THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CANDIDATES' ITEMS RESPONSE ANALYSIS REPORT ON THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATION (CSEE) 2023

BUILDING CONSTRUCTION

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071 BUILDING CONSTRUCTION

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FOREWORD

This report presents Candidates' Item Response Analysis (CIRA) on Building Construction subject in the Certificate of Secondary Education Examination (CSEE) which was conducted in November, 2023. The report aims at providing feedback to all educational stakeholders on the factors which contributed to the candidates' performance in Building Construction subject.

The Certificate of Secondary Education Examination (CSEE) is a summative evaluation, which intends to monitor students' learning by providing feedback in which teachers, students and other education stakeholders can use to improve teaching and learning processes. This analysis justifies the candidates' performance in the Building Construction subject. Factors that affected the candidates' responses include; failure to understand the requirements of the questions, insufficient knowledge of some tested subject matters and lack of sketching skills.

This report will help teachers to identify candidates' strengths and weaknesses as well as the challenging areas and improve teaching and learning process before sitting for future Certificate of Secondary Education Examination (CSEE).

The National Examinations Council of Tanzania (NECTA) expects that all education stakeholders will use the feedback and recommendations provided in this report to improve teaching and learning as well as candidates' performance in the future examinations.

The Council appreciates the contribution of all who participated in preparing this report.

Dr. Said Ally Mohamed

EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report provides a detailed analysis of the candidates' performance on the Certificate of Secondary Education Examination (CSEE) in 2023 for the Building Construction subject. The examination adequately covered the Form Four Syllabus for Technical Secondary School Education issued in 2019 in accordance with the Examination Format set in 2021. The Building Construction Examination paper involved eleven (11) questions distributed in three sections namely; A, B and C.

Section A comprised of questions 1 and 2. Question 1 weighed 10 marks, and question 2 weighed 6 marks, making a total of 16 marks. Section B comprised of questions 3, 4, 5, 6, 7, and 8. Each of these questions carried 09 marks, making a total of 54 marks. Section C consisted of questions 9, 10 and 11, and the candidates were instructed to attempt two questions each weighed 15 marks making a total of 30 marks.

In this report, the candidates' performance in each question was ranked as weak, average or good. Categories ranged from 0-29, 30-64 or 65-100 with Red, Yellow or Green colours respectively. Samples of candidates' responses are inserted as extracts to represent good and weak cases. In addition, graphs and charts have been used to summarize the candidates' performance in a specific question. In the last part of the report there is Appendix which shows the general candidates' performance (question-wise).

A total of 399 candidates sat for this examination. Generally, the performance was good, where 92.73 per cent of the candidates scored above 30 percent yet 7.27% failed. The candidates' performance in the year 2023 has increased by 17.17 % when compared to that of 2022. In 2022 the candidates who sat for the examination were 360, among them 272 (75.56%) passed yet 88 (24.44%) failed.

The analysis presents the requirements of each question, candidates' strengths and weaknesses according to their responses. The percentage of candidates' performance in each group of scores is presented using graphs. Finally, the report provides conclusion and recommendations. The general candidates' performance in the Building Construction subject is shown in Table 1.

Table 1: General Candidates' Performance in the Building Construction Subject

Scores	Remarks	General Candidates Performance	
		Number	Percentage (%)
0 – 29	Weak	29	7.27
30 - 64	Average	339	84.96
65 – 100	Good	31	7.77
Total		**399**	**100**

The distribution of scores and candidates' performance in Building Construction subject is shown in Figure 1

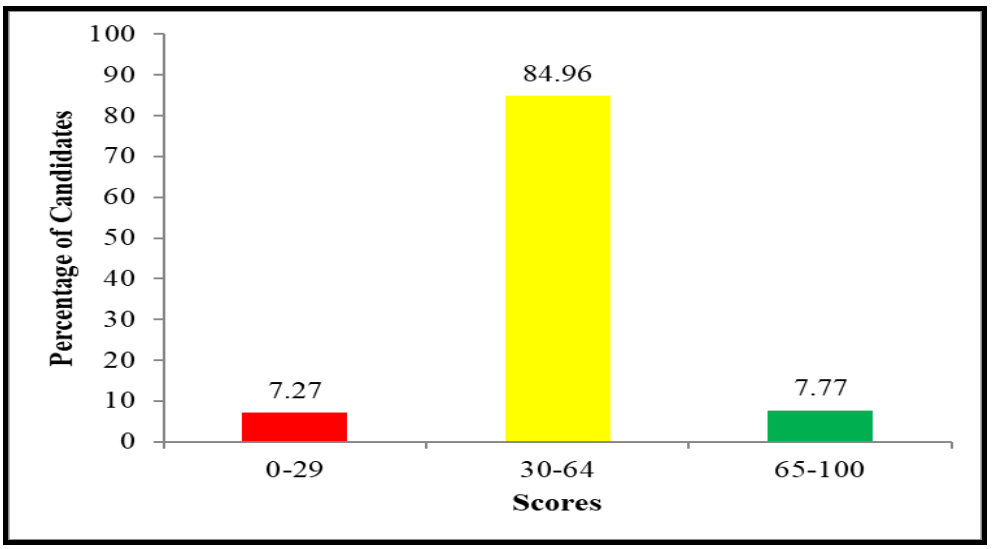


Figure 1: *The Distribution of Candidates' Performance in Percentage*

Among the candidates who sat for the Building Construction examination in year 2023, 05 (1.25%) candidates scored grade A, 27 (6.76%) scored grade B, 248 (62.16%) scored grades C, 90 (22.56%) scored grades D and the remaining 29 (7.27%) candidates failed by scoring grade F.

The range of the candidates' performance for each question was determined and analysis on the strength and weakness of the candidates' responses was done. Extracts of candidates' correct and incorrect responses were used to illustrate the cases presented. At the end of this report, conclusion and recommendations are made to help candidates, teachers, parents and other education stakeholders to take necessary measures to improve the teaching and learning process in the Building Construction subject.

2.0 ANALYSIS OF THE CANDIDATES' RESPONSES IN EACH QUESTION

2.1 SECTION A: Multiple Choice and Matching Items

This section consisted of two questions: 1 and 2. Question 1 required the candidates to choose the correct response among the given alternatives by writing its letter in the answer booklet provided. Question 2 required the candidates to match the safety precaution explained in List A corresponding to the list of safety precaution terms in List B by writing the letter of the correct response beside the item number in the answer booklet.

2.1.1 Question 1 : Multiple Choice Items

This question had 10 items, (i) to (x). The topics, which were covered in this question, were *Beams and columns, Roof, Temporary support, Stair and stair case, Foundation setting out, Wall, Building material, Introduction to building construction* and *Plumbing Science.*

The score ranges used in grading candidates' performance in this question are presented in Table 2.

Table 2: Score Intervals of Candidates' Performance 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 399 candidates attempted this question, 55 (13.78%) scored from 0 to 2 marks. 294 (73.69%) scored from 3 to 6 marks and 50 (12.53%) scored from 7 to 10 marks. General performance on this question was good since 344 candidates scored above pass mark. The overall performance on this question is presented in Figure 2.

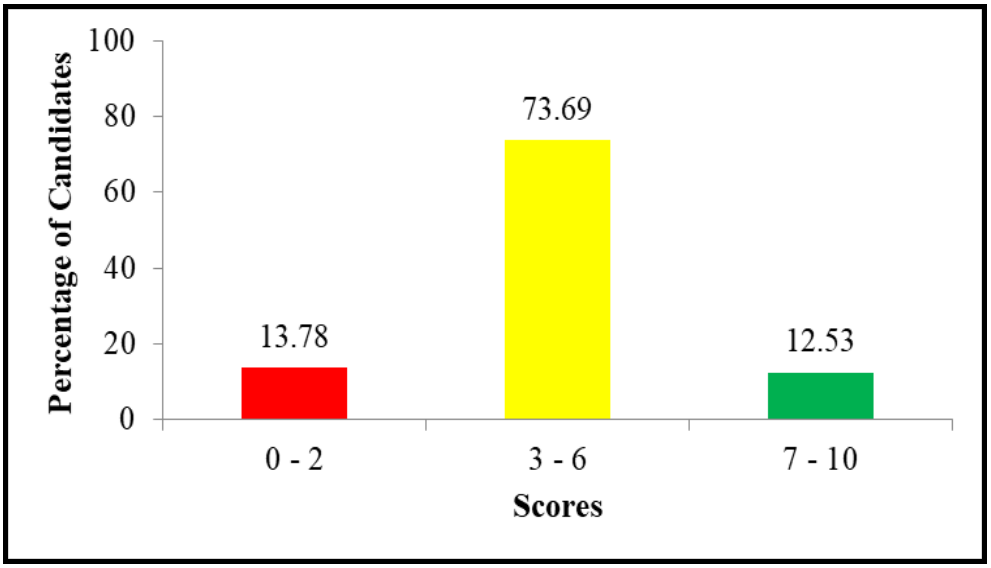


Figure 2: *The Candidates' Performance in Question 1*

The following part analyses the candidates' performance on items (i) to (x) of Question 1.

Item (i) was set from the topic of *Beams and Columns*. It intended to measure the candidates' ability to identify the basic structural engineering principles used in the construction field and the knowledge of different types of beam supports. The question was as follows:

Which construction member is supported in such a way that it does not sustain bending?
A Continuous beam B Simply supported beam C Cantilever beams
D I-section beam E Fixed ended beam

The correct answer is C, '*Cantilever beam'*, since it is supported at only one end and therefore does not sustain bending in the same way as the beam with other types of support. The candidates who opted for this alternative demonstrated the knowledge of different types of beams supports and how they affect the bending and deflection of the beam. Those who opted for alternatives A, '*Continous beam'* , B, *'Simply supported beam',* D, '*I – section beam'* and E, '*Fixed ended beam',* failed to understand that all these types of beams are specifically designed to resist bending and are essential structural elements in various engineering applications.

Item (ii) was set from the topic of *Roofs*. This question intended to measure the candidates' knowledge on recalling the characteristics of different types of roofs by identifying the specific type based on the description provided. The question stated:

Which kind of roof that a rafter is supported on walls at both side ends?
A Single pitched roof *B Double pitched roof* *C Gable roof*
D Contemporary roof *E Flat roof*

Alternative A, '*Single pitched roof',* was the correct response. The candidates who chose this response showed an ability to identify types of roof structure basing on the supports. Those who chose B '*Double pitched roof*', C, *'Gable roof',* D, '*Contemporary roof*' and E, '*Flat roof*' were really incorrect because the rafters of all these roof types are only supported by walls on one side.

Item (iii) was set from the topic of *Temporary Support.* This item required the candidates to demonstrate their competence in a practical skill or to analyze the situation and determine the best course of action to prevent further structural damage. The question stated:

What is the temporary support that is provided to the wall which is about to collapse on the oldest building?
A Scaffolding *B Dead shore* *C Raking shore*
D Flying shore *E Underpinning*

The correct option was C, '*Raking shore'*, which is used on repairing and maintaining the wall of the built structure safely. The candidates who opted for this response demonstrated their ability in repairing and maintaining the built structure safely. Moreover, those who wrongly selected *A,* '*Scaffolding,*' were confused by the word "temporary support" which is familiar in construction activities. However, they did not know that scaffold is a temporary structure erected to support workers and materials during the construction or repair of buildings including other structures.

Besides, the candidates who chose B, '*Dead Shore*', did not know that dead shore is a temporary vertical support used in construction to provide additional stability to a structure. It is typically used to support floors or roofs during construction or renovation work.

Additionally, those who wrongly selected alternative D, '*Flying Shore*', did not know that this is a horizontal shore which is used between two buildings to give temporary support to one or both of them. Yet, some candidates chose alternative E, '*Underpinning*'. These candidates did not understand that underpinning is a temporary support that is provided to the foundation of a house that is about to collapse. Therefore, alternatives A, B, D and E were incorrect.

Item (iv) was composed from the topic of *Stair and Staircase.* This question intended to measure candidates' competence in stair and staircase on how they can identify the term used in stairs terminology and their uses. The question stated:

Where do you keep your foot while going up or coming down on a stair?

A At rise *B At the tread* *C At the balustrade*
D At the hand rail *E At the flight*

Those who correctly chose B, *'At the tread'*, understood that the tread of a stair is the flat and horizontal surface that you step on when ascending or descending on a stair. It is the part of the stair that your feet contact. Treads are designed to provide a safe and comfortable surface for walking.
The candidates who chose alternative *A*, '*At rise'* failed to distinguish between the horizontal part of a stair and vertical distance between consecutive treads. Those who chose *C*, '*At the balustrade',* they did not understand that it refers to the entire railing system that runs along the sides of a staircase, providing support and safety for those using the stairs. Few candidates chose alternative *D, 'At the hand rail'.* These candidates did not understand that the handrail is the horizontal or inclined component that you hold onto while ascending or descending the stairs. It runs along the top of the balusters and provides stability and support. Likewise, for those who opted for alternative *E, 'At the flight',* were incorrect since flight does not provide directly correspond to where you keep your foot because it refers to the stairway itself, which combines both the treads and risers.

Item (v) was set from the topic of *Foundation Setting out.* This item tested the candidates' skills related to construction and building setting out which requires understanding of various methods and techniques for verifying the squareness of the base line, as well as knowing when and how to apply these methods effectively. The question was:

How do you check the square of base line in setting out of the building?

A *By measuring the base line.*
B *By using instrument called site square.*
C *By using three four five method.*
D *By calculating the lengths of diagonals*
E *By measuring the diagonals if are equal.*

The candidates, who selected the correct alternative *C*, '*By using three four five method',* were knowledgeable about the method of 3:4:5 which is often used in construction to ensure right angles. These candidates knew that in this method, you measure three units along one side of the base line, four units along the other side, and then measure the distance between the two points. If the distance between the two points is five units, then the corner is square. This method relies on the principle of the Pythagorean theorem ($3^2 + 4^2 = 5^2$), which states that in a right-angled triangle, the square of the length of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides.

However, the candidates who incorrectly selected *A*, '*By measuring the base line*', did not know that measuring the baseline does not guarantee a square of its base. Thus, it could not be used to check the square of the base line in setting out of the building. Moreover, those who wrongly selected *B, 'By using instrument called site square', D*, '*By calculating the lengths of diagonals',* and *E*, '*By measuring the diagonals if are equal',* did not understand that a square of the base line cannot be checked by such methods. Therefore, alternatives B, D and E were incorrect.

Item (vi) was extracted from the topic of *Walls.* The question intended to measure candidates' competence in practical skills related to masonry and construction work. The question stated:

What technical term is referred to a process of ranking out and filling the mortar joints in the external faces of all kinds of walls?

A Plastering *B Bonding* *C Pointing*
D Rendering *E Painting*

The correct alternative was C, '*Pointing'*. Pointing involves the removal of old mortar from the joints between bricks or stones in a wall, followed by the application of new mortar to fill the gaps. This process helps to improve the appearance, strength, and weather resistance of the wall. The candidates

who selected alternative C, chose the correct response and proved having enough knowledge in wall construction.

The candidates who chose alternative A, '*Plastering',* were wrong because they did not know that plastering is not specifically related to filling mortar joints between bricks or stones, but it involves applying a thin layer of plaster mixture to walls or ceilings to create a smooth, even surface. A few candidates who chose alternative B, '*Bonding',* were wrong because bonding does not specifically involve the process of raking out and filling mortar joints, but typically refers to joining materials, such as bricks or blocks, using mortar or adhesive. Likewise, those who opted for alternative D, '*Rendering'* lacked knowledge because "rendering" is not focused on filling mortar joints between bricks or stones, but it is the process of applying a coat of cement or plaster to the external surface of a wall to provide protection or improve its appearance. Likewise, those who opted for *E, 'Painting',* were wrong because painting does not involve working with mortar joints, but it involves applying a layer of paint to the surface of a wall for decorative or protective purposes. Therefore, alternatives A, B, D and E were incorrect because they do not refer to the specific action of "raking out and filling mortar joints".

Item (vii) was extracted from the topic of *Building Materials.* The question intended to measure candidates' awareness on timber treatment and how they can select the appropriate methods for drying timber effectively to achieve the desired moisture content. It stated:

Name the method of exposing the plunks pieces of timber at open shed to dry-out.

A Artificial seasoning B Natural seasoning C Kiln seasoning
D Chemical seasoning E Boiling seasoning

The correct option for this item was B, '*Natural seasoning'.* The candidates who chose this response were aware that natural seasoning involves allowing timber to dry naturally by exposing it to air and environmental conditions over time. Candidates who wrongly selected other alternatives had inadequate knowledge about the timber seasoning, as follows:
The candidates who chose alternative A, '*Artificial seasoning'* were incorrectly contradicting natural seasoning and artificial methods of drying timber because both involve air supply; however, in the natural method

timber is simply exposed to the natural air, whereas in the artificial method mechanical devices are normally deployed to supply air.

The candidates who selected option C, '*Kiln seasoning',* were not correct since they were not aware that the kiln seasoning is the artificial method of seasoning in which timber is dried using a heated chamber designed to control temperature, humidity, and airflow.

Alternative D, '*Chemical seasoning',* was not correct response, the candidates who selected this alternative did not know that chemical seasoning involves the use of special chemicals in the process of drying timber plunks. Likewise, for those who chose alternative E, '*Boiling seasoning',* were wrong because in boiling seasoning timber plunks treated by immersing in boiling water for a specific period of time. Therefore, those candidates who opted for alternatives A, C, D and E were unable to differentiate the methods of seasoning.

Item (viii) was set from the topic of *Building Materials.* This question intended to assess candidates' competence to identify and categorize hazardous materials with their potential risks to human health. The question stated:

Identify *a group of materials which is potentially the most dangerous to human* health.

A *Lead, mercury, asbestos*
B *Plastic, softwood, cork*
C *Cement, lime stone, glass*
D *Bricks, plaster, concrete*
E *Glass, plywood, asphalt*

The candidates who chose alternative A, '*lead, mercury, asbestos'*, were correct. They were knowledgeable of the most dangerous materials to human health. These are hazardous materials that can cause serious health problems when humans are exposed to them.

Those who opted for alternatives B, '*Plastic, softwood, cork',* C, '*Cement, lime stone, glass',* D, '*Bricks, plaster, concrete',* and E, '*Glass, plywood, asphalt',* were wrongly opted because all these set of alternatives have associated risks depending on how they are handled and used, but they do not contain materials that are universally recognized to most dangerous human health compared to substances like Lead, Mercury, or Asbestos.

Item (ix) was composed from the topic of *Introduction to Building Construction.* This question intended to assess candidates' understanding of terminologies related to construction activities. The question stated:

A person who work with experienced people until is capable to work alone is known as

A a site agent *B a trade foreman* *C general foreman*
D a supervisor *E an apprentice*

Those who chose alternative E, '*an apprentice',* were correct since their response showed that they had knowledge about the building team members and their roles. Those who selected other alternatives had inadequate knowledge about the building team members in the construction site.

The candidates who opted for alternative A, '*a site agent'* were wrong because, site agent is the overall in charge of a site especially for large projects. Those who chose alternative B, '*a trade foreman*', did not know that trade foreman is experienced because he / she is a leader in the project for a specific trade such as plumbing or masonry.

Those who chose alternative C, '*general foreman',* were not knowledgeable about the duties of the building team members because general foreman is the overall in charge of all trades in a project. Therefore, a general foreman is supposed to be experienced in construction activities. Likewise, those who chose alternative D, '*supervisor'* did not know that a supervisor is the one who supervises all activities at the site. Such as safety and material consumption, so experience is inevitable for somebody to be a site supervisor.

Item (x) was set from the topic of *Plumbing Science*. This question intended to assess candidates' competence in evaluating the proper system of distributing water to the consumer when the reduced level of the water source is higher than the reduced level of the consumer's place. The question stated:

Recommend the proper system of distributing water to the consumer when the reduced level of the water source is higher than the reduced level of the consumer's place.

A Roller method *B Pump method* *C Roping method*
D Gravity method *E Lift method*

Alternative D, '*Gravity method',* was the correct response. Candidates who opted for this alternative showed clear understanding of various methods of distributing water to the consumers.

Those who selected alternative A, '*Roller method',* failed to choose proper system due to insufficient knowledge on water distribution system because roller method is a barrel shaped container that holds water, rolls on the ground and it has a handle at its axis. Alternative B, *'Pump method',* was not correct because it is a method where a device is used to increase water pressure in order to transfer water from one place to another.

Few candidates who chose alternative C, '*Roping method',* were wrong because roping method is the action which uses a rope to catch and secure water from a well. Similarly, those who opted for alternative E, '*Lift method',* did not know that lift method is a method of irrigation in which water is not transported by natural flow but it is lifted with a pump. Therefore all candidates who opted for alternatives A, B, C and E failed to recorganise the proper system of distributing water.

2.1.2 Question 2 : Matching Items

This question consisted of six matching items derived from the topic of *Workshop Orientation.* In this question, the students were required to match the items from List A with responses in list B by writing the letter of the correct response beside the item number. Each item in this question carried 1 mark, totaling to 6 marks.

The score ranges used in grading candidates' performance in this question is presented in Table 3.

Table 3: Score Intervals of Candidates' Performance in Question 2

Scores Range (marks)	General Performance	
	Remark	**Grade**
0 – 1	Weak	F
2 - 3	Average	C – D
4 - 6	Good	A - B

A total of 399 (100%) candidates attempted this question, out of whom 19 (4.76%) scored from 0 to 1 mark, 213 (53.38%) scored from 2 to 3 marks, and 167 (41.86%) scored from 4 to 6 marks.

Generally, the students' performance on this question was good since 380 (95.24%) scored above average. This indicates that the candidates acquired enough knowledge on the topic of Workshop Orientation as shown in Figure 3.

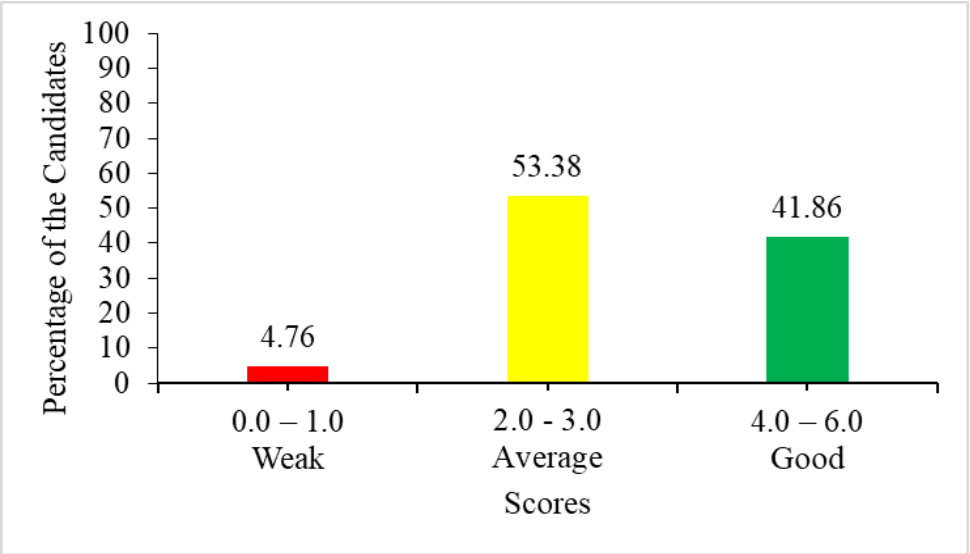


Figure 3: *The Candidates' Performance in Question 2*

The question designed to test the candidates' competence on workshop orientation with related safety rules in order to show clear understanding in the daily workshop operation. The questions were;

Match the descriptions used in safety precaution in **List A** with the corresponding safety precaution terms in **List B** by writing the letter of the correct response beside the item number in the answer booklet provided.

List A	List B
(i) It protects your body on injuries or an accident.	*A Safety regulation*
(ii) It keeps medical facilities to help victims before a doctor comes.	*B Safety precaution*
(iii) It makes some mistakes and an accident may happen.	*C First aid kit*
	D Safety measure
	E Causes of accident
	F Protective gear

List A	List B
(iv) It must be taken in advance in order to prevent problem or to avoid danger. *(v) It must be done to avoid an accident.* (vi) *It must be done to stop that cause problems or difficulties from happening.*	*G Employee responsibilities* *H Preventive measure*

Analysis on the candidates' performance in each item is as follows:

Item (i), required the candidates to identify the safety precaution term which described how to protect your body on injuries or an accident. The correct response was *F*, *Protective gear*. Majority responded correctly to this item which signifies that they have sufficient knowledge on safety issues at the workshop. Few candidates selected option *H*, *Preventive measure.* These candidates failed to understand that protective gear is a physical equipment used to safeguard builders from specific danger while preventive measure is a step taken to avoid or minimize danger from happening in the first place.

In item (ii), the candidates were required to identify a safety precaution term which describes things used to keep medical facilities which help victims before taking them to hospital. The correct response was *C*, *first aid kit*. Most candidates responded correctly to this item which indicates that they are familiar with the uses of first aid kits. Those who chose other alternatives failed because they had insufficient knowledge on the uses of first aid kits.

Item (iii), needed the candidates to be aware that there are some mistakes which may be a source of accidents. Those who chose alternative *E*, '*Causes of accident'* were correctly since they are knowledgeable on safety precaution in the construction areas. However, those who selected other alternatives showed that they had inadequate knowledge on the safety issues on construction areas.

Item (iv), required the candidates to identify the term describe something which must be taken in advance in order to prevent problem or to avoid

danger. The correct response was *B*, '*Safety precaution'*. The majority responded correctly to this item which signifies that they had satisfactory knowledge on safety precaution.

Item (v), required the candidates to identify the term describe something which must be done to avoid an accident in advance, in order to prevent the problem or to avoid danger. The correct response was *A*, '*Safety regulation'*. Most of the candidates responded correctly to this item which means that they are sufficient in safety regulations. However, there others who opted for other options which signify that they did not have enough knowledge on safety regulations.

Item (vi), required the candidates to identify the term that describes something which must be done to stop causing problems or difficulties in happening. The correct response was *H*, '*Preventive measure'*. The majority responded correctly because they had enough knowledge on how to maintain safety in the construction areas.

2.2 SECTION B: Short Answer Questions

This section had six (6) compulsory short-answer questions set from the various topics. Each question carried 09 marks, making a total of 54 marks. The score ranges used for grading candidates' performance in this section are indicated in Table 4.

Table 4: Score Intervals for Questions 3 to 8

Scores Range (Marks)	General Performance	
	Remark	**Grade**
0 - 2.5	Weak	F
3 - 5.5	Average	C – D
6 - 9	Good	A - B

2.2.1 Question 3: Irrigation System

This question was set from the topic of *Irrigation System.* It was intended to assess candidates' practical problem-solving skills, knowledge and understanding of environmental impacts.

The question was;

Climate change has resulted into unreliable rains for plant growth and food production.

(a) (i) *Propose a proper way that farmers can opt to rescue their plants under such circumstance.*

(ii) *Explain the four methods to accomplish the proposed way in (a) (i).*

(b) *Describe three effects to the land that can be caused by the technique proposed in (a)(i).*

The question was attempted by 399 (100%) candidates. Analysis indicates that, 102 (25.56%) candidates scored marks from 0 to 2.5, 199 (49.88%) scored from 3 to 5.5 marks; while 98 (24.56%) scored from 6 and 9 marks. The candidates' general performance on the question was good since 297 (74.44%) of the candidates scored above pass marks. The candidates' performance is summarised in Figure 4.

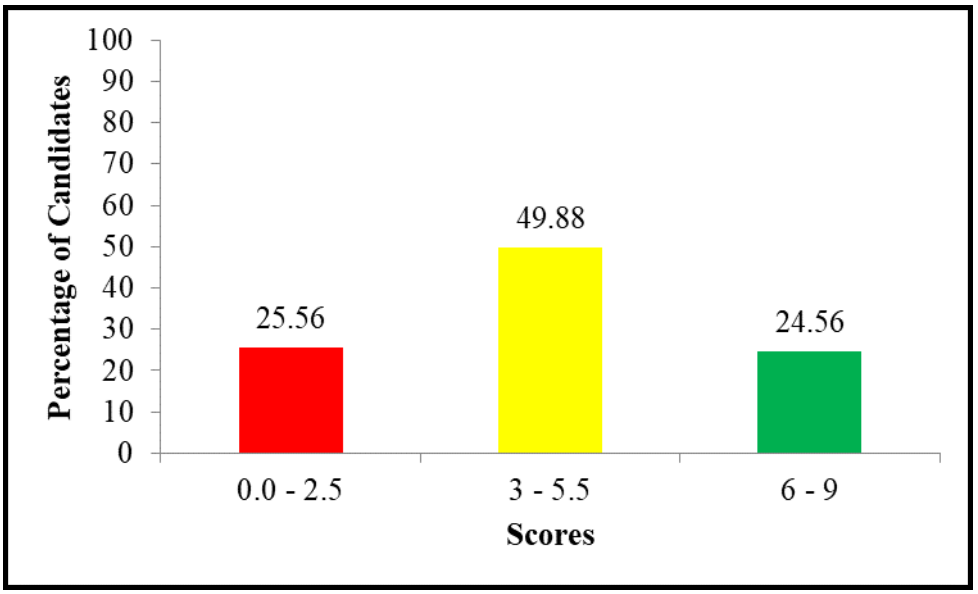
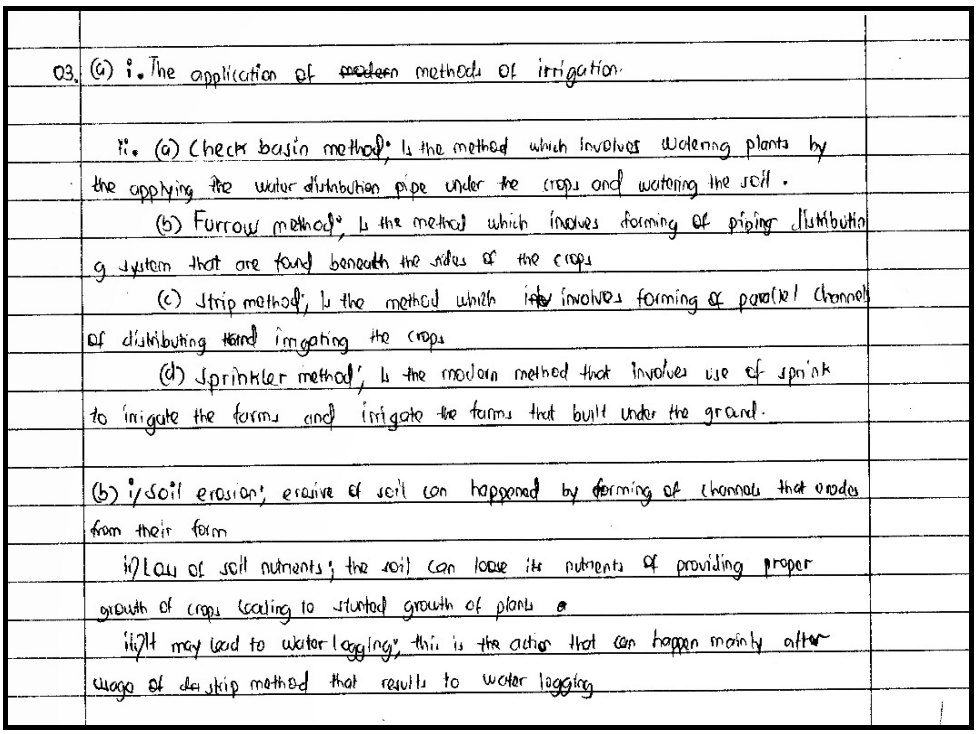


Figure 4: *The Candidates' Performance in Question 3*

The analysis shows that the majority candidates were able to answer most parts of the questions correctly. They were able to propose a proper way that farmers can use to rescue their plants under climatic change associated with unreliable rains for plants growth and food production as in part (a). The candidates proposed proper methods of irrigation and also managed to explain the methods to accomplish the proposed way by giving the following explanations: *drip irrigation* as *the method in which a pipe has drilled holes on it to allow irrigation through droplets*, *sprinkler irrigation as the method of irrigation in which ones uses some device which spreads*

water effectively, ring basin irrigation as the method in which water is collected in a basin. The responses indicate that the candidates had good understanding on various methods of irrigation. In part (b), the candidates were able to describe the effect to the land that can be caused by the proposed methods, as we know due to excessive water seepage, the soil nutrients can be washed away. Therefore, soil erosion can be caused and also water logging can happen to the land. The responses provided signified understanding and knowledge gained during their course. Extract 1.1 is a sample of the candidates' correct response.



03. (a) i. The application of ~~modern~~ methods of irrigation.

ii. (a) Check basin method; Is the method which involves watering plants by the applying the water distribution pipe under the crops and watering the soil.

(b) Furrow method; Is the method which involves forming of piping distributin g system that are found beneath the sides of the crops

(c) Strip method; Is the method which ~~is~~ involves forming of parallel channels of distributing ~~land~~ irrigating the crops

(d) Sprinkler method; Is the modern method that involves use of sprink to irrigate the farms and irrigate the farms that built under the ground.

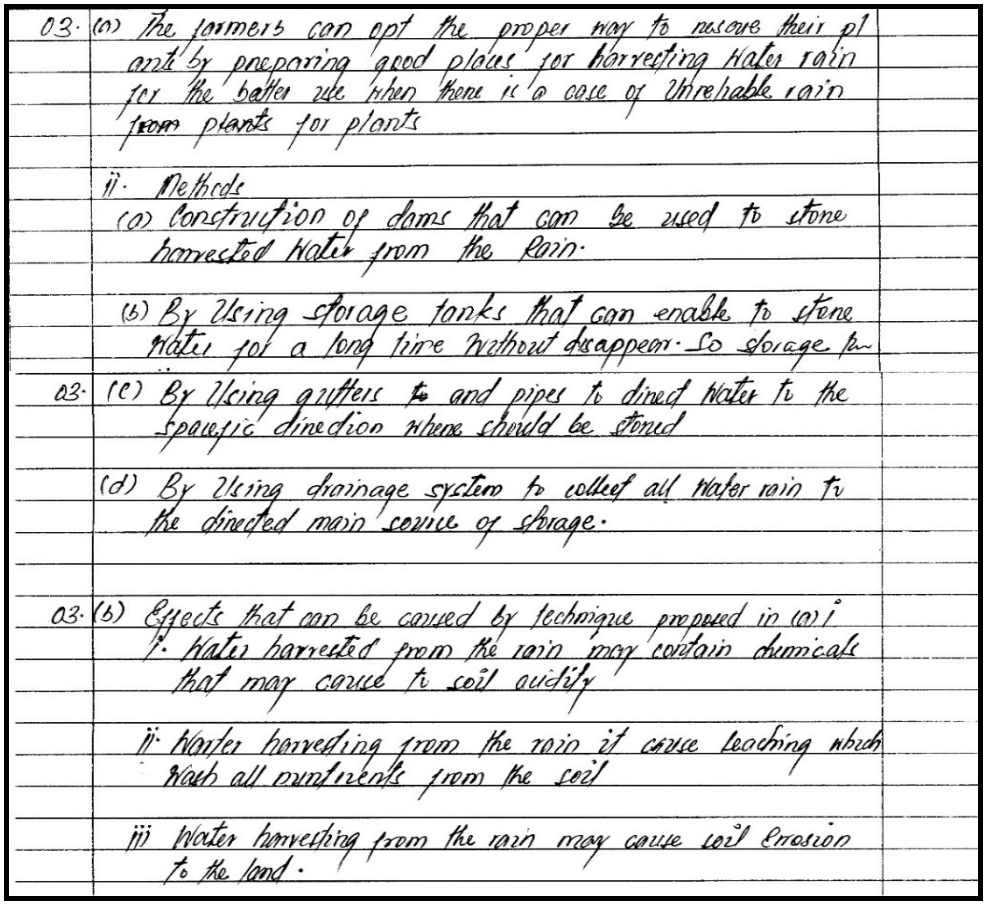
(b) i/soil erosion; erosive of soil can happened by forming of channels that erodes from their farm

ii/Lack of soil nutrients; the soil can loose its nutrients of providing proper growth of crops leading to stunted growth of plants.

iii/It may lead to water logging, this is the action that can happen mainly after usage of drip method that results to water logging

Extract 1.1: A sample of candidate's correct responses to Question 3

Even though most of the candidates performed well, some failed to score sufficient marks to pass this question. They failed to describe various methods of irrigation that can be used under shortage of rains due to climatic changes. Some candidates proposed incorrect methods such as preparing good places for rainwater harvesting, dams' outlet and storage tanks as presented in Extract 1.2. Furthermore, a candidate described the effect of the mentioned method as the rainwater harvested may contain chemicals and may cause erosion. All these responses show that the candidate did not either understand the requirement of the question or had no knowledge of the subject matter.



Extract 1.2: A sample of candidate's incorrect responses to Question 3

Extract 1.2 shows the response from the candidate who completely failed to propose a proper way that farmers can opt to rescue their plants under such circumstance even to explain the methods to accomplish the proposed way.

2.2.2 Question 4 : Pumps

This question was composed from the topic of *Pumps*. The purpose of this question is to evaluate candidates' ability to solve problems practically and their understanding on pump operations in relation to the water supply. The question was as follows:

(a) What do the following terms referred to as used in water supply?
(i) Pump (ii) Priming

(b) Give four applications of pumps in water supply.

(c) Explain three trouble shoot that may occur in pumps during working.

A total of 399 (100%) candidates attempted this question, 52 (13.03%) scored from 0 to 2.5 marks, 192 (48.12%) scored from 3 to 5.5 marks; and 155 (38.85%) scored from 6 to 9 marks. Generally, the candidates' performance on the question was good since 86.97% of the candidates scored pass and above pass mark. The candidates' performance is summarised in Figure 5.

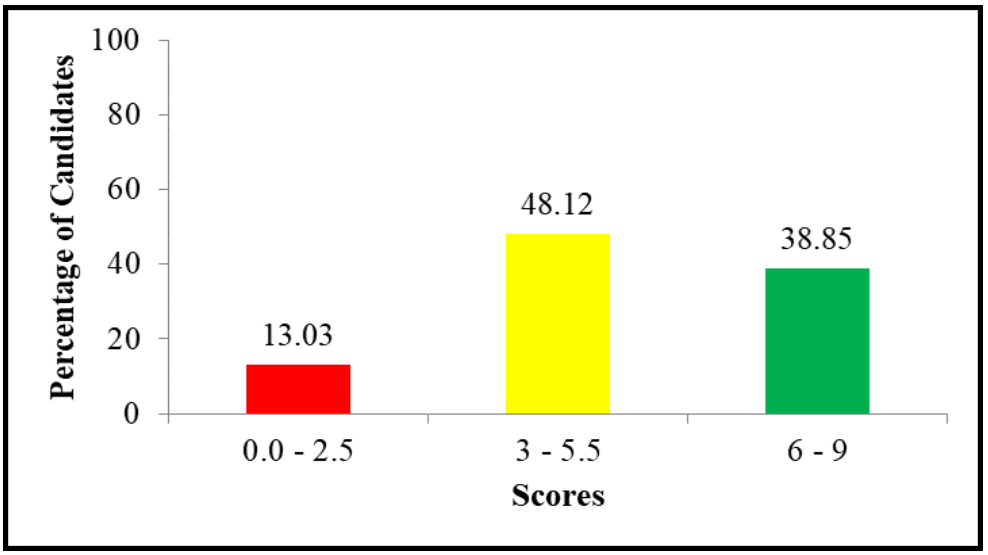
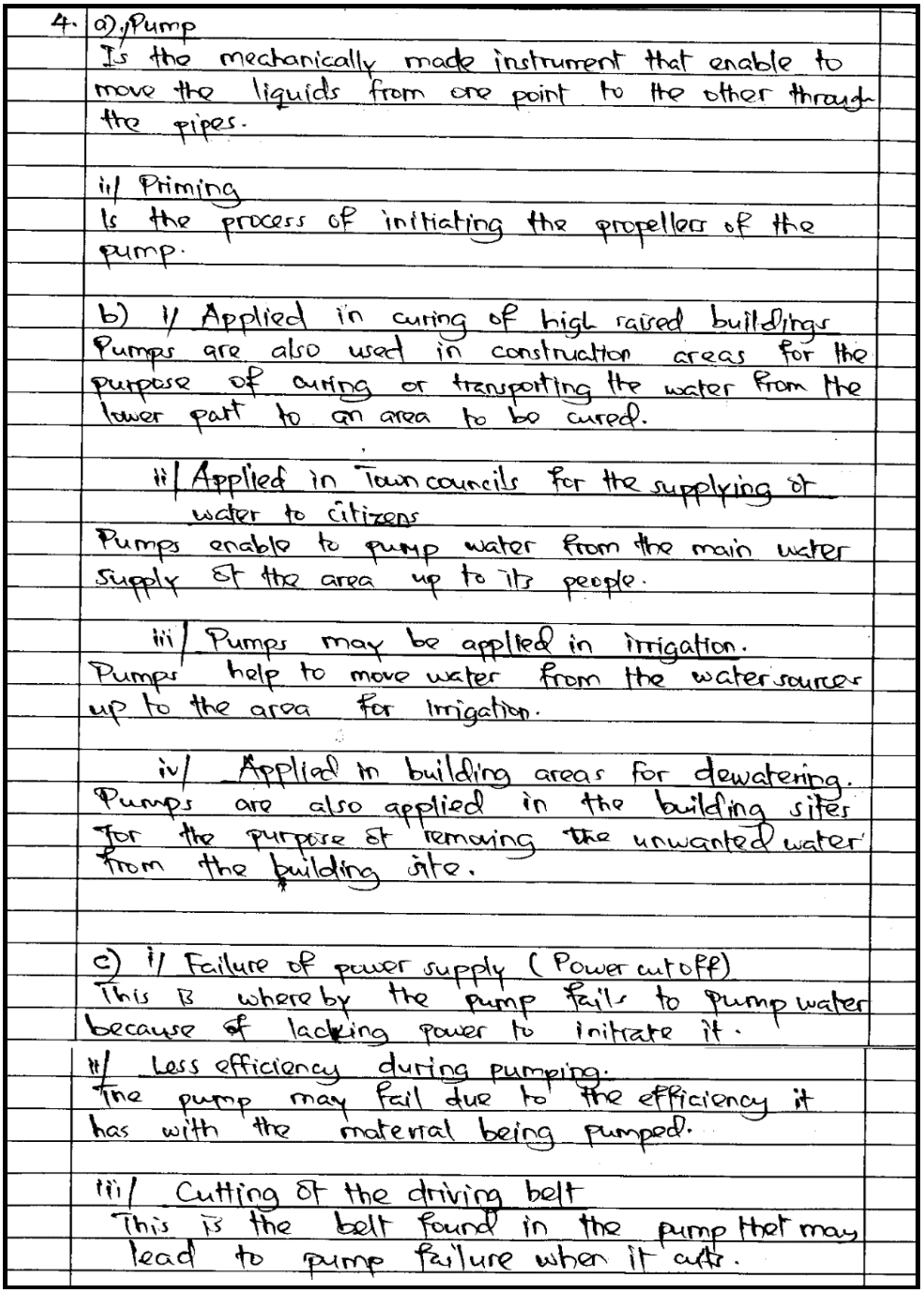


Figure 5: *The Candidates' Performance in Question 4*

The candidates who scored high marks had sufficient knowledge on pump works in relation to water supply. They managed to define the pump and priming in part (a) of this question. For example, they defined pump as *the mechanical device that uses energy to drive water from the source to the consumers; a device which moves liquid from lower level to higher level* and priming as *the process of initiating the propeller of the pump.* In part (b), the candidates managed to give the applications of pumps as used in the water supply by writing: *applied in building areas or sites for dewatering; used in irrigation to move water from the source; applied when driving water from the deep* wellapplied *in curing of high raised building when transporting water from lower level, used when supplying water from the main water supply to the area.* And lastly in part (c) they managed to observe the trouble shoot that might occur during pumping work which was *power cut off, less efficiency during pumping, cutting of the driving belt* and *engine failure*.

The candidates understood the demand of the question and in addition to their sufficient knowledge on pumping works they were able to produce good responses in all parts of the question. Extract 2.1 is a sample of the candidates' correct responses.



4. a) Pump
Is the mechanically made instrument that enable to move the liquids from one point to the other through the pipes.

ii) Priming
Is the process of initiating the propeller of the pump.

b) i) Applied in curing of high raised buildings
Pumps are also used in construction areas for the purpose of curing or transporting the water from the lower part to an area to be cured.

ii) Applied in Town councils for the supplying of water to citizens
Pumps enable to pump water from the main water supply of the area up to its people.

iii) Pumps may be applied in irrigation.
Pumps help to move water from the water source up to the area for irrigation.

iv) Applied in building areas for dewatering.
Pumps are also applied in the building sites for the purpose of removing the unwanted water from the building site.

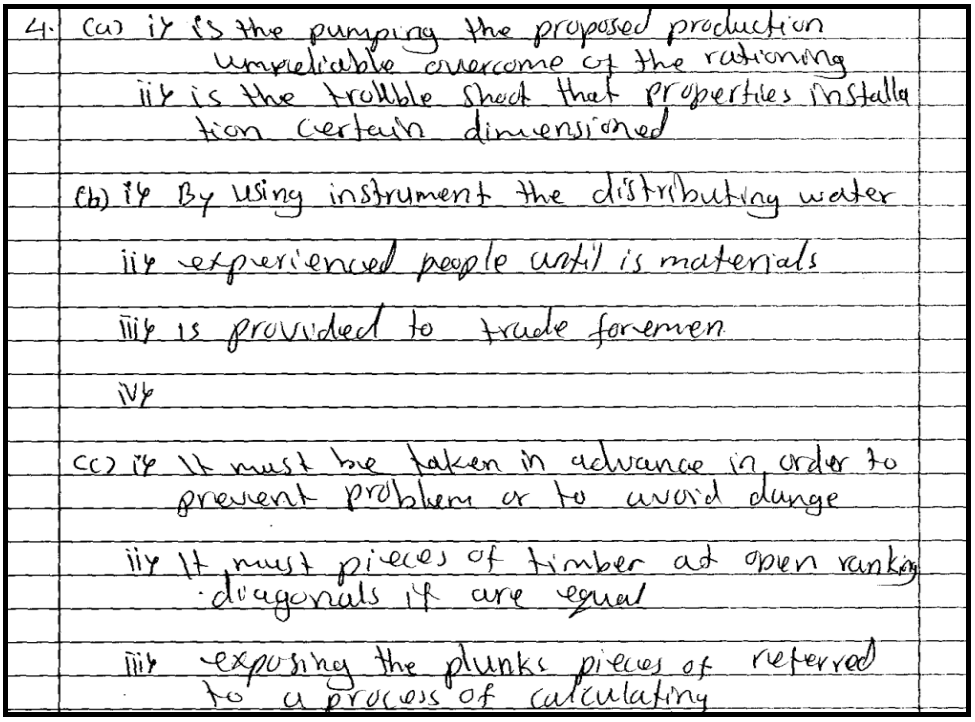
c) i) Failure of power supply (Power cut off)
This is whereby the pump fails to pump water because of lacking power to initiate it.

ii) Less efficiency during pumping.
The pump may fail due to the efficiency it has with the material being pumped.

iii) Cutting of the driving belt
This is the belt found in the pump that may lead to pump failure when it cuts.

Extract 2.1: A sample of correct responses to Question 4

Despite the high performance of the candidates, there were few who failed to score pass marks in this question. Along with the large use of the pump nowadays, these candidates still failed to write correct responses in all parts of the question. The candidates appear to lack understanding on this topic, they wrote incomprehensible responses hence scoring zero marks on this question. Extract 2.2 shows a sample of the candidate's incorrect response.


4. (a) i. is the pumping the proposed production
unreliable overcome of the rationing
ii. is the trouble shoot that properties installa
tion certain dimensioned

(b) i. By using instrument the distributing water
ii. experienced people until is materials
iii. is provided to trade foremen
iv.

(c) i. It must be taken in advance in order to
prevent problem or to avoid dunge
ii. It must pieces of timber at open ranking
diagonals if are equal
iii. exposing the plunks pieces of referred
to a process of calculating

Extract 2.2: A sample of incorrect responses to Question 4

Extract 2.2 shows a sample of the candidate's incorrect response. The candidates appear to lack understanding on this topic, they wrote incomprehensible responses hence scoring zero marks on this question.

2.2.3 Question 5 : Sanitary Appliance

This question was derived from the topic of *Sanitary appliances*. This question was intended to measure candidates' knowledge and understanding of sanitary appliances for a house. The question was as follows:

(a) Identify four common types of sanitary appliances and their uses.
(b) What are the three materials that can be used for manufacturing of sanitary appliance?

(c) Briefly explain four properties which should be possessed by sanitary appliances for house installation.

The question was attempted by 399 (100%) candidates. 41 (10.28%) candidates scored marks from 0 to 2.5, 80 (20.05%) scored from 3 to 5.5 marks and 278 (69.67%) candidates scored from 6 to 9 marks. The general performance on this question was good since 358 (89.72%) of the candidates scored pass and above pass mark. The trend of candidates' performance on this question is summarised in Figure 6.

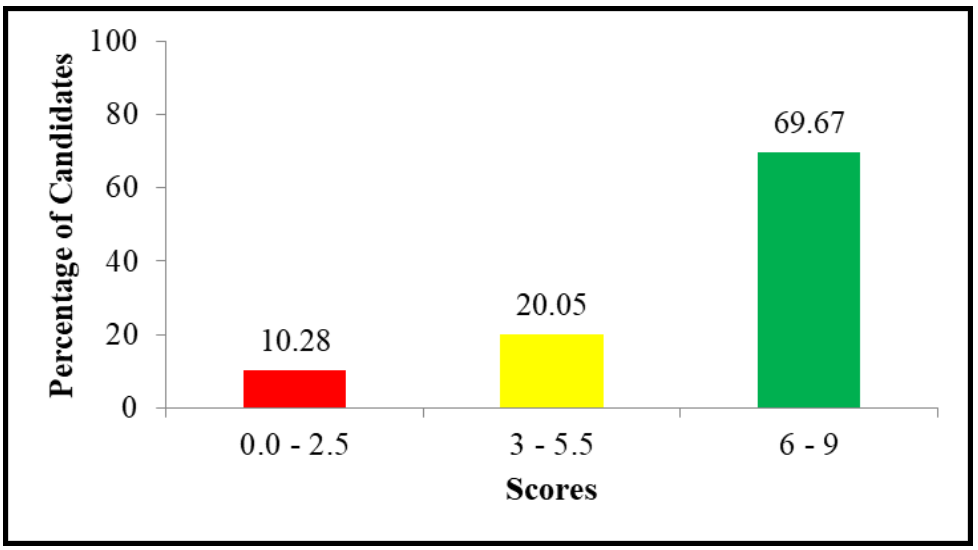
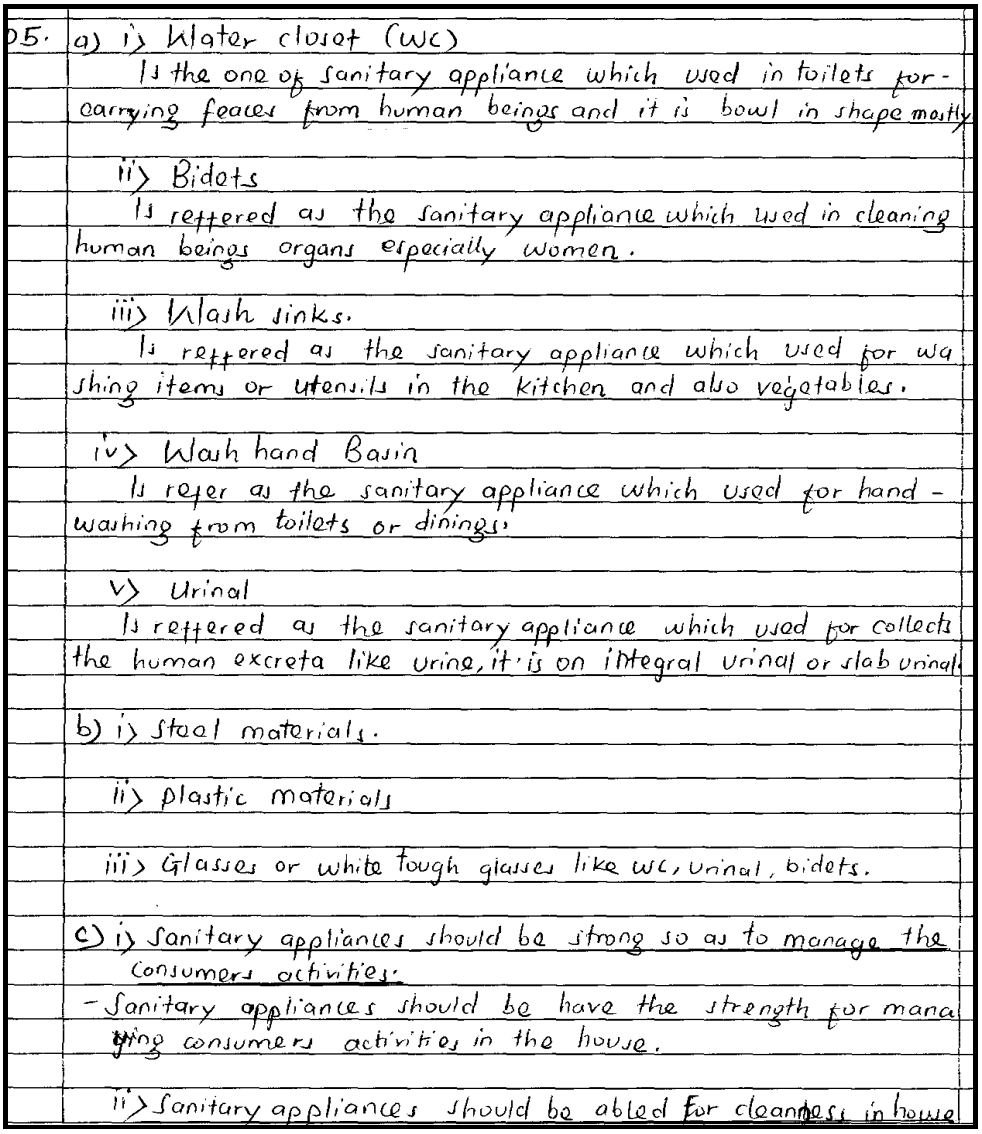


Figure 6: *The Candidates' Performance in Question 5*

The analysis shows that 358 (89.72%) candidates had a good performance, since they scored pass and above pass mark. This huge performance obtained by the candidates clearly demonstrates the skills they possess in the field, especially the area in which they have been asked. In part (a) they managed to identify common types of sanitary appliances and their uses, some of their responses were as follows; *Bath tubs used to contain water when people are taking bath, urinals used for urinating, sinks, water close for receiving human excreta and flush it to the disposing area, slop sink for washing hospital instruments after use, bidet used to clean human genital organ after excretion* and *wash hand basin for hand washing.* In part (b), these candidates mentioned the materials which are used in manufacturing sanitary appliances, some of the candidates' correct responses signified that they had sufficient knowledge whereas*: ceramics, plastics, vitreous china, steel, iron and porcelain materials.* Furthermore, in part (c), they managed

to explain the characteristics of sanitary appliances when they responded as: *they should be smooth, durable, easy to clean, and impervious*. Extract 3.1 is a sample of the candidates' correct responses.


5. a) i) Water closet (WC)
Is the one of sanitary appliance which used in toilets for-
carrying feaces from human beings and it is bowl in shape mostly

ii) Bidets
Is reffered as the sanitary appliance which used in cleaning
human beings organs especially women.

iii) Wash sinks.
Is reffered as the sanitary appliance which used for wa
shing items or utensils in the kitchen and also vegetables.

iv) Wash hand Basin
Is refer as the sanitary appliance which used for hand -
washing from toilets or dinings.

v) Urinal
Is reffered as the sanitary appliance which used for collects
the human excreta like urine, it is on integral urinal or slab urinal.

b) i) Steal materials.

ii) plastic materials

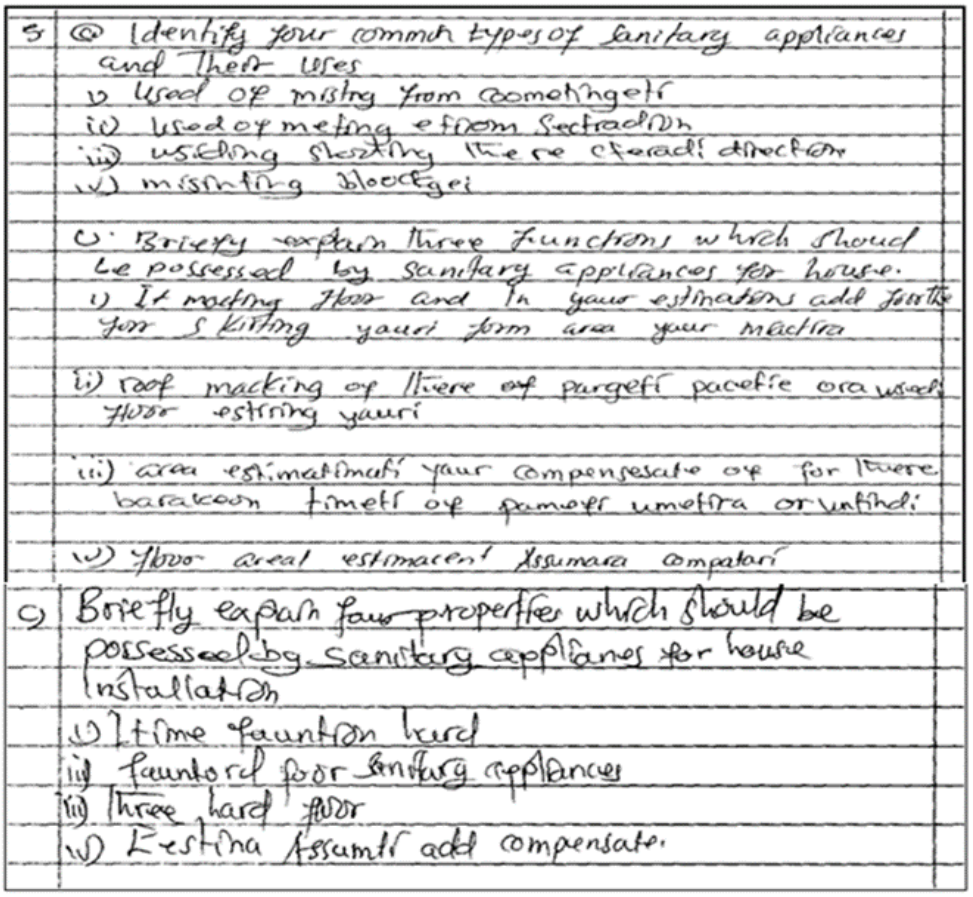
iii) Glasses or white tough glasses like WC, urinal, bidets.

c) i) Sanitary appliances should be strong so as to manage the
consumers activities.
- Sanitary appliances should be have the strength for mana
ging consumers activities in the house.

ii) Sanitary appliances should be abled for cleanness in house

Extract 3.1: A sample of correct responses to Question 5

However, few candidates provided irrelevant responses in parts (a), (b) and (c). They failed to identify types of sanitary appliances, materials that can be used to manufacture sanitary appliances and also properties of sanitary appliances. Their responses show that they lacked adequate knowledge on the subject matter. Extract 3.2 is a sample of the incorrect responses to Question 5.



Extract 3.2: A sample of incorrect responses to Question 5

Extract 3.2 show the incorrect responses to Question 5. The candidates wrote irrelevant responses in all parts of the question.

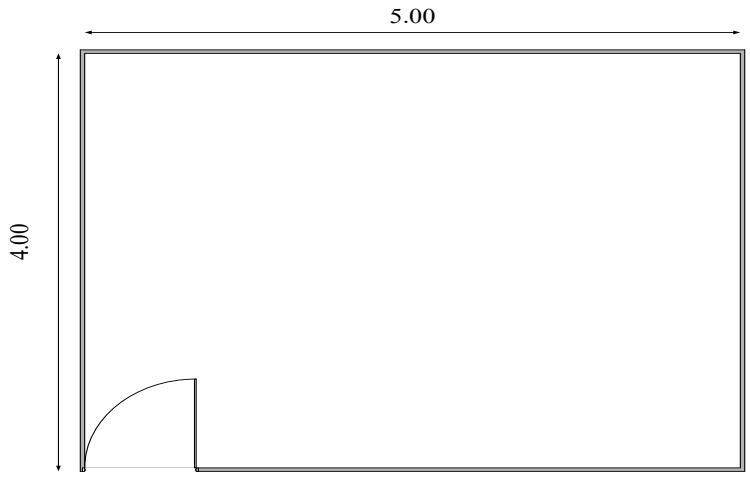
2.2.4 Question 6 : Cost Estimate

This question was set on the topic of *cost estimates.* It was intended to assess candidates' understanding of construction terminology, knowledge of construction principles, and the ability to apply mathematical concepts to real-world situations in estimating constructing costs. The question was asked as follows:

(a) Briefly explain three functions of hard core in floor structure.

(b) The owner of a certain building wants to keep the tiles in his room as represented in Figure 1 which is dimensioned in meter. Estimate the quantity of tiles used in floor and skirting as kept in height of 0.1016 m around the room except at the open-door area of 0.9 m. Assume the

size of tiles is 300 mm x 300 mm both for floor area and skirting. In your estimations add 5% to compensate for the broken tile.



The question was attempted by 399 (100%) candidates. Analysis indicates that, 174 (43.61%) candidates scored marks from 0 to 2.5, 170 (42.61%) candidates scored from 3 to 5.5 marks; while 55 (13.78%) candidates scored from 6 and 9 marks. The candidates' general performance on the question was average since 56.39% of them scored pass and above pass marks. The candidates' performance is summarised in Figure 7.

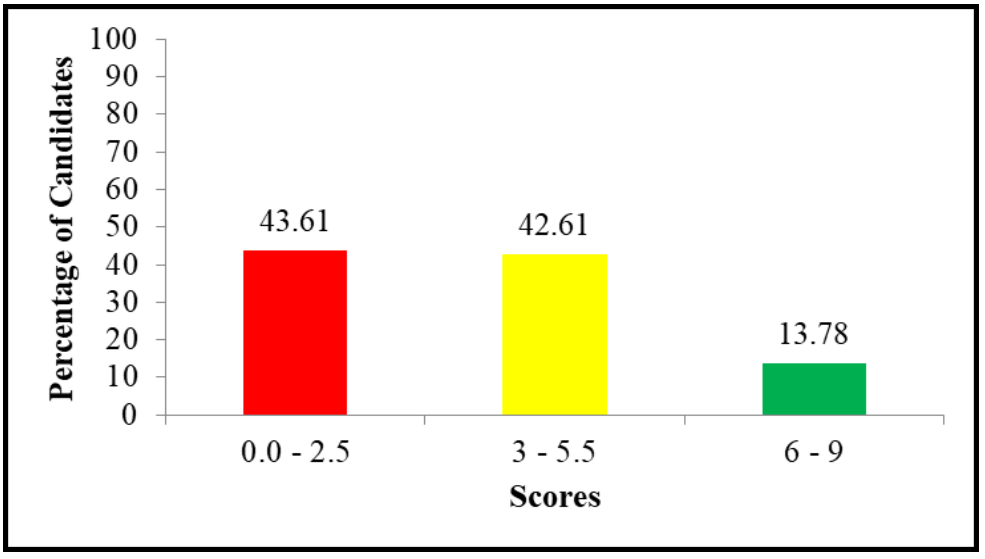


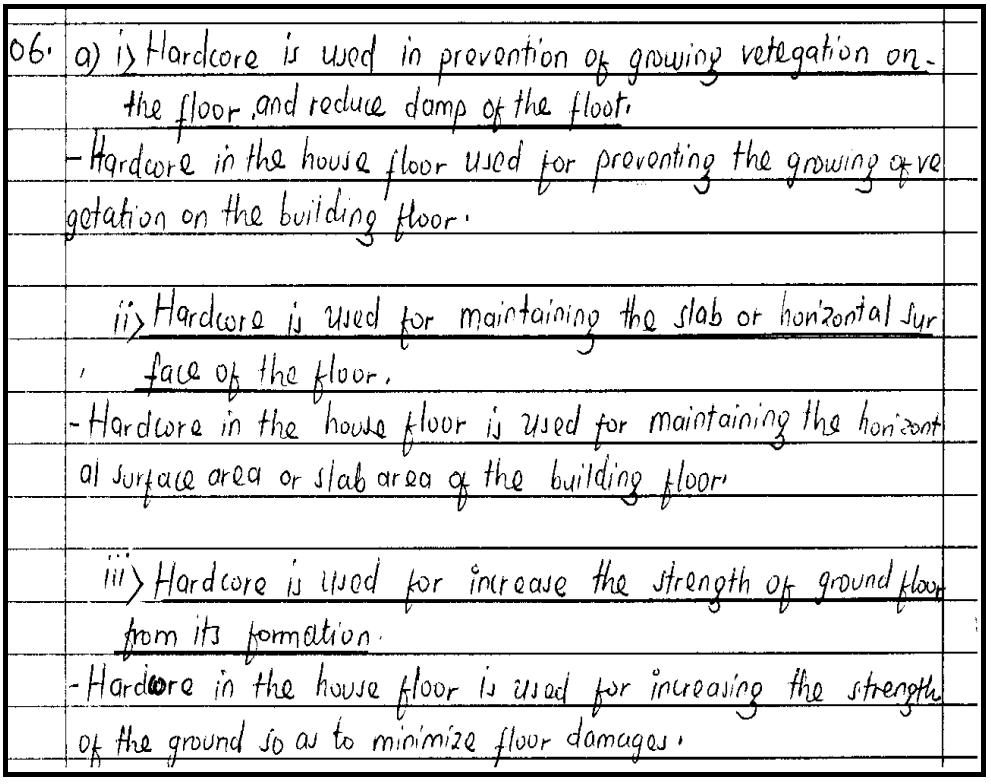
Figure 7: *The Candidates' Performance in Question 6*

The candidates proved that they had sufficient knowledge on hardcore in relation to building construction principles and Mathematical concepts in

making estimation. In part (a) they managed to explain the functions of hardcore, some of their responses were as: *to provide level surface, add strength and durability of the floor, avoid growth of vegetation.* These answers show that the candidates were knowledgeable about the functions of hardcore in floor structure. Several candidates were able display their competence in answering part (b), which asked the candidates to demonstrate their abilities in calculating and making estimates. Most of them had the abilities of finding the following:

> *Area of floor = length × breadth,*
> *Area of tile = length × width,*
> *Area to be skirted = height × perimeter of room - door length, Total area to be tiled = floor area + area to be skirted,*
> *Quantity of tiles = (total area to be tiled)/(area of each tile) and Total number of tiles = quantity of tiles + 5% of quantity of tiles*.

These candidates were able to attempt this question because they are familiar with common construction practices and they are able to perform basic calculations in estimating materials needed. Extract 4.1 is a sample of the candidates' correct responses.



06. a) i) Hardcore is used in prevention of growing vetegation on the floor and reduce damp of the floor.
- Hardcore in the house floor used for preventing the growing of vegetation on the building floor.

ii) Hardcore is used for maintaining the slab or horizontal surface of the floor.
- Hardcore in the house floor is used for maintaining the horizontal surface area or slab area of the building floor.

iii) Hardcore is used for increase the strength of ground floor from its formation.
- Hardcore in the house floor is used for increasing the strength of the ground so as to minimize floor damages.

06. b) Data requ: given.

Length of the room = 5.00m Quantity of tiles - required

width of the room = 4.00 m

height of floor = 0.016m

Door area = 0.9m

Size of tiles = 300mm x 300mm

→ Area of the room

A = length x width

= 5.00m x 4.00m

A = 20.00M²

1m = 100cm = 1000mm

size of tiles in m will be; 0.3m x 0.3m.

→ Area of the tiles.

A = 0.3m x 0.3m

A = 0.09m²

Quantity of tiles used = Area of the room / Area of the tile

Quantity of tiles used = 20.00m² / 0.09m²

Quantity of tiles used = 222.22 amounts. + 5%

Estimation quantity of tiles = 255

∴ The estimated number of tiles to be cover the area of the room is ~~255~~ tiles 255

Extract 4.1: A sample of correct responses to Question 6

Those candidates who scored below average failed this question, either because of lack of common construction practical knowledge or inability to understand basic calculations in estimating building materials. Among them, there were 31 candidates who scored 0; because they were unable to answer either part of the question. Extract 4.2 shows a sample of the candidate's incorrect response.

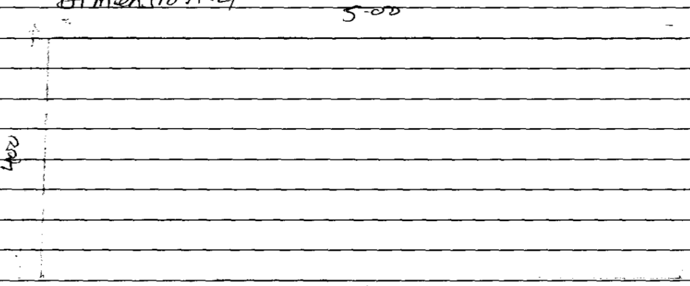
6 (a) Briefly explain three functions of hard core in your structure

i) Iltmi prat wateri clime has into that for plant of Murungebe Proren yaa you proor that can wy accom pedori three pump propeo ways

ii) Three popeti has propes into farms plant such porchera prople of proper

iii) Exple pople prople wepeto into prople that farmed plants

b) Dimensioned



soln

$\frac{400mm \times 5.00}{150}$

0.1016m × 0.9m

0.1012.

0.1016m × 0.9m × 300mm × 300mm × 5%

$\frac{0.106m}{0.9m} \times \frac{300mm}{300mm} = 5\%$

$\frac{0.106m \times 300mm}{1009}$

$\frac{0.106m}{0.106m} \times \frac{300m}{300m} = 31.8$

$\frac{1000\%}{31.8} - \frac{300}{300} = 8.18$

$\frac{31.8 \times 5\%}{3.8} = 159mm$

159mm

7 (a) Which coused the available source of water not meet the demand of the people

pati place and cavity wall according to their uses study building of visited construction site

pams - 11 timera might be conto there settels place of there building foundation of weathrd

Extract 4.2: A sample of incorrect responses to Question 6

Extract 4.2 shows a sample of the candidate's incorrect response who failed to write correct responses in question 6.

2.2.5 Question 7: Piping System

This question was set from the topic of *Piping System.* It was intended to assess candidates' practical problem-solving skills on water supply and pipe fixing. The question stated as follows:

(a) A Tanzania census conducted in August 2022 has shown an increase of population in Tanzania, which caused the available source of water not to meet the demand of the people. As a result, water rationing has to be applied to overcome that challenge. With the aid of a diagram, explain the method of storing water when the supply shift is not at your turn.

(b) (i) What fitting would you use to connect from main line to consumer's pipe line?

(ii) Write two fittings which can change direction in 90 angles of water in the plumbing activity.

(iii) What do you recommend to minimize blockage of the farmer's pipe after applying fertilizer in the water?

A total of 399 (100%) candidates attempted the question, 325 (81.45%) scored from 0 to 2.5 marks yet 74 (18.55%) scored from 3 to 5.5 marks. Generally, this was the poorly performed question in this section and in this paper in general. The candidates' performance is summarised in Figure 8.

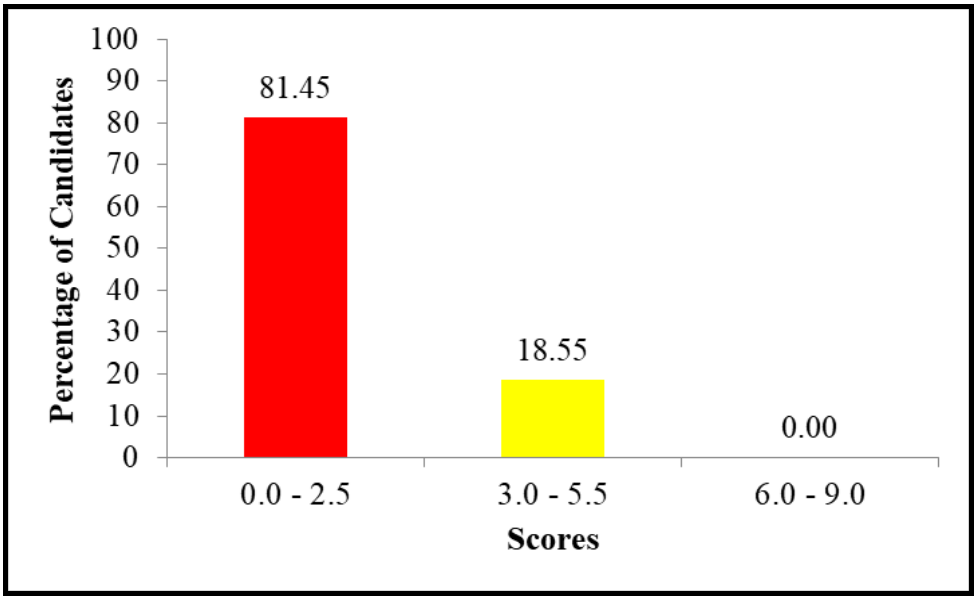
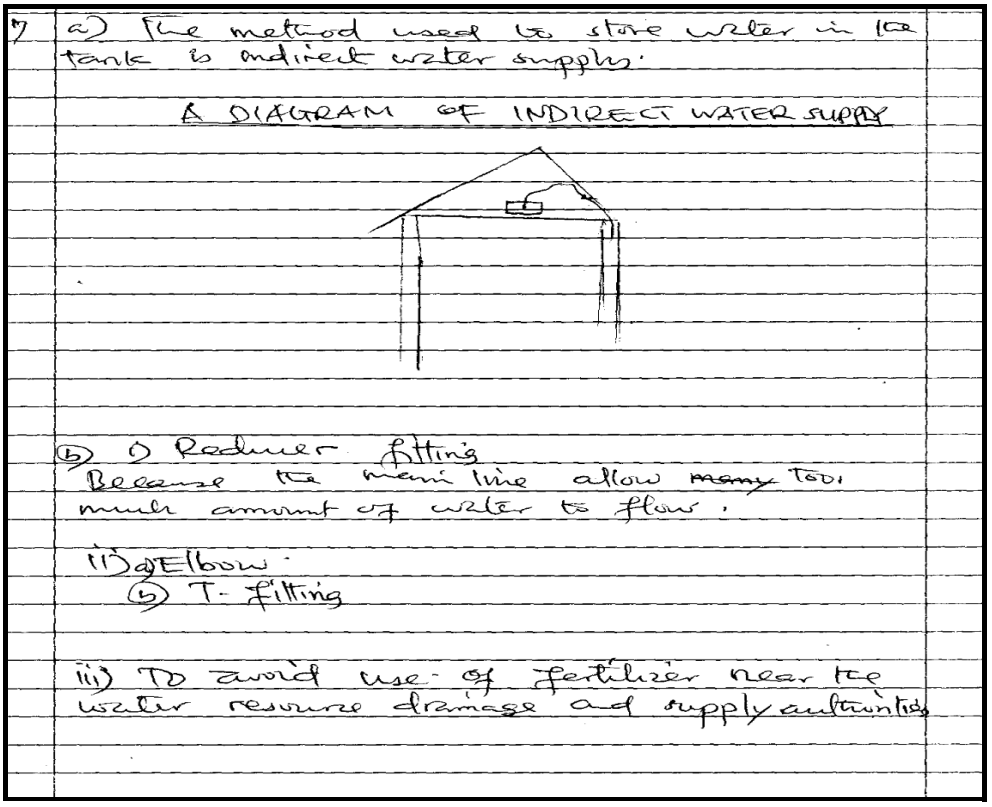


Figure 8: *The Candidates' Performance in Question 7*

The analysis that 325 (81.45%) candidates who failed did not have enough information related to the concepts of water supply and pipe fitting. In addition, there are 78 candidates who scored 0. The candidates failed to draw proper diagrams which illustrate how one can store water when the water supply system is not working. Also, they failed to mention fittings that can change the direction of water at 90 angles; and likewise, they failed to recommend minimizing blockage of the farmers' pipes. Extract 5.1 is a sample of the candidates' incorrect responses.



Extract 5.1: A sample of incorrect responses to Question 7

Extract 5.1 shows the response from the candidate who completely failed to draw the correct diagram of a method used to store water when service is not available; these responses clearly show that this candidate had no knowledge on the water supply. Despite massive failures in this question, there were a few candidates who scored pass marks. These candidates managed to respond partially correctly by scoring pass marks.

2.2.6 Question 8: Floor

This question was derived from the topic of *Floor*. The question intended to measure candidates' understanding of building maintenance and effects of dampness on building structures.The question was as follows:

Suppose you have visited a certain construction site and noticed that the floor of the building is damp and can cause trouble in the future.

(a) Which defects can be caused by dampness? Give six defects.

(b) Identify the parts of a building that are susceptible to moisture penetration and thus need to be protected.

(c) Suggest three ways to prevent dampness in buildings.

The question was attempted by 399 (100%) candidates. Analysis indicates that, 107 (26.82%) candidates scored marks from 0 to 2.5, 175 (43.86%) candidates scored from 3 to 5.5 marks; while 117 (29.32%) candidates scored from 6 and 9 marks. The candidates' general performance on the question was good since 73.18% of the candidates scored pass and above pass marks. The candidates' performance is summarised in Figure 9.

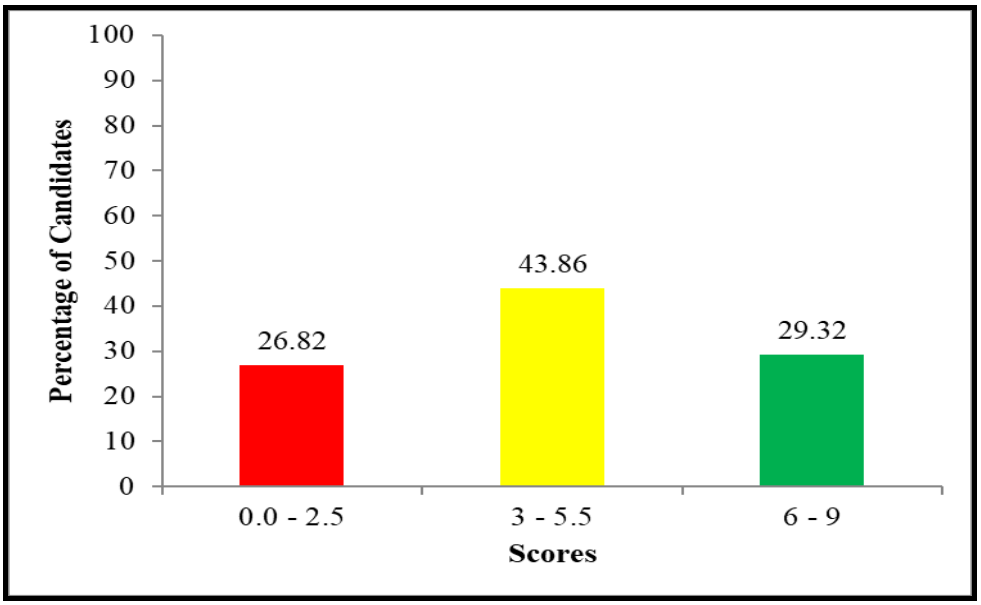
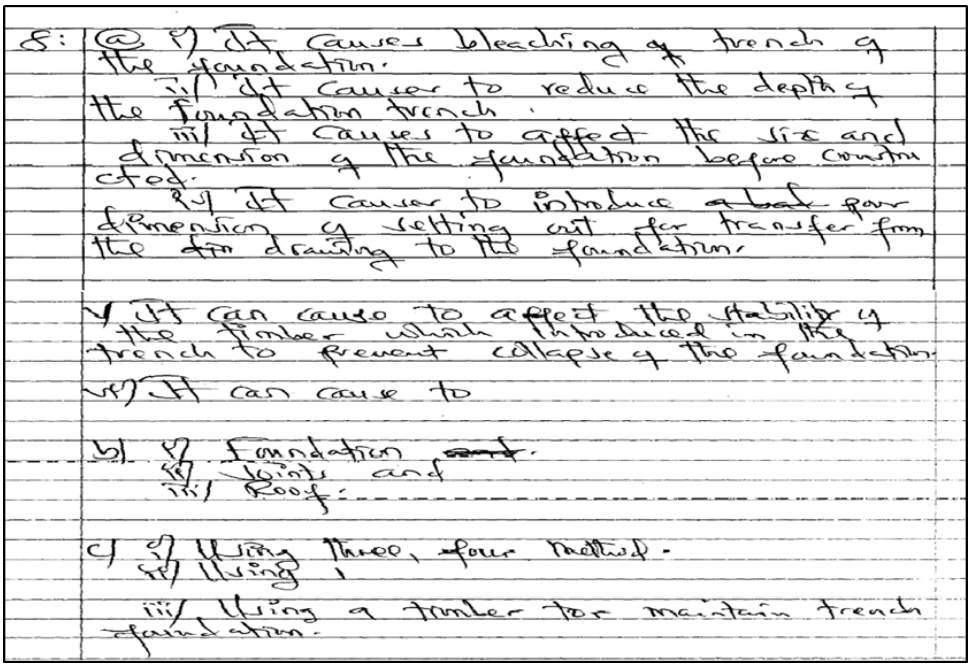


Figure 9: *The Candidates' Performance in Question 8*

The analysis shows that 292 (73.18%) candidates had a good performance, as they scored pass and above pass mark. The candidates' performance clearly shows the level of competence in the construction field, particularly in the area which they were asked. In part (a) they managed to mention defects caused by dampness. The defects which may occur include*; corossion of metals, destruction of electrical system in a building rotten timber, growth of fungi, blistering of paint, and disintergration of plaster*. In part (b), they also identified parts of a building which are susceptible to moisture penetration and thus need to be protected, such include: *wall,foundation wall, floor, destruction of timber structures like doors, growth of fungi around the wall* and *roof.* Furthermore, in part (c), they managed to suggest ways to prevent dampness in buildings which was: *providing* of *damp proof membrene to the floor, window sills, damp proof course to the wall* and *using cavity wall*. The responses they provided showed their ability to analyze the effect of dampness on the floor and the

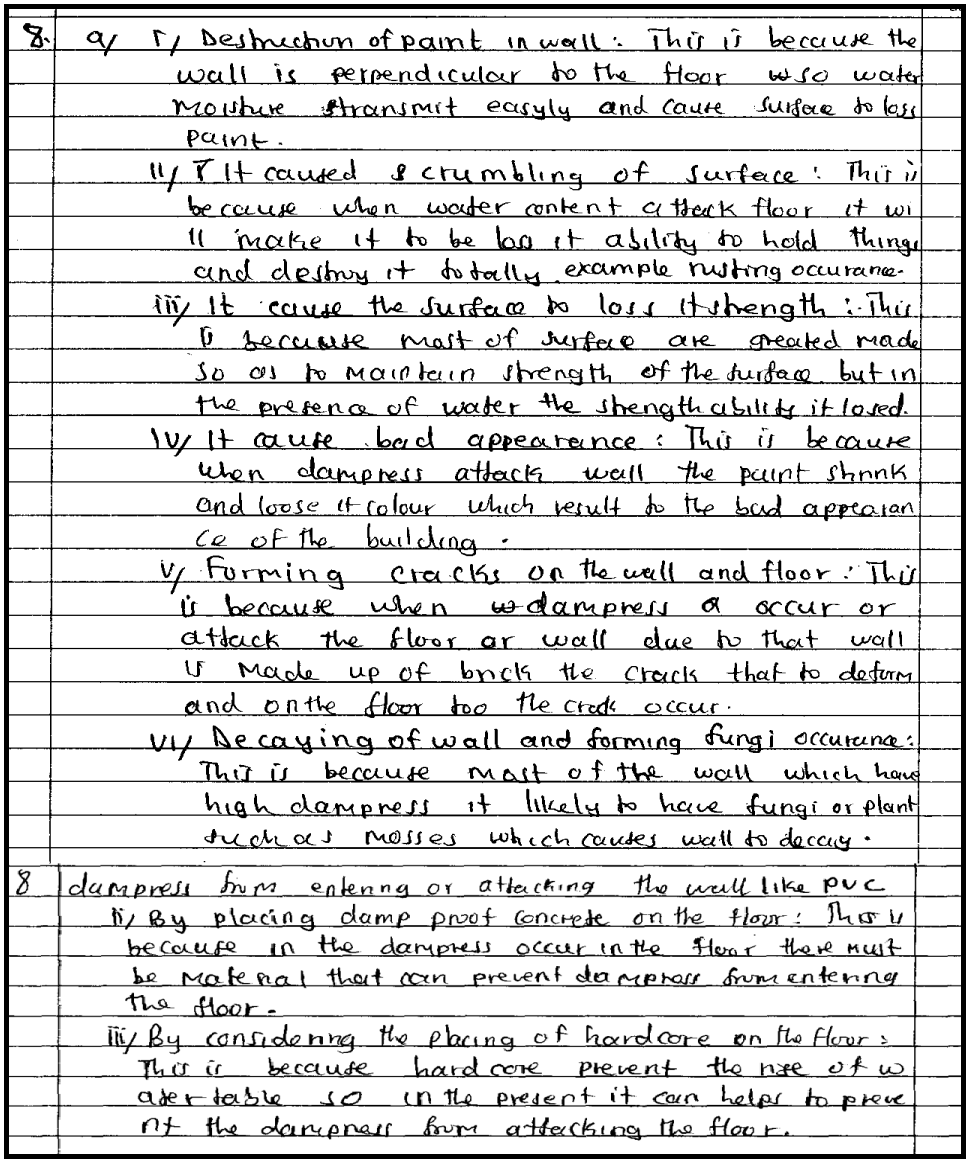
ways to prevent dampness in buildings. Extract 6.1 shows a sample of correct responses to the question.



Extract 6.1: A sample of correct responses to Question 8

Extract 6.1 shows a sample of responses from the candidate who managed to provide correct responses to the question 8.

Further analysis shows that, despite the fact that the majority of the candidates performed well, there are others who were not able to score a pass mark. Statistics show that 107 (26.82%) candidates scored 0 to 2.5. Their weak performance was attributed by irrelevant responses, which led them not to meet the requirements of the question. These candidates also proved that they had inadequate practical skills. In this question, a few candidates who scored zero wrote irrelevant responses in all parts of the question. Extract 6.2 is a sample of the candidates' incorrect responses.


8. a/ i/ Destruction of paint in wall : This is because the wall is perpendicular to the floor so water moisture transmit easyly and cause surface to loss paint.

ii/ It caused a crumbling of surface : This is because when water content a block floor it will make it to be loss it ability to hold things and destroy it totally example rusting occurance.

iii/ It cause the surface to loss it strength : This is because most of surface are created made so as to maintain strength of the surface but in the presence of water the shength ability it loved.

iv/ It cause bad appearance : This is because when dampness attack wall the paint shrink and loose it colour which result to the bad appearance of the building.

v/ Forming cracks on the wall and floor : This is because when dampness a occur or attack the floor or wall due to that wall is made up of brick the crack that to deform and on the floor too the crack occur.

vi/ Decaying of wall and forming fungi occurance : This is because most of the wall which have high dampness it likely to have fungi or plant such as mosses which causes wall to decay.

8 dampness from entering or attacking the wall like PVC

ii/ By placing damp proof concrete on the floor : This is because in the dampness occur in the floor there must be material that can prevent dampness from entering the floor.

iii/ By considering the placing of hardcore on the floor : This is because hard core prevent the rise of water table so in the present it can helps to prevent the dampness from attacking the floor.

Extract 6.2: A sample of incorrect responses to Question 8

Extract 6.2 is a sample of the candidates' incorrect responses. The candidates wrote irrelevant responses and hence scored a zero mark.

2.3 SECTION C: Structured Questions

This section had three (3) questions and the candidates were instructed to attempt two questions, each weighed 15 marks making a total of 30 marks. The score ranges used for grading candidates' performance in this section are indicated in Table 5.

Table 5: Score Intervals for Questions 9 to 11

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 9: Drainage Systems and Rainwater harvesting

This question was derived from the topic of *Drainage Systems and Rainwater harvesting*. This question was intended to measure candidates' knowledge and understanding of drainage system technical terms, as well as measure the skills on drilling wells technology. The question was as follows:

(a) Briefly explain the following terms as used in drainage system:
- *(i) Soil drainage (ii) Public sewer (iii) Gully*
- *(iv) Soil vent pipe (v) Trap*

(b) The expected water discharge from an open well of Water Supply Company is 30 unit/hour. If the working depression head of the well is 9.55 m the cost of 1unit = Tsh 1500;
- *(i) How many buckets of water will be discharged if 1 unit = 100 buckets of 10 litre.*
- *(ii) How much will be paid for the water?*
- *(iii) What is the minimum diameter of a well?*

This question was attempted by 188 (47.12%) candidates. Analysis shows that 67 (35.64%) candidates scored from 0 to 4 marks, 107 (56.91%) scored from 4.5 to 9.5 marks and 14 (7.45 %) scored from 10 to 15 marks. The candidates' general performance on this question was average since 64.36% of the candidates scored pass and above pass marks. The candidates' performance is summarised in Figure 10.

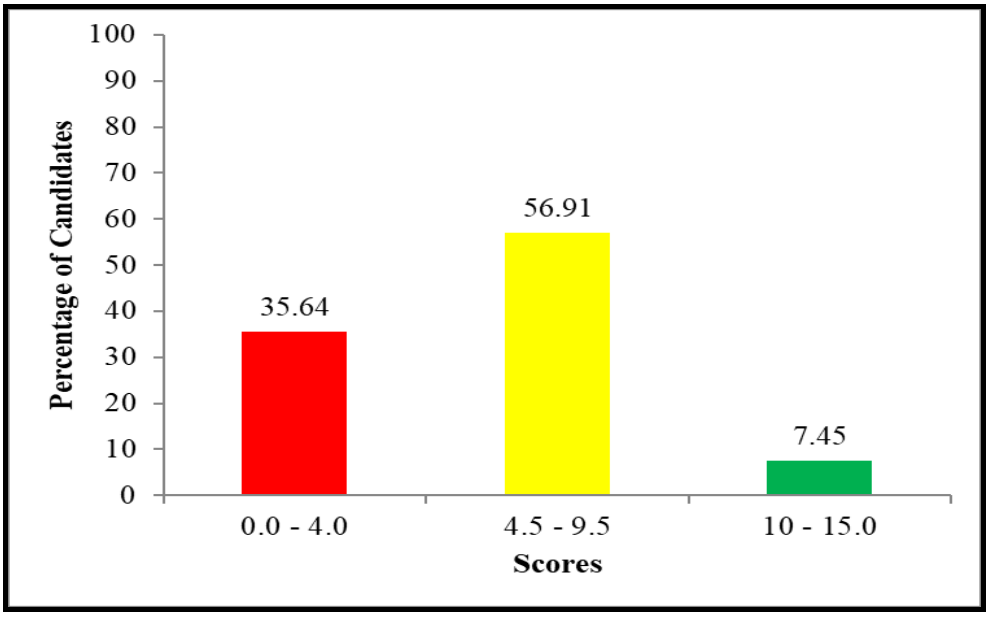
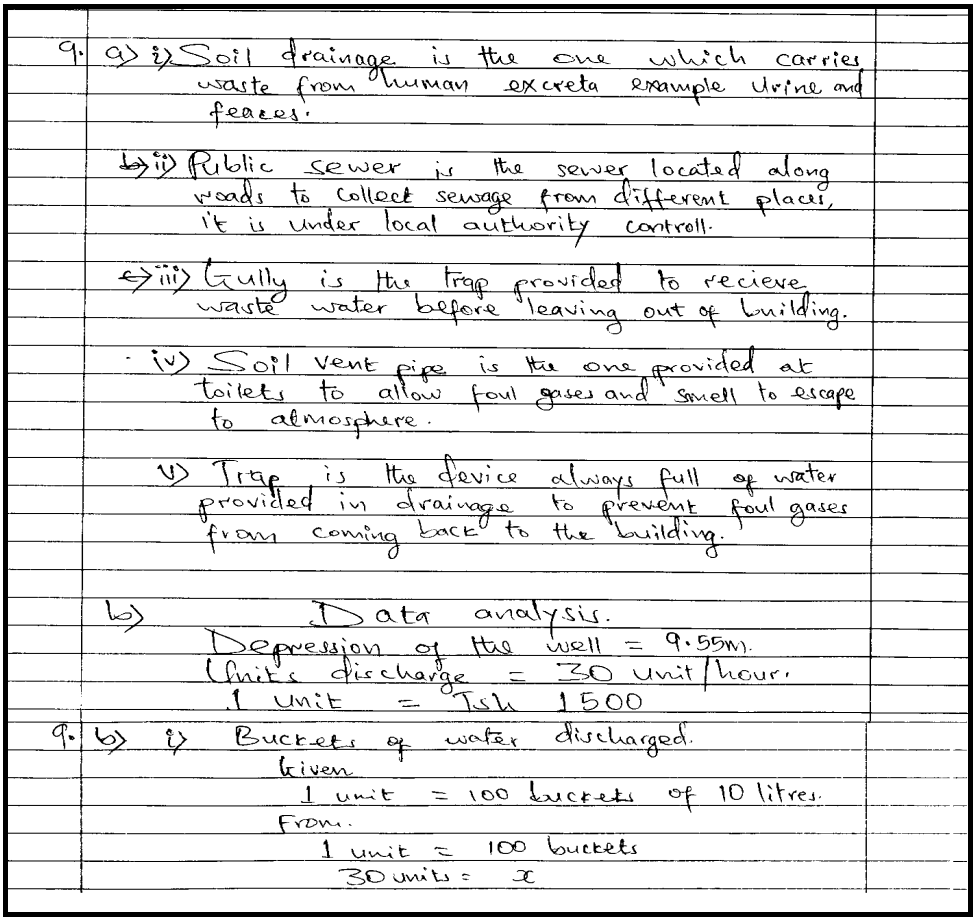


Figure 10: *The Candidates' Performance in Question 9*

Generally, the performance in this question was average as 64.36% of the candidates scored pass and above pass mark. This might be attributed to sufficient knowledge on the evaluated topic of drainage systems. In part (a), the candidates managed to give explanations of the terms used in drainage systems, such as; *soil drainage, the one which carries waste from human excreta; public sewer, the sewer located along roads to collect sewage from different places; soil vent pipe, the one provided at toilet to allow foul gases and smell to escape to atmosphere* and trap*, the device always full of water provided in drainage to prevent foul gases from coming back to the building*. In part (b), the candidate managed to convert the number of buckets discharged from the well, by being able to estimate the cost of the discharged water, they were also able to suggest the minimum diameter of a well that can discharge the estimated buckets of water. Extract 7.1 shows a sample of a candidate who managed to respond correctly to the question.


9. a) i) Soil drainage is the one which carries waste from human excreta example Urine and feaces.

ii) Public sewer is the sewer located along roads to collect sewage from different places, it is under local authority controll.

iii) Gully is the trap provided to recieve waste water before leaving out of building.

iv) Soil vent pipe is the one provided at toilets to allow foul gases and smell to escape to atmosphere.

v) Trap is the device always full of water provided in drainage to prevent foul gases from coming back to the building.

b) Data analysis.
Depression of the well = 9.55m.
Units discharge = 30 unit/hour.
1 unit = Tsh 1500

9. b) i) Buckets of water discharged.
Given
1 unit = 100 buckets of 10 litres.
From.
1 unit = 100 buckets
30 units = x

Extract 7.1: A sample of correct responses to Question 9

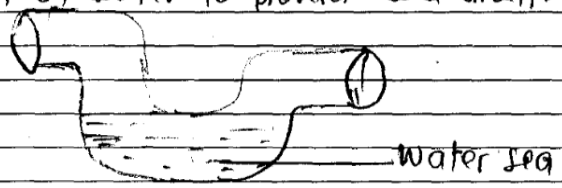
Further analysis shows that 35.64% of candidates failed this question, by writing irrelevant responses contrary to the requirements of the question. Some of those candidates wrote wrong responses due to lacking knowledge about the *Drainage Systems and Rainwater harvesting* topic. Other candidates were not able to convert mathematical units and formula. Extract 7.2 shows a sample of a candidate who failed to respond correctly to the question.

9.

(i) Soil drainage. — Is the process in which the water discharged in the soil

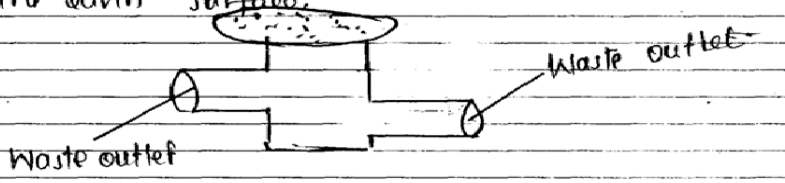
(ii) Public sewer — Is the plumber system which used to reduce some waste product from the

(iii) Gully is the drainage instrument which receive human excreta and discharge it to waste pipe it made either by metal or plastic. It has p amount of water to prevent bad smell.



(iv) Soil vent pipe.

(v) Trap is the drainage system instrument design ed to observe amount of liquid which can be applied in the earth surface.



9. (b)

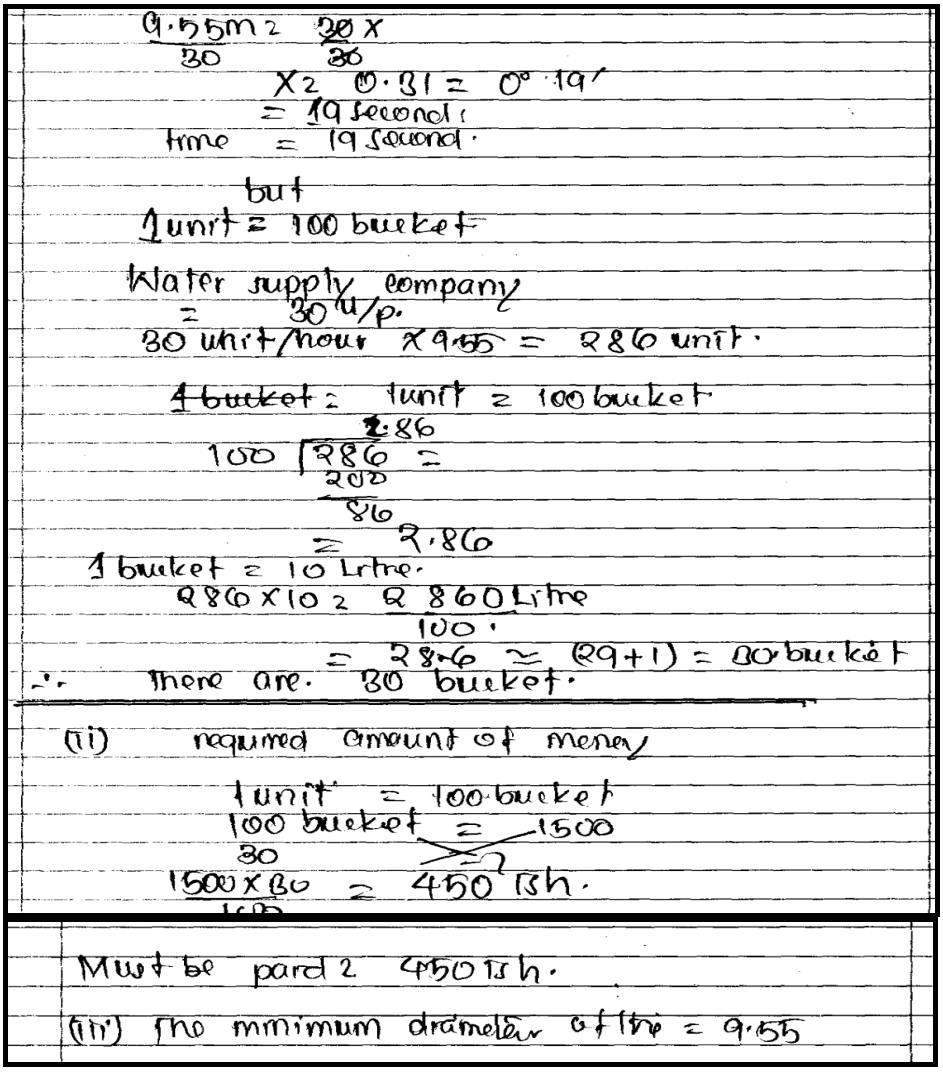
(i) Given data;

Water rate = 30 unit/hrs.
Head = 9.55 m
1 unit = cost 1500.
but
1 unit = 100 bucket of 10 Litre
soln
(i) required
~~Wat~~ Amount of bucket

Water rate = distance of water discharged / time.

but
water rate = 30m/hr.

$$\frac{30}{x} = \frac{9.55\,m}{x}$$



Extract 7.2: A sample of incorrect responses to Question 9

Extract 7.2 shows a sample of a candidate who failed to respond correctly to the question 9 and scored a zero mark.

2.3.2 Question 10: Fire Place

This question was set from the topic of *Fire place*. It was intended to assess candidates' understanding on building components and functions. The question stated as follows:

(a) Draw a well labelled sketch of a fire place and a cavity wall.
(b) Differentiate a fire place and a cavity wall according to their uses.

The question was attempted by 317 (79.45%) candidates. Analysis indicates that, 84 (26.50%) candidates scored marks from 0 to 4, 129

(40.69%) candidates scored from 4.5 to 9.5 marks; while 104 (32.81%) candidates scored from 10 and 15 marks. The candidates' general performance on this question was good since 233 (73.50%) scored pass and above pass marks. The candidates' performance is summarised in Figure 11.

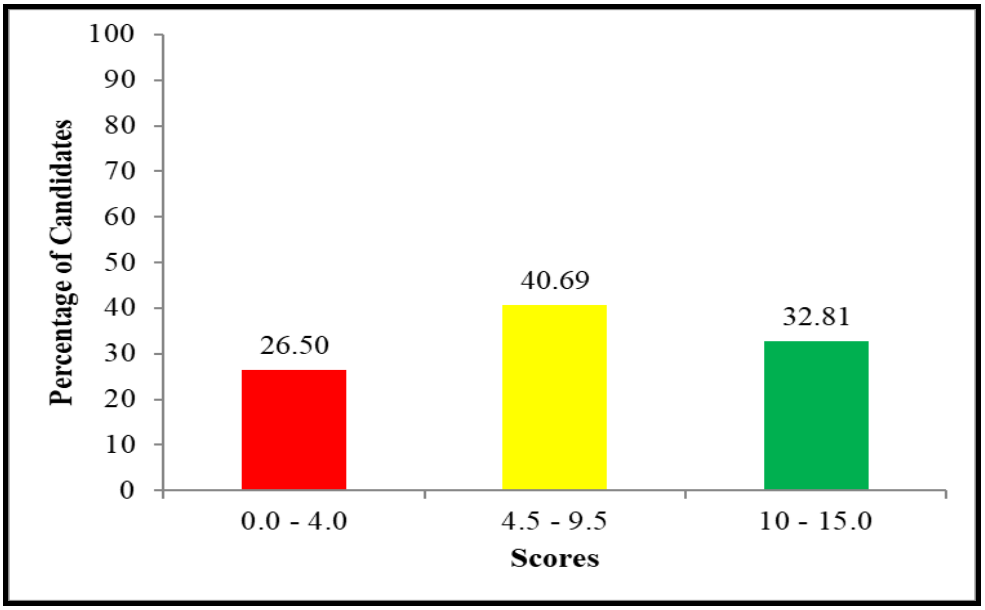
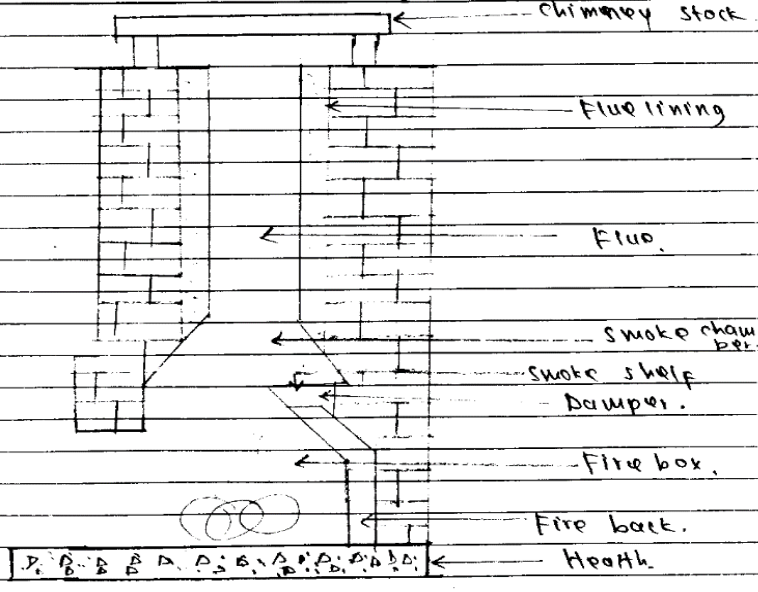


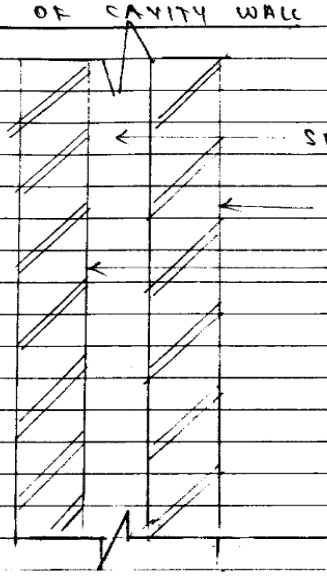
Figure 11: *The Candidates' Performance in Question 10*

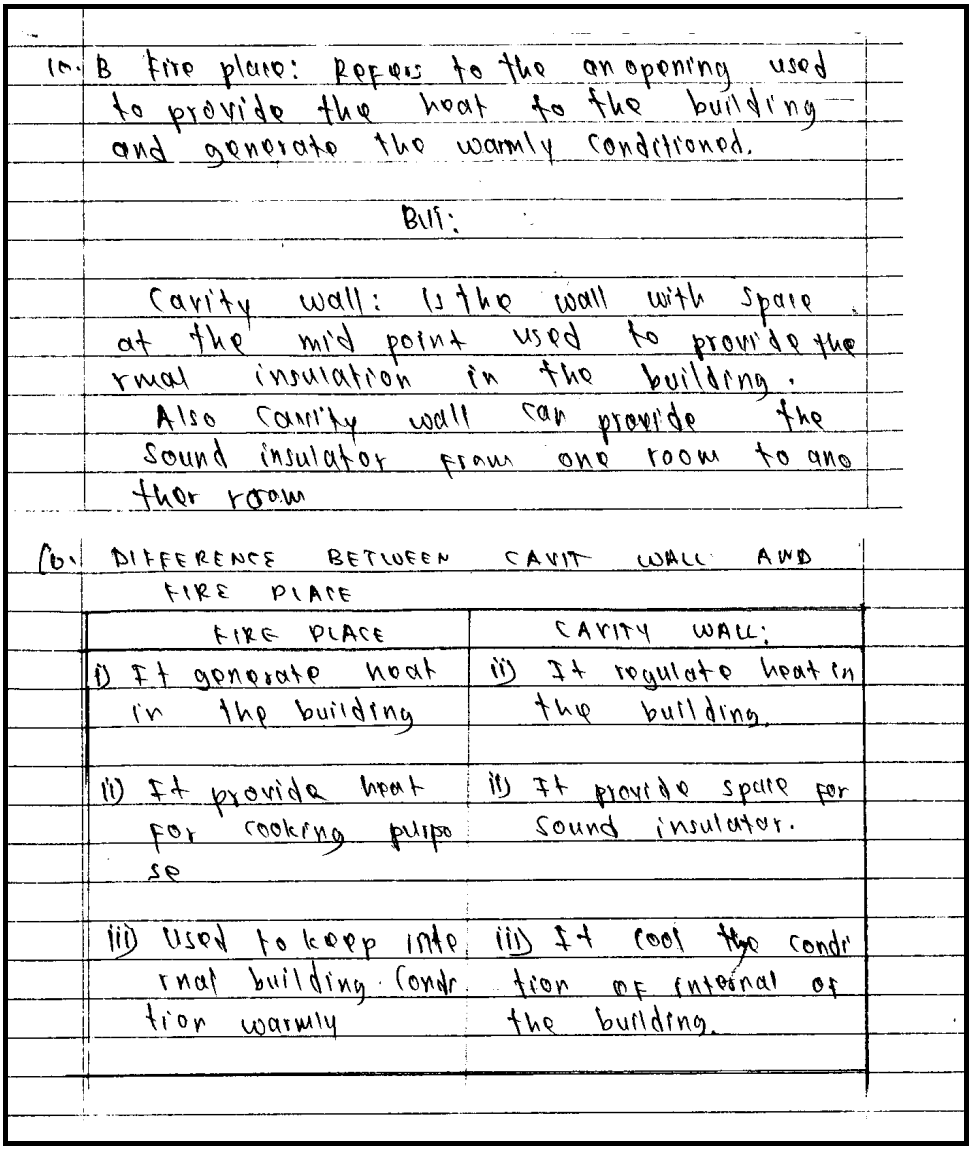
The analysis shows that 233 (73.50%) of the candidates who attempted this question managed to score pass and above pass mark, they were able to answer correctly all parts of the question. In part (a) they managed to draw and label sketch of a fireplace and a cavity wall. In part (b), they also managed to differentiate a fire place and a cavity wall, based on their uses. Some of the answers were as follows*; fire place is the opening designed to provide the heat to the building* while *cavity wall is the wall with space at the midpoint*, *fireplace generate heat in the building while cavity wall regulate heat in the building*. These responses show that the candindites are knowlegdeable on the subject matter so they are able to differentiate between fireplace and cavity wall, based on their uses. Extract 8.1 is a sample of the candidates' correct response.

10. A) SKETCH OF FIRE PLACE



10. A). SKETCH OF CAVITY WALL





10. B fire place: Refers to the an opening used to provide the heat to the building and generate the warmly condritioned.

Bui:

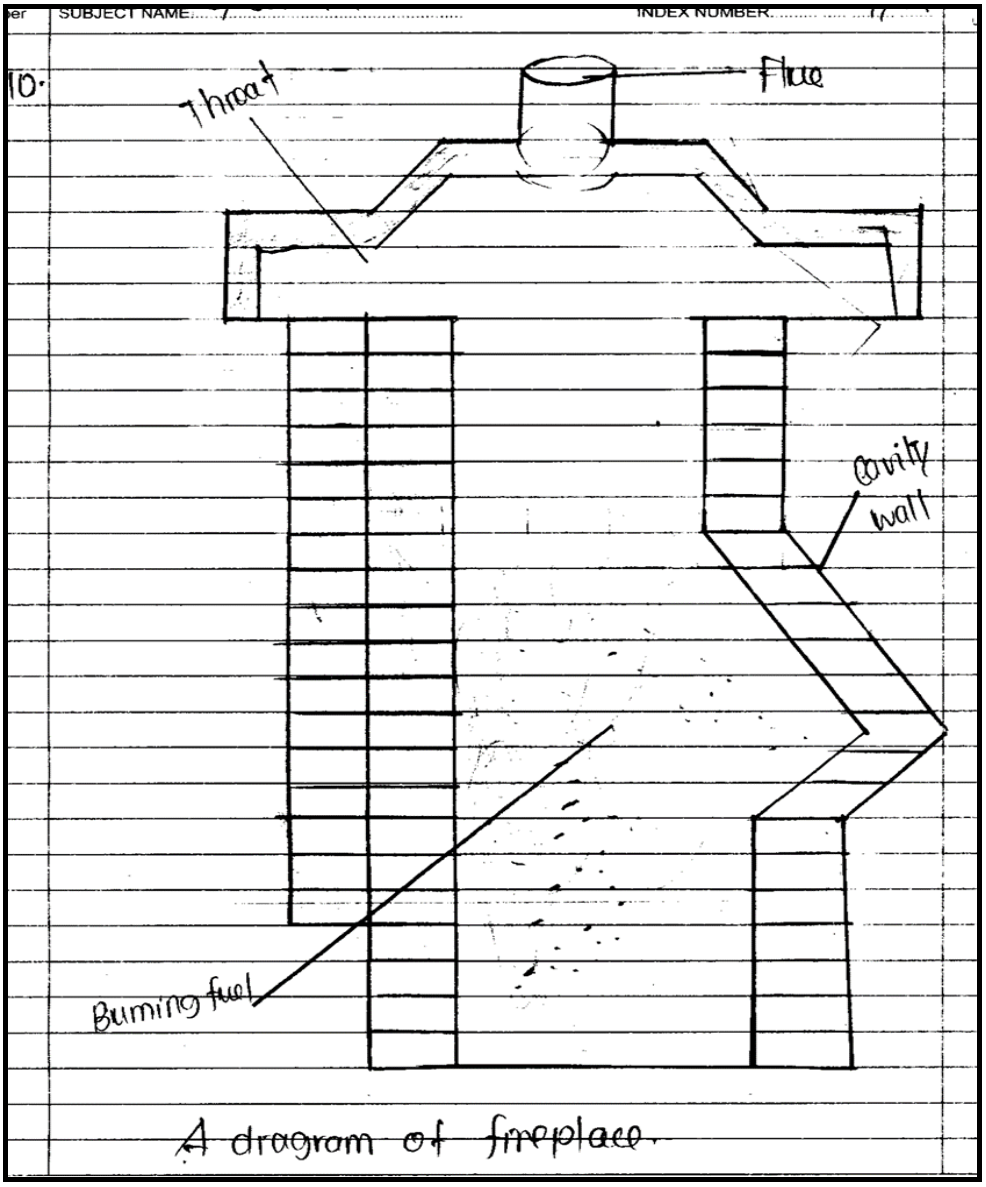
Cavity wall: Is the wall with space at the mid point used to provide the rmal insulation in the building. Also cavity wall can provide the sound insulator from one room to ano ther room

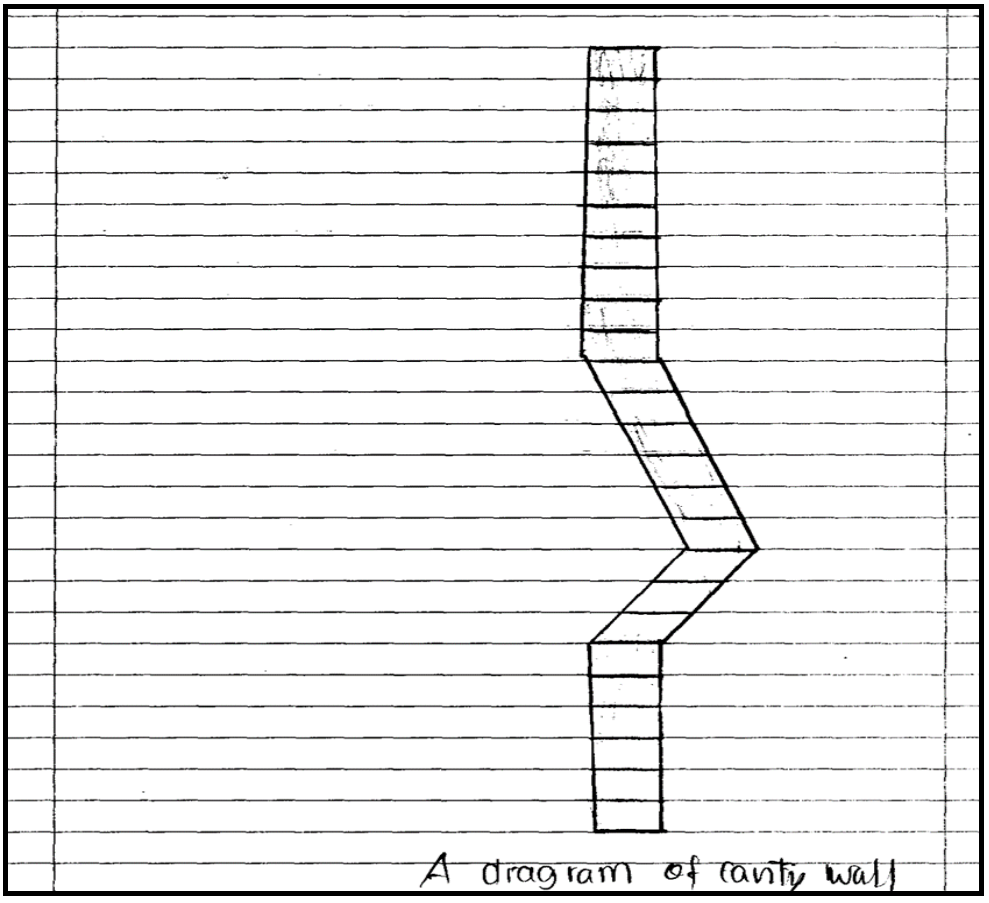
(b. DIFFERENCE BETWEEN CAVIT WALL AND FIRE PLACE

FIRE PLACE	CAVITY WALL:
i) It generate heat in the building	ii) It regulate heat in the building.
ii) It provide heat for cooking pupo se	iii) It provide spare for sound insulator.
iii) Used to keep inte rnal building condr tion warmly	iii) It cool the condr tion of external of the building.

Extract 8.1: A sample of correct responses to Question 10

Even if most of the candidates did well, further analysis shows that, there are others who scored below pass mark. Statistics show that 92 (29.02%) candidates scored from 0 to 4.5. Weak performance was attributed to unrelated responses, which led them not to meet the requirements of the question. These candidates also demonstrated that they had inadequate practical skills. Extract 8.2 is a sample of the candidates' incorrect responses.


SUBJECT NAME
INDEX NUMBER
10.
Throat
Flue
cavity wall
Burning fuel
A diagram of fireplace.



Extract 8.2: A sample of incorrect responses to Question 10

Extract 8.2 is a sample of the candidates' incorrect responses. These candidates also demonstrated that they had inadequate practical skills and failed to provide correct responses.

2.3.3 Question 11 : Fondation Setting Out

This question was derived from the topic of *Foundation Setting out*. The question was intended to measure candidates' ability in assessing soil properties, various types of foundation and principles of foundation settlement. The question was as follows:

Suppose you have been assigned to study building structures of a visited construction site and found that there is a failure of a building foundation due to unequal settlement.

(a) Identify five factors which might be the cause of unequal settlement of the foundation.

(b) Suggest four requirements of a good foundation to the unequal settlement.

(c) What are the five differences between pile and pier foundation which can be used to regulate building settlement?

The question was attempted by 293 (73.43%) candidates. Analysis shows that 101 (34.47%) candidates scored from 0 to 4 marks, 186 (63.48%) scored from 4.5 to 9.5 marks and 6 (2.05%) scored from 10 to 15 marks. The candidates' general performance on this question was good since 65.53% of the candidates scored pass and above pass marks. The candidates' performance is summarised in Figure 12.

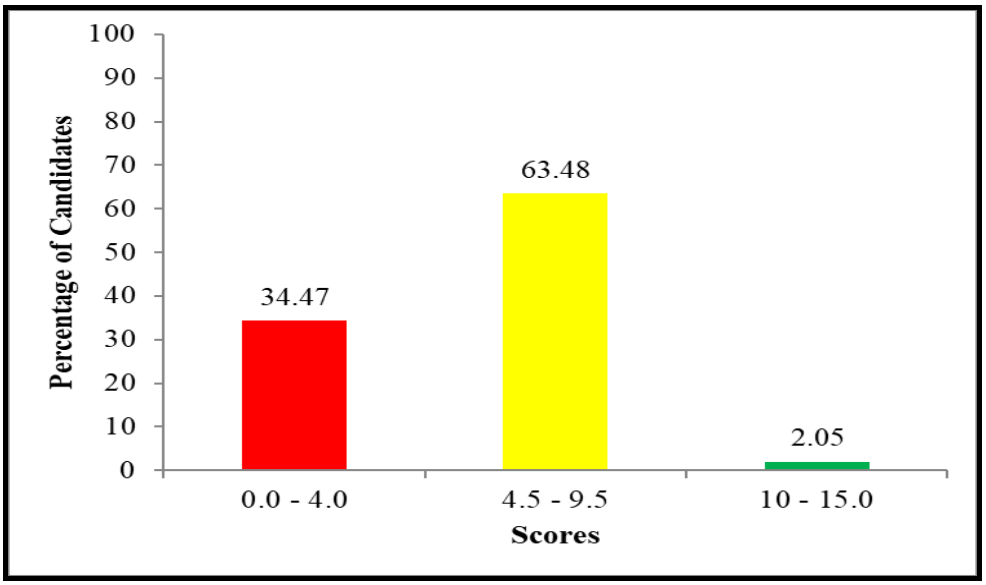
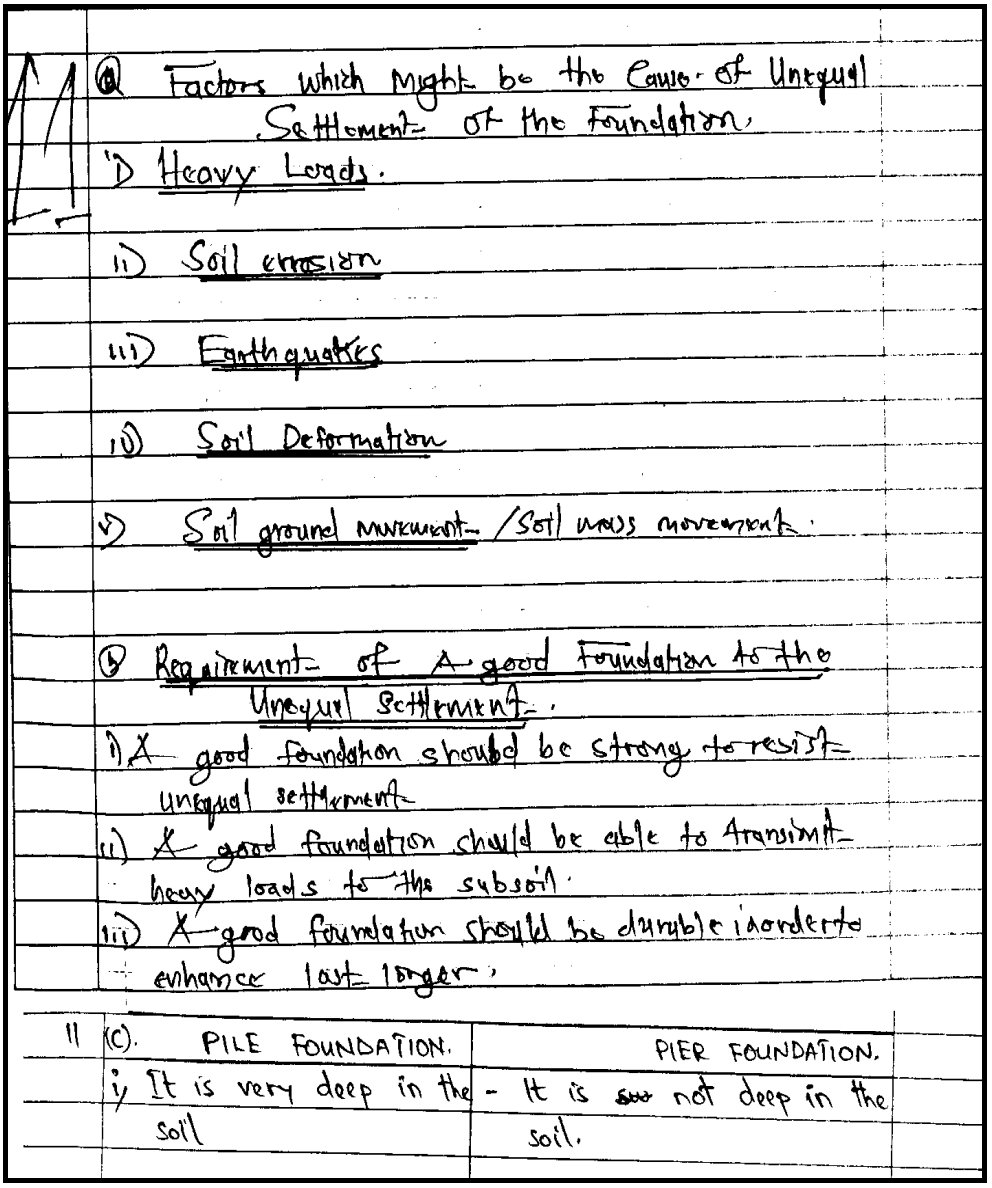


Figure 12: *The Candidates' Performance in Question 11*

The candidates indicate that they had sufficient knowledge on foundation setting out. They managed to identify factors which might be the cause of unequal settlement of the foundation. In part (a) of this question, the candidates identified factors such as; *low bearing capacity*, *water table*, *soil erosion*, *earth quake* and *poor ground compaction*. In part (b), they managed to suggest requirements of a good foundation by writing; *should be strong*, *should be able to transmit the loads to the subsoil* and *should be durable*. Lastly, part (c) was poorly performed by most of them, few managed somehow to differentiate between pile and pier foundation, for example; *pile foundation is deep* while *pier is not deep*. Extract 9.1 is a sample of the candidates' correct responses.



(a) Factors which might be the cause of Unequal Settlement of the foundation.

i) Heavy Loads.

ii) Soil erosion

iii) Earthquakes

iv) Soil Deformation

v) Soil ground movement /Soil mass movement.

(b) Requirement of A good foundation to the Unequal Settlement.

i) A good foundation should be strong to resist unequal settlement

ii) A good foundation should be able to transmit heavy loads to the subsoil.

iii) A good foundation should be durable inorder to enhance last longer.

11	(c). PILE FOUNDATION.	PIER FOUNDATION.
	i) It is very deep in the soil	- It is not deep in the soil.

Extract 9.1: A sample of correct responses to Question 11

Further analysis shows that 34.47% of candidates failed to respond to this question correctly. Some of them wrote inappropriate responses due to insufficient knowledge about the subject matter. Extract 9.2 shows a sample of a candidate who failed to respond correctly to the question

11. a) Factors which causes unequal settlement of foundation
i) Very loosen soil.
ii) Depth of the footings.
iii) Depth of the ground water table.
iv) collapsing of the soil.
v) Load carried by the foundation.

11. b) i) Increasing depth of the footings.
ii) Timbering into Trenches.
iii) Preventing overloading.
iv) Maintaining the foundation.

c) i) Pile foundation uses long piles in its construction.
While.
Pier foundation do not use long piles.

ii) Pile foundation used in construction of structures like bridges.
While.
Pier foundation is not used in construction of bridges.

iii) Pile foundation includes long pile and short pile foundations.
While.
Pier foundation include attached and detached pier foundations.

Extract 9.2: A sample of incorrect responses to Question 11

Extract 9.2 shows a sample of a candidate who failed to respond correctly to the question 11, as he/she wrote irrelevant responses.

3.0 ANALYSIS OF THE CANDIDATES' PERFOMANCE PER TOPIC

The candidates' performance in CSEE 2023 was average as shown in the analysis of each question. The paper covered eighteen (18) topics including: *Beams and columns, Roof, Temporary support, Stair and stair case, Foundation setting out, Walls, building materials, Introduction to building construction, Plumbing Science, Workshop orientation, Sanitary appliances, Pumps, Irrigation system, Fire place, Floor, Drainage and rainwater harvesting, Cost estimates and Piping system*. Among the topics tested, one had weak performance, two were averagely performed yet the rest had good performance.

The candidates demonstrated good performance in the topic of *Workshop orientation (95.24%); Sanitary appliances (89.72%); Pumps (86.97%); Beams and columns Roof, Temporary support, Stair and stair case, Foundation setting out, Walls, Building materials, Introduction to building construction* and *Plumbing Science* which were tested in multiple choice questions (86.22%); *Irrigation system (74.44%); Fire place (73.50%), Floor (73.18%)* and *Foundation setting out (65.53%).*

The topics in which the candidates performed averagely were *Drainage and rainwater harvesting (64.36%)* and *Cost estimates (56.39%).* The topic in which the candidates had weak performance was *Piping system* (18.55%).

Further analysis on the candidates' performance per topic is summarized in the **Appendix**.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The distribution of candidates' performance shows that the general performance in the Building Construction subject was good since 370 (92.73%) candidates were able to score from 30 per cent or above marks.

The candidates' performance in questions 1, 2, 3, 4, 5, 6, 8, and 9 was good while the performance in questions 6 and 9 was average. However, question 7 from the topic of *piping system* was poorly performed.

Despite having a good performance, the candidates encountered some challenges in answering various questions in Building Construction subject. These challenges included; lack of adequate knowledge of the concepts in responding to some of the questions, lack of sketching and mathematical skills particularly in the topic of cost estimates and failure of some candidates to understand the requirements of the questions.

4.2 Recommendations

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

Recommendations to Students:

(a) They should be encouraged to read carefully the instructions before attempting the given questions. This will enable them to understand the demands of the questions.

(b) They should be encouraged to search and study relevant materials from books, internet or any other sources 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 to Teachers:

(a) The topic which had weak performance, namely piping system should be taught and learnt through competence-based approach skills.

(b) Teachers and the school management should provide students with enough exercises, assignments, quizzes, tests and internal

examinations with close supervision to equip them with knowledge on interpreting the question requirements.

(c) Students should be subjected to more workshop and field practical as they can learn better through seeing and doing.

(d) Guest speakers who are experts in the construction fields should be invited to explain different concepts on the topics. For example, site supervisors, water supply and sanitation engineer extra.

Appendix

The Candidates' Performance Per Topic in Building Construction Subject

S/N	Topic	Question number	Percentage of Candidates who Scored 30% and above.	Remarks
1.	Workshop orientation	2	95.24	Good
2.	Sanitary appliances	5	89.72	Good
3.	Pumps	4	86.97	Good
4.	Beams and columns Roof Temporary support Stair and staircase Foundation setting out Walls Building materials Introduction to building construction Plumbing science	1(Multiple Choice Items)	86.22	Good
5.	Irrigation system	3	74.44	Good
6.	Fire place	10	73.50	Good
7.	Floor	8	73.18	Good
8.	Foundation setting out	11	65.53	Good
9.	Drainage and rainwater harvesting	9	64.36	Average
10.	Cost estimates	6	56.39	Average
11.	Piping system	7	18.55	Weak