after 12 years and 6 months?

#### WORK SPACE

$$\frac{1}{1} = \frac{PR\overline{1}}{100}$$

$$\frac{1}{1} = \frac{140,000 \times 25^{1/2} \times 12.5}{100}$$

$$\frac{1}{1} = 437,500 \text{ J}$$

The extract 9.1 above shows that, the candidates who scored high marks had good understanding of the topic of simple interest and its application. The candidate managed to recall the formula of simple interest and use the skills of finding the required answer correctly.

Analysis shows that, **2,776** (**86.08%**) of the candidates scored poorly. This indicates that these candidates either failed to understand the task of the question or they lacked the skills of calculating the percentage increase. A sample answer from one of the candidates is shown in extract 9.2.

#### Extract 9.1: Poor Extract

 Hapsa deposited sh. 140,000 in a bank which gives a simple interest of 25% per annum. How much will she gain after 12 years and 6 months?

WORK SPACE ution. 0,000/2 12 years and 6 mounth ? YRXI 1157) 000

In extract 9.2, the candidate was unable to find the required amount of money which was deposited in a bank. The candidate was well remembered the formula of simple interest but he /she was miscalculate time of deposited money, the correct answer was to change 6months to 0.5 years and adding to 12 years. As the candidate had a wrong time, finally got the meaningless calculation that lead him/her to wrong solution.

#### 3.1.10. Question 10: Square roots, Cube roots and Equations

The question had two parts, namely (a) and (b). In part (a) the candidate was required to work out on the given square root and cube root. In part (b) the candidate was asked to solve the equation of unknown xx for the given equation.

The question was attempted **3,976** (82.44%) of the candidates. Analysis shows that **2,922** (73.49%) scored poor, 424 (10.66%) scored average and 630 (15.85%) of candidates performed good. The candidate performed poor by 366 (9.21%) got from 2 to 6 marks as illustrated by table 1j. In this question due to fact the they lacked knowledge of square roots, cube roots and equations.

#### Table 1j: Candidates' perfomance in question 10

	OVERA	\LL					
POOR SCO	RE	AVERAGE SCORE		GOOD SC	CORE	PERFORM	IANCE
0 - 1.5		2-3.5		4 - 6			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,922	73.49	424	10.66	630	15.85	366	9.21

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In this question (a) the candidate was required to work on the square and cube roots of a given expression. And in (b) the candidate had asked to solve the equation.

From the data analysis shows that, very few candidates managed to apply the correct formula rules of square and cube roots for finding the required value of the given expression and was able to solve the asked equation. A sample answer from one of the candidates is shown in Extract 10.1.

#### Extract 10.2: Good Extract



Extract 10.1 shows that the candidates had good understanding on how to find the area of the circle by applying the correct formula and then done the appropriate calculation reaching to the best solution.

However, about **73.49** percent of candidates who attempted this question scored below 2 out of 6 marks. The candidates who scored low marks in this question had insufficient knowledge and skills on the topic of area. Extract 10.2 is a sample answer from the scripts of the candidates showing how they failed to answer this question.

10. a) Work out  $\sqrt{400} - \sqrt[3]{64}$ 

WORK SPACE

b) Solve: 3(x + 4) = 18

1

work space  

$$3(x+4) = 18$$
  
 $3x + 12 = 18$   
 $3x = 18 + 12$   
 $3x = 30$   
 $\frac{2x}{3} = \frac{30}{3}$   
 $x = 10$ 

In Extract 10.2, shows the candidate who wrote the incorect answer without regarding the rules of square root and cube root. In (a) the candidate subracted the square and cube root as ordinary numbers. In (a) the candidate miscalculated the equation when the candidate added 12 to 18 instead of subtraction. This shows that the candidate was unable to remember the rules of square and cube roots as well as lacked the skills of solving equation and then done the meaningless calculation.

#### 3.2 SECTION B: TO ANSWER ANY FOUR (4) QUESTIONS

There were six (06) questions in this section. The candidate was required to attempt any four (4) questions. Each question carried ten (10) marks thus making a total of forty (40) marks. For convenience of analysis of each question in this section, the following performance ranges from 0 to 2 marks is poor, from 2.5 to 6.0 is average and from 6.5 to 10 marks is good performance.

#### 3.2.1. Question 11: Ratios and Algebra.

The question had two parts, namely (a) and (b). In part (a) the candidate was asked to calculate the value of xx in the equation which envolved ratios. In part (b) the candidate was required to formulate algebraic equation from the given word problem.

A total of candidates **2,228** (**46.20%**) responded to this question. The analysis of the candidtes' responses shows that most of the candidates **1,734** (**77.83%**) had gotten poor performance, **297** (**13.33%**) had gotten the average performance and a few of the candidates **197** (**0.77%**) performed good. Hence the performance of this question was generally poor by **494** (**22.17%**) got from 2.5 to 10 marks as illustrated by table 2a as shown below.

#### Table 2a: Candidates' performance in question 11

	OVEI	RALL					
POOR SCC	ORE	AVERAGE	CORE GOOD SCORE			PERFORMANCE	
0 – 2		2.5 -	б	6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
1,734	77.83	297	13.33	197	8.84	494	22.17

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In in part 1(a), the candidate was required to calculate the value of xx form the given ratio equation. In part (b), the candidates were asked to formulate the algebraic equation and the required correct answer was 2xx - 2 = 60.

Despite the poor performnced that shown in this question, there were few candidates **494** (**22.17%**) who managed to apply correctly the required concept and finally scored full marks. Extract 11.1 shows the solution from one of these candidates.

#### Extract 11.1: Good Extract



In extract 11.1 above shows the candidate with clear undestanding of the question and cuold apply the correct formula for finding the time required. Also the candidate was able to find the profit.

The analysis of data shows that the question performed poorly by many candidates who were unable to find the time of interest and also failed to find the profit of bicycle sold at 6%. Extract 11.2 shows a sample answer of solution from one of the candidates.

a) Calculate the value of x if x: 25 = 500: 50

 b) A basket contains paw paws and oranges. If the number of oranges are less than the number of paw paws by 2.
 Formulate an algebraic equation if the total number of paw paws and oranges in the basket are 60.

WORK SPACE  
Let the number of pranges 
$$x$$
.  
 $x + 2x = 60$   
 $3x = 60$   
 $3x = 60$   
 $3x = 60$   
 $3x = 60$   
 $x = 2 = 60$   
 $2a = 2 = 60$   
 $2a = 60 + 2$   
 $2a = 60 + 2$   
 $2a = 52$   
 $a = 31$ 

Extract 11.2, in part (a), the candidate performed meaningless calculation, he/she was able to covert ratios in to devisions but multiplied wrongly. In part (b) the candidate was able to formulate the approprite equation but the candidate went far to solve the question while it was not neccessarly.

#### 3.2.2. Question 12: Area of Circle and LCM

The question had two parts, namely (a) and (b). In part (a) the candidate required to calculate the area of a circle that the cow was eating the grass. And in part (b) the candidate was asked to find the shortest length of the string that could be cut in 20 cm and 24 cm long.

The question was opted by 1,537 (31.87%) of the candidates. According to the analysis of data 1,374 (89.39%) scored poor marks, 108 (7.03%) obtained average marks and 55 (3.58%) candidates scored well by obtaining high marks. The analysis of this question shows the performance of the candidates was poor by 163 (10.61%) as shown in table 2b.

	OVER	ALL					
POOR SCORE		AVERAGE		GOOD SCORE		PERFORMANCE	
		SCOR	E				
0 –	2	2.5 -	6	6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
1,374	89.39	108	7.03	55	3.58	163	10.61

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In part (a) the candidate was asked to calculate the area of the cow that ate the grass. The candidate was wanted to apply the formula of the area of the circle to solve this question. In part (b) and also the candidate was asked to find the length of the string that could be cut in to 20 cm and 24 cm. the candidate was required to apply the knowledge of LCM to get the required answer correctly..

The candidate who answered well in this question managed to remember the correct formulae correctly and had the skills to use the formulae to the appropriate questions from the word problem and solve them correctly as illustrated in Extract 12.1.

#### **Extract 12.1: Good Extract**

12. a) A cow is tied to a peg in the ground. The rope is 7m long. What area of grass can the cow eat? WORK SPACE  $= \pi r^2$ Area of circle  $= \underline{22} x$ 22  $= 22 \times$ = 154mArea of grass com the cour eat is 14 A piece of string can be cut into equal lengths either 20 cm 24 cm long. Find the length of the shortest piece of string for which this is possible. WORK SPACE 163 NAMU 10 5555 The LCM of 20 and 24 = 2×2×2 The length of the shortest pir of string is 120cm.

The extract 12.1 above shows a candidate was able to simplify the algebraic expression and translate and formulate the required equation from the word problem on the algebra and solve the question correctly. On the other hand, the extract 12.2 below shows a candidate with poor performance.

#### Extract 12.2: Poor Extract

12. a) A cow is tied to a peg in the ground. The rope is 7m long. What area of grass can the cow eat?

Here a 
$$5J$$
 grass =  $hxb$   
=  $7x7$   
=  $\frac{49m^2}{2}$ 

b) A piece of string can be cut into equal lengths either 20 cm or 24 cm long. Find the length of the shortest piece of string for which this is possible.

WORK SPACE

Extract 12.2 in part (a) is the sample of candidate who failed to recall the formula of circle instead the candidate used the area of rectangle. In (b) the candidate had lack knowledge of understanding the needs of the question but the candidate subtracted the values given instead of finding the LCM of 20 and 24 as the solution of the question. This shows that the candidate had insufficient knowledge and skills of solving the word problems.

#### 3.2.3. Question 13: Fractions and Algebra

The question was divided in to two parts, namely (a) and (b). In part (a) the candidate required to simplify the fraction question which involve many fractions and operations. In part (b) the candidate asked to solve the algebraic equation.

The question was attempted by **3,513** (**72.84**%) of the candidates. Out of the candidates opted this question **2,729** (**77.68**%) performed poor, **518** (**14.75**%) had got the average performance and only **266** (**7.57**%) performed well. The analysis shows that the question was performed poor by **784** (**22.32**%) got from 2.5 to 10 marks as illustrated by table 2c as shown below.

 Table 2c: Candidates performance in question 13

	OVER/	ALL					
POOR SC	ORE	AVERAGE S	SCORE	GOOD SC	ORE	PERFORMANCE	
0-2.	.5	3 - 6		6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,729	77.68	518	14.75	266	7.57	784	22.32

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In part (a), the candidate was required to find the value of the fractions by using the law of operations (BODMAS) so as to obtain the required answer correctly. In the part (b), the candidate was required to solve the algebraic equation by opening brackets.

The candidates who performed well in this question were able to use arithmetic operation properly in finding the answer of the question asked and use the skills of solving equations and finally managed to score full marks. Extract 13.1 shows a sample answer of the candidate who scored full marks.





As illustrated in extract 13.1, part (a), the candidate who answered well this question managed to apply the arithmetic operation rules (BODMAS) while in part (b), the candidate managed to solve the equation correctly.

On the other hand, **77.68** percent of the candidates who attempted this question scored low marks from 0 to 2. The factors which contributed to poor performance in this question include: candidates inability to use basic mathematical operation and failure to translate the word problem given. Extract 13.2 is a sample answer showing how candidates failed to answer this question.

#### Extract 13.2: Poor Extract

13. a) Find the value of 
$$\frac{1}{2}$$
 of  $(\frac{1}{3} \times \frac{5}{2}) - \frac{1}{4} \times \frac{1}{3} + \frac{1}{12}$   
 $\frac{5 \times 6 \times 6 \times 5}{\frac{1}{2} \times \frac{5}{2}} - \frac{1}{4} \times \frac{5}{3} + \frac{1}{12}$   
 $\frac{1}{2} \times \frac{5}{5} - \frac{1}{4} \times \frac{5}{3} + \frac{1}{12}$   
 $\frac{1}{2} \times \frac{5}{5} - \frac{1}{4} \times \frac{1}{3} + \frac{1}{12}$   
 $\frac{1}{2} \times \frac{5}{5} - \frac{1}{4} \times \frac{1}{3} + \frac{1}{12}$   
 $\frac{5}{12} - \frac{1}{4} \times \frac{1}{3} + \frac{1}{12}$   
 $\frac{5}{2} \times - 2 + 5 \times 13$   
 $\frac{8}{2} \times - 5 = 13$   
 $\frac{8}{8} \times \frac{1}{8} + \frac{1}{8}$   
 $\frac{2}{8} \times \frac{1}{8} + \frac{1}{8}$ 

Extract 13.2 in (a) shows the sample of candidate who failed to use his/her knowledge and skills of basic operations in fractions. The candidate did not start to open brackets as the rule state (BODMAS) also he/she added the denominators instead of subtracting the identical portions. In (b) the candidate was failed to subtract 2 from 3 instead of adding and got 5. The candidate had understood the question but had lacked of solving problems.

#### 3.2.4. Question 14: Money, Profit and Loss.

The question was divided in to two parts, namely (a) and (b). In part (a) the candidate was asked to calculate the total amount of money after the farmer was selling his animals. And in (b) the candidate was required to find the selling price.

The data analysis shows that **3,207** (**66.49%**) of the candidates attempted this question. Out of these **2,734** (**85.25%**) scored poor, **378** (**11.79%**) scored average and **95** (**0.11%**) scored well. Data presented in table 15 indicates that the question was poorly performed by **473** (**14.75%**) got from 2.5 to 10 marks as illustrated by table 2d as shown below.

Table 2d: Candidate scored averages Perf	formance in question 14
------------------------------------------	-------------------------

	OVERALL						
POOR SC	ORE	AVERA SCOR	lGE E	GOOD SCORE		RE PERFORMA	
0 - 2		2.5 -	6	6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,734	85.25	378	11.79	95	2.96	473	14.75

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In part (a), the candidate was required to calculate the total amount of money after selling farmers' animals and in part (b) the candidate was required to find the selling price by applying the formula of percentage profit to get the required answer correctly.

Some of the candidates showed great understanding of the question, implying that they had satisfactory knowledge at the expense of the demands of the question on the content assessed. They were able to find the required answers in the given table. Extract 14.1 is a sample answer of the candidate who scored full marks

#### Extract 14.1: Good Extract

```
A farmer sold his animals as follows:
14. a)
         4 goats @ sh. 80,000
         2 dogs @ sh. 50,000
         2 sheeps @ sh. 100,000
         2 cows @ sh. 800,000
         How much money he collected?
                            WORK SPACE
                           = 320,000
   4 goats @sh. 80, 000
    2 dogs @ sh. 50,000 = 100,000
2 shops @ sh. 100,000 = 200,000
    200WS@sh. 800,000 = 160,0000
         330,000
       The much of money he collected is sh 2, 223,000.
        A goat bought at sh. 25,000 and sold at profit of 20%. Fir
     b)
         the selling price.
                           WORK SPACE
                     projeb made x 100%
                                         + projet made
 Percentage projit
                                                        - buy
                      parter burge
                                             15,000 + 5,000
                            × 100%
               Profit made
     20%
                                             = sh 30,000 .
                -sh25,000
       1
  20% x sh 25,000 = 1x Projet x 100%
                              100%
      100%
           sh 5,000 - Projet made
```

In extract 14.1, the candidate managed to present correct response to both parts of the question.

On the contrary, most of the candidates among those who attempted this question were unable to use the correct formula for finding the value of y in a given sequence of numbers, also they failed to find the value of x and y in a given table and finally they reach to incorrect solution. Extract 14.2 is an example of the candidates who performed poor in this question.

#### Extract 14.2: Poor Extract



Extract 14.1 shows the candidate lacked the knowledge and skills of finding the values of given letters instead he/she copied the numbers found in the question and got the wrong answer.

#### 3.2.5. Question 15: Volume and Currency

The question was divided in to two parts, namely (a) and (b). In (a) the candidate was required to find the volume of the rectangular prism and in (b) the candidate asked to convert.

The question was attempted by **2,783** (**57.70%**) of the candidates. The performance was generally poor as **1,549** (**55.66%**) scored poor, **633** (**22.75%**) scored average marks and only **601** (**21.60%**) of the candidates responded well by obtaining high marks, the analysis show that the candidates' performance of this question was poor by **1,234** (**44.35%**) got from 2.5 to 10 marks as illustrated by tabla 2e as shown below.

Table 2e:	Candidates'	performance	in question 15
-----------	-------------	-------------	----------------

	OVERALL						
POOR SC	ORE	AVERAGE SCORE		GOOD SC	ORE	PERFOR	MANCE
0 - 2		2.5 -	6	6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
1,549	55.65	633	22.75	601	21.60	1,234	44.35

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

In part 15a, the candidates were required to calculate the value of a given whole numbers and in part 15b the candidates were instructed to find the volume of the cube. Some of the candidates showed great understanding of the question, implying that they had acceptable knowledge at the expense of the demands of the question on the content of factors and volume. Extract 15.1 shows the responses from the script of one of the candidates who answered the question correctly.

#### Extract 15.1: Good Extract

 a) Find the volume of rectangular prism of the following dimension: 2cm by 3cm by 5cm.



 b) A man from Ngorongoro had 1500 US dollar and intended to convert into Tanzania shillings. How much did he get?
 if 1US dollar = 2430 Tanzania shillings.

The extract 15.1 in (a) above shows the work of the candidate who abled to apply correct formula of volume of prism and achieved the required answer. In (b) the candidate was able to remember the exchange rate by converting US dollar in appropriate rate to Tanzania shilling and managed to obtain the correct solutions as required by the examiner.

The analysis shows that most of the candidates **1,549** (**55.65%**) failed to get the correct solution. They failed to remember and to use the formula of volume of prism also they could not be able to remember the conversion of foreign exchange. This is due to the insufficient understanding of the topics assessed. Extract 15.2 shows a sample answer of one of the candidate who performed poorly in this question.

#### Extract 15.2: Poor Extract

- 15. a) Find the volume of rectangular prism of the following dimension:2cm by 3cm by 5cm.
  - b) A man from Ngorongoro had 1500 US dollar and intended to convert into Tanzania shillings. How much did he get?
     if 1US dollar = 2430 Tanzania shillings.

Extract 15.2 in (a) shows the sample of candidate who got poor marks on answering the question. The examinee provided incorrect solution by providing incorrect formula of finding the volume of prism. In (b) the candidate number as given by the examiner and use the wrong formula for finding volume of cube that leading him/her into wrong answers.

#### 3.2.6. Question 16: Graph and Chart

The question was in to two parts namely, (a) and (b). The part (a) was given four points to locate on the graph. And in (b) the candidate required to use the shape obtained in (a) to find the area.

This question was attempted by **3,242** (**67.22%**) candidates. Out of all candidates attempted the question, **2,447** (**75.48%**) had a poor performance, **633** (**19.52%**) had average performance and **162** (**5.00%**) got good performance. In generally, the performance of this question is poor by **795** (**24.52%**) got from 2.5 to 10 marks as illustrated by table 2f as shown below.

#### Table 2f: Candidates' performance in question 16

	OVERALL						
POOR SC	ORE	AVERAGE	SCORE	GOOD SC	ORE	PERFORMANCE	
0 - 2		2.5 -	6	6.5 - 10			
TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
2,447	75.48	633	19.52	162	5.00	795	24.52

The strengths and weaknesses of the candidates' performance in individual question are analyzed below.

The candidates were required to read the given points and represent them on the graph and then interpret the graph and write the name of the table formed.

Those candidates who performed well in this question had adequate knowledge on the topic assessed. They use the points given to plot the graph and use the skills of interpreting the graph and managed to write the required name of table formed. Extract 16.1 shows a sample answer from one of the candidates who did well in this question.

#### Extract 16.1: Good Extract

a) Plot the following points on x - y plane, P(4, 3), Q(4, 1), 16. R(-1,1) and S(-1, 3).



#### **GRAPH PAPER**

WORK SPACE

Area of rectangle =  $b \times h$ =  $5 \text{ cm} \times 2 \text{ cm}$ =  $10 \text{ cm}^2$ 

This extract 16.1 shows a sample of candidate who had provide correct responses to both parts of the question showing his/her good understand of the skills of reading and interpreting the given points and managed to sketch the required table and finally the candidate was able to write the correct name of the table and found its area correctly.

On the contrary, most of the candidates among those who attempted this question were unable to read and interpret the given points and also lacked knowledge on sketching the acceptable table. This led the candidates to incorrect solution. Extract 14.2 is an example of the candidate who performed poor in this question

a) Plot the following points on x - y plane, P(4, 3), Q(4, 1),
 R(-1,1) and S(-1, 3).



### **GRAPH PAPER**

The extract 15.1 above shows a sample of candidate who provide incorrect responses to the question asked due to the lack of knowledge and skills of reading, sketching and interpreting the data in the given points, instead of drawing the line to form table as instructed in the question, the candidate had drawn the meaningless table and found the wrong area of the table.

#### 4.0 CONCLUSION

The analysis of the candidates' performance shows that there is nine questions which was average performed, and seven questions have poor performane.

Generally, the quality of candidates' responses was affected by the following factors; failure to use basic concept and failure to apply correct formulae, insufficient knowledge and skills to manipulate equations and poor computation skills, candidates had lack of knowledge and skills on the examined topics, failure of candidates to identify the demands of the questions, failure of candidates to draw graphs correctly and English language barrier to the candidates in understanding the questions.

This report helps to support the teachers and students in improving the teaching of various concepts and learning of those topics which had poor performance.

#### 5.0 RECOMMENDATIONS

In order to raise the standard of performance in this subject, it is recommended that;

- a. The candidates should be given many exercises to get experience in applying various formulas in answering question.
- b. Student should use the school subject clubs to conduct discussion on M athematics topics that were poorly performed.
- c. The candidates have to be encouraged to build the habit of reading the question once, twice thrice in order to identify the demand of any task/question.
- d. The teachers must make sure that all topics in the syllabus are covered before taken place the examination.
- e. Teachers should understand the learning difficulties of students in order to give the special help.
- f. Teachers should make sure that they would give students enough exercises so that students would gain skills.
- g. The Ministry of Education and Vocational Training should conduct seminars and in service training to mathematics teachers, on difficult topics.
- h. Government and education stakeholders should ensure that the teaching and learning environment is conducive for improving performance.

#### APPENDICES

S/N:	TOPIC	QUESTION NUMBER	PERCENTAGES OF CANDIDATES PER QUESTION	REMARK
1	Numbers	1	47.28	AVERAGE
2	Volume and Currency	15	44.34	AVERAGE
3	Angles	3	33.80	AVERAGE
4	Squares, Cube roots and Equations	10	26.51	AVERAGE
5	Perimeters	2	25.94	AVERAGE
6	Coordinates and Area of quadrilateral	16	24.52	AVERAGE
7	Fractions and Algebra	13	22.32	AVERAGE
8	Ratios and Algebra	11	22.17	AVERAGE
9	Mean	5	21.81	AVERAGE
10	Algebra	6	16.17	POOR
11	Money, Profit and Loss	14	14.75	POOR
12	Simple interest	9	13.92	POOR
13	Factors	4	12.93	POOR
14	Areas of Circles and LCM	12	10.61	POOR
15	Areas	8	5.87	POOR
16	Units	7	3.81	POOR

#### APPENDIX 1: SUMMARY OF CANDIDATES' PERFORMANCE PER QUESTION AND TOPIC WISEIN 2023

#### APPENDIX II

#### SUMMARY OF CANDIDATES' PERFORMANCE PER QUESTION AND TOPIC WISE 2022

S/N:	TOPIC	QUESTION	PERCENTAGES OF CANDIDATES PER	REMARK
		NUMB ER	QUESTION	
1	Ratio	3	16.87	POOR
2	Types of Number	2	16.71	POOR
3	Graphs and charts	16	10.68	POOR
4	Factors and Volume	15	9.15	POOR
5	Multiples	1	7.80	POOR
6	Ratio	7	4.87	POOR
7	Base	5	4.04	POOR
8	Ratio	4	3.88	POOR
9	Numbers	13	3.27	POOR
10	Simple interest and Percentage lossand gain	11	3.04	POOR
11	Average and triangles	14	2.07	POOR
12	Area	10	1.96	POOR
13	Algebra	12	1.15	POOR
14	Percentage loss and gain	9	0.72	POOR
15	Conversion of units	8	0.26	POOR
16	Length and circle	6	0.00	POOR