

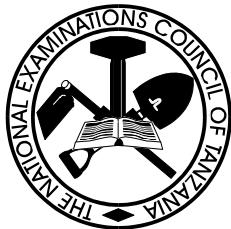
THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**STUDENTS' ITEM RESPONSE ANALYSIS REPORT
FOR THE FORM TWO NATIONAL
ASSESSMENT (FTNA) 2019**

071 CIVIL ENGINEERING

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



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(FTNA) 2019**

071 CIVIL ENGINEERING

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FOREWORD

The Students' Items Response Analysis (SIRA) report on the Form Two National Assessment (FTNA) 2019 for the Civil Engineering Subject has been written in order to give feedback to secondary school students, teachers, education specialists, policy makers, and other stakeholders. This report analyses the students' responses for each question and identifies some factors which might have contributed to poor performance. The factors include students' inability to interpret the demand of the questions, incorrect mention of sequence of operations in various practical procedures and lack of knowledge and skills in various topics. The analysis is done on each question and the performance is illustrated using sample answers extracted from the students' scripts.

The Form Two National Assessment is a comprehensive evaluation, which among other things, appraises the effectiveness of the general education system and specifically the mode of education delivery in Tanzania's secondary schools. The National Examinations Council of Tanzania presumes that the feedback that is given in this report will enable various actors in the public and private sectors, individuals and others who work within the education sector, to take appropriate measures in enhancing general students' performance. The report has been concluded with recommendations to the on-going secondary school students, teachers and the Ministry of Education, Science and Technology.

The National Examinations Council of Tanzania remains grateful to all the Examinations Officers and other people who participated in processing and analysing the data used in this report in various capacities.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report provides detailed analysis of the performance of the students in Civil Engineering paper in Form Two National Assessment (FTNA) in 2019. The paper adequately covered the Syllabus for Secondary School Education issued in 1994 and the paper was set in accordance with the Examination Format of 2017.

The Civil Engineering Assessment paper had thirteen (13) questions divided in two sections A and B. Section A comprised 8 questions; each weighing 5 marks, to make a total of 40 marks. Section B comprised 5 questions whereby each carried 60 marks. The students were instructed to answer all questions in section A and one question from section B depending on their areas of specialization.

Question 1 was a multiple choice one which comprised five items (i) to (v), drawn from *Materials, Foundation* and *Walls* topics. Question 2 was a matching item one and consisted of five items (i) to (v) drawn from the topic on *Walls* (Type of walls). Question 3 consisted of five TRUE or FALSE assertions which required the students to write the word TRUE for the correct assertions and FALSE for the incorrect ones. The question was drawn from the topic on *Walls*. Questions (4) to (8) were short answer items derived from various topics including *Materials, Site preparation, Scaffolding and Shoring, Foundation* and *Walls*.

Section B comprised 5 questions based on students' specializations. Question 9 was drawn from of surveying field. The parts of the question were derived from the following topics; *Introduction, Surveying Instruments* and *Chain surveying*. Question 10 was based on Carpentry and Joinery. Specifically, the question was based on *Tools and Equipment, Plants/Machines, Timber and Joints*.

Question 11 was based on the brickwork and masonry field. The topics included *Tools, Plants and equipment, Brick and block making, Mortar, Bonding* and *Concrete*. Question 12 was based on the field of Painting and Signwriting. It covered the sub-topics of *Safety, Tools, equipment, Plants and Brushes, Paint and Painting material, Water Paint* and *Texture finishes*. Lastly, Question 13 was based on the field of Plumbing. The question

specifically covered the topics that included *Safety, Tools, Equipment's and Plants*, and *Materials*.

A total of 547 students sat for this assessment, out of 553 registered students. In 2018, the number of students who sat for FTNA for this subject was 655, which indicates there was a decrease of 19.74% of students in 2019.

Generally, the performance was average as only 43.88% of the students who sat for this assessment passed and 56.12% failed. The distribution of scores and students performance is shown in Table 1 and Figure 1.

Table 1: General Students' Performance in Civil Engineering Subject

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
0 – 29	Weak	307	56.12
30 - 64	Average	215	39.31
65 – 100	Good	25	4.57
	Total	547	100

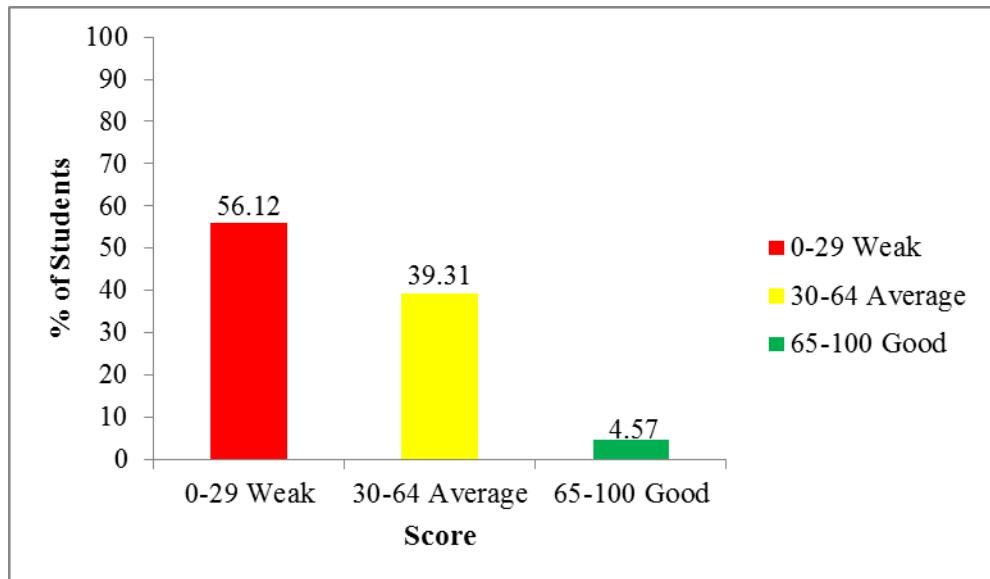


Figure 1: General Students' Performance in Civil Engineering

Relevant explanations on students' failure to attain the expected performance are given in the analysis performance on each question. Sample answers extracted from the students' scripts have been attached to illustrate various aspects of students responses in the topics tested.

2.0 ANALYSIS OF STUDENTS' RESPONSE IN EACH QUESTION

2.1 SECTION A: VARIOUS TOPICS

2.1.1 Question 1: Multiple Choice Items

This question consisted of (5) five items (i) - (v) based on various topics within the syllabus. Each item carried 1 mark. Students in this question were required to demonstrate their skills in selecting the standard mix ratio for a concrete block, choose type of foundations which will reduce the cost of excavation on sloping sites. Also they were required to identify the term for the row of bricks on a wall, select the tools used together with bolster for cutting purposes and lastly to identify a suitable tool for plumbing the angle of work vertically and leveling the course horizontally.

A total of 545 candidates attempted this question and their general performance was good as 7.9% scored 0 out of the 5 marks allotted. Moreover, 5.1% of the students who attempted this question scored all the 5 marks and 83.9% got scores ranging from 1 to 4 marks.

The summary of students' scores for this question is presented in Table 2 and Figure 2.

Table 2: Student's performance on question 1

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
-	Omitted	2	0.37
0 – 1	Weak	176	31.26
2 - 3	Average	264	49.54
4– 5	Good	105	18.83
	Total	547	100

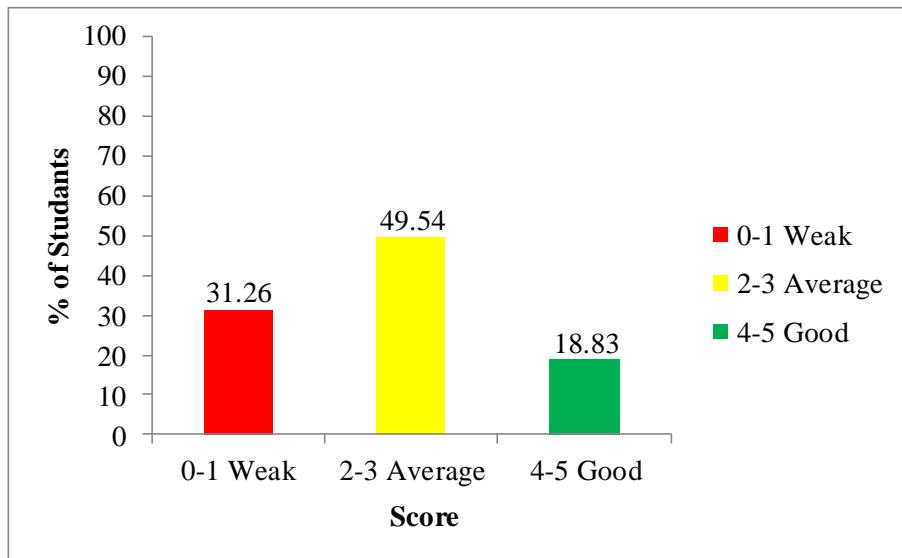


Figure 2: Student's Performance on Question 1

The students who managed to score good marks were able to answer correctly most of the questions by choosing the correct answers from the given alternatives of the multiple choice items. This shows that they had good knowledge on foundations, walls and construction materials specifically on concrete mixing. On the other hand, students who scored poorly had inadequate knowledge on some of the topics tested since they failed to choose the correct answers from among the given alternatives. The majority of candidates responded poorly to the items (ii) and (v).

In item (ii), the students were instructed to choose the correct types of foundations which reduce the cost of excavation on the sloping site. The question was:

- (i) *Which among the following types of foundations reduces the cost of excavation on sloping site?*

- A stepped foundation
- B deep strip foundation
- C wide strip foundation
- D mat or raft foundation
- E pad foundation

The correct response was A ‘stepped foundation.’ The students who chose the correct answer ‘stepped foundation’ had enough knowledge

on the type of foundation suitable to be used on a sloping site. The students who chose B ‘deep strip foundation’ failed to understand that such a type of foundation is suitable for shrinkage clay soils to counteract the variable soils conditions of different seasons.

Those who selected C ‘wide strip foundation’ lacked enough knowledge on foundation selection in different site conditions, since such foundations are suitable for spreading the load over a larger area where the load bearing capacity of the soil is low. The students who chose D ‘mat or raft foundation’ did not understand that the type of foundation is suitable for weak soils where the superstructure load is distributed evenly over the soil. Lastly, students who chose E ‘pad foundation’ did not understand that such type of foundation is usually suitable for supporting a column load.

In item (v), the students were instructed to choose the correct tools for plumbing the angles. The question read:

(ii) *The suitable tool for plumbing the angles of work vertically and leveling the courses horizontally is known as*

- | | |
|-----------------|------------------|
| A spirit level | B plumb bob |
| C straight edge | D mason’s square |
| E plumb rule | |

The correct answer was A ‘spirit level’. The students who managed to choose the correct answer had enough knowledge on tools required for plumbing the angle of work vertically and levelling the courses horizontally during erection of walls. The students who chose B ‘plumb bob’ failed to understand that this is a tool used indicate true vertical of a wall by means of fine cord with a weight hung on the end.

Those who selected C ‘straight edge’ did not understand that ‘straight edge’ is used to check the flatness of a newly laid piece of a wall and to ensure that all blocks are laid at the same level in each course. The students who chose D ‘mason square’ did not understand that ‘mason square’ is a tool used in checking whether or not the angle formed by two walls meeting one another is 90 degrees. Lastly, students who chose E ‘plumb rule’ did not understand that ‘plumb rule’ is a tool used to ensure very accurate vertical check of wall.

2.1.2 Question 2: Matching Items:

This question was derived from a topic on walls in building construction. The students were required to match the descriptions of each term mentioned in list A with specific names in list B by writing the letter of the correct response from list B beside a number in list A.

Question 2: Matching items Questions

<i>List A</i>	<i>List B</i>
i) A wall built around the fireplace.	A Separating wall
ii) A wall which is common to two adjoining building.	B Buttressing wall
iii) A wall affording lateral support to another wall.	C Load bearing wall
iv) A wall which receive support from another wall.	D Fender wall
(i) A wall carrying the vertical imposes.	E Supported wall
	F Parapet wall
	G Boundary wall

The question was attempted by 543 students out of whom 6.8% scored 0. On the other hand 78.8% got scores that ranged from 1 to 4 marks and 14.4% scored all the 5 allotted marks. The general performance for this question was good. The performance on this question is summarized in Table 3 and Figure 3.

Table 3: Student's performance on question 2

Scores	Remarks	Students	
		Number	Percentage (%)
-	Omitted	04	0.73
0 – 1	Weak	121	22.12
2 - 3	Average	254	46.44
4 – 5	Good	168	30.71
	Total	547	100

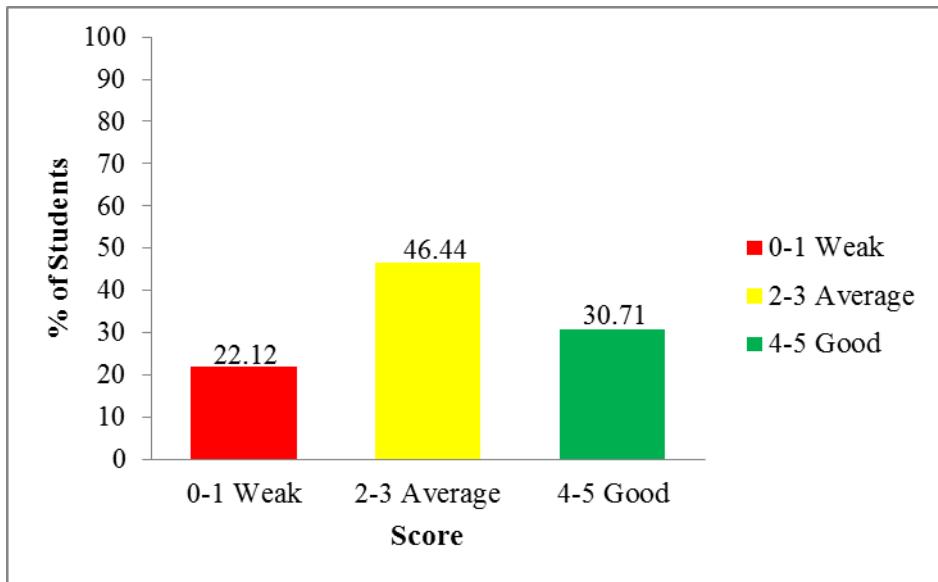


Figure 3: Student's Performance on Question 2

Majority of the students provided poor responses to items (ii) and (iii).

In item (ii), the students were required to match a wall which is common to two adjoining buildings. The correct response was A ‘Separating wall’. The students who chose the correct response ‘Separating wall’ had good knowledge on the types of walls. The majority of students chose G ‘Boundary wall’ as a correct response but they failed to understand that ‘boundary wall’ refers to the fence wall constructed on the land of one owner. ‘Separating wall’ is a wall which is common between two adjoining buildings.

In item (iii), the students were required to match a wall affording lateral support to another wall. The correct answer was B ‘buttressing wall’. The students who choose response B ‘buttressing wall’ had good knowledge on the types of walls. The majority of students who opted F as the correct answer ‘Parapet wall’ failed to understand that parapet wall is the one erected to hide the slope or pitch of the roof or the one on a balcony or bridge.

2.1.3 **Question 3: True and False**

This question required the students to write **TRUE** for the correct assertions and **FALSE** for the incorrect ones on the five statements set from the topic on walls. The question was attempted by 547 who sat

for this assessment out of whom 0.7% scored 0, 8% scored all the 5 marks and 91.3% of the remaining ones got scores ranging from 1 to 4 out of 5 marks allotted.

Generally, the question was performed well as 94.1% of the students scored above average marks. Table 4 and Figure 4 represent the performance of the students in this question.

Table 4: Students' performance on Question 3

Score	Remarks	Students	
		Number	Percentage (%)
-	Omitted	-	-
0-1	Weak	32	5.85
2-3	Average	278	50.82
4-5	Good	237	43.33
Total		547	100

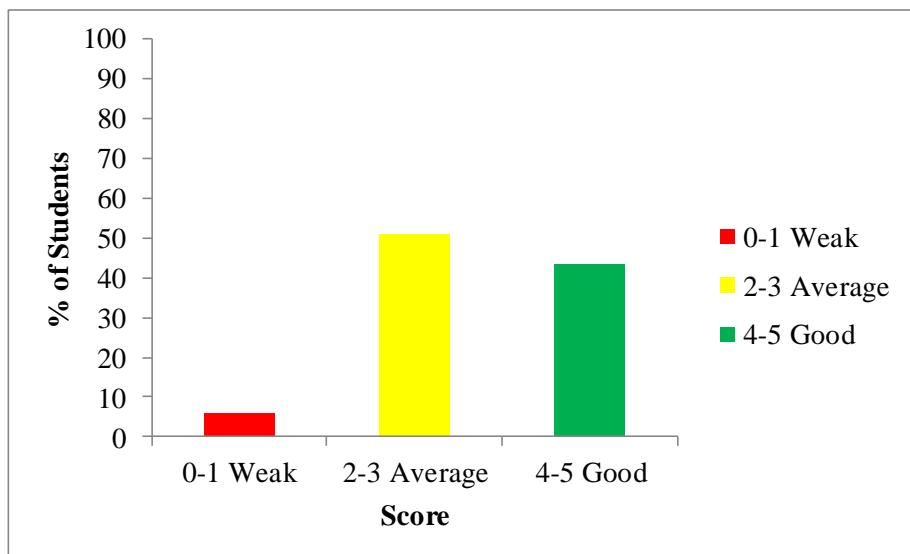


Figure 4: Student's Performance on Question 3

The question required the students to recall some important facts on the skills they had acquired on the construction of walls. Majority of the students remembered those facts but a few students were not able to recall correctly the facts contained in all the statements. Item (ii) was the mostly poorly performed by majority of the students. The item asked;

- (ii) *The modified form of English bond is called Dutch bond.*

Most of the students disagreed with this statement. However, the fact was different. Failure to recall that Dutch bond is modified form of English bond, indicated that the students failed to realize that, Dutch bond consist of alternate course of headers and stretchers each stretching the course starts at the quoin with three-quarter bat and every alternate stretching course has a header placed next to the three-quarter brick bat at the quoin. Extracts 3.1 and 3.2 illustrate good and poor responses respectively.

3. For each of the following statements, write **True** if the statement is correct or **False** if the statement is not correct.
- (i) Raking bond is used for doing inner filling of thick wall.**True**.....
 - (ii) Bricks masonry should not be allowed to take tension.**False**.....
 - (iii) Block bonding is used for increasing the thickness of the wall.**True**.....
 - (iv) Maintenance of brickwork is done to ensure stability.**True**.....
 - (v) The modified form of English bond is called Dutch bond.**True**.....

Extract 3.1: A sample of the student's good responses in question 3

In Extract 3.1 there is a sample of the response provided by a student who was able to recall the facts in those statements and so they scored all the marks.

3. For each of the following statements, write **True** if the statement is correct or **False** if the statement is not correct.
- (i) Raking bond is used for doing inner filling of thick wall.**False**.....
 - (ii) Bricks masonry should not be allowed to take tension.**False**.....
 - (iii) Block bonding is used for increasing the thickness of the wall.**False**.....
 - (iv) Maintenance of brickwork is done to ensure stability.**False**.....
 - (v) The modified form of English bond is called Dutch bond.**True**.....

Extract 3.2: A sample of students' poor responses in question 3

Extract 3.2 contains a sample of a response of a student who failed to answer correctly any of the statements and scored zero.

2.1.4 Question 4: Foundation

This question was based on the topic on foundation. Students were required to give two factors which govern the choice of a foundation. The question was attempted by 534 students which was equivalent to 97.6% of all the students who sat for this assessment. Out of whom 235 scored 0, 154 scored all the 5 marks and 144 got scores that ranged from 1- 4.5 marks. The majority of these students performed averagely in this question as summarized in Table 5 and Figure 4.

Table 5: Students' performance on Question 4

Score	Remark	Students	
		Number	Percentage (%)
-	Omitted	13	2.37
0-1	Weak	252	46.07
1.5-3	Average	105	19.20
3.5-5	Good	177	32.36
Total		547	100

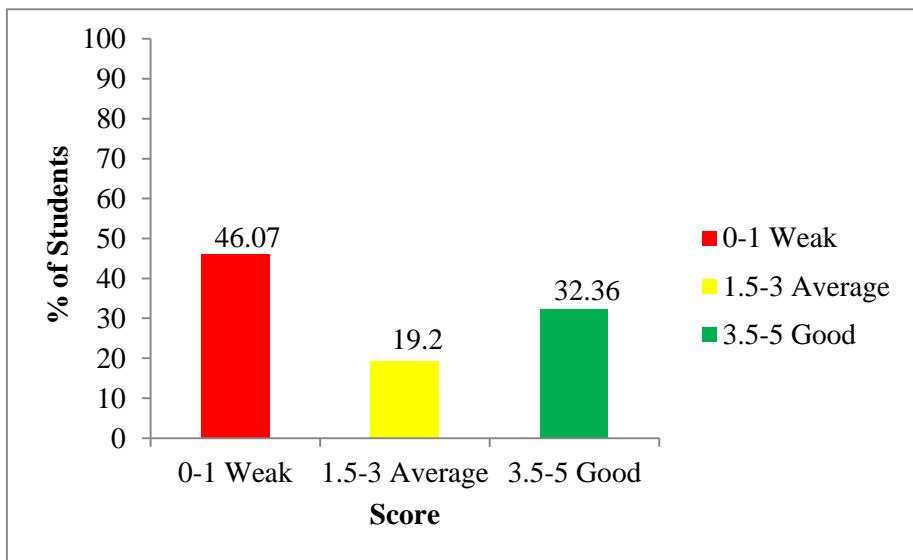


Figure 5: Student's performance on question 4

Many of the students were able to give two factors which govern the choice of a foundation. This indicates that they had enough knowledge

on foundations. Extract 4.1 provides a sample of one of the candidate who scored all the marks allotted for this question.

4. Give two factors which govern the choice of a foundation.

(a) *The ability of the soil to carry the load*

(b) *Type of building that has to built*

Extract 4.1: A sample of the student's good responses in question 4

Extract 4.1 is a sample of a response given by the student who was able to give two factors which govern the choice of a foundation and scored all marks allotted for the question.

Further analysis of the students' responses shows that the students who responded poorly provided irrelevant answers which could not conform to the demand of the question as illustrated in extract 4.2.

4. Give two factors which govern the choice of a foundation.

(a) *foundation must be durable*

(b) *foundation must be strong.*

Extract 4.2: A sample of students' poor responses in question 4

Extract 4.2 is a sample of poor response given by the student who scored zero. The student provided irrelevant answers.

2.1.5 Question 5: Site preparation

This question had two parts (a) and (b). Students were required in part to (a) Describe the term “soil” as related to building construction. (b) To identify six types of soil that can be found in the construction site.

The question was attempted by 541 students, of whom 21.4% scored 0. On the other hand, 64.4% got scores ranging from 1 to 4 marks and none of the students' scores all the 5 given marks. The general performance in this question was average as indicated in Table 6 and Figure 6.

Table: 6 Students' performance on question 5.

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
-	Omitted	06	1.10
0 – 1	Weak	269	49.18
1.5 - 3	Average	211	38.57
3.5– 5	Good	61	11.15
	Total	547	100

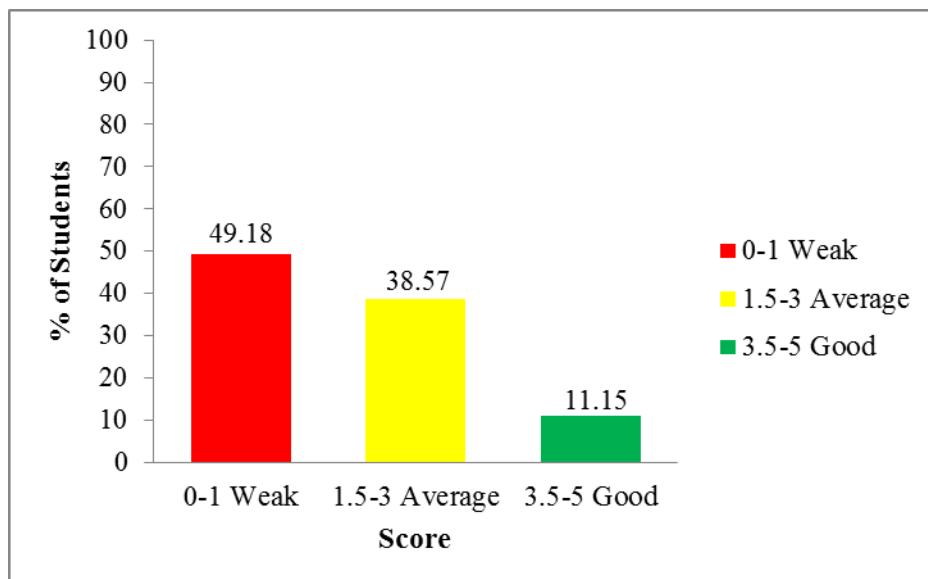


Figure 6: Students' Performance on Question 5

There was average performance on this question since 49.8% of the students scored above average. There were a few students who managed to describe the term soil and identify types of soil that can be found in the construction site. Extract 5.1 provides a sample of such responses.

5. (a) Describe the term "soil" as related to building construction.
Is the ground layer where the building foundation is constructed.
- (b) Identify six types of soil that can be found on the construction site.
- | | |
|----------------------------------|-----------------------------------|
| (i) ... <i>Loam soil</i> | (ii) ... <i>Rocky soil</i> |
| (iii) ... <i>Sand soil</i> | (iv) ... <i>Gravel soil</i> |
| (v) ... <i>Clay soil</i> | (vi) |

Extract 5.1: A sample of the student's good responses in question 5

Extract 5.1 is a sample of responses presented by the students who managed to describe the term soil and identified the types of soil that can be found on the construction site.

On the other hand, 49.2% of the students failed because they provided irrelevant answers, omitted or misinterpreted some questions. Extract 5.2 gives a sample of a poor response from one of the students' scripts.

5. (a) Describe the term "soil" as related to building construction.
Is the ground layer where the building foundation is constructed.
- (b) Identify six types of soil that can be found on the construction site.
- | | |
|------------------------------|-----------------------------|
| (i) <i>Pile Foundation</i> | (ii) <i>deep foundation</i> |
| (iii) <i>with foundation</i> | (iv) <i>Pad Foundation</i> |
| (v) <i>strip foundation</i> | (vi) <i>raft foundation</i> |

Extract 5.2: A sample of students' poor responses in question 5

Extract 5.2 is a sample of a response presented by the student who wrote irrelevant answers.

2.1.6 Question 6: Materials

This question was set from the topic on materials. The students were required to outline the five functional requirements of concrete at its hardened state.

The question was attempted by 505 students, out of whom 52.9% scored 0. Apart from that 41.8% had scores that ranged from 1 to 4 marks and 5.3% scored all the 5 allotted marks. The general performance for this question was average as indicated in Table 7 and Figure 7.

Table 7: Students' performance on question 6

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
-	Omitted	42	7.68
0 – 1	Weak	312	57.04
1.5 - 3	Average	120	21.94
3.5 – 5	Good	73	13.35
	Total	547	100

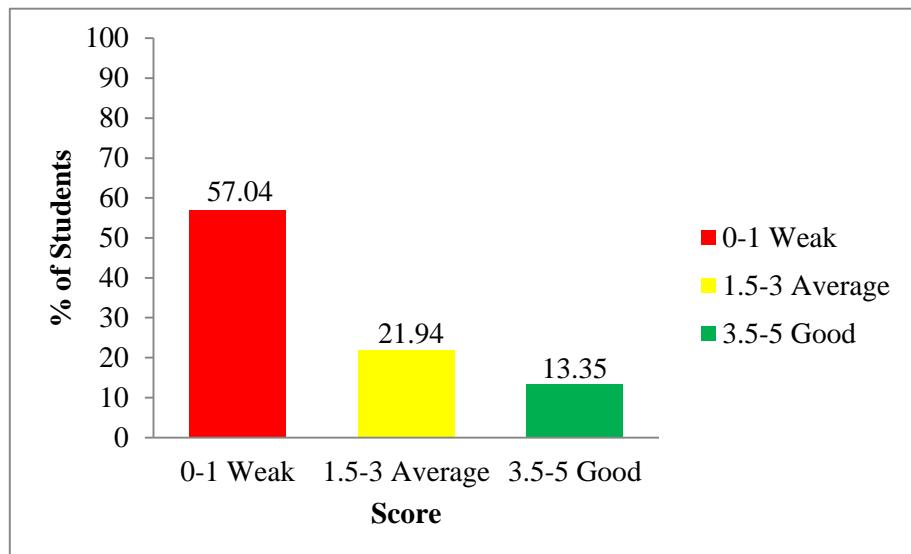


Figure 7: Students' Performance on Question 6

There was average performance in this question since 35.3% of the students scored above average. A few students were able to list correctly functional requirements of concrete at its hardened state. This indicates that they had clear knowledge on the topic. Most of the students failed to outline the functional requirements of concrete in its hardened state. Some of them named types of materials used to prepare concrete instead of functional requirements of concrete as required in the questions.

A number of factors are assumed to have contributed to students' failure in this question. These factors include lack of practical skills, poor understanding of the subject matter and wrong interpretation of the question. Extract 6.1 provides a sample script for a poor response presented a student.

6. Outline the five functional requirements of concrete at its hardened state.
 - (i) Reinforcement bars.....
 - (ii) Cement.....
 - (iii) Sand.....
 - (iv) Coarse aggregate.....
 - (v) Water.....

Extract 6.1: A sample of students' poor responses in question 6

Extract 6.1 provides a sample script for a poor response presented by the student who named types of materials used to prepare concrete instead of functional requirements of concrete in hardened state.

Despite these poor responses, there were a few students who managed to outline five functional requirements of concrete at its hardened state. Extract 6.2 illustrates a sample of such responses.

- | |
|--|
| 6. Outline the five functional requirements of concrete at its hardened state. |
| (i) <i>Strong and stable during hardening</i> |
| (ii) <i>Durable to maintain its shape</i> |
| (iii) <i>Fire resistant</i> |
| (iv) <i>Provide adequate thermal insulation</i> |
| (v) <i>Provide sufficient sound insulation</i> |

Extract 6.2: A sample of the student's good responses in question 6

2.1.7 Question 7: Scaffolding and shoring

This question was set from the topic on scaffolding and shoring. The students were required to give five advantages of wooden scaffolds. The question was attempted by 519 students, of whom 46.8% scored 0. Additionally, 52.4% got scores that ranged from 0.5 to 4.5 marks and 0.8% scored all the 5 marks. The general performance in this question was average as indicated in Table 8 and Figure 8.

Table: 8 – Students' performance on question 7

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
-	Omitted	28	5.12
0 – 1	Weak	355	64.90
1.5 - 3	Average	148	27.06
3.5 – 5	Good	16	2.92
	Total	547	100

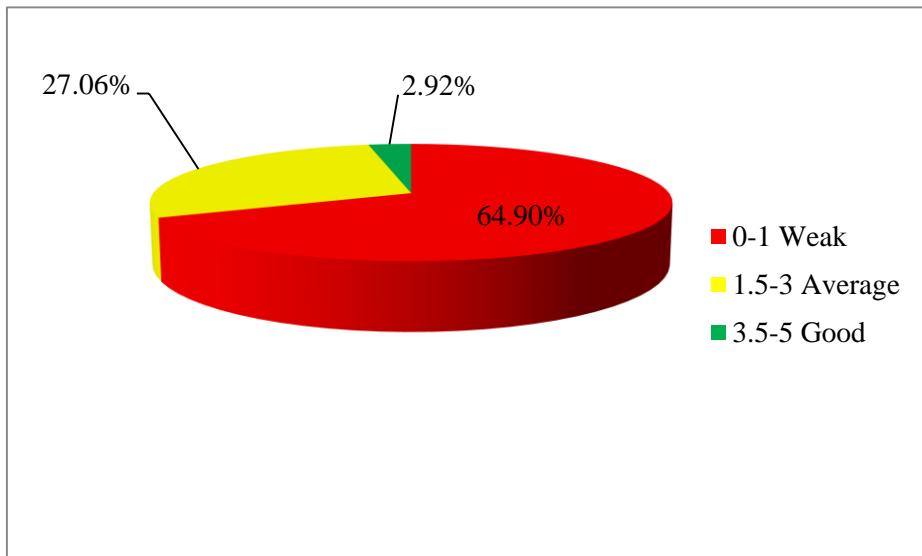


Figure 8: Students Performance on Question 7

The analysis shows that the students' performance for this question was average because 30% scored average marks. This was indicative that these students had basic knowledge on scaffolding. On the other hand, poor performance of students in this question could be attributed to lack of knowledge on wooden scaffolding because this type seems to be informal type of scaffolds compared to steel scaffold among the students and that made them provided irrelevant information. Extract 7.1 illustrates a sampled script of a student whose responses involved irrelevant information in relation to advantages of wooden scaffolds.

7. What are the five advantages of wooden scaffolds.
- (i) Wooden scaffolds do not need any fitting .. .
 - (ii) Wooden scaffolds do not need any maintenance .. .
 - (iii) Wooden scaffolds is costless during construction .. .
 - (iv) In a place where trees are more available it is easy to construct .. .
 - (v) Old wooden scaffolds can be sold as firewood .. .

Extract 7.1: A sample of students' poor responses in question 7

Extract 7.1 is a sample of the students' responses for a student who wrote irrelevant information in this question.

Despite the aforementioned weakness, a few students managed to score high marks in this area of specialization. They successfully gave five advantages of wooden scaffolds. Extract 7.2 illustrates the sampled script of a response given by a student who was able to give five advantages of wooden scaffolds.

7. What are the five advantages of wooden scaffolds.
- (i) Wooden scaffolds do not need any fitting.
 - (ii) Wooden scaffolds do not need any maintenance.
 - (iii) Wooden scaffolds is costless during construction.
 - (iv) In a place where trees are more available it is easy to construct.
 - (v) Old wooden scaffolds can be sold as firewood.

Extract 7.2: A sample of the student's good responses in question 7

2.1.8 Question 8: Walls

This question was set from the topic on walls. The students were required to describe cavity wall as applied in building construction.

This question was attempted by 463 students. Out of them, 75.6% scored 0. Additionally 14% got scores ranging 1 to 4 marks, 2.9 % scored all the 5 allocated marks and 15.4% did not attempt this question. The general performance on this question was poor. Table 9 and Figure 9 illustrate the students' scores.

Table 9: Students' performance on question 8

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
-	Omitted	84	15.36
0 – 1	Weak	358	65.45
1.5 - 3	Average	46	8.41
3.5 – 5	Good	59	10.78
	Total	547	100

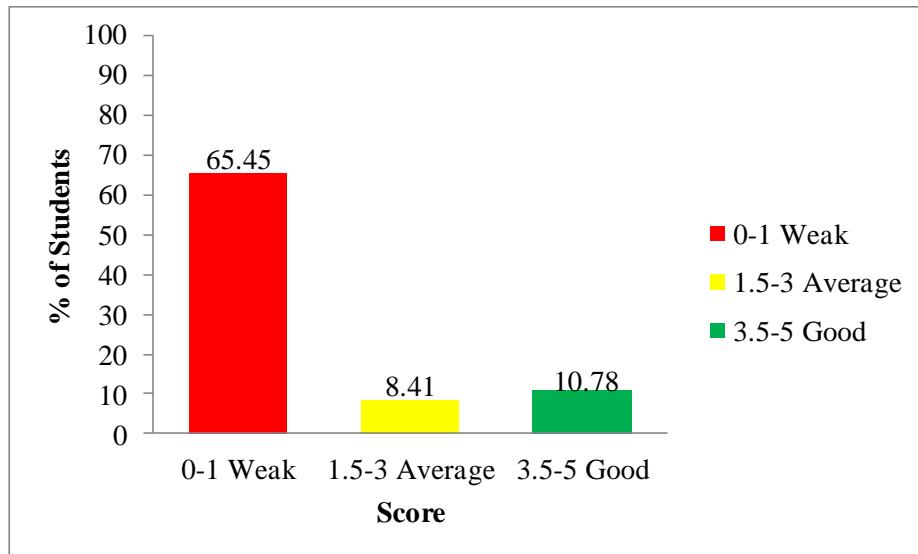


Figure 9: Students' Performance on Question 8

Most of the students failed to describe cavity wall as applied in building construction. The students were supposed to describe that ‘cavity wall’ is a system of walling consisting of two walls constructed parallel each other with a continuous air space between them. The wall is constructed to prevent the penetration of moisture through the external surface to the inner surface of building from outside especially in case relatively thin walls are in exposed situations. Some of the students seemed to have not understood the question as they mentioned materials used in construction works.

The performance for this question was poor because only 0.2% of the students could provide correct responses to this question. These candidates had sufficient knowledge on wall construction. Extracts 8.1 and 8.2 provide sample scripts of poor and good responses respectively.

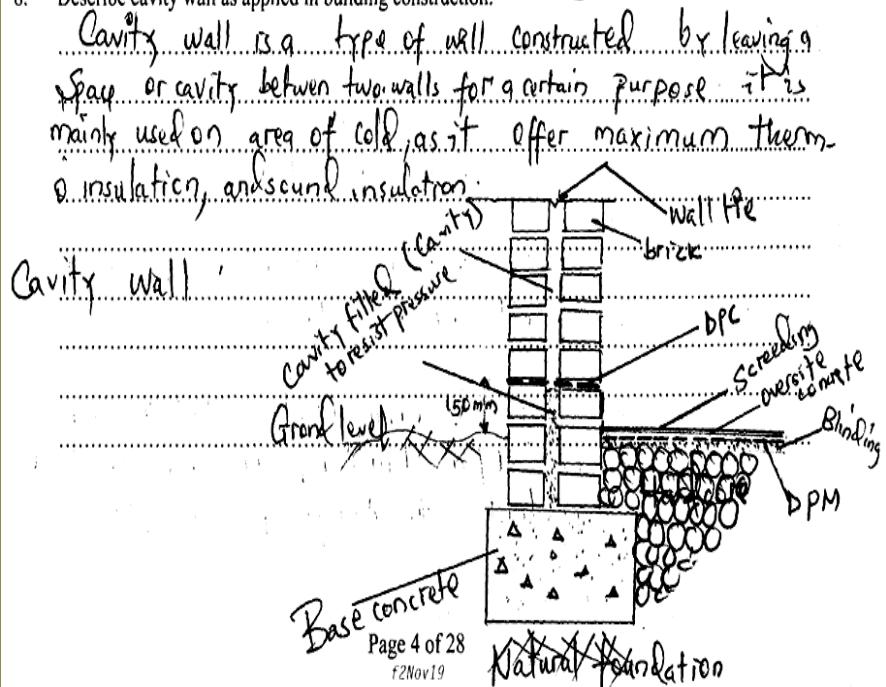
8. Describe cavity wall as applied in building construction.

Cavity wall is a type of wall made up by two solid walls with space between them. Cavity wall is common in areas with low temperature. Function of cavity wall is to prevent cold from getting in the building and preventing heat/temperature from getting out of the building.

Extract 8.1: A sample of students' poor responses in question 8

Extract 8.1 contains a sample of the students' responses for a student who wrote irrelevant materials in this question.

8. Describe cavity wall as applied in building construction.



Extract 8.2: A sample of the students' good responses in question 8

2.2 SECTION B: AREA OF SPECIALIZATION

2.2.1 Question 9: Surveying

This question was attempted by students who specialized in Surveying. The topics covered in this question included Introduction, Surveying instruments and Chain surveying. The question was divided into five parts: (a), (b), (c), (d) and (e).

In part (a), the students were required to (i) describe the function of the survey equipment's; field book, optical square and theodolite, (ii) identify the two instruments used for direct ranging in surveying and (iii) outline two uses of arrows in land surveying. In part (b), they were required to (i) describe a 'well-conditioned triangle' as applied in surveying, (ii) explain the necessity of using a 'well-conditioned triangle' in surveying works and (iii) show with the aid of a sketch the methods of chaining past the pond.

In part (c), the students were required to explain the following types of surveying; (i) topographical surveys, (ii) cadastral surveys, (iii) engineering survey, (iv) triangulation survey, (v) city surveying and (vi) marine surveying. The part (d) of question required the students to (i) mention three works of a surveyor, (ii) outline three office works of a surveyor (iii) explain the terms; *representative fraction, scale of a plan and graphical scale*.

In part (e), the students were required to (i) explain the terms accuracy and precision as applied in surveying, (ii) differentiate between cumulative and compensating errors and (iii) briefly explain two sources of errors in surveying.

This question was attempted by 54 students who specialized in this area. Out of them 7 students (12.96%) scored a 0 mark. On the other hand, 36 students (66.67%) who attempted this question got scores that ranged from 1 to 17.5 marks while the remaining 11 students (20.37%) got scores ranging from 18 to 38.5 marks. No one scored above average marks. The general performance of this question was poor. Table 10 and Figure 10 illustrate the students' scores.

Table 10: Student's performance on question 9

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
0 – 17.5	Weak	43	79.63
18 – 38.5	Average	11	20.37
39 – 60	Good	00	0.00
	Total	54	100

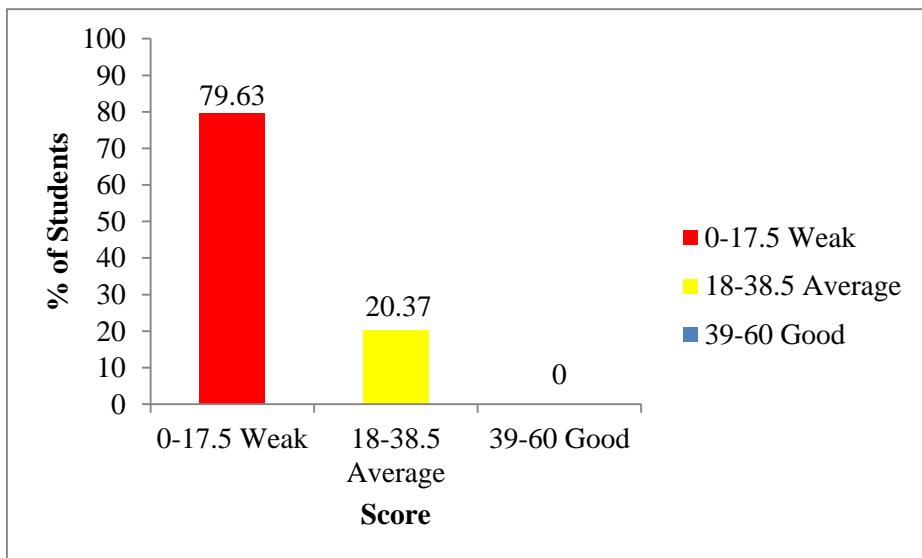


Figure 10: Students' performance on question 9

Most of the students who scored below average failed to produce irrelevant answers. Their poor responses indicate that they lacked knowledge on basic survey instruments as required. In part (a) (i), majority of the students were able to identify optical square and theodolite as measuring or setting equipment but they failed to identify where these instruments are used. Optical Square is used to set perpendiculars (right angles) while theodolite is used to measure horizontal and vertical angles, horizontal distance between two points, ranging a line, measuring deflection angles and magnetic bearings. In (ii), some of the students failed to identify instruments used for direct ranging in surveying: Instead they mentioned *compass surveying and plain table surveying*. They failed to understand that the instruments used for direct ranging are Line ranger and Theodolite. Most of the students skipped part (b) (iii). In part (d) (i) students failed to explain the given terms *representative fraction* as the ratio of map distance to the corresponding ground distance. Both distances in the same units and scale of a plan is the fixed station that every distance of the plan bears with corresponding distance on the ground. Extract 9.1 illustrates the sample of students 'script that produced poor responses in the whole question.

9. (a) (i) Briefly describe the function of the following equipments in surveying:

- Field book

..... Is a book that used to take notes during survey activities.

- Optical square

..... This is an equipment used in Measuring angles.

- Theodolite

..... This is an instrument used for measuring scales.

(ii) Identify the two instruments used for direct ranging in surveying.

• Ranging rod

• Arrows

(iii) Explain the following terms:

Representative fraction

..... This is a scale that represent in

Scale of a plan

..... Is the ratio distance in the plan to the actual distance in the ground in a large area. This scale is used in large estate area to compare both the map.

Extract 9.1: A sample of students' poor responses in question 9

Despite the poor performance of the students on these questions, there are some students who were able to outline the uses of arrows in land survey, describe a good condition triangle as applied in the survey, mention work of surveyor and describe the terms *accuracy* and *precision* as used in the survey. Extract 9.2 illustrates a sample of students' good response in some parts of the question.

(iii) Outline two uses of arrows in land surveying.

- Arrows are used to count the number of chains during measurements in chain surveying.
- Arrows used to mark the end of one chain and which is also the beginning of another chain

(b) (i) Describe a 'Well Conditioned Triangle' as applied in surveying.

Well conditioned triangle is the triangle which is suitable in survey works, i.e equilateral triangle, and its angles should greater or equal to 30° but less or equal to 120° i.e $30^\circ \leq \theta \leq 120^\circ$

(d) (i) Mention three works of a surveyor.

- Field work,
- Office work,
- Care and adjustment of instruments.

(ii) Outline three office works of a surveyor.

- Calculations.
- Preparing maps/plan.
- Planning.

(e) (i) Explain the following terms as applied in surveying:

- Accuracy

Is the degree of perfection used in instruments, methods and planning.

- Precision

Is the degree of perfection obtained which depends on precision instruments, precise methods and good planning.

Extract 9.2: A sample of the student's good responses in question 9

2.2.2 Question 10: Carpentry and Joinery

This question was set from the topics on Plants and Machines, Timber and Joints. The question consisted of five parts (a), (b), (c) (d) and (e).

In part (a), students were required to outline six useful hints when using a wood working bench. In part (b), they were required to (i) identify four machines required for a planned machine shop for woodwork and (ii) explain four ways of feeding timber into a machine.

In part (c), they were required to (i) explain lumber as applied in timber, (ii) summarise two conditions for a wood to be lumber and (iii) distinguish softwood from hardwood. Part (d) required the students to (i) explain the use of hinged joint, (ii) describe four processes of marking mortise (iii) identify four types of lap joints and in part (e) students were required to identify six means of sawing logs so as to obtain (i) bulk, (ii) plank (iii) deal (iv) board (v) scantling and (iv) quartering as timber products.

The question was attempted by 52 (100%) the students who specialized in this area. A total of 9 (17.3%) students scored 0 marks. Moreover, 90.38% of the students scored below average while the remaining 9.62% of the students scored average marks. There was no student who scored above and average therefore the general performance on this question was poor. Table 11and Figure 11 illustrates the students' scores.

Table 11: Students' performance on question 10

Score	Remark	Students	
		Number	Percentage (%)
0-17.5	Weak	47	90.38
18-38.5	Average	5	9.62
39-60	Good	0	0.00
Total		52	100

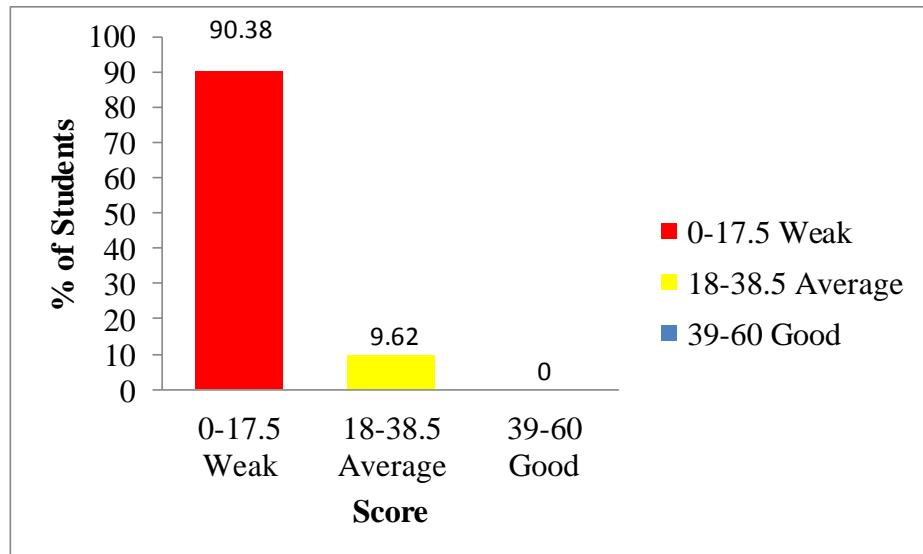


Figure 11: Student's performance on question 10

The poor performance in this question indicates that majority of the students had little understanding on timber product and joints. Students who scored lower marks failed to give correct responses in many parts of the question that needed them to demonstrate practical skills. These students failed even to explain four ways of feeding timber into the machine during timber processing in the workshop. Some of them wrote *the timber it should be well planned by using the machine called planning, the timer it should be converted by sawing methods, the timber it should be preservation by poisonous of fungus and insect and the timber can be either soft or hard when feeding into a machine.* Extract 10.1 shows a sample of response by students who gave an irreverent response to this question.

(ii) Explain the four ways of “feeding timber” into machine.

- *The timber it should be well planned by using the machine called planning.*
- *The timber it should be converted by sawing method.*

- The timber it should be preservation by, poison of fungus and insect.
- The timber can be either soft or hard when feeding into a machine.

Extract 10.1: A sample of students' poor responses in question 10

Extract 10.1 shows a sample of a response by a student who attempt this question but failed to answer this question correctly in all part.

However, some the students show had adequate knowledge on wood works workshop, timber joints and product. They able to outline the useful hints when using a wood working bench, they were able to identify machines for a 'planned machine shop' they were also able to identify the type of lap joints and means of sawing logs so as to obtain the particular timber product: bulk, plank, deal, board, scantling and quartering. Extract 10.2 shows a sample by a student how attempted and performed well in some areas of this question.

10. (a) Outline the six useful hints when using a wood working bench.
- (i) Working bench should be clean before starting working.
 - (ii) Working bench should left cleaned after the work.
 - (iii) Working bench should be strong and stable that does not move in any direction.
 - (iv) The working bench should be large enough to allow different works to be carried on it.
 - (v) The working bench should be placed at the place where there is an enough area for working.
 - (vi) The working bench it should have all its parts and safe.

(b) (i) Identify four machines for a "carefully planned machine shop" for woodwork.

- Tenoning machines.
- ~~The Vertical log~~ band mill machines. (Milling machines).
- ~~The hood~~ Moulding machines.
- Planning machines.

(iii) Identify the four types of Lap joints.

- Half lap joint
- End to end lap joint
- Face to Face lap joint
- Splayed lap joint

(c) Identify the means (style) of sawing logs so as to obtain the following timber products:

(i) Bulk

This is obtained by sawing logs into the dimensions of 250mm and 300mm. It is in square form.

(ii) Plank

This is obtained in square of fawn log to dimensions of 50mm and 150 mm.

(iii) Deal

This is rectangular block obtained by sawing log into thickness of 150mm to 200mm.

(iv) Board

This piece of timber obtained by sawing log into the thickness of dimensions 200mm and 250mm.

(v) Scantling

This piece is obtained in rectangular with with thickness of 200mm to 250mm.

(vi) Quartering

If the piece of timber obtained by sawing the timber, into four parts in which this one is the quarter of that timber.

Extract 10.2: A sample of the student's good responses in question 10

Extract 10.2 is a sample of response by a student who produced a relevant response in large areas of this question.

2.2.3 Question 11: Brickwork and Masonry

This question was set from the Brickwork and Masonry subject on the following topics; Tools, plants and equipment, Materials, Brick and Block making as well as Mortar, and Bonding. The question was divided into five parts: (a), (b), (c), (d) and (e). The students were required to (a) (i) differentiate between bricklayers hand tools; brick trowel and pointing trowel, brick hammer and club hammer, (ii) explain how a craftsman can maintain his tools after each day's work. In part (b), they were required to (i) classify four types of bricks according to their uses and (ii) explain four stages used for burning clay bricks. In part (c), the students were required to outline six functions of mortar in building construction.

Part (d) required the students to (i) explain the term *bonding* as applied in wall construction, (ii) give three aspect on the importance of bonding a wall and (iii) explain the bonding terms; *queen closer* and *king closer* and in part (e), they were required to classify three types of a concrete and give two examples in each type.

This question was attempted by 326 students who specialized in this area. Out of those, 45 students (13.80%) scored 0. Moreover, 115 students (35.28%) got scores that ranged from 1 to 17.5 marks, 136 students (41.72 %) had scores that ranged from 18 to 38.5 marks and 30 students (9.20 %) got scores that ranged from 39 to 60 marks but no one scored all the marks allotted. The overall performance was average. Table 12 and Figure 12 analyses the performance of the students for this question.

Table 12: Student's performance on question 11

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
0 – 17.5	Weak	160	49.08
18 – 38.5	Average	136	41.72
39 – 60	Good	30	9.20
	Total	326	100

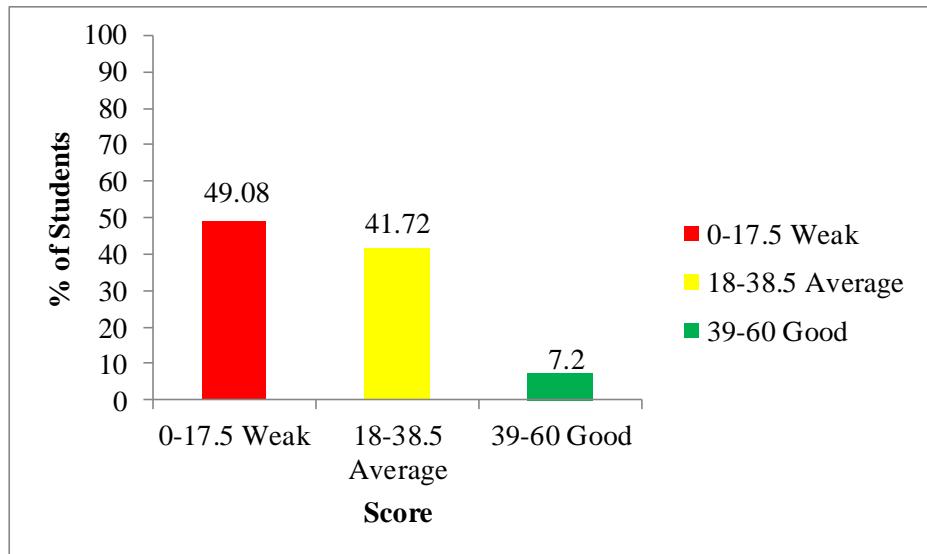


Figure 12: Student's performance on question 11

The analysis of the students' performance in this area of specialization shows that the question was averagely performed since 43.5 percent of the students were able to differentiate various brickwork hand tools, classify types of bricks, explain stages for burning clay bricks, outline functions of mortars in the building construction, explain the term *bonding* and its importance. This means that such students had good knowledge on the basic principles and skills of constructing a building. Extract 11.1 provides a sample of the best response from one of the students' scripts.

11. (a) (i) Write the difference between the following bricklayers hand tools:

- Brick trowel and pointing trowel

Brick trowel - is the type of trowel which is used for laying mortar and spread it evenly before laying bricks / blocks.

Pointing trowel - is the type of trowel used for filling in joints with mortar before when bonding.

- Brick hammer and club hammer

(Club hammer - Is used in conjunction with the chisel to make holes on floor or walls and cutting bricks and blocks while)

(Brick hammer - Is used for driving in and out Nails from the timber and woods.)

- (b) (i) Classify the four types of bricks according to their uses.

- facing bricks
- Engineering bricks
- Common bricks
- Fire bricks

- (c) Outline the six functions of mortars in building construction.

(i) Used for making bond with bricks, blocks or stones

(ii) Used for plastering and rendering in walls.

(iii) Used for manufacturing of bricks and blocks

(iv) Clay mortar is used for making traditional buildings.

(v) Mortar is used for floor finishing

(vi) Mortar is used in addition with cement & coarse aggregate to manufacture concrete.

- (d) (i) Explain a term "bonding" as applied in wall construction.

Bonding → Is the art of arranging bricks and blocks or stones in a systematic pattern to ensure stability and good appearance of the wall.

(iii) Explain the following bonding terms:

- Queen closer

Is the portion of brick obtained by cutting the brick halfway along the length. Inside the sketch below.



A queen closer

- King closer

Is the portion of brick obtained by cutting the brick to the half of width along one half of length (stretcher end). Inside the sketch below.



A king closer

Extract 11.1: *A sample of the student's good responses in question 10*

Extract 11.1 is a sample of good responses for the larger part of the question.

On the other hand, 49.1% of the students failed because they provided irrelevant answers, omitted or misinterpreted some questions. In part (b) (i), some students failed because they lacked skills and knowledge that could enable them to answer the question properly. A good example is that of a student who was required to classify types of bricks according to their use. Instead of doing that, the student wrongly classified bricks as *clay burnt brick, cement sand bricks, burnt bricks cement, lime, and sand brick*. But normal bricks are classified according to their use as bricks for interior purposes, bricks for exterior purposes, bricks for pressure resisting purposes and bricks for fire resisting purposes. In part d (iii), some of the students failed because they seemed to have not understood the demands of the question. Students were required to explain the bonding terms *queen closer* and *king closer*. Instead, they wrongly explained '*queen closer*' as *is the part of brick that contraction in building unity contracting the material* and '*king closer*' as *is the shape of brick that controlling main part of brick to the building*. The terms *queen closer* and *king closer* are used to identify the portion of the bricks after cutting in different positions. For example as a *queen closer*, a brick is cut. The brick is cut equally along its length and as a *king closer* a brick is obtained by removing a corner and leaving half-header and half-stretcher faces. The students' poor responses indicate that they lacked knowledge on the basic principles and skills of constructing a building. Extract 11.2 shows a sample of a poor response from one of the students' scripts.

(b) (i) Classify the four types of bricks according to their uses.

- Cement sand bricks
- Gypsum sand cement lime sand bricks
- Clay brick
- Boring clay bricks Burning clay bricks

(iii) Explain the following bonding terms:

- Queen closer

*Whole part of brick that contracts in bonding.
uniting contrating the material*

- King closer

*Whole shape of bricks that contrating main part
of bricks to the building*

Extract 11.2: A sample of students' poor responses in question 10

2.2.4 Question 12: Painting and Signwriting

The question was set from the area of Painting and Signwriting and covered the following topics; Safety, Tools, equipment, plant and brushes, Paint and painting materials, Water paints and texture finishes. It comprised five parts: (a), (b), (c), (d) and (e). Part (a), required the students to (i) describe six effects of accidents occurring in the painting workshop and (ii) list six items which should be kept in the first aid kit in the painting workshop. In part (b) students were required to (i) explain excessive brush mark and ropiness in painting works and (ii) explain four ways of avoiding excessive brush mark and ropiness.

In part (c), students were required to (i) explain painting terms; stain, stainer, and staining power, (ii) mention four types of stains and (iii) describe the use of stains. Part (d) asked the students to (i) name three type of water mixed materials, (ii) explain the advantage of using water mixed materials in painting works, (iii) explain the term soft *distemper* and state their common colour, (iv) explain the use of staff distemper and (v) explain two ingredients of distemper. In part (e) students were required to explain the characteristics of paints from the following painting materials (i) pigment (ii) binder and (iii) thinner.

The total marks allocated for this question were 60. The question was attempted by 13 students. One (1) student (7.69%) scored 0. Meanwhile, seven (7) students (53.85%) got scores that ranged from 1

to 17.5 marks. Moreover 5 students (38.46%) got scores which ranged from 18 to 38.5 marks and none of the students' got scores ranging from 39 to 60 marks. The general students' performance on this question was average as stipulated in Table 13 and Figure 13.

Table 13: Student's performance on question 12

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
0 – 17.5	Weak	7	61.54
18 – 38.5	Average	5	38.46
39 – 60	Good	0	0.00
	Total	13	100

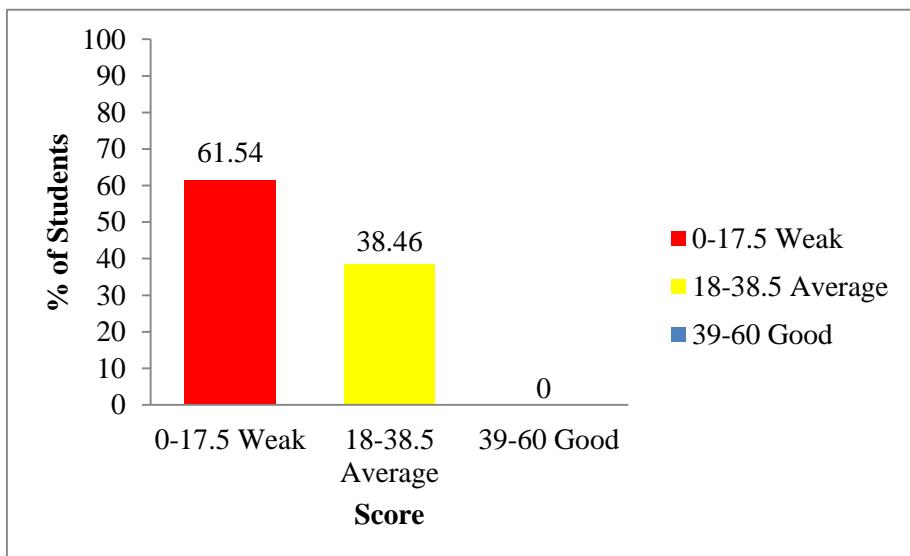


Figure 13: Student's performance on question 12

Analysis of this question shows that the students provided correct answers in some parts of the question. Some students were able to describe effects of accidents occurring in the painting workshop, list items which should be kept in the first aid kit in the painting workshop, explain what excessive brush mark is and ropiness in painting works and explain the characteristics of paints from pigment. This shows that these students had basic knowledge on painting and decorations. Therefore they able to score average marks as Extract 12.1 shows a sample of a good response to this question.

12. (a) (i) Briefly describe six effects of accidents occurring in the painting workshop.

- Loss of tools and equipment
- Injury to the workers and other related people in the workshop
- Low productivity
- Tensionizes the workers

(ii) List six items which should be kept in the First Aid Kit in the painting workshop.

- Liniment
- Pain killers
- Bandages
- Plaster
- Antiseptic
- Scissors

(b) (i) What is excessive brush mark and ropiness in painting works?

Excessive brush marks are left marks of brushes seen on the painting surface when painting or after painting.
Ropiness are left marks of brushes seen more clearly than excessive brush marks.

(c) Explain the characteristics of paints from the following painting materials.

(i) Pigment

Contains the desired colour to be applied.

It is in form of particles in liquid form.

Extract 12.1: A sample of the student's good responses in question 10

However, 61.5% of the students showed that they had not adequately acquired basic knowledge on painting and decorations. Most of them, omitted some parts of this question. The few who attempted this question produced irrelevant responses. For example, in part e (i), the question wanted the students to explain the characteristics of paint from pigment. For this, students were supposed to respond by saying that 'pigments are insoluble substances in finely divided form which impart colour and opacity to paint. Pigment also possesses some other properties such as the power to inhibit rusting, resistance to some specific form of chemical attack and resistance to heat which enhances their value for some particular purposes.' Instead, they explained pigment as *materials in painting at the painter*. Hence, they did not

understand the demand of the question. Extract 12.2 provides a sample of a response of this category.

1

Explain the term 'soft distemper' and state their common colour.

What is the use of staff distemper?

The use of staff distemper is common material in the pigment in painting materials.

(v) What are the two ingredients of distemper?

(e) Explain the characteristics of paints from the following painting materials.

(i) Pigment

A pigment ~~is~~ this is materials in painting
~~with~~ at the painter i.e. Sanity.

(ii) Binder

A pigment this is materials in painting is
the avoid to ingredients at staining i.e.
car and hours

Extract 12.2: A sample of students' poor responses in question 10

2.2.5 Question 13: Plumbing

This question was attempted by the students who opted for Plumbing as their area of specialization. The question was set from the following

topics; Tools, equipment's and plants, and Materials. The question was divided into five parts and total marks allotted in this question were 60.

Students were required to: in part (a) outline five characteristics of metals which differentiate them from non-metals, (ii) explain the use of the following tools; bossing mallet, titmans mallet and shave hook and in part (b) students were required to explain the characteristics of the following materials; (i) brittle (ii) malleable (iii) ductile (iv) hard (v) tensile strength (vi) elastic.

In part (c), (i) students were asked to (i) differentiate between thermoplastic and thermosetting plastic materials, (ii) give three examples from each group mentioned in part (i). in part (d) students were asked to draw the following tools used in plumbing works: (i) bending stick, (ii) bent pin, (iii) chase wedge, (iv) flat dresser, (v) bossing stick and (vi) setting in stick. In part (e), the students were asked to (i) calculate the area of a piece of sheet metal measuring 1320mm and 432mm and (ii) find the volume of a cistern which is 1.5m, long 1.2 wide and 1 m deep.

The question was attempted by 91 students. Out of them, 26.4% scored 0. On other hand, 15.39% scored average marks. The general performance for this question was poor. The student's performance on this question is as summarized in Table 14 and Figure 14.

Table 14 Students' performance on question 13

Score	Remark	Students	
		Number	Percentage (%)
0-17.5	Weak	77	84.61
18-38.5	Average	14	15.39
39-60	Good	0	0.00
Total		91	100

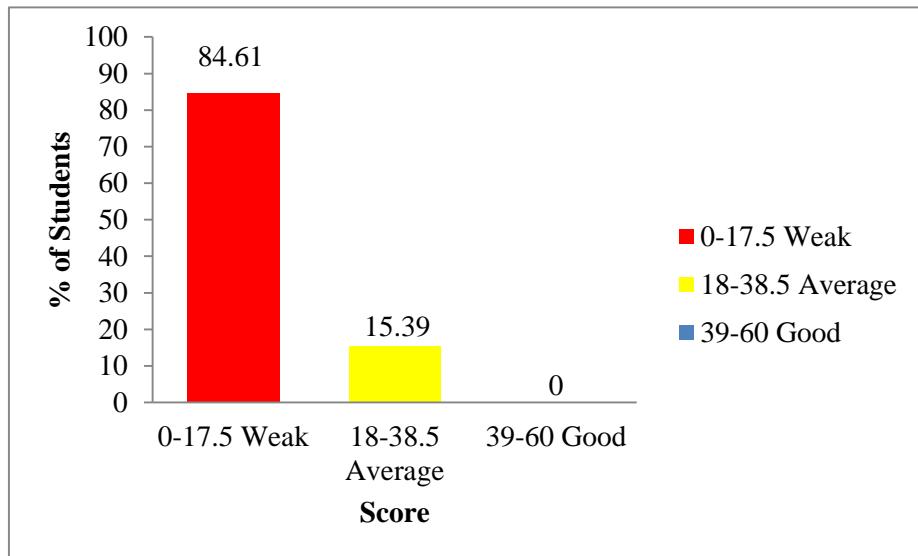


Figure 14: Students' Performance on Question 13

The analysis of the students' performance in this question shows that the performance was poor. Majority of the students failed because they did not produce relevant responses or they omitted some parts of the question. The students failed to recall the knowledge obtained in plumbing. Moreover, in part (e) (ii) the students failed to make simple calculations which required them to calculate the volume of cistern which is 1.5m long, 1.2m wide and 1m deep. Extract 13.1 shows the sample of a script of a student who did not provide relevant responses acceptable according to the demand of the question.

Extract 13.1: A sample of students' poor responses in question 10

Further analysis shows that students who scored above average marks were able to give correct responses in some parts of the questions. These students had good knowledge specifically on the properties of materials used for plumbing works. They were able to calculate correctly the required area of a sheet of metal and volume in the cistern tank. The students showed that they had enough knowledge on area and volume that enable them to compute correctly the required area and volume. Extract 13.2 shows the script of the student who was able to give correct responses on some areas of the question.

13. (a) (i) Outline five characteristics of metals which differentiate them from non-metals.

→ Metals have high melting point.
 → Metals have high densities than non-metals
 → Metals are good conductors of heat.
 → Metals more ductile than non-metals.
 → Metals are sonorous than non-metals.

- (ii) Find the volume of a cistern which is 1.5 m long, 1.2 m wide and 1 m deep.

Data given
 length (L) = 1.5 m

width (w) = 1.2 m

depth (h) = 1 m.

Required: Volume (V) = ?

Soln

From: $V = \text{Area} \times \text{height}$.

$$V = L \times w \times h$$

$$V = 1.5 \text{ m} \times 1.2 \text{ m} \times 1 \text{ m.}$$

$$V = 1.8 \text{ m}^3$$

$$V = 1.8 \text{ m}^3$$

∴ The volume of cistern will be 1.8 m^3

Data given
 Length (L) = 1320 mm $\rightarrow 1.32\text{m}$.
 width (w) = 432 mm $\rightarrow 0.432\text{m}$.
 Required: Area (A) = ?

Soln
 From Area (A) = Length (L) \times width (w).
 $= L \times w$
 $= 1.32\text{m} \times 0.432\text{m}$.
 $= (1.32 \times 0.432) \times 5\text{ decimal places}$
 $= \begin{array}{r} 1.32 \\ \times 0.432 \\ \hline 396 \\ 528 \\ \hline 57024 \end{array} \times 5\text{ decimal places}$
 $= 0.57024\text{ m}^2$.

∴ The Area of metal will be 0.57024 m^2 .

Extract 13.2: A sample of the student's good responses in question 10

3.0 ANALYSIS OF THE STUDENTS' PERFORMANCE IN DIFFERENT TOPICS

The topics covered in the Civil Engineering paper for FTNA 2019 included: *Materials, Site preparation, Foundation, Scaffolding and Shoring and Walls* in the compulsory section of the paper as well as optional parts of the assessment. In the surveying field, the topics tested included *Introduction, Surveying Instruments and Chain surveying*. For Carpentry and Joinery, the topics tested included *Tools, equipment, Plants/Machines, Timber and Joints*. For the Brickwork and Masonry field, the topics tested included *Tools, Plants and Equipment, Bricks and blocks making, Mortar, Bonding and Concrete*. As for the Painting and Signwriting field, the topics tested included *Safety, Tools, equipment, plants and brushes, Paint and Painting*

material, Water paint and Texture finishes. Lastly, in the field of Plumbing, the topics included *Safety, Tools, Equipment's and plants, Materials*. The students' performance per topic was analysed by computing the percentage of an average score in all the questions under one topic. The average score of questions in each topic are grouped into three classes, namely weak (0 – 29), average (30 – 64) and good (65 – 100).

The students' performance per topic is presented below:

- 3.1 In *Construction materials, Foundation, and Walls* (multiple choice items), the performance was good as the percentage of students who scored the pass mark and above was 68.37 per cent of all valid students.
- 3.2 Based on *Walls* (matching items), students were required to match descriptions against corresponding parts. The performance in this question was generally good as 77.15 per cent scored the pass mark and above.
- 3.3 As for true/false questions based on *Walls* as a topic, students were required to recall the facts presented in the statements. The performance for this question was generally good as 94.15 per cent scored the pass mark and above.
- 3.4 For the question on *Foundation*, the performance was average as only 51.56 per cent of the students were able to score the pass mark and above. This could be attributed to inadequate knowledge on the topic.
- 3.5 For the question based on *Site preparation*, the performance was generally average as 49.72 per cent of the students scored the pass mark and above.
- 3.6 As for the question based on *Walls*, the performance was moderate as only 34.99 percent of the students were able to score a pass mark and above.

- 3.7 As for the question based on *Scaffolding and Shoring*, the performance was generally average as 29.98 percent of the students scored the pass mark and above.
- 3.8 Regulating the question on *Walls*, the performance was poor as only 6.40 per cent of the students were able to score the pass mark and above. This could be attributed to inadequate knowledge on the topic.
- 3.9 Based on surveying, the topics tested included *Introduction to surveying laboratory*, *Surveying Instruments*, *Chain surveying and Chain and Compass Traversing*. The performance for these was generally poor as 21.43 per cent of the students scored the pass mark and no student scored above the pass mark.
- 3.10 As far as Carpentry and Joinery is concerned, the topics tested included *Tools and equipment*, *Machines/plants*, *Timber and Joints*. The performance was generally poor as 9.62 per cent of the students scored a pass mark and no student scored above the pass mark.
- 3.11 The field of Brickwork and Masonry had the topics which included *Tools, plants and equipment*, *Bricks and blocks making*, *Mortar, Bonding and Concrete*. The performance for this was generally average as 50.92 percent of the students scored the pass mark and above.
- 3.12 Painting and Signwriting field contained the topics which included *Safety, Tools, equipment, plants and brushes*, *Paint and Painting material*, *Water paint and Texture finishes*. The performance for those questions was generally average as 38.46 per cent of the students scored the pass mark and no student scored above the pass mark.
- 3.13 The field of Plumbing had topics which included *Safety, Tools, Equipment's and plants*, *Materials*. The performance was generally poor as 15.39 per cent of the students scored the pass mark and no student scored above the pass mark.

4.0 CONCLUSION

The general performance of students in the Civil Engineering paper for 2019 Form Two National Assessment (FTNA) was average.

The analysis of the students' performance has shown that out of the thirteen questions asked, four were performed poorly and the other nine questions were performed well. The students performed well in questions 1, 2, 3, 4, 5, 6, 7, 11 and 12. They had poor performance in questions 8, 9, 10 and 13. Poor performance in these questions indicates that the students had insufficient knowledge on the topics that were supposed to be covered at the level of form two in different areas of specialization including Surveying; Carpentry and Joinery and Plumbing. See Appendix B which shows the performance on each question through charts in three categories; poor, average, and good.

The analysis of students' performance per question indicated in percentages shows that questions on Surveying, Carpentry and Joinery and Plumbing were poorly performed by more than 78% of the students who attempted them. On the other hand, questions 1, 2, 3, 6, 7, 11 and 12 had the performance of 30 to 94 per cent as reflected in Appendices A and B.

This analysis shows that various stakeholders including students, parents, teachers, guardians, educational policy makers and the government has a lot of work to do if the performance is to be improved. This report has shown in summary areas that demonstrated poor mastery and therefore they need emphasis in order to improve the performance. It is expected that this report will act as a catalyst for action among various stakeholders.

5.0 RECOMMENDATIONS

5.1 Recommendations for Students

Based on the performance observed in this analysis, the following recommendations are worth making for students.

- (a) Since it was observed that some students failed to adhere to the demands of the questions they attempted, it is recommended that future students be encouraged to read

carefully the instructions before they can answer the questions.

- (b) Because there are areas where students demonstrated lack of knowledge, it is advised that the future students be encouraged to search; practise and read relevant books/other information sources including the media in order to widen their knowledge on various aspect of the subject.

5.2 Recommendations for Teachers

- (a) To improve performance, teachers should be encouraged to set enough exercises and tests for their students before such students sit for the national assessment. This will give them an opportunity to check problematic areas and rectify them in time.
- (b) Since students demonstrated all signs of having no knowledge on aspects that require prior practical, it is recommended that practical skills be provided to students so that they can relate theories and practice and hence acquire the expected competences.

5.3 Recommendations to government

- (a) Poor performance in civil engineering should be an eye opener for the government to invest more in the subject.
- (b) The government through education quality assures should find out what the challenges are needed immediate action.

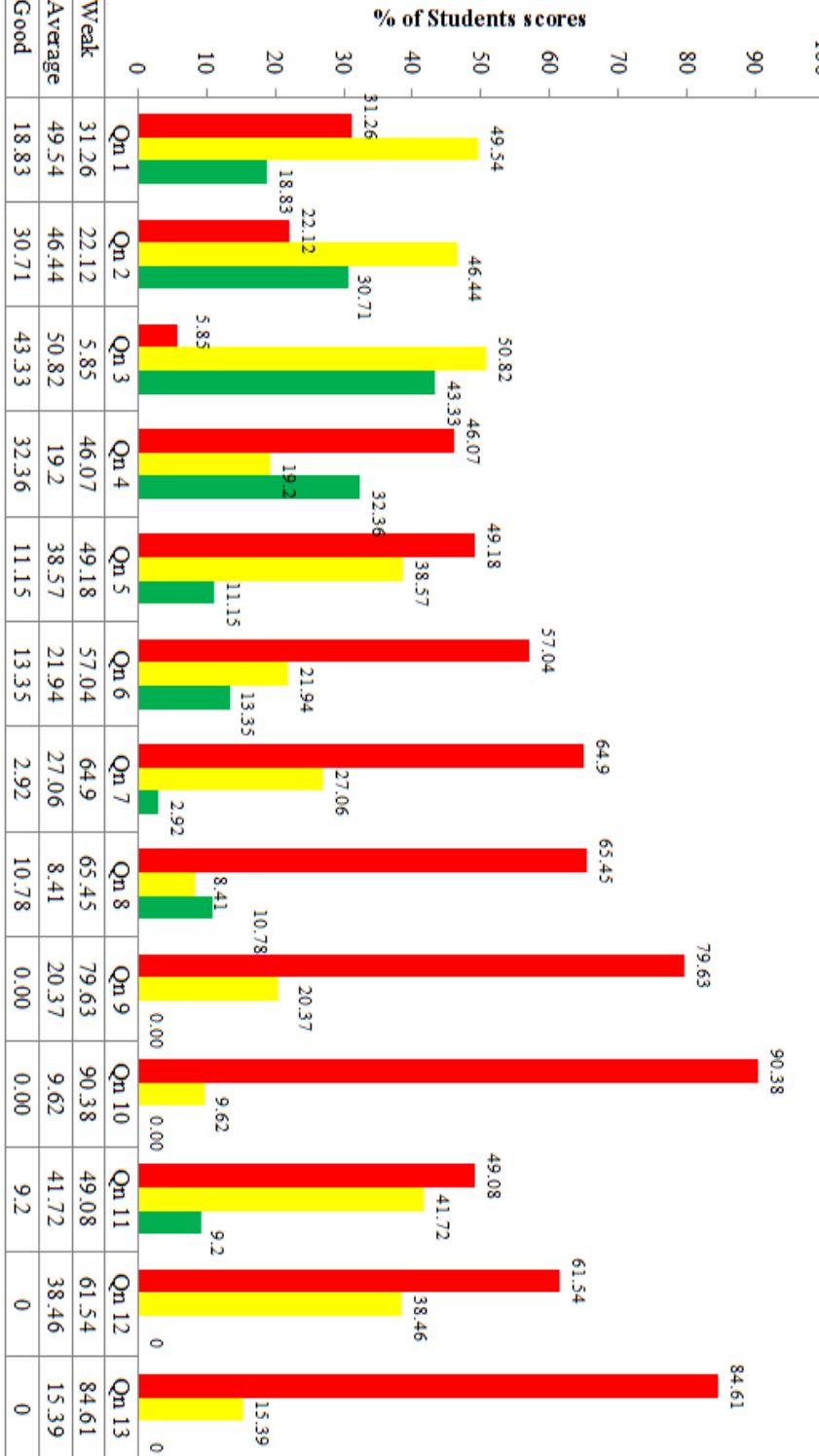
Appendix A

Analysis of the Students' Performance Question-Wise

S/N	Topic	Question Number	Percentage of Students who Scored 30% or More	Remarks
1	Walls	3 (True or false Items)	94.15	Good
2	Walls	2 (Matching Items)	77.15	Good
3	Foundations, walls, Materials (concrete)	1 (Multiple Choice Items)	68.37	Good
4	Foundations	4	51.56	Average
5	Tools, plants and equipment, Brick and block making, Mortar, Bonding and Concrete	11	50.92	Average
6	Site preparation	5	49.72	Average
7	Safety, tools equipment and brushes, Paint and painting materials, and Water paints and Texture finishers	12	38.46	Average
8	Construction Material	6	34.99	Average
9	Scaffolding and shoring	7	29.98	Average
10	Introduction, Surveying instruments, and Chain surveying	9	21.43	Weak
11	Walls	8	19.19	Weak
12	Safety, Tools, Equipment's and plants and Materials.	13	15.39	Weak
13	Tools, equipment and machines, Timber and Joints	10	9.62	Weak

Appendix B

The performance of the student's in 071 CivilEngineering



Questions

