THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

STUDENTS' ITEM RESPONSE ANALYSIS REPORT ON THE FORM TWO NATIONAL ASSESSMENT (FTNA) 2021

BUILDING CONSTRUCTION

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071 BUILDING CONSTRUCTION

Published by
National Examinations Council of Tanzania,
P.O. Box 2624,
Dar es Salaam, Tanzania.

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FOREWORD

The Students' Items Response Analysis (SIRA) report on the Form Two National Assessment (FTNA) 2021 for Building Construction Subject has been written in order to give feedback to secondary school students, teachers, education specialists, policy makers and other stakeholders.

Generally, 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 presentation 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 National Examinations Council of Tanzania presumes that the feedback 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 analyzing the data used in this report.

Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report provides detailed analysis of the performance of the students in Building Construction paper on Form Two National Assessment (FTNA) in 2021. The paper adequately covered the Form Two Syllabus for Technical Secondary School Education issued in 2019 and the paper was set in accordance with the Examination Format of 2021.

The Building Construction Assessment paper had ten (10) questions divided in three sections A, B and C. Section A comprised 2 questions, which are question 1 and 2. Question 1 weight 10 marks and question 2 weight 5 marks, to make a total of 15 marks. Question 1 was a multiple choice which comprised ten items, (i) to (x) drawn from the following topics, Foundation, Building Construction (Site analysis), Materials (plastic and metals), Introduction to Building Construction, Building Construction Science and Technology, Workshop Orientation and Temporary Support (scaffolding).

Question 2 was a matching item and consisted of five items (i) to (v) drawn from the topic of Walls.

Section B comprised of 7 short answer questions whereby each carried 10 marks derived from various topics including Walls, Materials (stone, timber, glass and concrete), Temporary support, and Foundation. Section C comprised of 1 question with 15 marks from the topic of Workshop Practice (Foundation setting out). The students were instructed to answer all questions in all sections.

A total of 508 (97.5%) out of 521 registered students sat for this assessment. Generally, the performance was average as only 31.69% of the students who sat for this assessment passed with average marks and 68.31% failed. The students' performance and distribution of scores is shown in Table 1 and Figure 1 respectively.

Table 1: General Students' Performance in Building Construction Subject

Scores	Remarks	General Students Performance	
		Number	Percentage (%)
0 – 29	Weak	347	68.31
30 - 64	Average	161	31.69
65 – 100	Good	0	0.00
	Total	**508**	**100**

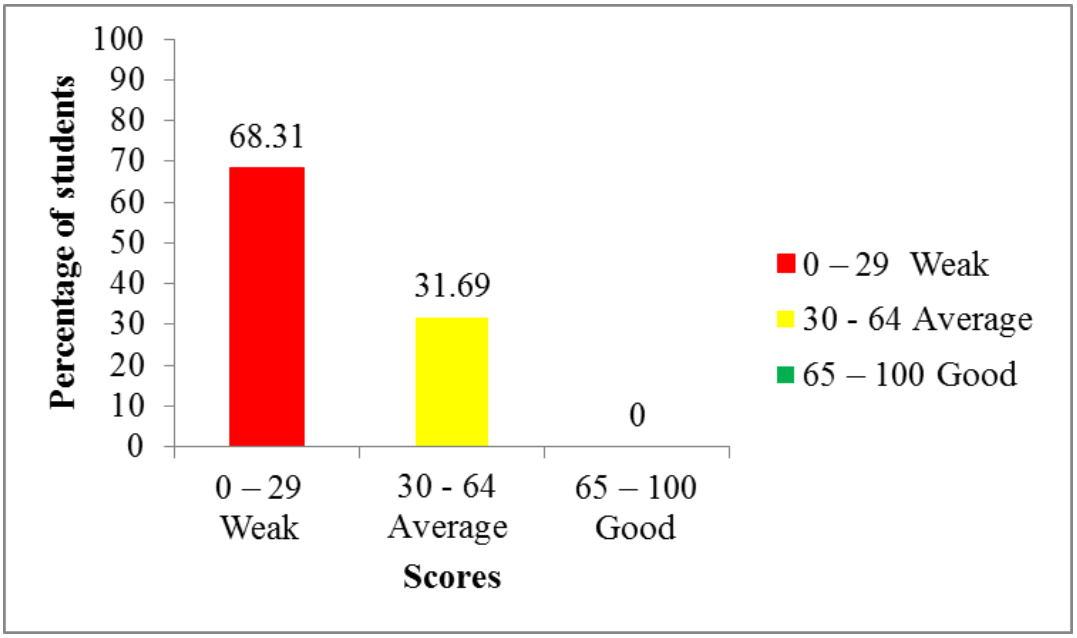


Figure 1: *The Distribution of students' Performance in Building Construction Subject 2021*

Among the students who sat for the Building construction in year 2021, none of them scored grade A and B. Only 19 students (3.74%) scored grade C and 142 (27.95%) passed with grade D. The majority, 347 (68.31%) students failed by obtaining grade F.

During analysis of the requirements of each question, students' strengths and weaknesses in responding to questions are identified. Extracts of the good and poor responses are used to illustrate the cases presented. At the end, conclusion and recommendations has been put forward to help education stakeholders to take necessary measures in improving the prospective students' performance in future assessments.

2.0 THE ANALYSIS OF THE STUDENTS' RESPONSE IN EACH QUESTION

2.1 Section A: Multiple Choice and Matching Items

This section consisted of two questions. Question 1 had 10 multiple choice items each carrying 1 mark to make a total of 10 marks. Question 2 had 5 matching items each carrying 1 mark to make a total of 5 marks. The score ranges used for grading students' performance has been shown on each question. The students were considered passing successful if they scored grade D and above.

2.1.1 Question 1: Multiple Choice Items

The score intervals used for grading students' performance in this question is shown in Table 2. The student's pass mark grade is D and above.

Table 2: Score Range of Students in Question 1

Scores range (marks)	General Performance	
	Remark	**Grade**
0-2	Weak	F
3-6	Average	C - D
7-10	Good	A - B

A total of 508 (100%) students attempted the question, whereby 31 (6.10%) scored 0 to 2 marks, of which 0.8% students scored a 0 mark. A total of 378 (74.41%) students scored 4 to 6 marks while 99 (19.49%) of the students scored 7 to 10 marks.

The general students' performance in this question was good as 93.90% of the students scored above the pass mark. The summary of students' scores in this question is presented in Figure 2.

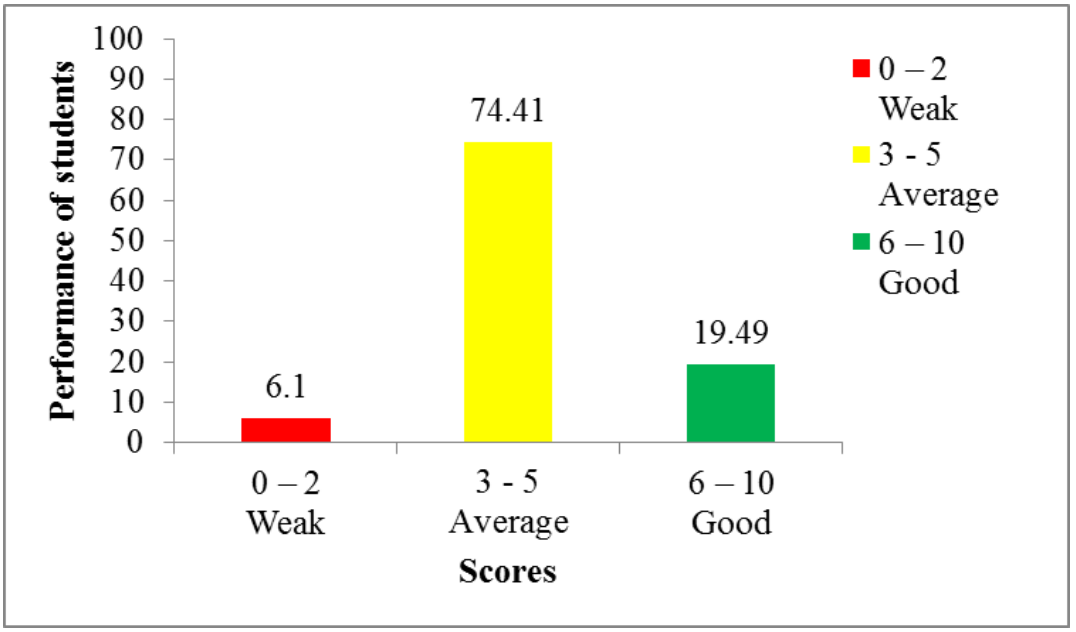


Figure 2: *Students' Performance in Question 1*

The students who managed to score good marks in this question were able to choose the correct option from the given alternatives of the multiple choice items. The items which were correctly responded to by most of the students in this question were; (i), (v) and (ix) constructed from the *Building construction science and technology, Building construction (Site analysis)* and *Workshop orientation* topics.

On the other hand, 6.1 per cent of the students who scored 0 to 2 marks lacked enough knowledge on the evaluated concepts. Most of the students in this group failed to recall the fact on different given statements. Thus, they failed to select correct alternatives. Items (ii) and (iii) on *Introduction to building construction* and *Building Materials* topics were poorly performed as compared to other items in the question.

The strengths and weaknesses of students on the choice of correct responses for individual items in the question is analyed as follows:

(i) How would you categorize the construction works involving water supply, drainage systems, sanitation, electric supply and installation of lifts?

A Building finishes *B Building services*
C Building specification *D Building components*

In item (i), the students were required to sort a group of construction works performed on the buildng site as specific given works. The question intended to measure students' awareness on the building through building science and technology. The correct response for this item was alternetive B, *Building Services*, but a few students opted alternative A, *Building finishes*. In the latter case, students failed to recall the fact that building finishes are done in every individual stage of construction works. Usually any construction project has a collection group of works which are categorized through their nature.

(ii) The portion of a building structure between the ground surface and the floor level immediately just above the ground is known as

A Foundation *B superstructure*
C floor *D plinth*

The item (ii) required the students to identify the part located between the ground surface and the floor level. This item was wrongly responded to the majority of the students who selected B, *superstructure* which was an incorrect response. A superstructure is part of the building constructed above the ground level, this part

of the building consists of wall, roofs, pillars or columns, doors, windows etc, but the part which is *immediately kept just above the ground and it between the ground surface and the floor level known as plinth or plinth beam.* The majority of the students failed in this item seemed to confuse between *Plinth* and alternative B *Superstructure.* Plinth is a thickening at the base of a wall, column or building on which it stands. A plinth can be made with plinth beam which is provided to prevent the extension or propagation of cracks from the foundation into the wall above when the foundation suffers from settlement. A plinth beam is constructed between a substructure and superstructure of a building.

(iii) What is the function of fillers in the moulding composition of plastics?

A To improve mechanical properties.

D To make plastic soft, flexible, flexible and improve toughness.

C To give the required colour to the plastic.

D To facilitate moulding operations by increasing the flow of plastic mix.

In item (iii), students were required to select the function of a mentioned additive which is used to improve certain properties during composition of plastics. Most of the students selected alternative D, *To facilitate moulding operations by increasing the flow of plastic mix*. Students who opted for this alternative lacked knowledge on plastics composition. *To improve mechanical properties*, response from alternative A is the best option due to the fact that the uses of plastics replaced some materials which are used nowadays. The plastics may allow easy and perfect cutting or threading if the mechanical properties of plastics are improved.

(iv) Why lead pipe is not recommended for the domestic water supply system?

A It has corrosive effect. *B It is highly flexible.*

C It has poisoning effect. *D It is light in weight.*

In item (iv), the students performed moderately. The poisoning effect in alternative C was the correct choice. Nowadays most water supply pipe used in our country are plastic pipe including IPS, PPR and PVC pipe, these pipes replaces lead and galvanized pipe. EPA and CDC proved that there is no known safe level of lead in a child's blood and agreed that lead is harmful to health, especially for children. Some students failed to choose the correct answer, because they were not well informed about the efforts made by the health organization to replace the harmful pipes with plastics.

(v) Suppose you are supervising a site preparation for construction of a class room; what will be the first task to be performed on a site?

A Excavation of trenches. *B Timbering to trenches.*

C Back filling. *D Site clearence.*

Item (v) required the students to identify the first task to be performed on the site during site preparation. Site preparation is the set of tasks or activities that are carried out before an engineer commences the construction work. The majority of the students chose the correct answer D, *Site clearance*, but a few students who failed in this item seemed to confuse site preparation with *Site clearance* which was the case in alternative A, *Excavation of trenches.* The first step in constructing a class room or any building is excavation of trenches but before this task is performed the first activity is to clear the site. This activity seems to be more familiar to most of the students due to the fact that it has been a common practice that before commencement of any construction project the site is cleared from any obstacle; including bushes and removing of top vegetable soil.

(vi) Which group of buildings include a Parliament house?

A Sanitaria *B Institutional*

C Assembly *D Mercantile*

In item (vi), the students performed moderately. All four alternatives are building used in different activity such as for treatment, office, educational activities, meeting gathering and commercial. Some of the students chose the correct answer which was alternative C, *Assembly* referred to as the meeting building. On the other hand, some of the students chose alternative B, *Institutional* by referring to public building accommodating a variety of people in different activities. These students were unable to differentiate between the two concepts.

(vii) The weight of all walls, partitions, floors, roofs and other permanent structures in the building are termed as

A Live load *B Dead load*

C Point load *D Effective load*

Item (vii) was also performed moderate. In this item the students were required to select the proper term of the weight subjected to the permanent structures. The correct term used to represent those loads was placed in alternative B, *dead load.* Dead loads are static forces that are relatively constant for an extended time, they can be in tension or compression. Dead loads include the self-weight of walls, floors, beams, columns etc. and also the permanent fixtures present in the

structure. Most of the students chose the correct alternative because that term is familiar to many because is also taught in other engineering subjects. Therefore the students could easily recall by transferring the knowledge and chose the correct answer. However, there were some few students who completely failed in this item because of lack of knowledge and shortage of construction vocabulary.

(viii) What is the disadvantage of tubular scaffold as used in building construction?

A	*Have higher fire resisting qualities.*	*B*	*Are easy dismantling.*
C	*Have high initial cost.*	*D*	*Have greater durability.*

In item (viii), also students performed moderately. The students were required to identify the disadvantage of tubular scaffold as used in building construction. Most of the sudents selected the proper disadvantage of that temporay structure because tubular scaffold is steel structure that initially needs a lot of money to acquire. Therefore the students selected alternative C, *have high initial cost* got correct; that is why middle and small construction company did not afford to use tubular scaffold. Some of them opt to rent instead of buying it due to the high cost implication. However, some of the students failed to select the correct answer, by selecting alternative B, *are easy to dismantling*. In this group, students confused with the word dismantling and misinterpret the statement.

(ix) When some one suddenly falls ill or injured in the workshop, what kind of assistance needed before treatment process?

A	*First aid*	*B*	*Clinical*
C	*Medical*	*D*	*Administration*

In item (ix), students performed very well. The students were tested on safety precautions during operations in the workshop. Majority of students selected the correct alternative A, *First aid*. This term seems to be very familiar to the students because First aid service are found in most public areas in our daily life even in transport facilities like the passangers' bus. However, a few students failed to score good marks, those from this group selected alternative C, *Medical*. This group failed to comprehend due to the fact that all treatments must be attended by a professional personel. In emergency situations during accident the injured person is given first aid care before taken to hospital for the proper treatment.

(x) Excavation of foundation trenches in ground having high water table or water logged area needs to be dewatered. What is the method used for shallow excavation ?

A Well point dewatering system.
B Ditches and sumps dewatering system.
C Vacuum method dewatering system.
D Electro-osmosis method dewatering system.

In item (x), majority of students who attempt this item selected incorrect alternative and most of them selected alternative A, *Well point dewatering system*. The students lacked knowledge on foundation construction specifically on trench excavation where some unusual conditions may arise due to the nature of the soil. The students failed to recall the technique applied when construction is done at the area of high water table or water logged area or in the soil of poor bearing capacity. Alternative B, *Ditches and sumps dewatering system* was the correct answer which was selected by the few students. Ditches is a long, narrow open hole that is dug into the ground, usually at the side of a road or field, used specifically for draining or removing water. Usually water move from higher logged area to lower logged, therefore when dug a trench around the site it causes water to flow towards the trenches, thus the site remains free from the water mass.

2.1.2 Question 2: Matching Items

The question required the students to match items (i - v) in List A with the corresponding responses in List B by writing the letter of the correct response in the table provided. Each item in this question carried 1 mark, making a total of 5 marks. The question was designed to test the students' knowledge about *Walls.* The question was;

List A	***List B***
(i) A wall built with two different materials.	*A Parapet*
(ii) A wall built with two leaves.	*B Composite wall*
(iii) A wall projecting above the roof level.	*C Cavity wall*
(iv) A wall built to support a timber floor.	*D Honey combing wall*
(v) A wall designed to curves in and out along its length.	*E Serpentine wall*
	F Boundary wall
	G Fender wall
	H Fence wall

Answers

List A	*(i)*	*(ii)*	*(iii)*	*(iv)*	*(v)*
List B					

The score ranges used to grade students' performance in this question is presented in Table 3.

Table 3: Score intervals used to grade Students in Question 2

Scores range (marks)	**General Performance**	
	Remark	Grade
0 – 1	Weak	F
2– 3	Average	C - D
4 - 5	Good	A - B

This question was attempted by 508 (100%) students; whereby 254 (50%) scored 0 to 1 mark, of which 111 (21.9%) students scored a zero mark. A total number of 206 (40.60%) scored from 2 to 3 marks while 48 (9.40 %) students' scores from 4 to 5 marks. Only 13 students scored all allotted marks (5) on this question.

The performance on this question was generally of an average as 50 % of the students scored above pass mark. The summary of student's scores is presented in Figure 3.

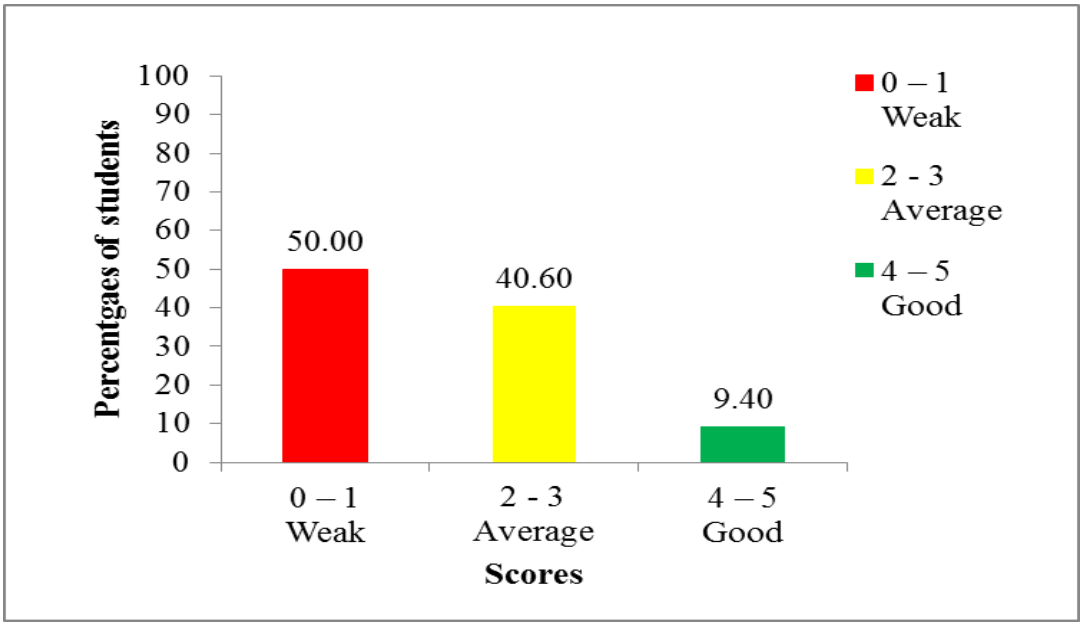


Figure 3: *Students Performance in Question 2*

As shown in Figure 3, 50% of the students scored above pass mark in this question. This might be attributed by enough knowledge on walls regarding their types. In this group the students managed to match correctly two to five descriptions of walls with their corresponding technical names. Extract 2.1 shows a sample of student's good performance in question 2.

List A	List B
(i) A wall built with two different materials.	A Parapet wall
(ii) A wall built with two leaves.	B Composite wall
(iii) A wall projecting above the roof level.	C Cavity wall
(iv) A wall built to support a timber floor.	D Honey combing wall
(v) A wall designed to curves in and out along its length.	E Serpentine wall
	F Boundary wall
	G Fender wall
	H Fence wall

Answers

List A	(i)	(ii)	(iii)	(iv)	(v)
List B	B	C	A	D	E

Extract 2.1: A sample of correct responses on Question 2

However, the rest of the students scored below pass mark of which 21.9% of the students scored a zero mark and 28.9% scored greater than zero but not more than 1 mark. This shows that some of the students were not well informed about the types of walls hence they failed to match the descriptions listed in List A with their correct technical names of walls listed in List B. Extract 2.2 shows a sample of a poor responses on question 2.

List A	List B
(i) A wall built with two different materials.	A Parapet wall
(ii) A wall built with two leaves.	B Composite wall
(iii) A wall projecting above the roof level.	C Cavity wall
(iv) A wall built to support a timber floor.	D Honey combing wall
(v) A wall designed to curves in and out along its length.	E Serpentine wall
	F Boundary wall
	G Fender wall
	H Fence wall

Answers

List A	(i)	(ii)	(iii)	(iv)	(v)
List B	F	D	H	E	C

Extract 2.2: A sample of the incorrect responses on Question 2

2.2 Section B: Short Answer Questions

This section consisted of seven (7) questions (from question 3 to 9), each carrying 10 marks. The score intervals used for grading the performance of students in this section is as indicated in Table 4.

Table 4: Score intervals used to grade Students' Performance in Questions 3 to 9

Scores range (marks)	General Performance	
	Remark	Grade
0 – 2.5	Weak	F
3 - 6	Average	C - D
6.5 - 10	Good	A - B

2.2.1 Question 3: Walls – Partition walls

This question required the students to (a) give four functional requirements of partition walls (b) describe four types of partition walls based on the materials of construction.

The question was attempted by 508 (100%) students; whereby 384 (75.59%) students scored 0 to 2.5 marks out of which, 43.5% students scored a 0 mark. A total number of 74 (14.57%) students scored from 3 to 6 marks whereas 50 (9.4%) students scored from 6.5 to 10 marks. None of the students scored full allotted 10 marks.

The performance in this question was generally weak as 75.59% of the students scored below the pass mark as summarized in Figure 4.

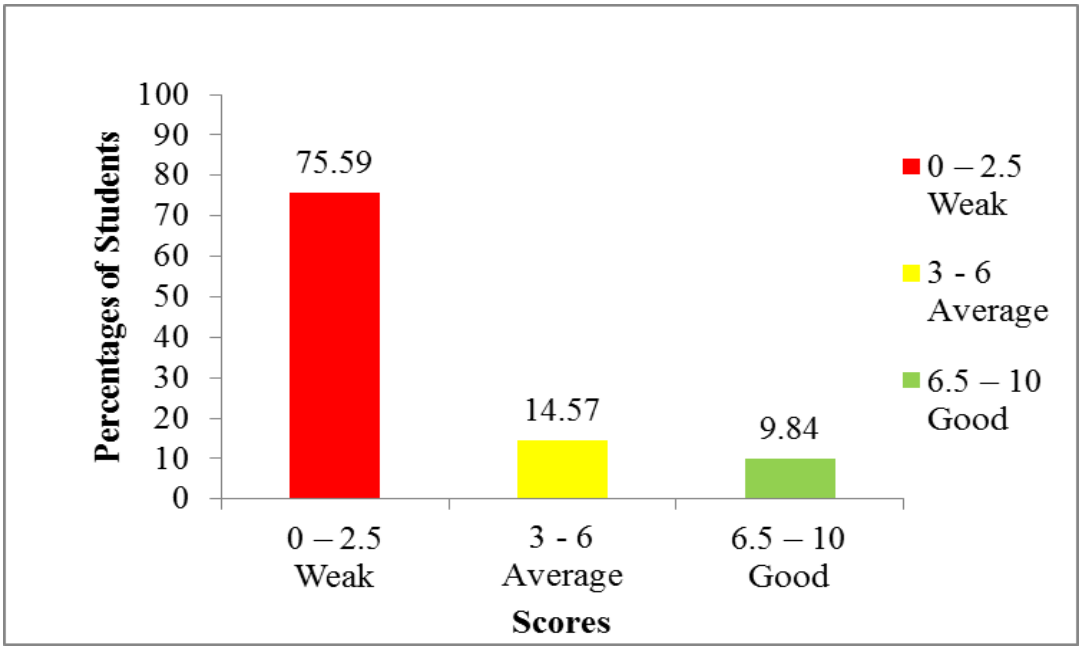


Figure 4: *Students Performance in Question 3*

The analysis shows that, 75.59% of the students failed to explain functional requirements as well as to describe the types of partition walls regarding to materials used. Generally, the students who failed in this question lacked knowledge on walls as they wrote irrelevant materials. Some of them tried to recall the general knowledge of wall requirements but failed to deliver the required responses and others simply copied the type of walls from question 2 and described it wrongly as depicted in Extract 3.1.

3. Walls of different types made up of different materials are adopted in construction of buildings to save various functions.

(a) What are the four functional requirements of partition walls?

(i) Brick:

(ii) Blocks:

(iii) Concreate:

(iv) Water.

(b) Briefly describe four types of partition walls based on the materials of construction.

(i) Cavity wall – This is the type of wall- built by different types of materials.

(ii) Composite wall – These are walls that composes two or more than two leaves.

(iii) Ferder wall – Is the type of wall placed around the roof.

(iv) Serpenite wall – Is the wall build to support- timber flow.

Extract 3.1: A sample of an incorrect response on Question 3

In Extract 3.1 a student could neither recall any function of walls nor describe the four types of walls basing on the materials of construction as required.

Despite high rate of failure of students in attempting this question, some of them were able to score the pass mark and above. These students demonstrated knowledge on walls, and produced relevant responses for the partition walls requirements. They also managed to describe four types of partition wall basing on the materials of construction as depicted in an Extract 3.2.

3. Walls of different types made up of different materials are adopted in construction of buildings to save various functions.

(a) What are the four functional requirements of partition walls?

(i) Partition walls should prevents water from penetrating inside the room

(ii) Partition walls should divide an areas into rooms

(iii) Partition walls should be sound insulation

(iv) Partition walls should be thermal insulation

(b) Briefly describe four types of partition walls based on the materials of construction.

(i) Timber / Wood partition walls:
These are walls which are made up of timbers which are diviziing the areas into rooms:

(ii) Glass partition walls:
These are walls which are made up of glass which are dividing the areas into rooms

(iii) Brick partition walls:
These are walls which are made up of bricks which are also dividing the areas to get into rooms:

(iv) Block partition walls:
These are walls which are made up of blocks which are also dividing the areas to get into rooms

Extract 3.2: A sample of correct responses on Question 3

Extract 3.2 shows a sample of the response from one of the students who was able to give the function of walls. Also, he/she was able to describe the four types of walls basing on the materials of construction.

2.2.2 Question 4: Materials - stones

The question required the students to (a) mention four reasons that make stone be useful construction material, (b) describe three types of stones used in construction of buildings. In part (c) to identify three conditions that deteriorates stones and each show how it deteriorates the stones.

This question was attempted by 508 (100%) students, whereby 351 (69.10%) students scored 0 to 2.5 marks. The students' who scored from 3 to 6 marks were 152 (29.92%) and 5 (0.98%) students scored from 6.5 to 10 marks.

Generally, the students' performance in this question was average as 30.90% students scored above the pass mark as summarized in Figure 5.

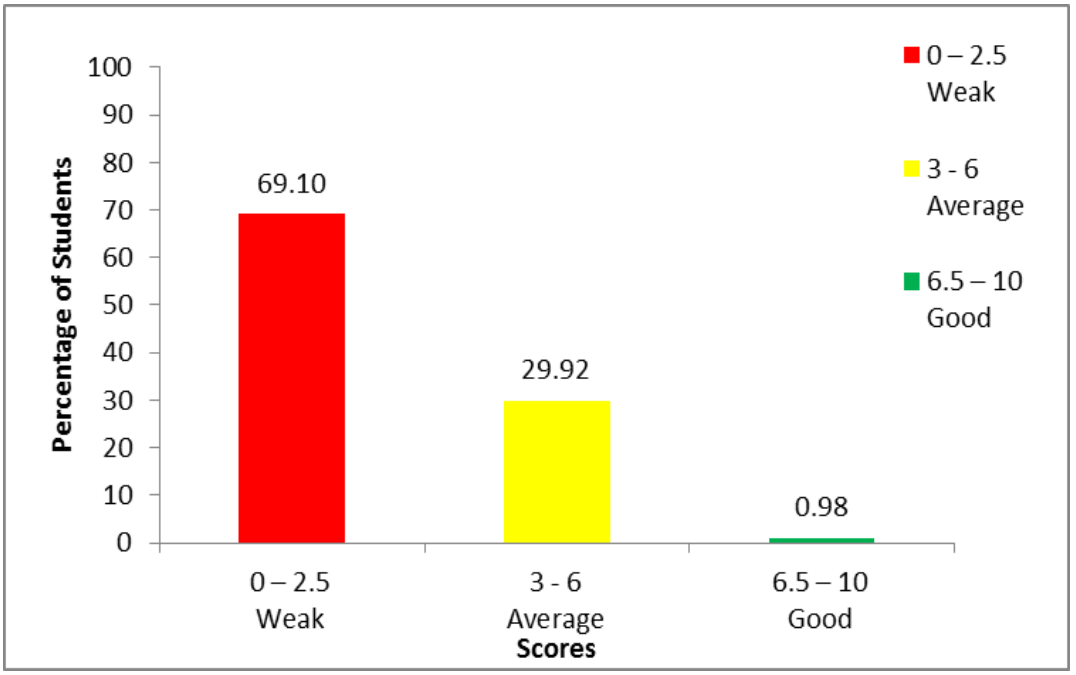


Figure 5: *Students Performance in Question 4*

Majority of the students, (69.10%) failed in this question. The massive failure of the students' in this question was due to the fact that they failed to give reasons of why stones are used as construction material. Not only that but also, the students failed to describe three types of stones used in building construction which are igneous rocks, metamorphic rocks and sedimentary rocks. Finally, they failed to identify three conditions which lead to stone deterioration and how deterioration takes place. Most of the students in this group wrote irrelevant responses and some of them just copied the question and wrote as their responses as depicted on the Extract 4.1.

4. (a) Stones are building material used since ancient time. What are the four reasons that make stone being useful construction material?

(i) Used ~~buing~~ building

(ii) make used of three types of building.

(iii) Used people are water.

(iv) reason.

(b) Briefly describe three types of stones used in the construction of buildings.

(i) building specification.

(ii) building components.

(iii) building finishes. or uses water people show that. deteriorates

(c) Identify three conditions that deteriorates stones and in each show how it deteriorates the stone.

(i) U that water Mangio show people which your building. based on molecular what is building used wash.

(ii) main what is building people a two that pa'ts.

(iii) Are easy initial cost.

Extract 4.1: A sample of an incorrect response on Question 4

Extract 4.1 elaborates a sample of responses by the student who was not conversant with building materials specifically stones. The student was not able to responds correctly in all parts of the question.

However, 30.90% of the students managed to score at an average or above the average marks. Extract 4.2 shows an example of a response by the student who attempted the question and produced relevant responses.

4. (a) Stones are building material used since ancient time. What are the four reasons that make stone being useful construction material?

(i) Because stones are more stronger and stable.

(ii) Because stones are durable / they have durability.

(iii) Because stones are fire and weather resistance.

(iv) Because stone bonds are more attractive.

(b) Briefly describe three types of stones used in the construction of buildings.

(i) STONES from IGNOUS ROCKS:
- Are stones obtained from Ignous rocks they can form a bonds such as Ashlar, Flints and rubble usually on masonry work.

(ii) STONES from SEDMENTARY ROCKS-
These are stones obtained from sedmetary rocks they can form a flints, Ashlar or Rubble bonding on masonry work.

(iii) STONES from METAMOPHIC ROCKS.
- That are stones obtained from metamophic rocks. They can be an Ashlar bond, flints, Rubble bond on masonry work

(c) Identify three conditions that deteriorates stones and in each show how it deteriorates the stone.

(i) FIRE CONDITIONS when stones are put on fire they can break up so to affect its workability.

(ii) WEATHER CONDITIONS it can deteriorates the stone because it can also affect the stability of stones.

(iii) THE NATURE OF ROCK WHERE IT IS OBTAINED. there is rocks that are stable and durable in nature and there is also weakest rocks.

Extract **4.2:** A sample of the best responses on Question 4

Regarding to the analysis conducted, Extract 4.2 shows a sample of responses by the student who managed to provide the required responses in this question and scored reasonable marks. The students wrote the correct reasons that make stone to be useful in construction works. Also he/she was able to describe the types of stones and the conditions to be avoided for the stone to be safe.

2.2.3 Question 5: Temporary support – Shoring and Scaffolding

In this question, the students were required to (a) briefly explain with the aid of well labeled sketches the three types of shoring to be used in a building of two floors which requires temporary support for the construction process to be continued and (b) state why scaffolding is needed to accomplish the work.

This question was attempted by 487 (95.87%) students; whereby 472 (96.92%) students scored from 0 to 3 marks out of which 46.51% scored a 0 mark. A total number of 15 (3.08%) students scored from 4 to 6 marks while none of the students scored between 7 to 10 marks.

The performance in this question was generally poor as a few students who attempted the question scored average marks. The trend of students' performance in this question is summarized in Table 5.

Table 5: General Students' Performance in Question 5

Scores Range (marks)	Remark	Students	
		Number	**Percentage (%)**
0 – 2.5	Weak	482	94.88%
3 – 6	Average	26	5.12 %
6.5 - 10	Good	00	0.00%
TOTAL		**508**	**100.00%**

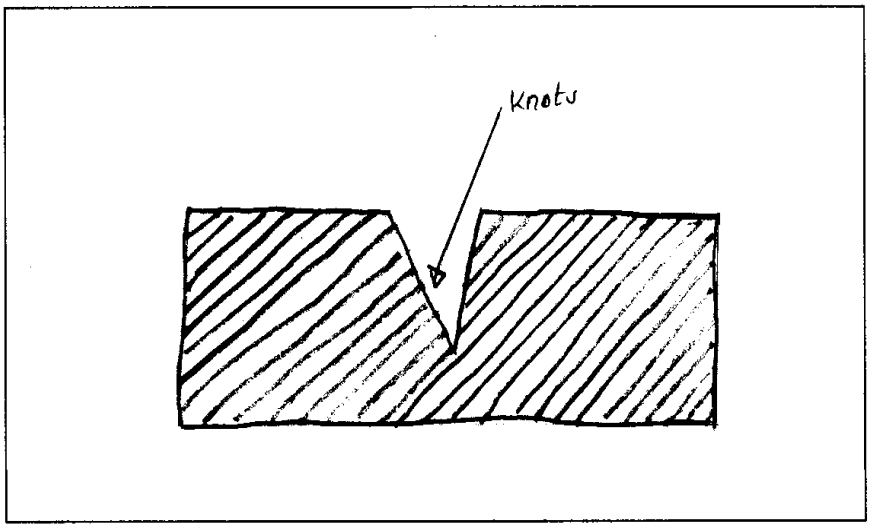
Table 5 shows that, most of the students (94.88 %) scored below pass mark. These students seem to have deficiency knowledge regarding the topic of temporary support. They were not able to sketch, label, and explain three types of shoring. They also failed to give the reason why scaffold is needed to accomplish the work. Majority of students wrote irrelevant responses in both parts (a) and (b). They either copied the questions and wrote as their responses or wrote explanations which were not asked as shown in Extract 5.1. The extract shows responses given by one of the students from this group who wrote the defect of timber rather than drawing and writing proper types of shores.

5. You visited a site where a building of two floors requires temporary supports for the construction process to be continued.

(a) With the aid of a well labeled sketch, briefly explain three types of shoring to be used.

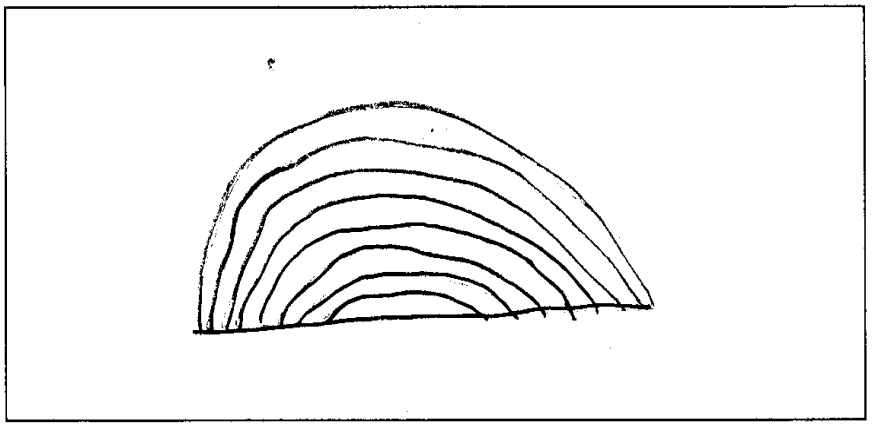
(i) Knots

The used for timber was the shoring which the floor which the tempodary for site.



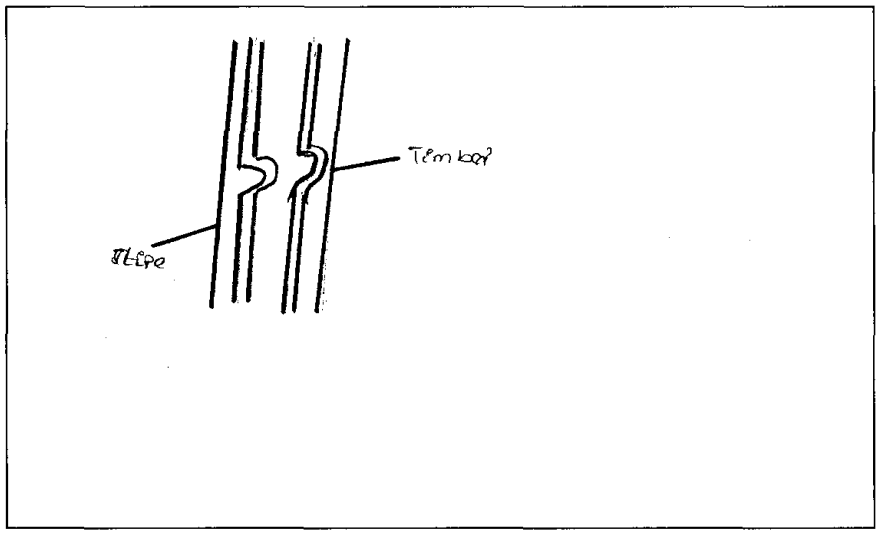
(ii) Dected shoring

The dotect of timbai which the shoring of the constructing building.



(iii) Timber shoring

The shoring which the effect of the timber with deals constructing.



(b) Why scaffold is needed to accomplish the work?

Is a work of constructing building which the temporary structure which used for time.

Extract 5.1: A sample of incorrect responses on Question 5

Extract 5.1 illustrates poor responses given by one of the students from this category who wrote the defect of timber rather drawing and writing proper types of shores. The students also failed to give the reasons which substantiate the needs of scaffolds during construction works.

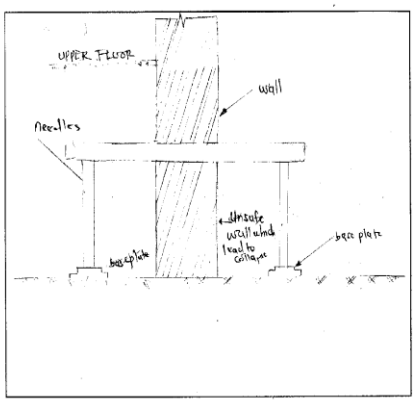
Despite the poor performance of the students, few of them (5.12%) managed to give good responses in some parts of the question and hence they were able to score within the pass mark margin. Unfortunately, none of the students scored above average marks in this question. Extract 5.2 is a sample of responses from one of the students who produced good response in the part of this question.

5. You visited a site where a building of two floors requires temporary supports for the construction process to be continued.

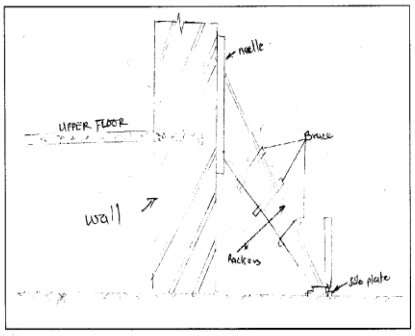
(a) With the aid of a well labeled sketch, briefly explain three types of shoring to be used.

(i) Dead shoring

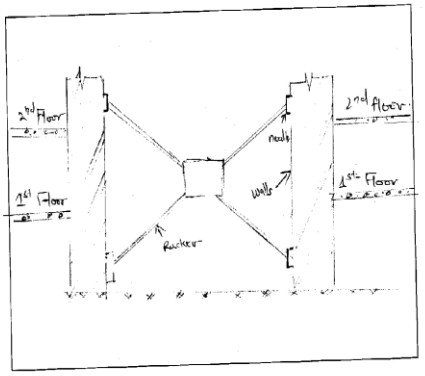
Is a type of shoring which is constructed to support unsafe structure. It is usually support inwards or outward walls.



(ii) Rucking shoring is the type of shoring which consists of rackers which is used to support unsafe temporary structures



(iii) Flying shoring is the type of shoring which is used to support unsafe internal walls.



(b) Why scaffold is needed to accomplish the work?

Because Scaffold is used to support the workers and materials above the ground surface during constructions.

Extract 5.2: A sample of correct responses on Question 5

Extract 5.2 shows a sample of response from one of the students who had enough knowledge on temporary support used in construction works. He/she also gave the needs of scaffolding for accomplishment of the works.

2.2.4 Question 6 : Materials - Timber

In this question, the students were required to (a) state factors which determine the quality timber and (b) give four qualities of good timber.

A total of 508 (100%) students attempted this question, whereby 383 (75.39%) students scored from 0 to 2.5 marks, of which 215 (42.3%) students scored a 0 mark. However, 121 (23.82%) students scored from 3 to 6 marks and 4 students (0.79%) scored from 6.5 to 10 marks.

The performance in this question was generally poor as only 24.61% of the students scored above the pass mark as summarized in Figure 6.

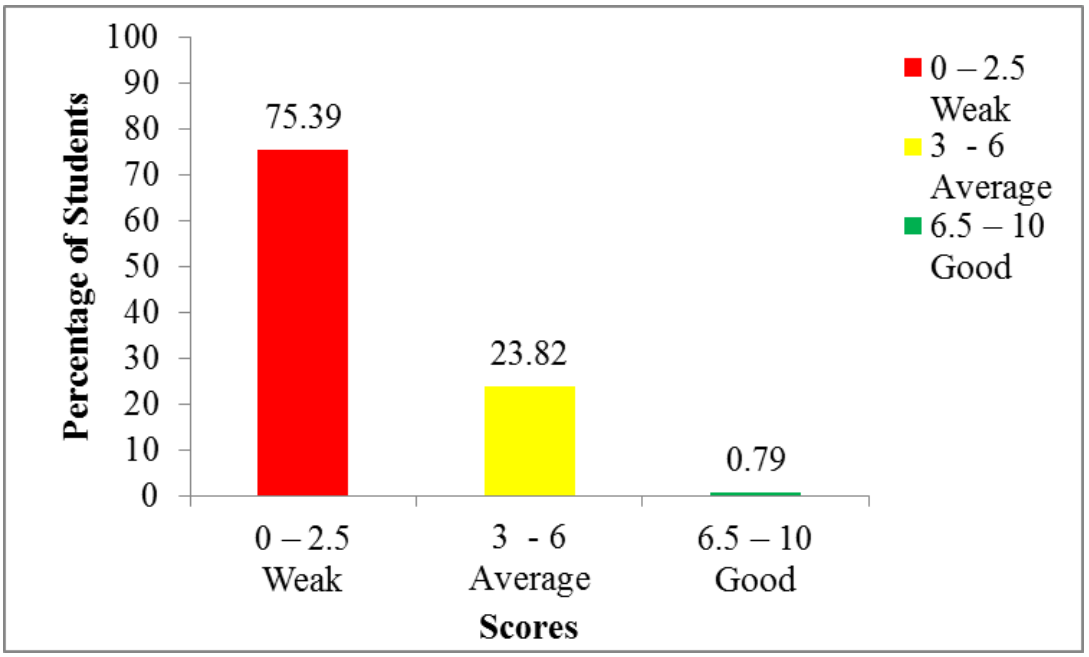


Figure 6: *Students Performance in Question 6*

The analysis shows that, 75.39% of the students scored below pass mark. These students did not comprehend with the requirements of the question. Majority of them confused the factors to be considered in choosing the quality timber which is taught in topics of site clearance and foundation trenches. Instead the students wrote the uses of timber during site clearance and excavation of trenches as depicted in Extract 6.1 which illustrates a response from a sample script of one of students.

6. A constructor asked you to purchase timber for construction works.
   (a) What factors will you consider in making a choice of the quality timber?
      (i) Timbering of to trenches.
      (ii) Excavation of trenches.
      (iii) Back filling
      (iv) Site clearance
   (b) What are the factors that you will observe in deciding the quality of timber to choose? Give four factors.
      (i) timbering to trenches.
      (ii) Site clearance
      (iii) Back filling
      (iv) Excavation of treanches

Extract 6.1: A sample of an incorrect response on Question 6

Extract 6.1 displays the sample responses of the students who failed to provide relevant responses on this question. In this sample, a student provided the uses of timber materials during construction works or the areas where timber can be used.

However, there were some students (24.61%) who scored the pass mark and above. Such students managed to give a correct response on factors that should be considered in making a choice of the quality timber which are colour, cost, appearance, and durability. Extract 6.2 shows a sample of responses by one of the students who was able to respond correctly on the question asked.

6. A constructor asked you to purchase timber for construction works.
   (a) What factors will you consider in making a choice of the quality timber?
      (i) Colour
      (ii) Cost
      (iii) Appearance
      (iv) Durability
   (b) What are the factors that you will observe in deciding the quality of timber to choose? Give four factors.
      (i) Method of seasoning.
      (ii) Type of the tree.
      (iii) Time of felling.
      (iv) Maturality of the tree.

Extract 6.2: A sample of correct responses on Question 6

Extract 6.2 shows a sample response from one of the students who was able to produce the relevant responses in many parts of the question and hence scored good marks.

2.2.5 Question 7: Materials - Glasses

In this question, the students were required to (a) give reasons of using glasses in the building and (b) give six types of glasses that can be used in the building and show how they differ from one another.

This question was attempted by 508 (100%) students out of which 422 (85.36%) students scored from 0 to 2.5 marks. The students who scored from 3 to 6 marks were 69 (13.58%) while only 4 (0.76%) students scored from 6.5 to 10 marks. The performance in this question was generally poor as 14.37% of the students who attempted this question scored pass marks and above it. The trend of students' performance in this question is summarized in Table 6.

Table 6: General Students' Performance in Question 7

Scores range (marks)	General Students Performance	
	Number	Percentage (%)
0 – 2.5	435	85.63%)
3 – 6	69	13.58%
6.5 - 10	4	0.79%
TOTAL	**508**	**100**

The analysis shows that, majority of the students (85.63%) scored below pass mark. The students failed to give reasons of using glasses in the buildings. They also failed to give six types of glasses that can be used in buildings. They were not able to explain that glasses are used for aesthetic purposes, decoration and emitting light. Types of glasses used in the buildings include obscured glasses, wired glasses, and plain glasses among others. Failing to provide those responses, shows that students had either little or no knowledge on the topic. Despite the fact that nowadays the glass is highly used in Tanzania, but it seems the knowledge of using this materials is still very low to stakeholders, thus why students didn't manage to produce relevant responses on this question.

Only 14.37% of the students who attempted this question managed to score a pass mark and above it, as they managed to produce relevant responses. However, none of the student in this group scored full allotted marks. These students demonstrated practical knowledge regarding glasses as materials used in construction buildings. Sample of students' poor and good responses are shown in Extract 7.1 and 7.2 respectively.

7. Nowadays glasses are used as part of building components.

(a) Why someone should opt for glasses in the building?

(i) some glasses they reduce bearing capacity of the soil.

(ii) Some glasses are not durable

(iii) Some glasses are broken down by fungi which reduces durability of glasses.

(iv) Some glasses are very soft

(b) Give six types of glasses that can be used and show how they differ from one another.

(i) Tropical glasses

(ii) Equitorial glasses.

(iii) Savana ~~glasses~~ glasses.

(iv) Mediterania glasses.

(v) Hot desert glasses.

(vi) Tundra glasses.

Extract 7.1: A sample of an incorrect response on Question 7

Extract 7.1 displays a sample response from one of the students who attempted this question but failed to produce relevant responses. A student failed to mention any correct reason of opting a glass during construction of a building. Also he/she failed to mention any type of glasses commonly used and how they differ.

7. Nowadays glasses are used as part of building components.

(a) Why someone should opt for glasses in the building?

(i) Glass is used for aesthetic purpose.

(ii) Glass is used for decoration purpose.

(iii) Glass is used for internal work.

(iv) Glass is used in emitting light inside and letting air pass through.

(b) Give six types of glasses that can be used and show how they differ from one another.

(i) Tinted glass - this is the type of glass which does not show the other side if it opaque in one side.

(ii) Obscured glass - this is a type of glass which differs because it is obscured.

(iii) Coloured glass - this type of glass is coloured it differs from other.

(iv) Flat glass - this type of glass is flat it is different from others.

(v) Wired glass - this type of glass is wired it is different from other.

(vi) Plain glass - this type of glass is normal it's just a plain sheet of glass.

Extract 7.2: A sample of a correct response on Question 7

Extract 7.2 shows a sample of responses by one of the students who provided relevant responses. He/she was able to mention the reasons that can make someone to opt glasses in buildings as well as to give six types of glasses commonly used and how they differ from others.

2.2.6 Question 8: Materials - Concrete

The question required the student to identify four stages or procedures of making concrete.

This question was attempted by 508 (100%) students out of which 283 (55.71%) students scored from 0 to 2.5 marks, 143 (28.15%) students scored from 3 to 6 marks while 82 (16.14%) students scored from 6.5 to 10 marks. Only 8.2% of the students were able to score full mark.

Generally, the performance was average as 44.29% of the students who attempted this question scored above the pass mark. The trend of students' performance in this question is as summarized in Figure 7.

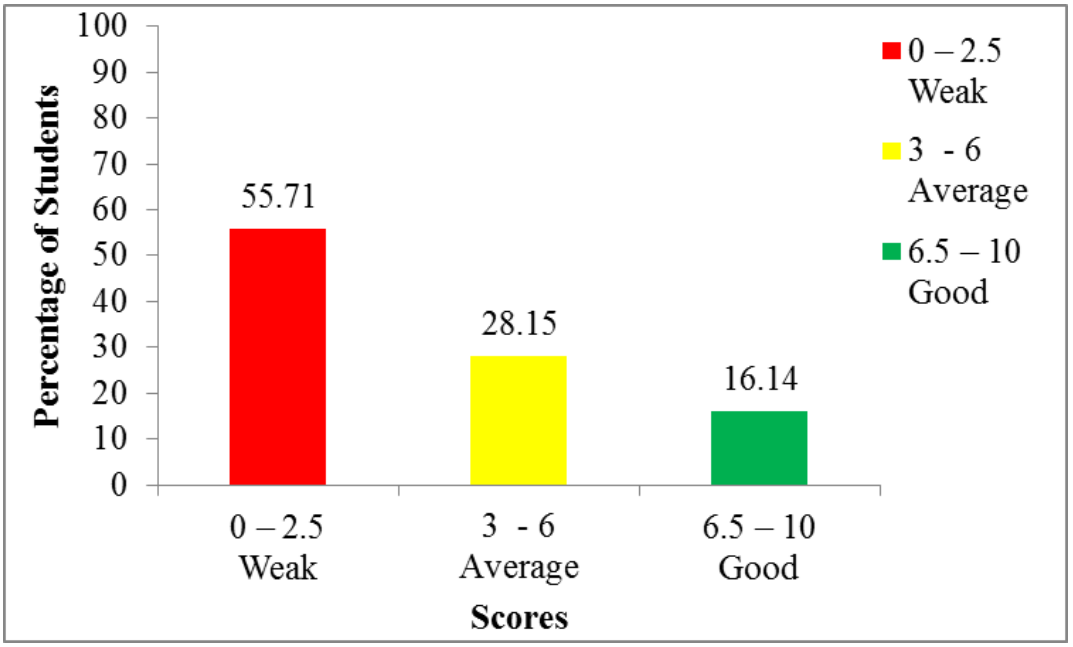


Figure 7: *Students Performance in Question 8*

Figure 7 shows that, 55.71% of the students were not able to score above pass mark in this question. On the other hand, 44.29 % of the students managed to score a pass mark and above. Most of the students who scored below pass mark produced irrelevant responses on appropriate procedures of making concrete. Normally, the processes of making concrete passes through five steps from first step of batching, mixing, transporting, placing and lastly compacting. The students in this category lacked adequate knowledge on the tested concepts. They presumed that marking concrete is just the mixing of cement, fine aggregate, coarse aggregate with water, but in reality the procedures for making concrete starts with batching to the last step of compacting. Most of the students ended up writing how they can mix a concrete through cement, fine aggregate, coarse aggregate with water and forgotten the technical concepts in the process of making concrete as depicted in Extract 8.1.

8. You are at a construction site where there is an argument concerning the appropriate procedures for making concrete. Identify five stages of making concrete.

(i) Concrete sand and soil

(ii) Exacation
exacation of foundation trencher in ground having high water table or water logged are needs to be dewatered.

(iii) water
is adopted materials are adopted in Construction of building to have various function

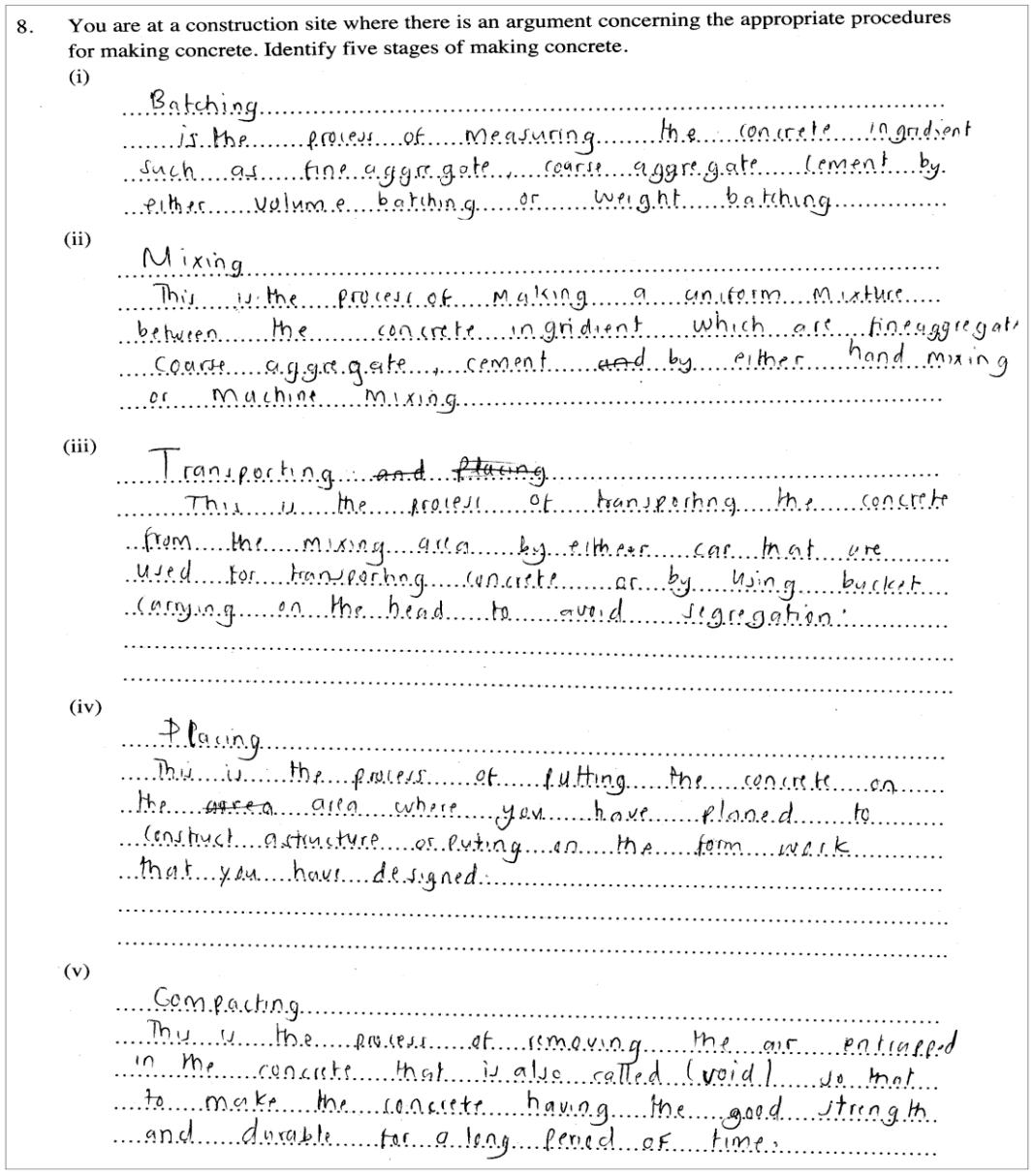
(iv) Suppose you are supervising a site preparation for building par construction Excavation of trencher Timbering to trencher site clearance

(v) lead pipe recommended par the domestic water supply To facilitate moulding operations by increasing the flow of mixing materials

Extract 8.1: A sample of an incorrect response on Question 8

Extract 8.1 shows a sample responses of one of the students who failed to identify the five appropriate stages in making concrete and hence scored zero. Instead of answering the questions, he/she listed the ingredients of concrete without explanations.

On the other hand, Extract 8.2 shows one of the good responses among the students who managed to identify clearly the steps on concrete making process. This indicates that the students had enough knowledge regarding the steps on concrete mixing.


8. You are at a construction site where there is an argument concerning the appropriate procedures for making concrete. Identify five stages of making concrete.

(i)
Batching
is the proces of measuring the concrete ingridient such as fine aggregate, coarse aggregate, cement by either volume batching or weight batching

(ii)
Mixing
This is the proces of making a uniform mixture between the concrete ingridient which are fineaggregate, coarse aggregate, cement and by either hand mixing or machine mixing

(iii)
Transporting ~~and Placing~~
This is the proces of transporting the concrete from the mixing area by either car that are used for transporting concrete or by using bucket carrying on the head to avoid segregation.

(iv)
Placing
This is the proces of putting the concrete on the ~~area~~ area where you have planed to construct a structure or puting on the form work that you have designed.

(v)
Compacting
This is the proces of removing the air entrapped in the concrete that is also called (void) so that to make the concrete having the good strength and durable for a long period of time.

Extract 8.2: A sample of a correct response on Question 8

Extract 8.2 shows a sample of the response by one of the students who was able to identify the five appropriate stages of making concrete.

2.2.7 Question 9: Foundation

In this question the students were required to (a) mention four functions of foundation to be considered in the construction of a school toilet and (b) outline six factors which will cause a foundation to fail.

This question was attempted by 508 (100%) students, whereby 288 (56.70%) students scored from 0 to 2.5 marks. A total number of 189 (37.20 %) students scored from 3 to 6 marks while 31 (6.10%) students managed to score from 6.5 to 10 marks.

Generally, the performance on this question was average as 43.30% of the students scored above the pass mark.

The trend of students' performance in this question is as summarized in Figure 8.

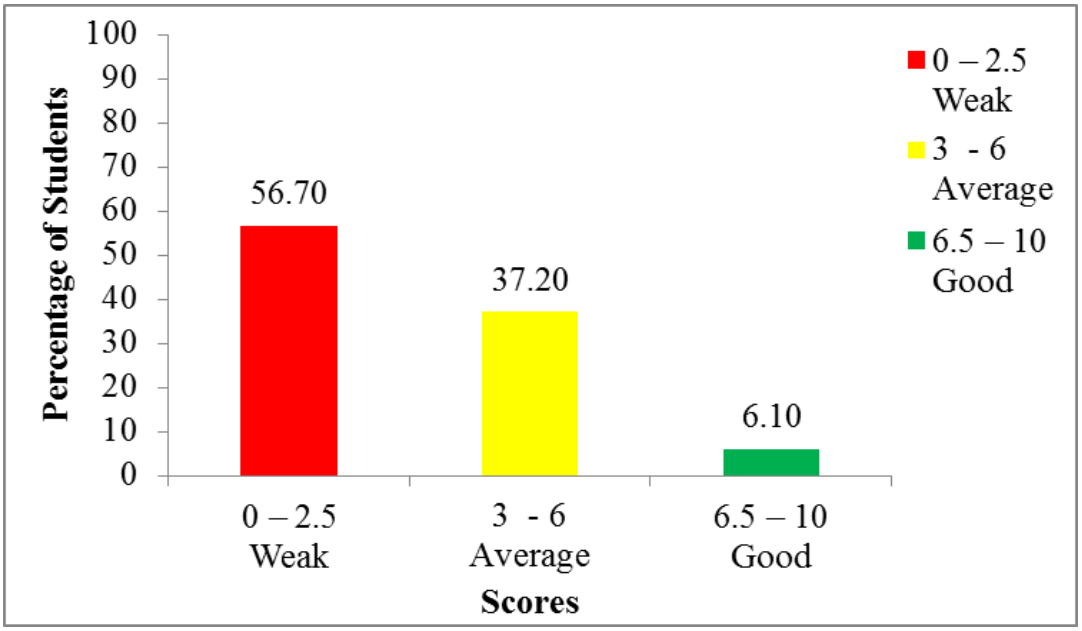
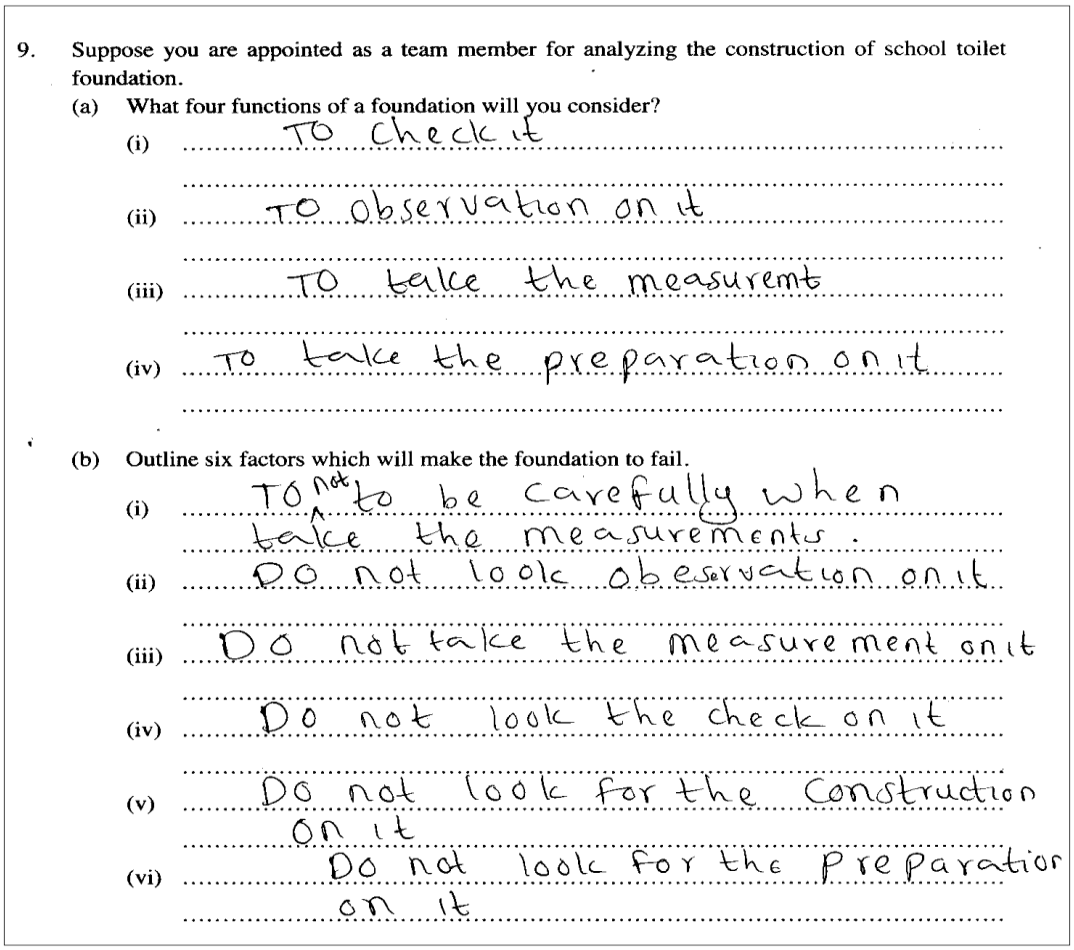


Figure 8: *Students' Performance in Question 9*

Figure 8 shows that, 56.70 percent of the students failed to score the pass mark. These students failed in either all or a great part of the question by writing irrelevant responses contrary to the demand of the question. Some of the students failed not only to mention four functions of foundation but also to outline six factors which may cause a foundation failure. As it has been the case, some of the students in this question wrote irrelevant responses or copied the questions and wrote them as an answer. The question was derived from features of a lower part

of the building (substructure), which was assumed to be familiar to everyone. In contrary most of the students didn't make it which indicates that they missed the basic knowledge on foundation, hence they failed to write any function or causes of the foundation failure. Extract 9.1 shows, the irrelevant responses given by one of the students.



9. Suppose you are appointed as a team member for analyzing the construction of school toilet foundation.

(a) What four functions of a foundation will you consider?

(i) TO check it

(ii) TO observation on it

(iii) TO take the measurent

(iv) TO take the preparation on it

(b) Outline six factors which will make the foundation to fail.

(i) TO not to be carefully when take the measurements.

(ii) DO not look observation on it

(iii) DO not take the measurement on it

(iv) DO not look the check on it

(v) DO not look for the construction on it

(vi) DO not look for the preparation on it

Extract 9.1: A sample of an incorrect response on Question 9

Extract 9.1 shows a response from one of the students who failed to give any correct function of a foundation. Also he/she failed to outline the factors that may cause a foundation to fail.

However, some of the students (43.30%) managed to answer the question correctly. Thus, they were able to score average and above pass mark. Those students seem to have adequate knowledge on the functions and causes of foundation failure. Extract 9.2 shows one of the correct responses provided by a student.

9. Suppose you are appointed as a team member for analyzing the construction of school toilet foundation.

(a) What four functions of a foundation will you consider?

(i) In order to provide a level surface of a building

(ii) To supply the weight of the building to the sub-soil

(iii) To provide a base for a building

(iv) To support the walls of the building

(b) Outline six factors which will make the foundation to fail.

(i) Weather effect

(ii) Poor bearing capacity of the soil

(iii) General earth movement

(iv) Over loading

(v)

(vi)

Extract 9.2: A sample of a correct response on Question 9

Extract 9.2 shows a sample of response from one of the students who demonstrated to have adequate knowledge on foundation as an important part of a building. Also he/she managed to outline some factors that may cause a foundation to fail as a result he/she scored good marks.

2.3 Section C: Structured Question

This section consisted of one (1) question, carrying 15 marks. The score ranges used for grading the performance of students in this section is as indicated in Table 7.

Table 7: Score Ranges for Students' Performance in Questions 10

Scores range (marks)	General Performance	
	Remark	Grade
0 – 4	Weak	F
4.5 – 9.5	Average	C - D
10 - 15	Good	A - B

2.3.1 Question 10: Workshop Practice – Foundation setting out

The question had three parts, part (a) required the students to describe two main activities that should be done on site before the commencement of setting out the building. Part (b) required the students to describe, with the aid of well labeled sketches, the procedures which should be followed in the site setting out, and part (c) to show, in a site plan measured 15m x 10m; a well labeled sketch plan with six necessary site accommodation services.

This question was attempted by 508 (100%) students; whereby 353 (69.50%) students scored from 0 to 4.5 marks. A total of 155 (30.50%) students scored from 5 to 10 marks while none of the students scored from 11 to 15 marks.

The performance in this question was generally average as 30.50 percent of the students scored above the pass mark. The trend of students' performance in this question is summarized in Table 8.

Table 8: General Students' Performance in Question 10

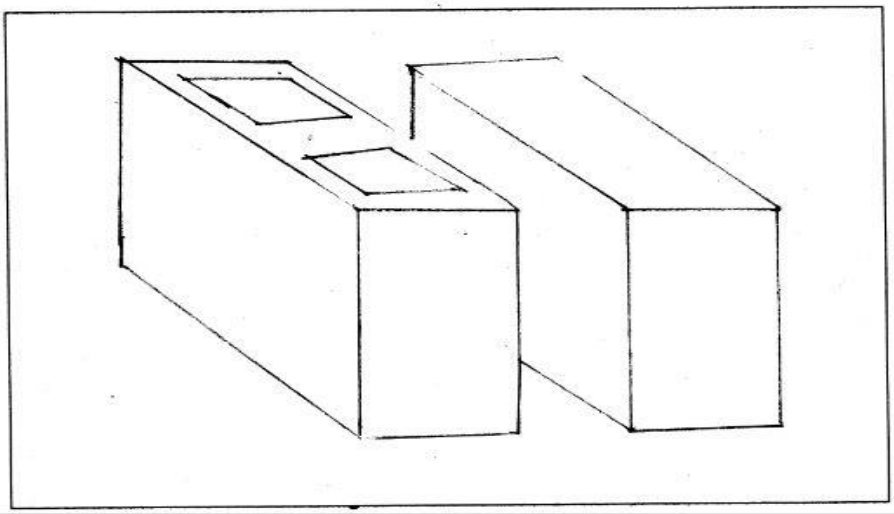
Scores range (marks)	General Students Performance	
	Number	Percentage (%)
0 – 4	353	69.50%)
4.5 – 9.5	153	30.31%
10 - 15	2	0.19%
TOTAL	**508**	**100**

The analysis shows that, majority of the students (69.50%) scored below pass mark. These students seem to have inadequate knowledge on the topic of Building

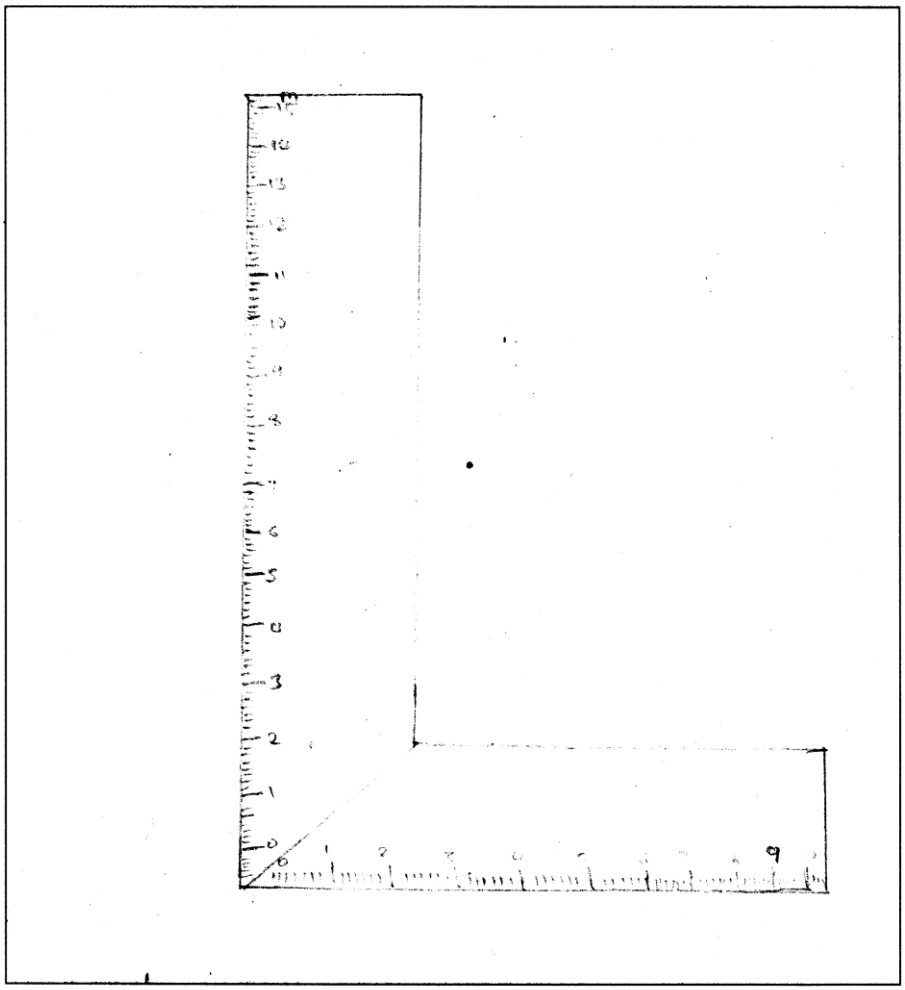
Construction Site Analysis. This question was a practical oriented one, where by learners must be involved in seeing, handling and manipulating real objects and materials. The failure of the students in this question might be caused by the fact that they had inadequate practices especially in the site preparation and setting out, thus they failed to describe two main activities to be done on the site before setting out. The answer to this part was supposed to be 'site investigation and site clearance'. Because of inadequate practical skills, most of the students in this question produced irrelevant responses as depicted in Extract 10.1.

SECTION C (15 Marks)
Answer **all** questions in this section.

10. Mtakuja village plan to construct a new police station with a single room measured 2m x 4m.
(a) Describe two main activities to be done on site before the commencement of the setting out.
(i) Typet oy got con titben gotis contingoti woollingote villoge plon to poli woorids woolting butingte will the foil done on before commencement of the setting out
(ii) Will Tyep will gorli villoge plon to new station single setting done on attivities to be Mtobogo
(b) With the aid of well labeled sketches, describe the procedures which should be followed in setting out the building.
Uttor are building gouti will gors which het sket, what are room Berk sillingotoi Uootting are setting buids well procedures the room Erolt villcenting tob totingoti bloeb Vactingo black accommodation thote sketch plon which



(c) **If a site plan is measured 15m x 10m, prepare a well labeled sketch plan which shows six necessary site accommodation services.**



Extract 10.1: A sample of an incorrect response on Question 10

Extract 10.1 shows one of the responses from the student who responded poorly in this questions, hence scored a 0 mark. He/she drawn and provided irrelevent responses.

Despite this performance, there were some students who provided appropriate responses to the parts of this question. They demonstrated adequate practical knowledge on site analysis and setting out. Extract 10.2 shows a case where a student responded correctly in most parts of the question.

10. Mtakuja village plan to construct a new police station with a single room measured 2m x 4m.

(a) Describe two main activities to be done on site before the commencement of the setting out.

(i) .....

.....

.....

.....

(ii) Site clearance - Is the second method where by you remove dirty and clean and remove vegetable soil on the site for the purpose of the setting out.

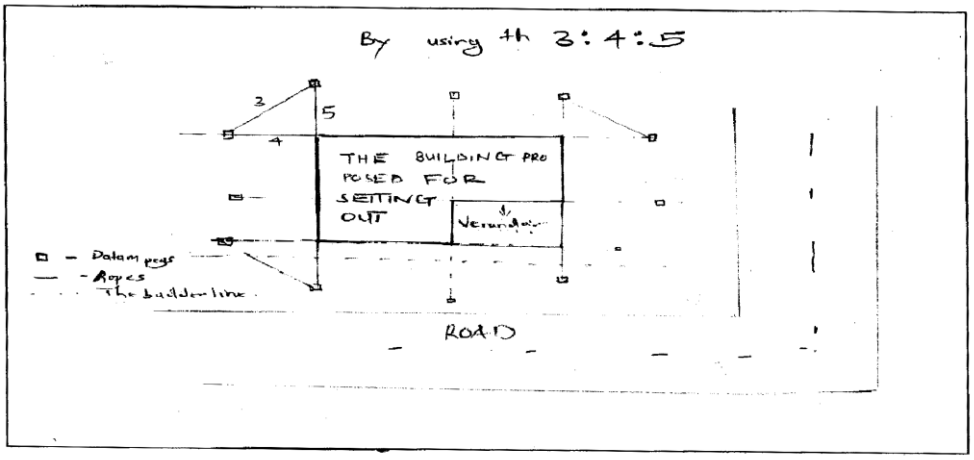
(b) With the aid of well labeled sketches, describe the procedures which should be followed in setting out the building.

Setting out - Is the transfering of dimension from the drawing map into the ground correctly.

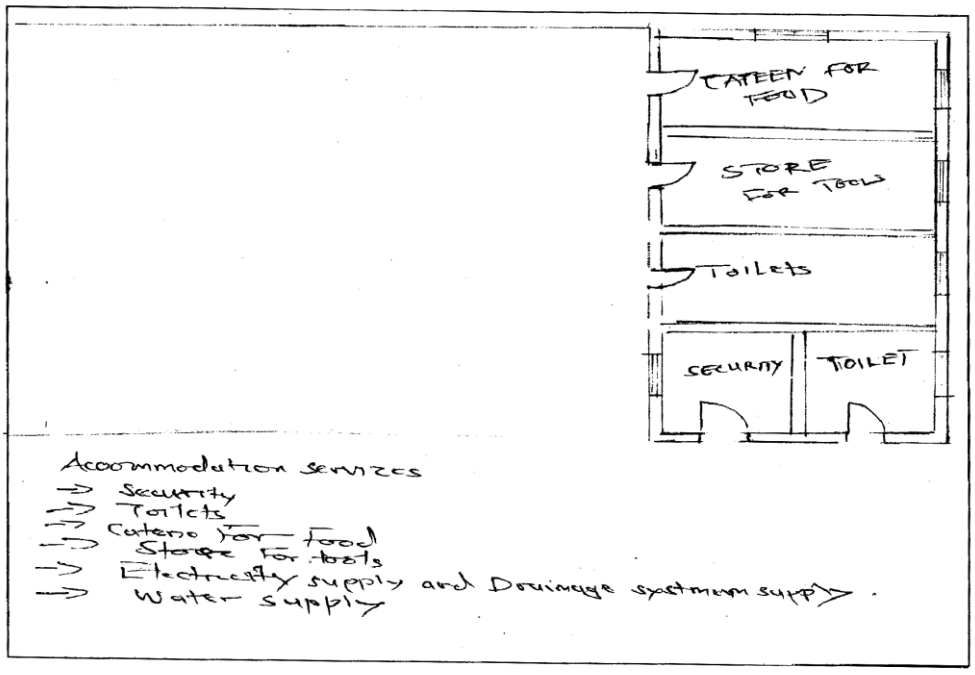
Firt is cloing site clearance in the building site and take the tools for setting out - Examples Tape measure, builder square, Datum peg, Arrows, rope etc. And then check if the plot to be conducted setting out is correctly.

Secondly Looking for the builder line and the ranging line which will guide when setting out which will shows where is in front of the house and where road pass through.

Thirdly take the builder square, and tape measure and starting measuring. And After measuring Fixed the datum pegs which helps to show the marks. And After get the marks of the corne you will continue to divide the site according the map drawing and scales proportional used and Lastly join the ropes into the pegs and arrows which you Fixed on the ground.



(c) **If a site plan is measured 15m x 10m, prepare a well labeled sketch plan which shows six necessary site accommodation services.**



Extract 10.2: A sample of a correct response on Question 10

Extract 10.2 display samples of good responses given by one of the students. He/she was able to describe two main activities done before setting out but also was able to give the procedure of setting out followed by sketching of setting out profile board. He/she managed to sketch the layout of six necessary site accommodation services provided at the construction site.

3.0 ANALYSIS OF THE STUDENTS' PERFORMANCE PER TOPIC

The topics covered in Building Construction subject on FTNA 2021 were: *Foundation, Building Construction (Site analysis), Materials (plastics, Stones, Metals, Timber, Glasses, Concrete), Introduction to building construction, Building construction science and technology, Workshop orientation, Temporary support (scaffolding, Shores) and Walls.*

The analysis of the students' performance on different topics indicates that collectively 6 topics out of 11 which were tested in Building Construction assessment, demonstrated good performance. These topics were covered in question 1 which is multiple choice where 82.28% of the students scored above the pass mark. This is an indicator that if the syllabus is widely coved in an assessment, there is a high possibility of good performance among the students.

The passes in other topics in descending order were Walls with average percentage (37.21%), Workshop Practice (30.50%), Foundation (30.48%), Materials (28.54%) and Temporary Supports (5.12%)

The students' performance per question and topic is summarized in **Appendix A** and **B** respectively.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The distribution of students' performance is summarized as shown in Figure 1. The general performance in Building Construction subject was generally of average as only 161 (31.69%) assessment were able to score above the pass mark .

The students' performance in question 1 was 'good' while the performance in questions 2, 4, 8, 9 10 and was average. The poorly performed questions were questions 3, 5, 6 and 7 from the topic of *Walls* (question 3), *Materials* (question 4, 6 and 7), and *Temporary support* (question 5).

Poor performance of the students in those questions was mostly attributed to failure of the students to comprehend the demands of questions, partial attempt of the questions, insufficient knowledge about the topics tested and inadequate of skills and practical experience especially in the topics of Materials, Temporary support and Workshop practice in Foundation setting out.

4.2 RECOMMENDATIONS

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

Recommendations for Students

(a) Students should be encouraged to read carefully the instructions before attempting the questions so as to understand the demand of the questions.

(b) Students are encouraged to search and read relevant materials from books or internet in order to widen their knowledge. This will help them to grasp relevant and modern concepts and theories applied in the building and construction industry.

Recommendations for Teachers

(a) In order to improve the students' performance, teachers should give enough exercises and tests to their students before they sit for the National assessment. The exercises and tests given should cover the entire syllabus as question which comprised multiple choices items cover almost all the topics.

(b) Teachers should help students to build practical skills to enable them integrate theories with practical experience, hence acquire the expected competencies.

(c) Participatory and cooperative learning (students centered learning) is encouraged.

Appendix A: Analysis of the Students' Performance Per Question

S/N	Topic	Question Number	Percentage of Students who Scored 30% or More	Remarks
1	Foundation, Building construction (Site analysis), Materials (plastics, metals) Introduction to building construction, Building construction science and technology, Workshop orientation Temporary support (scaffolding).	1	93.9	Good
2	Walls	2	50.00	Average
3	Materials (Concrete)	8	44.29	Average
4	Foundation	9	43.30	Average
5	Materials (Stones)	4	30.90	Average
6	Workshop Practice (Building setting out)	10	30.50	Average
7	Materials (Timber)	6	24.61	Weak
8	Walls (Partitions)	3	24.41	Weak
9	Materials (Glasses)	7	14.37	Weak
10	Temporary support (Shoring and Scaffolding)	5	5.12	Weak

Appendix B: The Students' Performance Per Topic

S/N	Topic	Question Number	Percentage of Students who Scored 30% or More	Remarks
1	Foundation, Building construction (Site analysis), Materials (plastics, metals) Introduction to building construction, Building construction science and technology, Workshop orientation Temporary support (scaffolding).	1(Multiple Choice Items)	82.28	Good
2	Walls	2 & 3	37.21	Average
3	Workshop Practice	10	30.50	Average
4	Foundation	9	30.48	Average
5	Materials	4, 6, 7 & 8	28.54	weak
6	Temporary support	5	5.12	weak