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

ARCHITECTURAL DRAUGHTING

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

072 ARCHITECTURAL DRAUGHTING

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

TABLE OF CONTENTS

FOREWORD

This report presents Candidates' Items Response Analysis (CIRA) on Form Four National Examinations in the subject of Architectural Draughting conducted in November 2023. The report aims to provide feedback to all education stakeholders on the factors which contributed to the candidates' performance in the Architectural Draughting subject.

The Certificate of Secondary Education Examination (CSEE) is a summative evaluation that intends to monitor candidates' learning by providing feedback which teachers, candidates and other education stakeholders can apply to improve learning and teaching processes. This analysis justifies the candidates' performance in different topics of Architectural Draughting subject. The analysis revealed that the candidates had good performance in the topics of *Architectural Drafting and Occupational Information, Drawing Instruments and Equipment, Layout of Drawing or Paper Formatting, Geometrical Figure, Orthographic Projection, Auxiliary View, Development of Foundation Plan, Elevations, Stairs and Staircase, Electrical Supply and Distribution, Building Specification* and *Passive Regulated House Development.* The average performance was noted on the topics of *Doors, Computer Aided Draughting (CAD)* and *Drainage Systems.*

However, the performance on the topic of *Pictorial Drawing* was weak. The factors which could have affected the candidates' ability to respond correctly include; inability to identify the requirements of the questions and misinterpretation of the question, which led to improper application of knowledge and skills acquired during the course.

This report aims to identify candidates' strengths and weaknesses by improving learning of the prospective candidates before sitting for their Certificate of Secondary Education Examination (CSEE). It will also help teachers to identify the challenging areas of the course and take appropriate measures during teaching and learning processes.

The National Examinations Council of Tanzania (NECTA) expects that the feedback provided in this report will enable the education stakeholders to take proper measures in improving learning and teaching of Architectural Draughting. Consequently, candidates will acquire knowledge, skills and competences stipulated in the syllabus for a better performance in future examinations.

The Council appreciates the contributions of all who participated in preparation of this report.

Dr. Said Ally Mohamed
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report provides a detailed analysis of the performance of candidates who sat for the Certificate of Secondary Education Examination (CSEE) 2023 in the Architectural Draughting subject. The examination paper was set according to the examination format developed from the Civil Engineering Syllabus for Secondary School Education issued in 2019.

The examination paper had eight (8) questions categorised into three sections namely A, B, and C. Section A consisted of one (1) objective question with ten (10) multiple-choice items, weighing one (1) mark each. Section B had six (6) short answer questions, each carrying ten (10) marks. All questions in Sections A and B were compulsory. Section C had one (1) structured question, weighing 30 marks.

A total number of 364 candidates sat for the Architectural Draughting National Examination in 2023. Among them, only 11 (3.02%) candidates scored from 65 to 100 marks. The candidates who scored from 30 to 64 were 232 (63.74%), whereby 121 (33.24%) candidates scored from 0 to 29 marks. This implies that the general performance in this subject was good, because majority of candidates who were 243 (66.76%) scored above pass mark. However, when the results are compared to those of 2022, an increase of 18.28% was observed. In 2022 the number of candidates who passed was 159 (48.48%).

Figure 1 shows the general distribution of scores and candidates' performance in the 2023 National Examination.

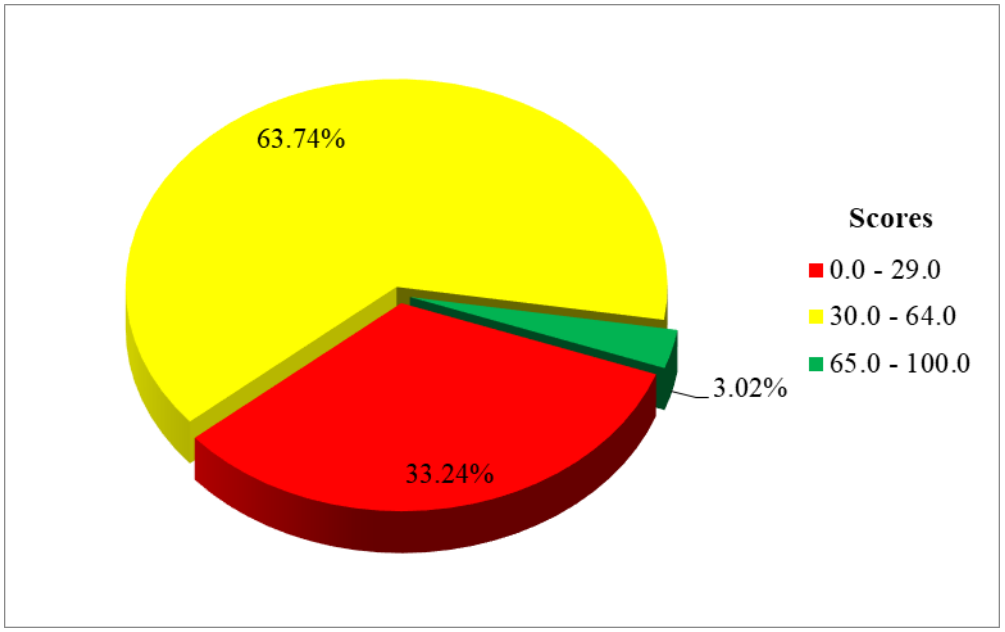


Figure 1: *The Candidates' Performance in 2023*

This report analyses candidates' responses in regards to the requirements of the questions. In the course of analysis, brief notes are provided on what candidates were required to do and the reasons for the ranks on their performance. Samples of candidates' good or poor responses are also inserted in the form of extracts to illustrate the cases presented. Charts are also used to summarize the candidates' performance in a particular question. The candidates' performance have been categorized into three groups: 65–100, 30–64 and 0–29 to indicate good, average and weak, respectively. These categories of performance has beeen represented in colours of Green, Yellow and Red respectively, representing the three categories of the performance. Finally, the report gives the conclusion and recommendations for implementation.

2.0 THE ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION

2.1 SECTION A: OBJECTIVE QUESTIONS

2.1.1 Question 1: Multiple Choice Items

This question had ten (10) multiple choice items from (i) to (x). It required candidates to choose the correct answer from the given five (5) alternatives (A - E) by writing the letter of the correct answer in the answer booklet provided. The items were constructed from ten (10) topics, namely, *Layout of the Drawing Paper or Paper Formatting, Instrument/Equipment and Materials, Development of Foundation Plan, Electrical Supply and Distribution, Auxiliary View, Elevation, Building Specification, Orthographic Projection, Architectural Draughting and Occupational Information* and *Passive Regulated House Development.*

All 364 (100%) registered candidates attempted the question of whom 52 (14.29%) candidates scored from 0 to 2 marks. The candidates who scored from 3 to 6 marks were 257 (70.60%), whereas 55 (15.11%) candidates scored from 7 to 10 marks. The performance of the candidates in this question is summarized in Figure 2.

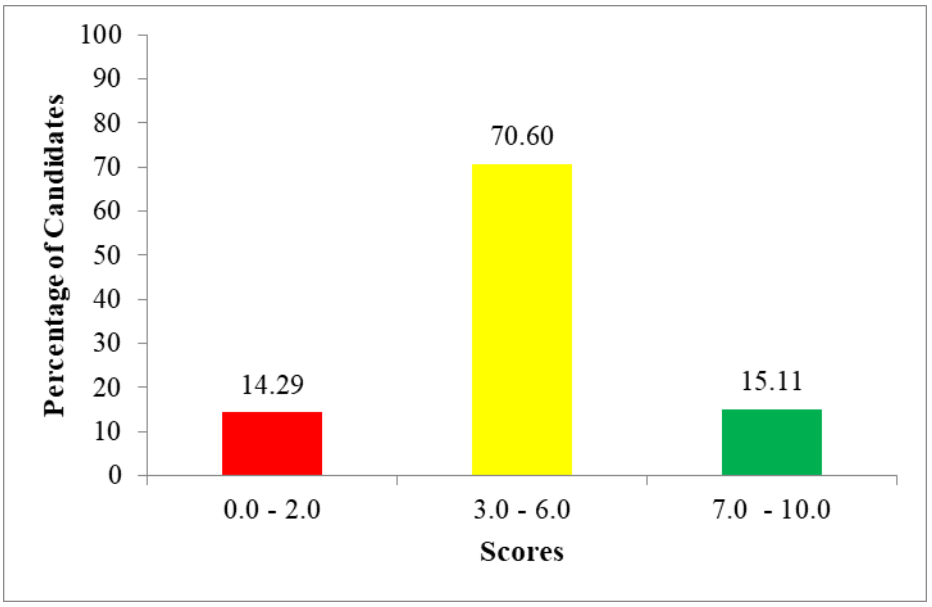


Figure 2: *The Candidates' Performance in Question 1*

Figure 2 shows that the candidates' performance in this question was good, since 312 (85.71%) candidates scored average marks and above. The candidates who performed well in the question demonstrated a strong ability in applying knowledge from various topics to identify the correct responses among the given alternatives. However, most candidates failed in item (v) drawn from the topic of *Auxiliary Views* and (viii) on the topic of *Orthographic Projection*. The analysis of the candidates' responses shows that most of them chose correctly the response for item (ii) drawn from the topic of *Drawing Instruments, Equipment and Materials*. The rest of the items were averagely performed. The strengths and weaknesses of the candidates in choosing the correct answers in the items are analysed as follows:

Item (i) was set from the topic of *Layout of Drawing or Paper Formatting*. It tested candidates' ability in identifying the layout of a drawing sheet. The question was:

Drawing sheets should be filed or bound. Which side of a sheet borderline has more space for this purpose?

A Left hand side *B Top side* *C Right hand side*
D Bottom side *E Bottom and top side*

The correct response was A, '*Left hand side'*. The candidates who opted for this alternative were correct because, according to the International Standards Organization (ISO), the space for filing or binding is located on the left side of the drawing paper. This adherence to ISO standards ensures consistency in document organization and facilitates easy access when filing or binding documents.

Candidates who selected the incorrect options failed to recall the international standards of drawing paper. For instance, alternative B, *'Topside'*, is reserved for headers or titles and is not designated for such purposes. Similarly, alternative C, *'Right-hand side'*, was also an incorrect response because it commonly serves as a margin area. Alternative D, *'Bottom side'*, contains a title block, making it unsuitable for filing or binding. Furthermore, alternative E, *'Bottom and Topside'*,

was also incorrect because it combines areas that typically have different purposes, resulting in a cluttered documentary layout.

Item (ii) was developed from the topic of *Drawing Instruments and Equipment*. It tested the candidate's ability to identify the use of drawing tools. This question was:

Suppose you are drawing a building floor plan that requires repetitive dimensions transferring. What drawing instrument will you use?

A	*Compass*	*B*	*Divider*	*C*	*Template*
D	*Protractor*	*E*	*French curve*		

The correct response from the given alternatives was B, '*Divider'*. Candidates who opted for this alternative were correct because a divider accurately transfers measurement from one part of a drawing to another. Candidates who chose alternative A, *'Compass',* C, '*Template'*, D, '*Protractor',* and E, *'French curve',* were wrong because these are instruments used in drawing for different purposes. Compasses are primarily used for drawing circles and arcs, templates provide predefined shapes, designs, numerals, alphabets and symbols allowing consistency and efficient replication of styles and standards, whereby protractors measure angles, and French curves are for drawing smooth curves. However, they all lack the precision and efficiency needed for transferring repetitive linear dimensions.

Item (iii) was set from the topic of *Development of Foundation Plan*. The item was designed to assess the candidates' knowledge of foundation design. The question was:

Which of the following is not preliminary considered for the foundation of a single storey building?

A	*Bearing capacity of soil*	*B*	*Ground water condition*
C	*Settlement control*	*D*	*Soil organism*
E	*Load of the building*		

The correct response was D, '*Soil organism'*. Candidates who chose this response were aware that soil organism does not have an impact on structural stability, durability or foundation performance.

Alternatives A, B, C, and E were incorrect because all of them are crucial considerations in preliminary foundation design for a single-storey building. Option A, *'Bearing capacity of soil,'* is essential as it assesses the soil capability on upholding building loads. Similarly, option B, *'Ground water condition,'* evaluates the water table positioning, crucial for foundation design. Option C, *'Settlement control',* outlines methods to regulate building settlements by ensuring structural integrity. Lastly, option E, *'Load of building',* correlates with soil capacity affecting foundation design.

Item (iv) was extracted from the topic of *Electrical Supply and Distribution*. The question required the candidates to identify the symbol representing a socket outlet with a switch. The question was as follows:

Identify a symbol representing a socket outlet with a switch

A  *B*  C 

D  *E* 

The correct response was B. Candidates who selected this alternative demonstrated knowledge of electrical fitting drawing symbols. Further analysis indicates that options A and C were chosen by candidates who were unaware that such symbols represent a socket without a switch and a socket with a triple gang respectively. Alternatives D and E are incorrect because they both represent a switch.

Item (v) was set from the topic of *Auxiliary View.* This question tested the candidates' ability in identifying the types of auxiliary view. The question was:

Which type of auxiliary view is used to project symmetrical features?

A	*Primary*	*B*	*Secondary*	*C*	*Half*
D	*Partial*	*E*	*Tertiary*		

The correct alternative was C, '*Half*'. The candidates who chose this alternative demonstrated the ability to differentiate between types of auxiliary views. Distractors A, *B, D,* and *E,* are incorrect for projecting symmetrical features because they lack specific design for this purpose. Option A, *'Primary',* is for features perpendicular to the plane of projection. Option B, *'Secondary',* is for features which are not perpendicular to any primary plane. Option D, *'Partial',* is for features not fully visible in primary views. Option E, *'Tertiary',* is for features inclined to primary and secondary planes.

Item (vi) tested the candidate's knowledge on the topic of *Elevations*. The question was:

How many elevation views are normally required to show the features of a building in architectural draughting?

A 1 B 2 C 3 D 4 E 5

The correct response among the given alternatives was D, *'4'*. In this case, the elevation views are left, right, rear and front elevation views which make a total of 4 views. Candidates who opted for Alternative A, B, C, and E likely suggested a different number of views, indicating a misunderstanding of the concept or misinterpretation of the question.

Item (vii) was set from the topic of *Building Specification.* Candidates were required to determine the document which will give the standard of materials for the execution of the construction project. The question was:

A contractor is required to purchase materials for the execution of the construction project. Which contract document will give the standards of the materials?

A Bill of quantity B Drawings C Schedules
D Conditions of contracts E Specification

Candidates who chose E, *'Specification',* were aware that specification document outlines the standards, quality, and requirements for materials to be used in the project. It provides detailed descriptions of the materials, their properties, dimensions, and any other relevant specifications that the contractor needs to adhere to during the

execution of the project. Candidates who chose alternative A, '*Bill of quantity',* failed to understand that a bill of quantity is a document containing lists of quantities of materials required for the project for project cost evaluation. Alternatives C, '*Schedules'* and D, '*Condition of contracts',* were incorrect responses because these two documents deal with project timelines and activities and establish legal terms respectively.

Item (viii) tested the candidates' knowledge on the topic of *Orthographic Projection.* The candidates were required to identify the projection formed when the projector is parallel and perpendicular to each other in the projection. The question was:

What is a projection formed when the projector is parallel to each other and perpendicular to the projection?

A Orthographic B Isometric C Axonometric
D Oblique E Perspective

The correct response from the given alternatives was A, *'Orthographic'*. Candidates who opted for this alternative demonstrated proficiency in technical drawing. Alternative B, *'Isometric',* was incorrect because isometric projection is formed when projectors are not parallel to the principal plane but parallel to each other. Similarly, alternative C, *'Axonometric',* was also incorrect because axonometric is a type of orthographic projection used for creating a pictorial drawing of an object, where an object is rotated around once or more of its axes to reveal multiple sides. Alternative D, *'Oblique',* is not correct because oblique is formed when projectors are not parallel to the projection. Finally, Alternative E, *'Perspective',* is also not correct because perspective is a drawing technique in which an object is depicted as seen by the observer.

Item (ix) was set from the topic of *Architectural Drafting and Occupational Information*. It required candidates to identify the drawing that comes first when preparing a set of working drawing. The question was:

Suppose you are preparing a set of working drawing for the building. Which drawing will you create first?

A Foundation plan B Site plan C Floor plan
D Sections E Elevations

The correct response was C, *'Floor Plan'.* The candidates who opted for this alternative had an ability to draw a floor plan and other working drawings related to the building project. Candidates who opted for alternatives *A*, '*Foundation plan'*, B, '*Site plan'*, D, '*Section*', and E, '*Elevations*', failed to understand that a floor plan forms the basis of all working drawings including foundation plans, sections and site plans.

Item (x) tested the candidates' knowledge on the topic of *Passive Regulated House Development*. This question required the candidates to recall the important factor for consideration when dealing with passive solar heating and cooling system in a building. The question was:

Which one of the following is important with respect to passive solar heating and cooling system in a building?

A Material used to build cooling system
B Electrical systems used to perform heating operation
C Mechanical systems used to perform cooling operation
D Material used to build heating system
E Materials used to construct the building

The correct answer was E*, 'Materials used to construct the building'.* Candidates who chose the correct response were conversant with the factors affecting comfortability within a building. Candidates who chose alternatives A, B, C and D were incorrect because the materials for cooling, electrical, mechanical and heating systems are important when the building structure is already built. Such candidates were not aware of the concept of passive regulated houses.

2.2 SECTION B: SHORT ANSWER QUESTIONS

This section consisted of six (6) short answer questions, each question weighed ten (10) marks. The score ranges used for grading the

candidates' performance of in each question in this section are indicated in Table 1.

Table 1: Score Ranges for Grading Candidates' Performance in Questions 2 to 7

Scores range	General Performance
0 - 2.5	Weak
3 - 6	Average
6.5 - 10	Good

2.2.1 Question 2: Computer Aided Draughting (CAD)

The question consisted of two parts: (a) and (b), where part (a) required the candidates to list the application of a computer aided drafting. In part (b), candidates were required to identify the function of the given tool icon as applied in arch CAD. This question tested the candidates' ability to use and apply computer-aided draughting (CAD). The question was:

(a) What are the four applications of a computer aided drafting?
(b) Identify the function of each of the following tool icon as applied in Arch CAD.

(i)  (ii)  (iii) 

(iv)  (v) 

The analysis shows that 364 (100%) candidates attempted the question of whom 227 (62.36%) scored from 0 to 2.5 marks. Candidates who scored from 3 to 6 marks were 125 (34.34%) while 12 (3.30%) scored from 6.5 to 10 marks. Figure 3 summarizes the candidates' performance in question 2.

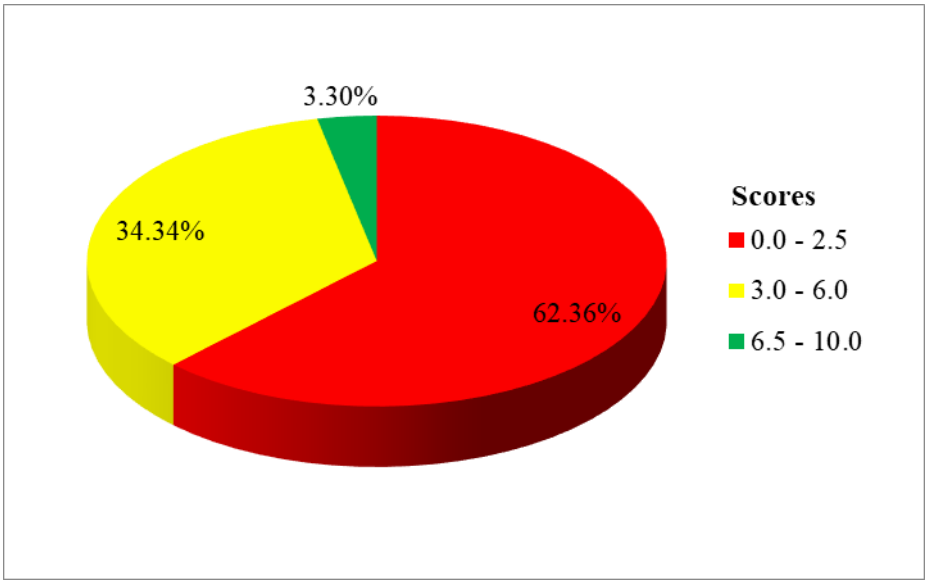
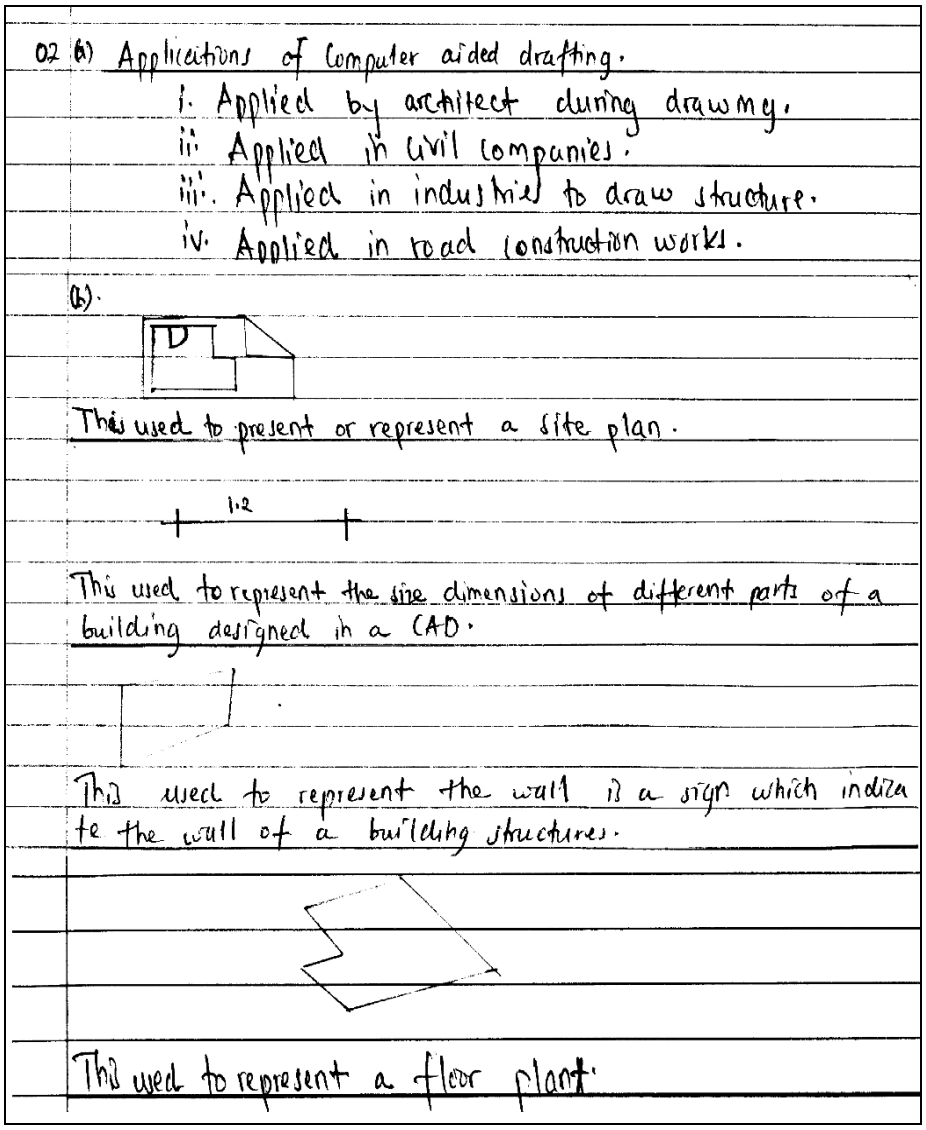


Figure 3: *The Candidates' Performance in Question 2*

Figure 3 indicates that the general performance of candidates in this question was average as 137 (37.64%) candidates scored 3 marks and above. These candidates successfully identified various computer-aided drafting applications in part (a) of the question, including preparation of 2D and 3D drawings, building drawings, graphics using mathematical data, company logos and presentations, maps, layouts, and interior designing and viewing. However, few candidates managed to identify the function of the tool icons as applied in Arch CAD in part (b), which includes tools for hatching, inserting drawings and dimensions, drawing walls and slabs or floors. Their performance might be attributed by sufficient practical knowledge of CAD and understanding the requirements of the question demands. Extract 1.1 shows a sample of correct responses provided by one of the candidates.



Extract 1.1: A sample of correct responses to Question 2

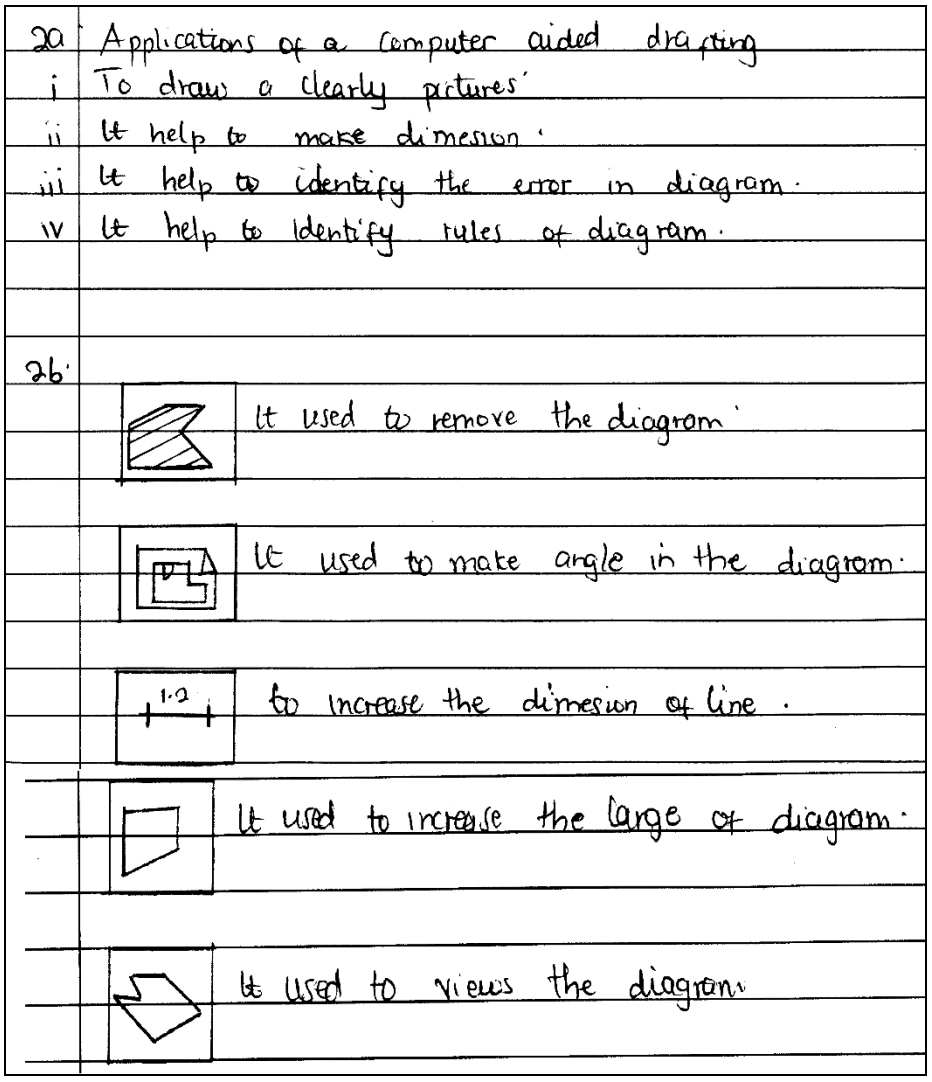
Extract 1.1 shows a sample of responses from the candidate who managed to provide relevant responses on the application of a computer aided drafting in part (a), and he/she identified the function of each given tool icon as applied in Arch CAD, in part (b) of the question.

Further analysis reveals that 227 (62.36%) candidates performed poorly by achieving the score range of 0 to 2.5 marks. Majority of the candidates who scored in this range were able to provide one or two applications of computer aided drafting (CAD) in part (a) but skipped

part (b) of the question and vice versa, while others repeated the same responses more than once in the three parts of the question. Moreover, other candidates misinterpreted parts (a) with (b) of the question by mentioning the functions of tools such as fill, dimensioning, wall, slab and beam as the applications of computer aided drafting (CAD)

The candidates who scored 0 in part (a), mentioned the importance of computer aided drafting (CAD) instead of mentioning applications of computer aided drafting (CAD) while others were unaware of the computer aided drafting (CAD) by providing irrelevant responses. For instance one candidate wrote "*computer aided drafting (CAD) helps in operating different machines*" while others mentioned functions of computer applications such as copying and printing. Moreover, others were not able to write anything on the answer sheet. On the other hand, in part (b) candidates confused the tool icons with the elevations of the building drawings while others identified them as tool components for drawing isometric and orthographic projections instead of describing their uses.

The poor performance might have been attributed due to failure to adhere to the question demands and lack of practical session on computer aided drafting. Extract 1.2 shows a sample of incorrect responses.



Extract 1.2: A sample of incorrect responses to Question 2

Extract 1.2 shows a sample of responses from one of the candidates who failed to list both the applications of CAD in part (a) by identifying or mentioning the uses of the tool icons in part (b).

2.2.2 Question 3: Drainage System

The question required the candidates to use the sketch to describe three types of drainage system layouts which are used in any urban town in Tanzania. This question intended to test candidates' ability to understand the types of drainage systems which can be used in urban areas.

The analysis shows that 364 (100%) candidates attempted the question of whom 203 (55.77%) scored from 0 to 2.5 marks. The candidates who scored from 3 to 6 marks were 79 (21.70%), whereas 82 (22.53%) candidates scored from 6.5 to 10 marks. Figure 4 shows the performance of the candidates in this question.

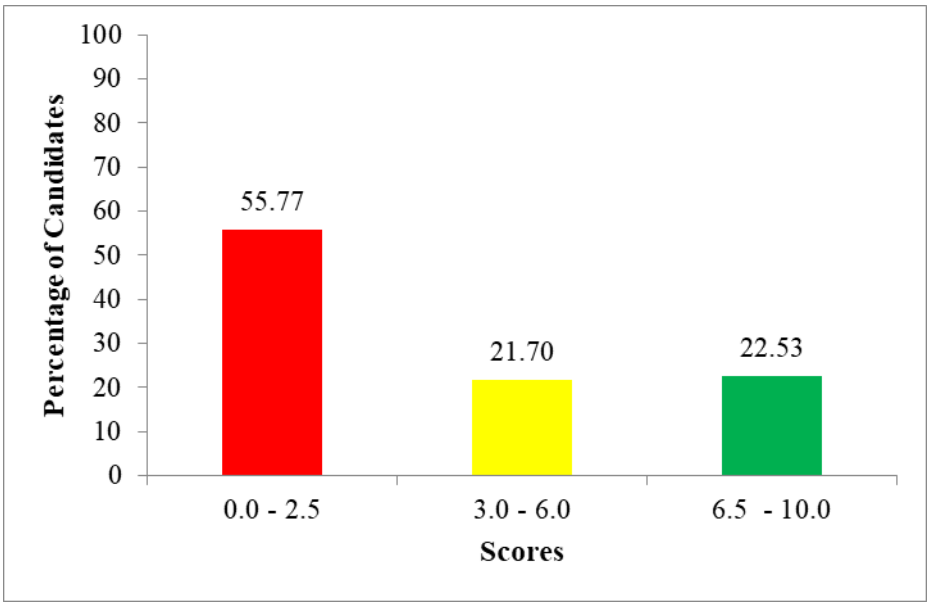
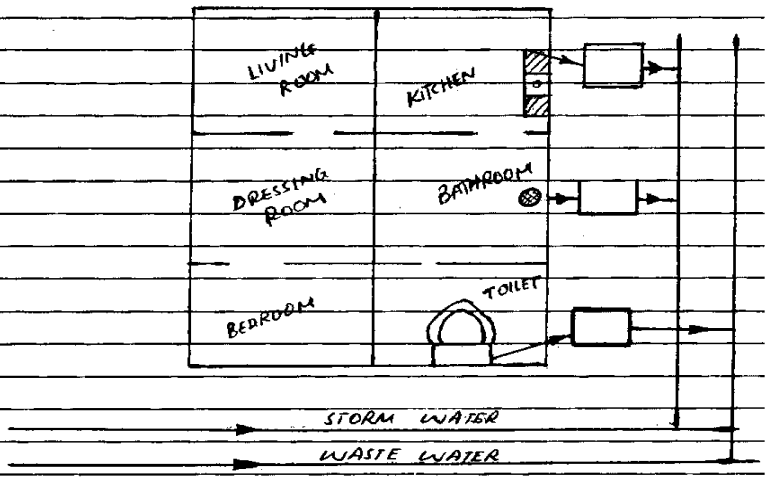


Figure 4: *The Candidates' Performance in Question 3*

Generally, the performance of candidates in this question was average as 161 (44.23%) candidates scored above pass mark. Such candidates had the ability to sketch and describe the drainage system layout in urban towns. This might be attributed to adequate knowledge on practical and drawing skills of drainage systems. Moreover, other candidates failed to score full marks because they provided sketches with insufficient details. Extract 2.1 provides a sample of correct responses by the candidate in this category.

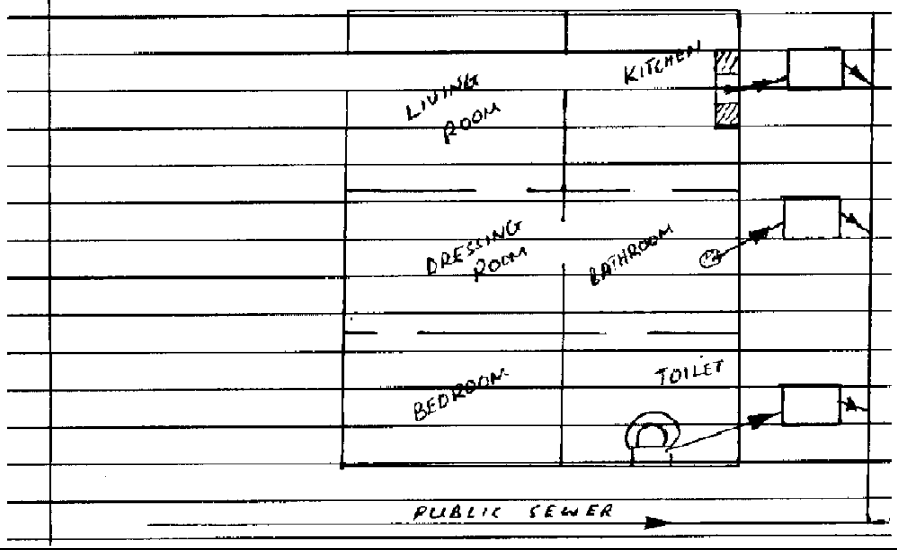
3. (i) Separate drainage system.

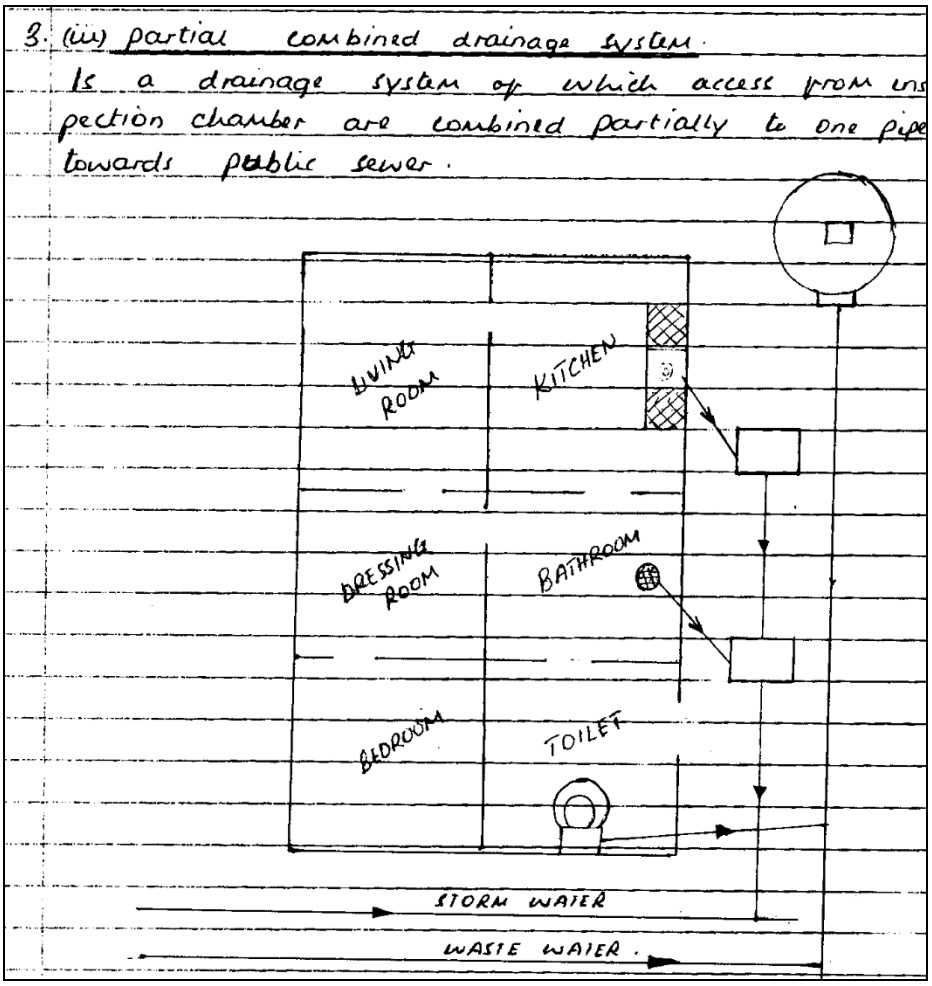
- Is a system which uses two pipes in which one carries waste water from sanitary appliance and another carries fresh water from paved areas, and roof as rainfall water to the disposal area



(ii) Combined drainage system.

Is a system of which one pipe ~~carry~~ is used to carry out both storm water and waste water from sanitary appliances to the public sewer.





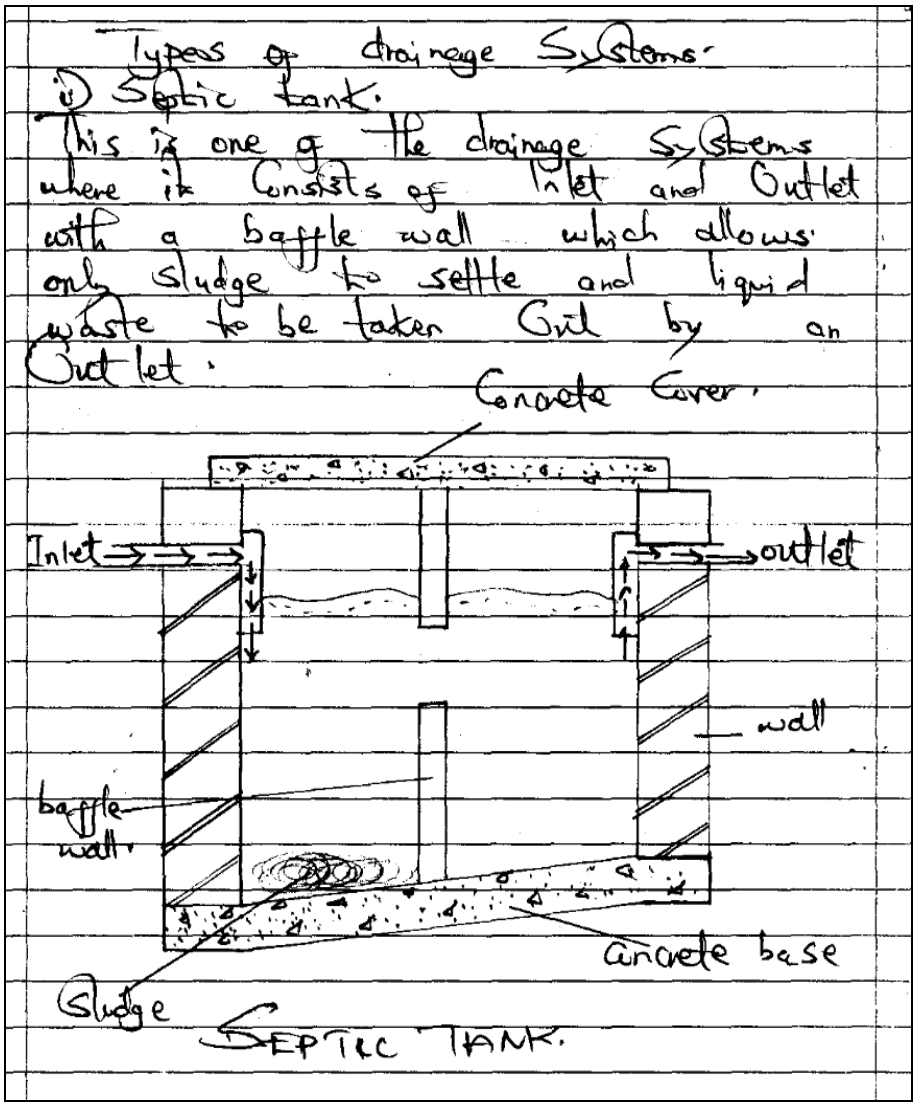
Extract 2.1: A sample of correct responses to Question 3

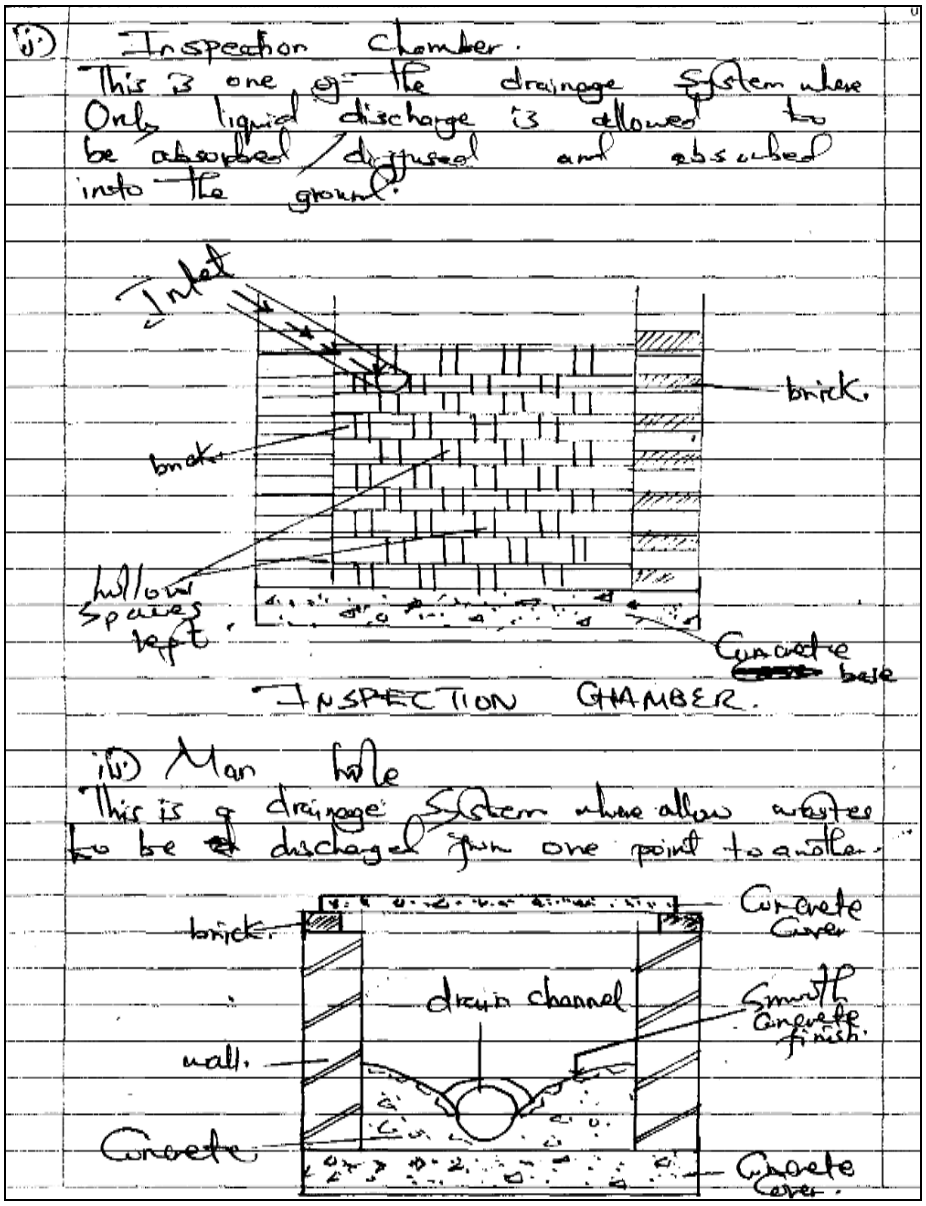
Extract 2.1 shows a sample of responses from one of the candidates who managed to sketch by describing the drainage system layouts which can be used by any urban setting in Tanzania.

Nevertheless, 203 (55.77%) candidates performed poorly by attaining scores range of 0 to 2.5 marks. The reasons for this poor performance varied from one candidate to the other. The majority of them was able to mention the basic drainage systems but failed to provide explanations or sketches and vice versa.

The candidates who scored 0 misinterpreted the questions as they focused on describing components of sewage systems such as septic

tanks, inspection chambers, and manholes. Additionally, they described concepts unrelated to drainage systems like the supply water system. These candidates demonstrated lack of knowledge and practical skills in sketching and describing types of drainage systems in urban towns. Extract 2.2 provides a sample of incorrect responses by one of the candidates in this category.





Extract 2.2: A sample of incorrect responses to Question 3

Extract 2.2 shows a sample of responses from one of the candidates who described components of sewage systems such as septic tanks, inspection chambers, and manholes, instead of types of drainage system layouts which are used in any urban areas as the question demanded.

2.2.3 Question 4: Stairs and Staircases

This question consisted of two parts. The candidates were required to; in part (a), to identify four materials used in designing a building stair with 13 steps, and in Part (b), to calculate the size of rise and going of a stairway if the stair has 13 steps, a total rise of 2.4 m and going of 2.925 m. This question intended to test candidates' ability in identifying the materials used to design the stairs by calculating the size of the step components.

The question was attempted by 364 (100%) candidates whose scores were as follows: 102 (28.02%) candidates scored from 0 to 2.5 marks; 143 (39.29%) scored averagely from 3 to 6 marks and 119 (32.69%) had good performance by scoring from 7 to 10 marks. Figure 5 summarizes the overall performance in the question.

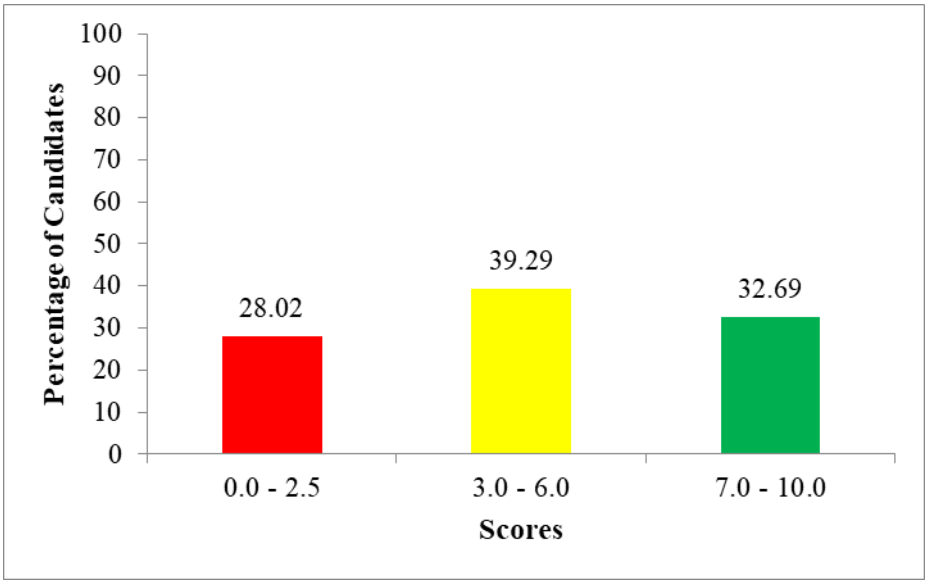
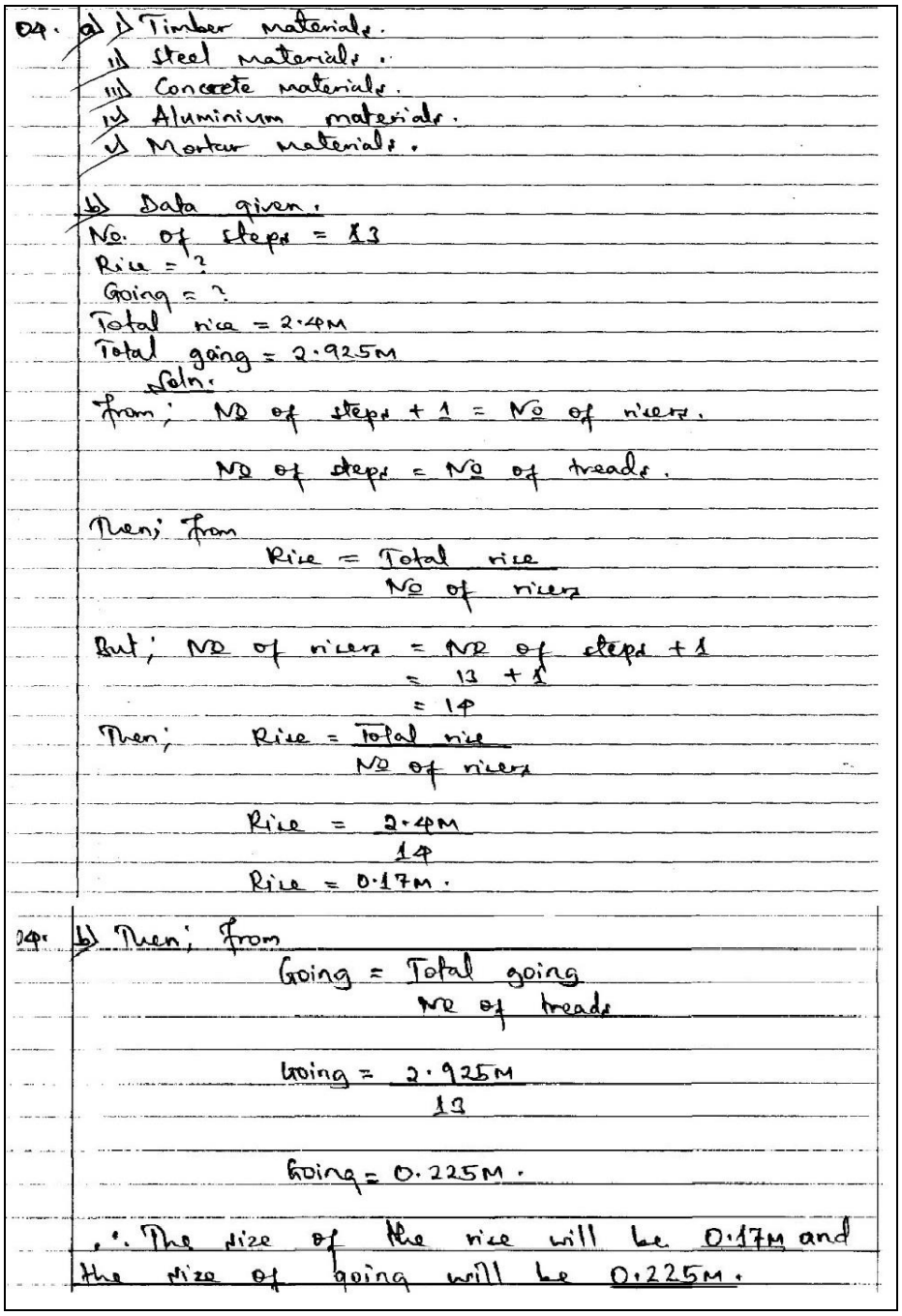


Figure 5: *The Candidates' Performance in Question 4*

Figure 5 shows that 262 (71.98%) candidates scored 3 marks and above, which is an indicator of a good performance. Such candidates were able to identify materials taken into account when designing a building stair. They correctly identified that the total number of treads equals to the number of steps and the number of risers is more than the total number of steps.

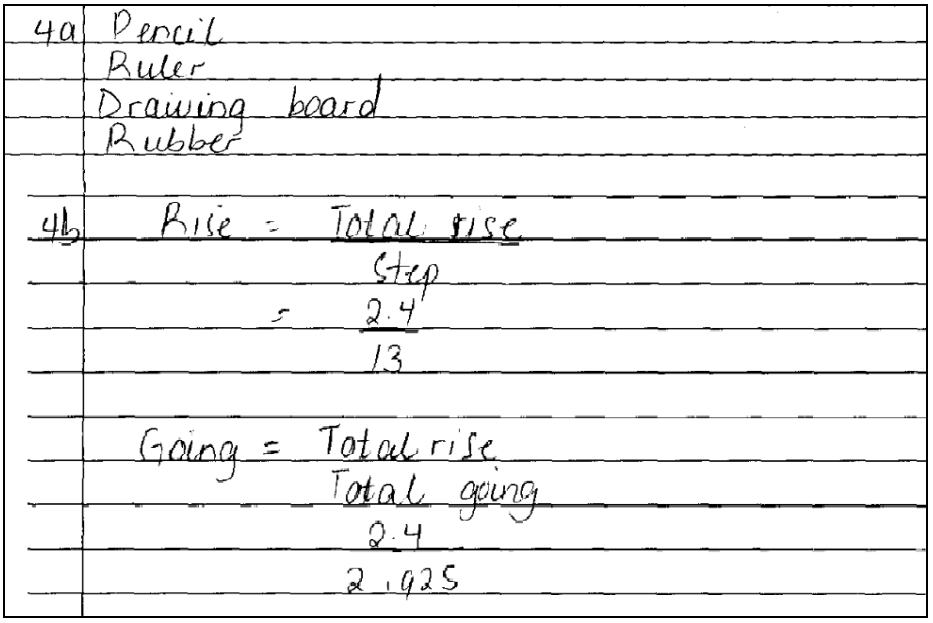
Furthermore, they were able to calculate the height of each rise by dividing the total rises by the number of risers to determine the width of each tread by dividing the total going by the number of treads. Extract 3.1 is an illustration of the correct responses from one of the candidates.



Extract 3.1: A sample of correct responses to Question 4

Extract 3.1 shows a sample of responses from one of the candidates who correctly identified the materials and calculated the size of rise and going of a stairway accurately.

However, 102 (28.02%) candidates scored below pass mark ranging from 0 to 2.5 marks. The analysis shows that candidates who scored within this range were relatively able to identify materials taken into account when designing a stair. Most of them calculated the size of the going but failed to obtain the total number of risers to needed ascertain the size of a riser. The candidates who scored 0 lacked knowledge of stairs and staircases which led him into failing to comprehend to the question. Extract 3.2 is an illustration of the incorrect responses from one of the candidates.



Extract 3.2: A sample of incorrect responses to Question 4

Extract 3.2 shows a sample of incorrect responses from the candidate who presented the drawing instruments instead of stairs' materials and failed to calculate the size of rise and going of a stairway.

2.2.4 Question 5: Geometrical Figures

This question consisted of two parts, (a) and (b). In part (a), candidates were required to; (a) draw an area made by triangle with a measurement AB = 70 mm, BC = 50 m and CA = 3 m, by using a scale of 1:100. In part (b), they were required to construct a square with equal area to the

triangle in (a). This question intended to test candidate's skills on constructing similar figures.

A total of 364 (100%) candidates attempted the question of whom 160 (43.96%) scored from 0 to 2.5 marks. Candidates who scored from 3 to 6 marks were 168 (46.15%), whereas 36 (9.89%) scored from 6.5 to 10 marks. The performance of the candidates in this question is summarized in Figure 6.

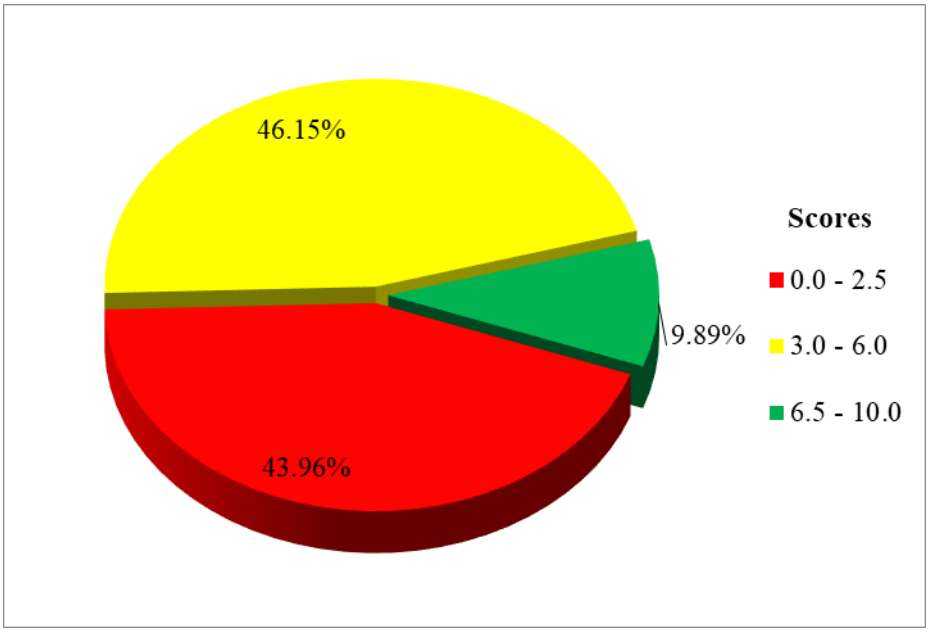
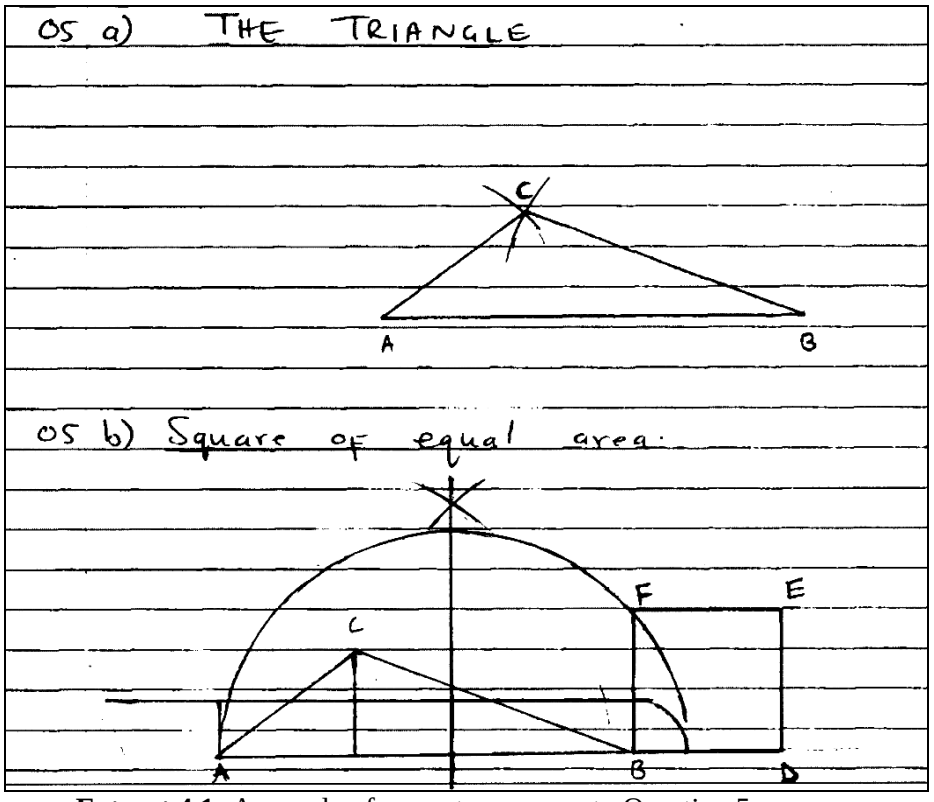


Figure 6: *The Candidates' Performance in Question 5*

The general performance of candidates in this question was average because 204 (56.04%) candidates scored average and above as illustrated in Figure 6. These candidates managed to draw an area of a triangle and constructing a square with equal area to the drawn triangle. Their variation in marks depended on correctness of the presentation of the drawing, dimensioning, neatness, proper use of scale and ability to recall the procedure of constructing similar figures. Extract 4.1 illustrates a sample of the correct responses provided by the candidate.



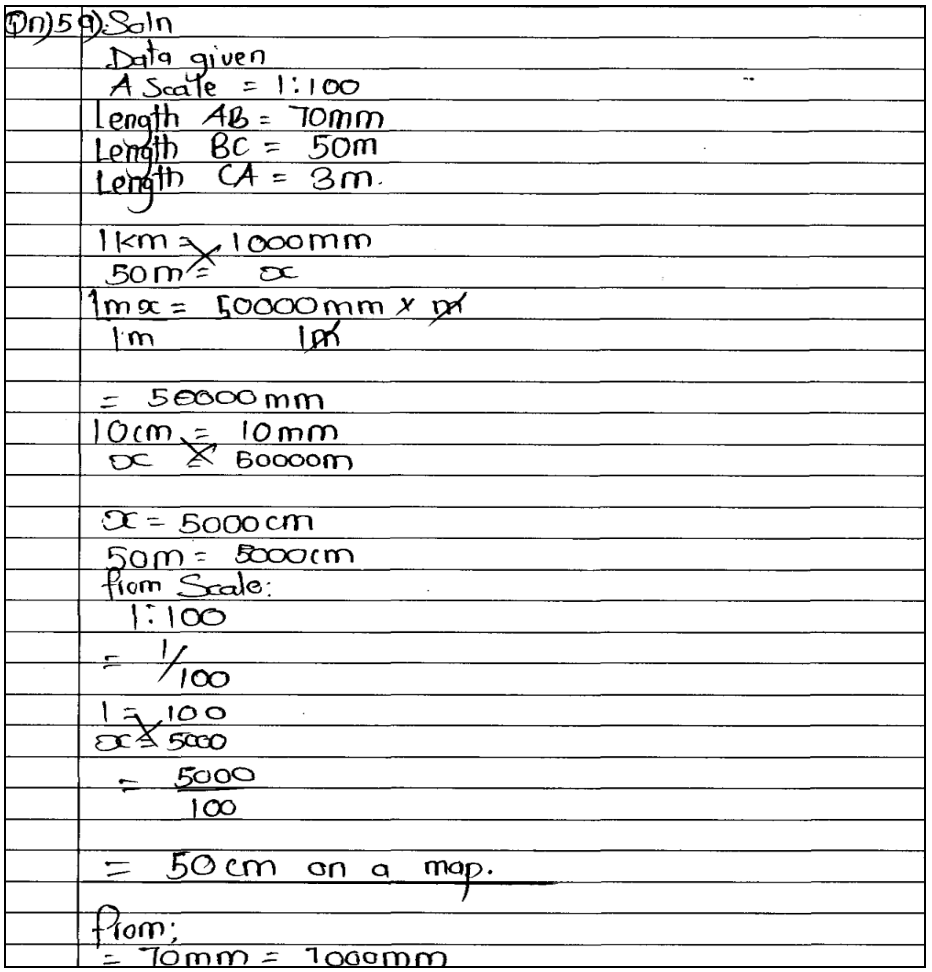
Extract 4.1: A sample of correct responses to Question 5

Extract 4.1 shows responses by a candidate who demonstrated the ability to draw a square with equal area to the triangle.

Moreover, 160 candidates (43.96%) performed poorly, scoring from 0 to 2.5 marks. These candidates failed to follow some procedures for drawing a triangle and constructing a square with an equal area to that of the triangle. Some struggled to construct a scalene triangle but ended up producing an equilateral triangle in part (a) of the question, while others failed to extend one side of the triangle so they drew a perpendicular bisector from a vertex to the extended line. They did not mark half the length of this line on the extension, which was necessary for constructing the square in part (b).

Furthermore, the majority of these candidates lacked precision in drawing straight lines using drawing instruments. Those who scored 0 merely presented the provided data, calculated the area of the triangle, then used it to calculate the length and width of the square without

executing the required figures. Extract 4.2 illustrates a sample of the incorrect responses provided by the candidate.


Q n) 5 a) Soln
Data given
A Scale = 1:100
Length AB = 70mm
Length BC = 50m
Length CA = 3m.

1km = 1000mm
50m = x
1m x = 50000mm x x
1m 1m

= 50000mm
10cm = 10mm
x = 500000m

x = 5000cm
50m = 5000cm
from Scale:
1:100
= 1/100
1 = 100
x = 5000
= 5000/100

= 50cm on a map.

from;
= 70mm = 1000mm

Extract 4.2: A sample of incorrect responses to Question 5

Extract 4.2 is a sample of incorrect responses from one of the candidates who misinterpreted the question.

2.2.5 Question 6: Residential (Dwelling) House Development

The question consisted of three parts and the candidates were required: in part to (a) identify three main areas for zoning rooms. (b) List factors to consider when deciding on living room placement and (c), describe designing criteria to consider in planning a dining room. This question

intended to test candidates' skills concerning development of residential house. The question stated:

Suppose you are assigned to design a residential house;
(a) Identify three main areas you will zone your rooms.
(b) What are the factors will you consider when deciding living room placement? Give four.
(c) Briefly describe three design criteria to consider in planning a dining room.

The analysis shows that 364 (100%) candidates attempted the question. Out of these, 57 (15.66%) scored from 0 to 2.5 marks. Candidates who scored from 3 to 6 marks were 215 (59.07%), while 92 (25.27%) scored from 6.5 to 10 marks. Figure 7 summarizes the candidates' performance in this question.

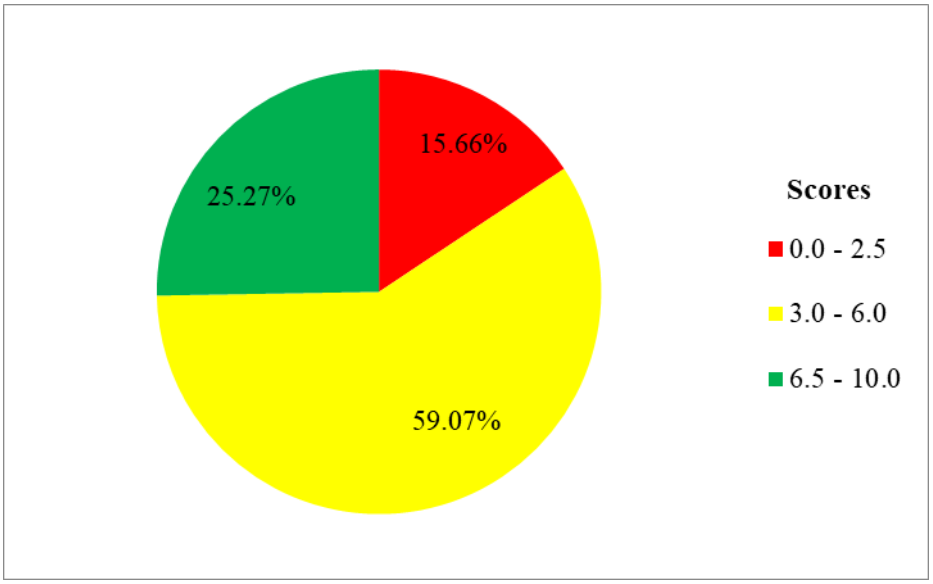


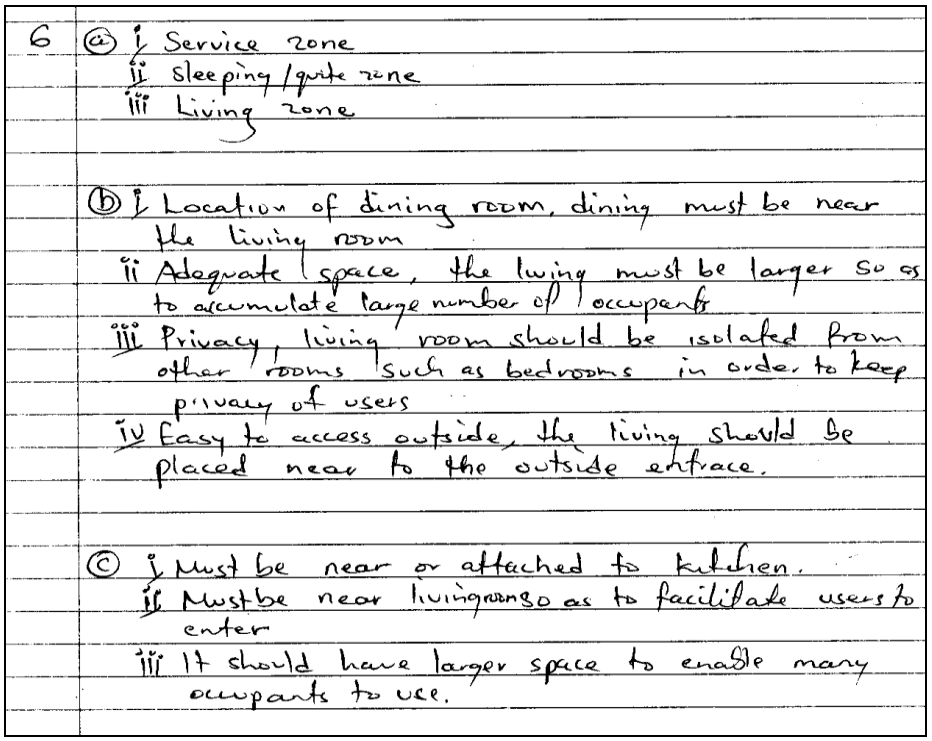
Figure 7: *The Candidates' Performance in Question 6*

Figure 7 shows that 307 (84.34%) candidates scored 3 and above marks, which indicates a good performance. The candidates scored high marks because of sufficient knowledge of the subject matter and the ability to recall the necessary information needed before planning a residential house. In part (a), candidates demonstrated their knowledge

by identifying the three main areas for zoning rooms: Living area, sleeping area, and service area.

In part (b), candidates managed to elaborate the factors to be considered when deciding the placement of the living room. They emphasized placing the living room near the entry for the guests' convenience, by enabling accessibility to the rest of the house, considering energy efficiency, and strategically positioning the room to optimize natural light based on climate conditions.

In part (c), candidates were able to describe design criteria to be considered when planning a dining room. They emphasized that the dining area should be connected to the living area while maintaining a degree of separation for formal dining. They highlighted the importance of proximity to the kitchen for meal servicing, without direct visibility into kitchen work areas. Furthermore, they suggested placing the dining room between the living room and kitchen or in a corner between the two, with adequate size to accommodate table seat and storage area. Extract 5.1 is an illustration of the correct responses from one of the candidates.



Extract 5.1: A sample of correct responses to Question 6

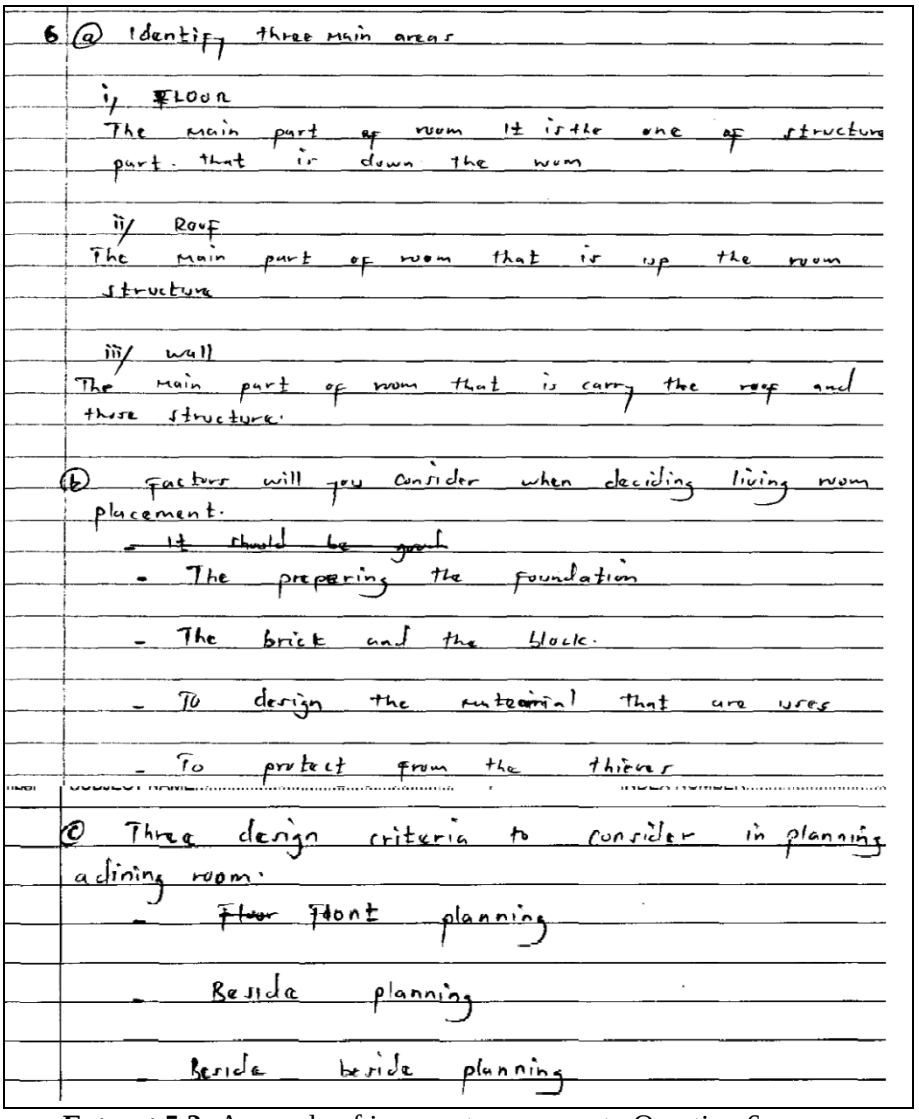
Extract 5.1 is a sample of responses from a candidate who was able to provide correct responses as per the requirements of the question. Such candidate was able to zone a room, mentioned factors to be considered when deciding a living room and he/she described three design criteria for a dining room.

Further analysis reveals that 57 (15.66%) candidates performed poorly with a score range between 0 to 2.5 marks, by giving irrelevant responses that were entirely out of the requirement of the question. In part (a), candidates failed to identify correctly the three primary zoning areas for rooms, instead mentioning structural elements of the house such as the roof, floor, or walls. Similarly, in part (b), these candidates discussed materials for constructing a living room, like bricks and blocks, while providing no responses in part (c), resulting into inability to score even a single mark.

Conversely, while a minority of candidates attained partial marks across all parts of the question, they were unable to obtain points from critical

components. For instance, in part (a), a candidate discussed unrelated concepts of privacy which are functional requirements of the door. Another contributing factor to poor performance among candidates was the recurrence of responses across all three parts of the question, such as emphasizing the importance of a proper ventilation system.

Such meaningless responses are indicators that the candidates were not conversant with the concept of residential house development. Extract 5.2 is a sample of the incorrect responses provided by one of the candidates.


6 (a) Identify three main areas

i/ FLOOR
The main part of room it is the one of structure part. that is down the room

ii/ Roof
The main part of room that is up the room structure

iii/ wall
The main part of room that is carry the roof and those structure.

(b) Factors will you consider when deciding living room placement.
- It should be good
- The preparing the foundation
- The brick and the block.
- To design the material that are uses
- To protect from the thieves

(c) Three design criteria to consider in planning a dining room.
- Ffor front planning
- Beside planning
- Beside beside planning

Extract 5.2: A sample of incorrect responses to Question 6

Extract 5.2 is a sample of responses from a candidate who listed the building components instead of identifying the main area to zone in a room.

2.2.6 Question 7: Pictorial Drawing

In this question, with the aid of a given plan and an elevation of a solid concrete, candidates were required to draw an isometric projection of the coping by using a scale of 1:5. This question intended to test

candidates' ability to convert an orthographic projection into an isometric projection. The question was:

Figure 1 is a plan and elevation of a solid concrete coping to be installed on top of a pillar. By using a scale of 1:5, draw an isometric projection of the coping.

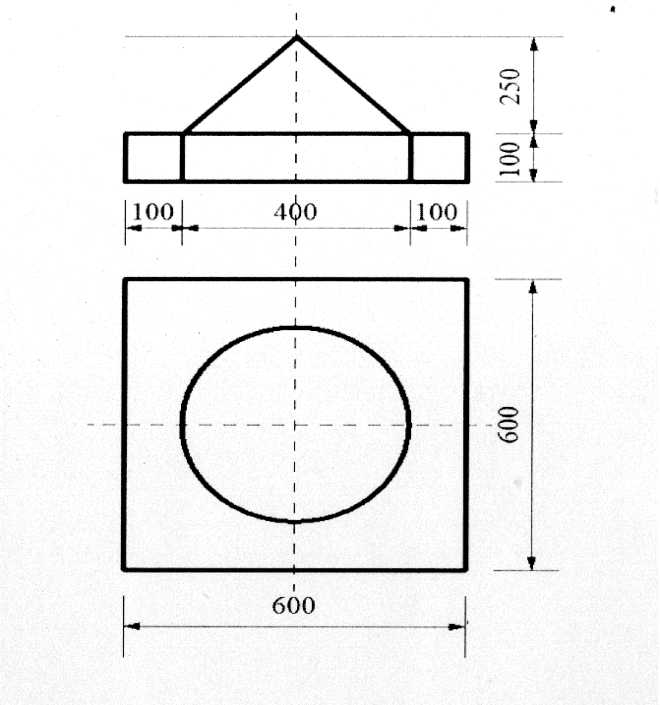


Figure 1

The question was attempted by 364 (100%) candidates of whom 278 (76.37%) scored from 0 to 2.5 marks. Further data analysis indicates that 54 (14.84%) candidates scored from 3 to 6 marks, while 32 (8.79%) scored from 6.5 to 10 marks. Figure 8 illustrates the candidates' performance in this question.

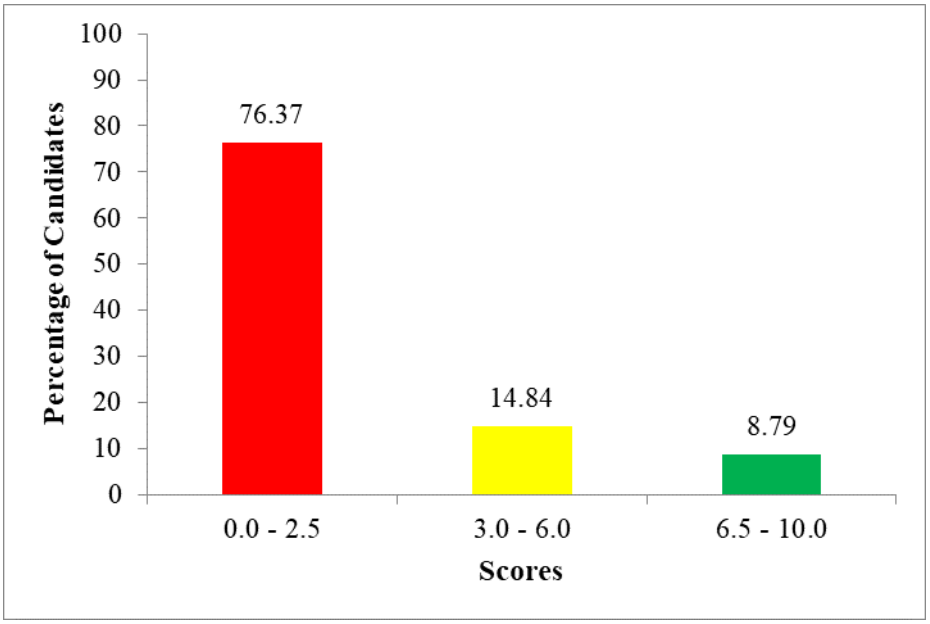
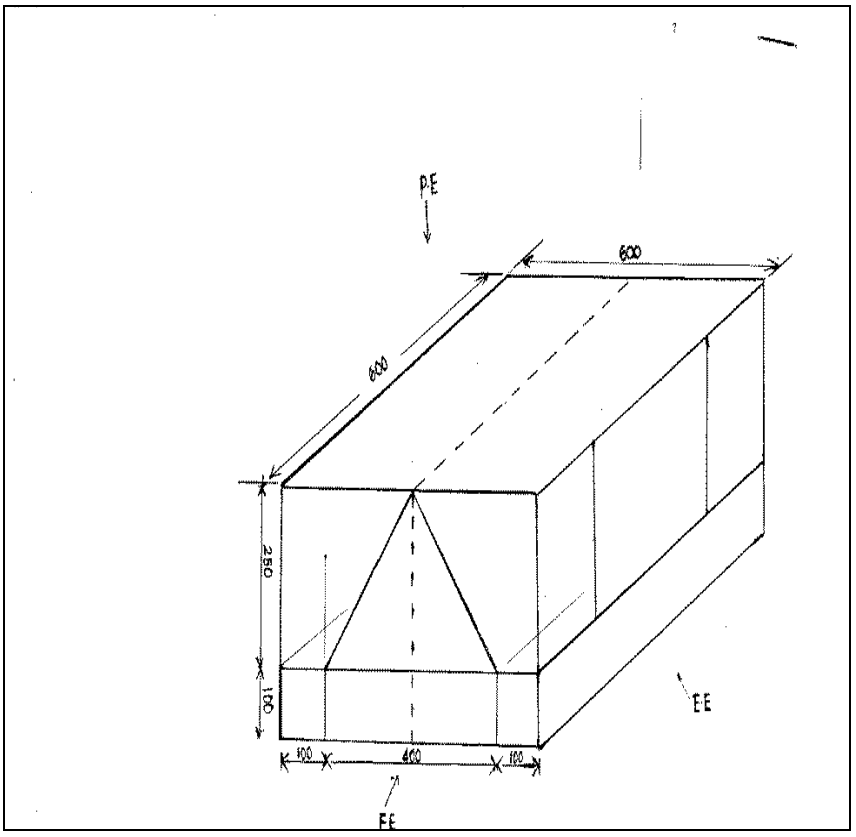


Figure 8: *The Candidates' Performance in Question 7*

Figure 8 illustrates that the general performance of the candidates in this question was poor, 278 (76.37%) scoring 2.5 marks and below. The candidates' poor performance was due to lack of knowledge and practical skills in pictorial projections. Many candidates struggled to conceptualize the angle of projection and apply the given scale to meet requirements of the question.

For example, most of the candidates were unable to draw an accurate circle in isometric projection while a few who managed to draw a coping in isometric projection failed to adhere to the correct scale or indicate dimensions and angles of the projection. Additionally, other candidates overlooked the fact that isometric projection drawings are created at a 30-degree angle axis in both directions from the datum line however others had poor visualizing skills. The majority of candidates who scored zero lacked basic knowledge of the tested concepts. Extract 6.1 provides a sample of incorrect responses from one of the candidates.



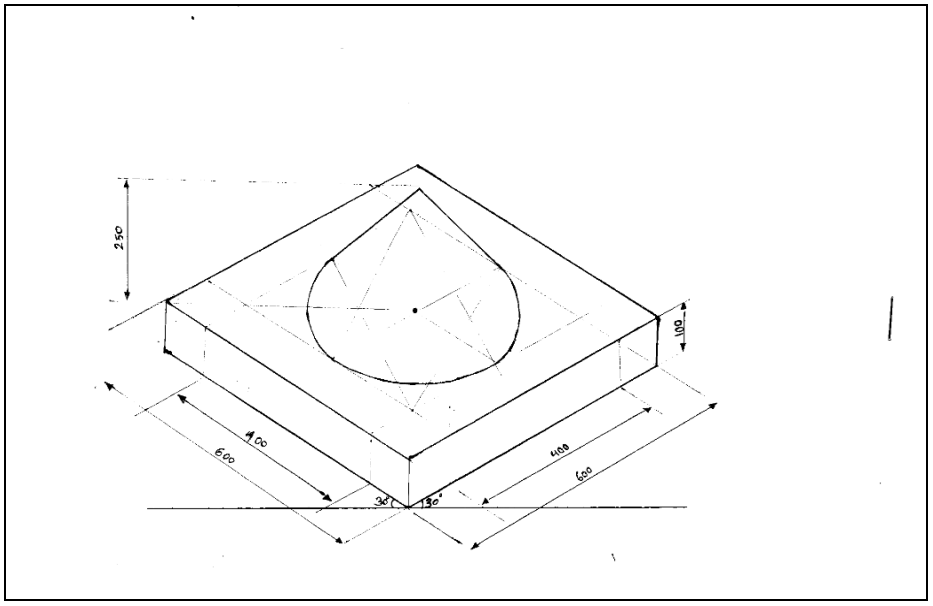
Extract 6.1: A sample of incorrect responses to Question 7

Extract 6.1 shows a response from one of the candidates who mismanaged in drawing an isometric projection of the coping by using a scale of 1:5.

On the contrary, candidates who scored average marks (3.0 to 6.0) were able to draw the required drawings though skipped some procedures in the process of attempting the question. For instance, candidates in this category were able to draw the required isometric view though with incorrect scale and angle.

Nevertheless, 32 (8.79%) candidates scored from 6.5 to 10 marks. Such candidates not only understood the requirements of the question but also managed to translate the view of coping by using the scale of 1:5 to draw its isometric projection. Candidates in this category mastered well the concepts of pictorial projections as stipulated in the syllabus.

Extract 6.2 illustrates the correct responses from a candidate who attempted the question.



Extract 6.2: A sample of correct responses to Question 7

Extract 6.2 shows that the candidate managed to provide relevant responses for the question. This implies that the candidates in this category had acquired relevant knowledge on isometric projections.

2.3 SECTION C: STRUCTURED QUESTIONS

This section consisted of one question. This question carried thirty (30) marks. The score ranges used for grading the candidates' performance in this section are indicated in Table 2.

Table 2: Score Ranges for Grading Candidates' Performance in Question 8

Scores range	General Performance
0 - 8.5	Weak
9 - 19	Average
19.5 - 30	Good

2.3.1 Question 8: Doors

This question consisted one part of which the candidates were required to use the given dimensions to draw an elevation, plan, vertical and horizontal sections of the door. The question stated as follows:

A carpenter is required to make and draw the panel doors with the following specifications.

(i) Door opening measures 900 mm x 2400mm.

(ii) The size door shutter is 800 mm x 2100 mm.

(iii) Sections of members the doorframe measures 50 mm x 150 mm with a rebate of 50 mm x 25 mm, members are joined with tongue and grooved joints.

(iv) Stiles and top rail is 100 mm x 50 mm.

(v) Lock and bottom rail is 200 mm x 50 mm; the lock rail is placed in centre line 800 mm from the bottom of the shutter.

(vi) Mullion is 100 mm x 50 mm fixed at centre of the shutter.

(vii) The stiles and the rails are mortised and tenoned.

(viii) The thickness of the four wooden panel is 15 mm.

Assist a carpenter by using a scale of 1:20 to draw an elevation, plan, vertical and horizontal sections of the door.

A total of 364(100%) candidates attempted the question of whom 135 (37.09%) scored from 0 to 8.5 marks. The candidates who scored from 9 to 19 marks were 197 (54.12%), while only 32 (8.79%) candidates scored from 19.5 to 30 marks. The performance of the candidates in this question is summarized in Figure 9.

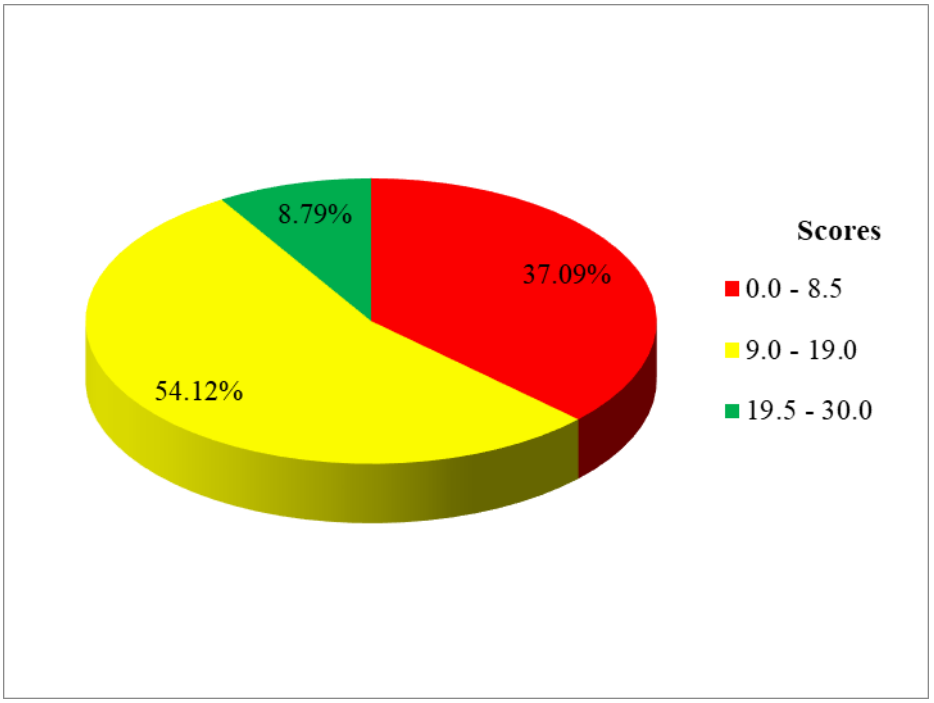
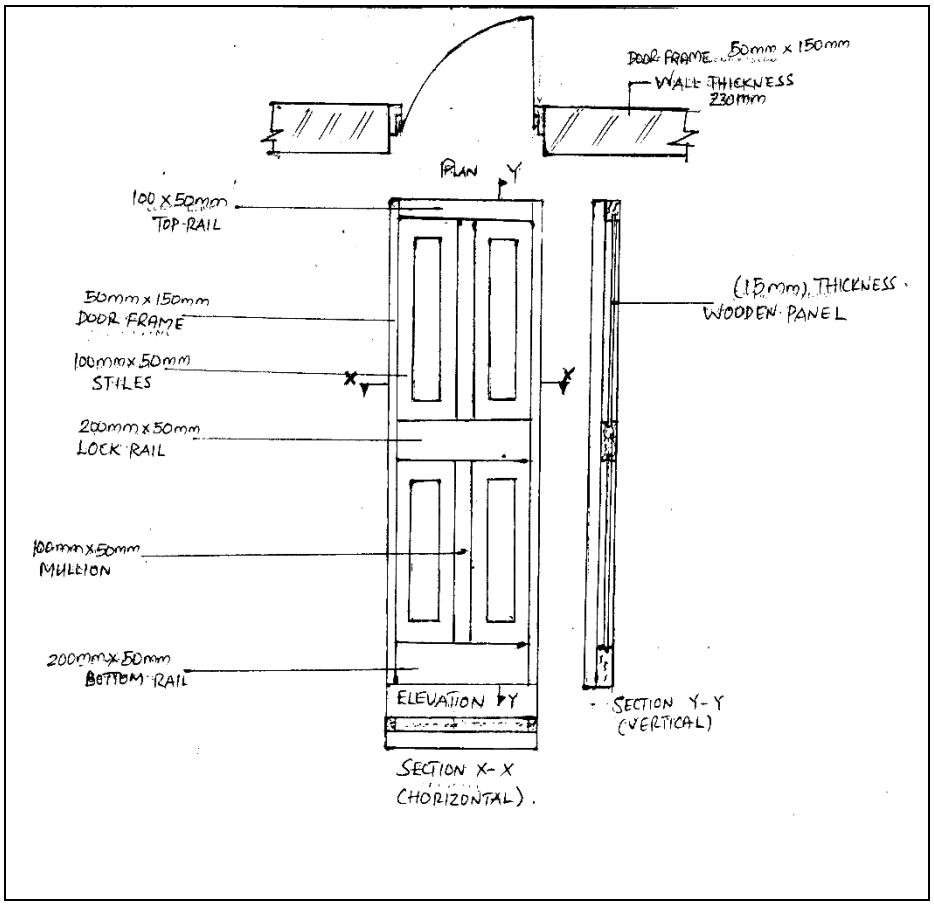


Figure 9: *The Candidates' Performance in Question 8*

The general performance of candidates in this question was average since 229 (62.91%) candidates scored 8.5 marks and above as depicted in Figure 9. Majority of the candidates scored average marks because they successfully drew a panel door with at least one section. Moreover, the candidates who scored 19-30 marks perfectly drew the elevation and sections of the panel door. The variation in their marks depended on several factors, including the proper use of architectural scale, neatness, the quality of lines, labeling, dimensioning and the usage of data to produce the anticipated drawing. Extract 7.1 is a sample of the correct responses from a candidate in this category.



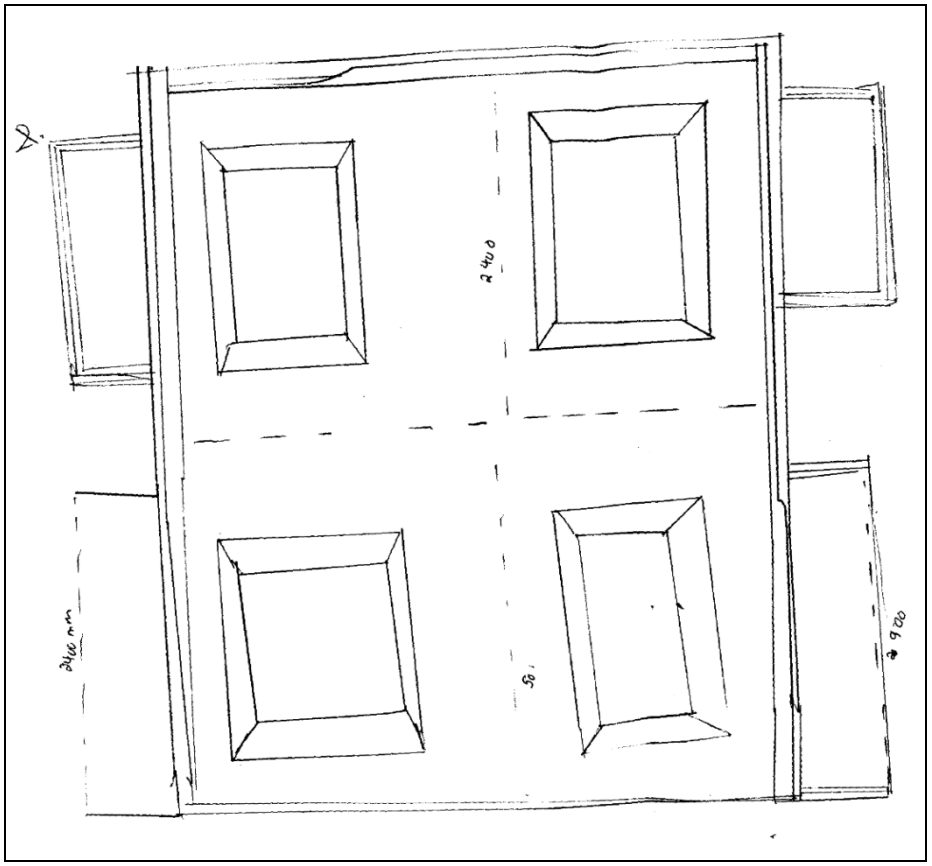
Extract 7.1: A sample of correct responses to Question 8

Extract 7.1 shows a response from a candidate who correctly interpreted the question and drew an elevation, plan, vertical and horizontal sections of the door.

Further analysis reveals that 135 (37.09%) candidates performed poorly by attaining the score range of 0 to 8.5 marks. The poor performance varied considerably from one candidate to other. The majority of these candidates failed to accurately draw the elevation of the door with the vent or the required number of panels. However, the direction of the door opening as shown in the plan views of few candidates' responses was also incorrect. For instance, some drew doors with six panels instead of the required four, omitting crucial components like mullions and rails.

Other contributing factors to poor performance comprised the omission of creating horizontal and vertical sections across the panels, overlooking labeling requirements, by inaccurately dimensioning and placing of door components. For example, one response featured a rock rail positioned at 1000 mm instead of the correct placement at 800 mm from the centerline to the bottom of the shutter.

The candidates who scored 0 failed both parts of the question. Such candidates did not only draw types of matchboard doors instead of panel doors as asked in the question but also failed to draw borderlines and title blocks. Failing in this question is an indication misinterpretation for the question, poor drawing skills, and inadequate practical knowledge of doors. Extract 7.2 illustrates a sample of the incorrect responses presented by a candidate who failed the question.



Extract 7.2: A sample of incorrect responses to Question 8

Extract 7.2 shows a sample of responses from a candidate who sketched incorrectly the panel door elevation without clear dimensions, improper use of drawing instruments such as a ruler and poor management of scale.

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH TOPIC

The topics covered in Architectural Draughting paper of 2023 were: *Layout of the Drawing Paper or Paper Formatting, Instrument/Equipment and Materials, Development of Foundation Plan, Electrical Supply and Distribution, Auxiliary View, Elevation, Building Specification, Orthographic Projection, Architectural Draughting and Occupational Information, Passive Regulated House Development, Computer Aided Draughting (CAD), Drainage System, Stairs and Staircase, Geometrical Figures, Residential (Dwelling) House Development, Isometric Projection* and *Doors.* The analysis shows that the candidates had a good performance in two topics with an average performance in four topics. Further analysis shows that they performed poorly in one topic.

The topics that were well performed include; Multiple-choice items from question one. The performance in question 1 was recorded at 85.71%. The topics which were involved in that question were: *Layout of the Drawing Paper or Paper Formatting, Instrument/Equipment and Materials, Development of Foundation Plan, Electrical Supply and Distribution, Auxiliary View, Elevation, Building Specification, Orthographic Projection, Architectural Draughting and Occupational Information* and *Passive Regulated House Development.* The performance was also good in the topics of *Residential House Development* and *Stairs Staircases*, as tested in questions 6 and 4 with performance of 84.34% and 71.98% respectively. The high level of performance in the mentioned topics was attributed by adequate knowledge and correct interpretation of the question.

The four topics in which the candidates had average performance were: *Doors* (62.91%) tested on question 8; *Geometrical Figures* (56.04%) tested on question 5; *Drainage System* (44.23%) tested in question 3 and *Computer Aided Drafting* (CAD) (37.64%) tested in question 2. The average

performance in those topics is an indication that the candidates lacked sufficient knowledge to perform above average.

The candidates also performed poorly in the topic of *Pictorial Drawing* (23.63%), which was tested on question 7. The analysis shows that inability of the candidates to identify the question requirements, misinterpretation of the question, lack or improper application of knowledge and skills acquired were the causes of poor performance in that topic.

A summary of the detailed analysis of the candidates' performance in each topic is presented in the attached Appendix, whereas, Green, Yellow, and Red colours represent good, average, and weak performances respectively.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The analysis of the candidates' performance was done in all questions examined in Architectural Draughting paper for CSEE 2023. Generally, the candidates' performance in this paper was good, as the majority of 243 (66.76%) candidates were able to score from 30 per cent or above pass marks.

The candidate's performance in questions 1, 4 and 6 was good while the performance in questions 2, 3, 5 and 8 was average. However, question 7 had weak performance.

Weak performance might have been attributed by candidates' failure to interpret the questions, partial attempt of the questions, inadequate knowledge of the topics tested, lack of practical skills, poor command of the English language and inadequate live site practices.

4.2 Recommendations

4.2.1 Recommendations to candidates

Basing on the performance observed in this analysis, the following are recommended to prospective candidates:

(a) Careful reading of instructions before answering the questions in order to clearly understand and meet the demand of the questions.

(b) Candidates should adhere to the principles of architectural drawing by observing neatness, scale convention, exactness of the views, proper dimensioning, clear objects and construction lines.

(c) Reading relevant materials and practicing different architectural drafting skills is essential in order to widen architectural knowledge, especially in areas where most candidates demonstrated inadequacy knowledgeably and practically especially under the topic of *Pictorial Drawing*.

4.2.2 Recommendations to teachers

(a) In order to enhance candidates' performance, teachers should offer sufficient exercises and tests prior to sitting for their national examinations. Teachers are required to facilitate learning and teaching processes by guiding students in acquiring all basic practical skills across topics, particularly those related to freehand sketching and the use of drawing tools, instruments and equipment for creating various architectural drawing, sections, elevations, and plans.

(b) Since the analysis revealed that some candidates demonstrated inadequacy knowledge in various aspects that require prior practical skills, it is, therefore, recommended to teachers that such skills be provided to candidates so as to enable them to integrate theories with practical experience, hence acquire the stipulated competencies.

(c) Teachers' ought to motivate students in cultivating skills by planning and conducting study tours to the fieldwork concerning to urban water systems and live construction sites for residential buildings. This study approach of will bridge the gap between classroom learning and practical experience, hence enhancing students' technical drawing competences.

(d) Teachers are highly encouraged to read Architectural Draughting CIRAs in order to identify the challenging areas by taking appropriate measures during teaching and learning process.

Appendix

Analysis of the Candidates' Performance in Different Topics

S/N	Topic	Question number	Percentage of the Candidates who Scored 30% and above	Remarks
01	Layout of the Drawing Paper or Paper Formatting, Instrument/Equipment and Materials, Development of Foundation Plan, Electrical Supply and Distribution, Auxiliary View, Elevation, Building Specification, Orthographic Projection, Architectural Draughting and Occupational Information, Passive Regulated House Development	1 (Multiple Choice Items)	85.71	Good
02	Residential (Dwelling) House Development	6	84.34	Good
03	Stairs and Staircases	4	71.98	Good
04	Doors	8	62.91	Average
05	Geometrical figures	5	56.04	Average
06	Drainage Systems	3	44.23	Average
07	Computer Aided Draughting (CAD)	2	37.64	Average
08	Pictorial Drawing	7	23.63	Weak