# THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT FOR THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATION (CSEE) 2019**

# 072 ARCHITECTURAL DRAUGHTING

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# FOREWORD

The National Examinations Council of Tanzania is pleased to issue the Candidates' Item Response Analysis (CIRA) report in Architectural Draughting for Certificate of Secondary Education Examination (CSEE) in 2019. The analysis provides feedback to the candidates, teachers, parents policy makers, and other education stakeholders on how the candidates responded to the items.

The Certificate of Secondary Education Examination marks the end of the four years of ordinary secondary education. It is a comprehensive evaluation which, among other things, shows the effectiveness of the education system in general, and the education delivery system in particular. Essentially, the candidates' responses to the examination questions is a strong indicator of what the education system was able or unable to offer to the students in their four years of Ordinary Secondary Education.

The analysis presented in this report is intended to contribute to understanding the possible reasons behind the candidates' good and poor performance in the Architectural Draughting subject. The reasons for good performance includes sufficient knowledge of the content in the topic tested and correct interpretation of the questions. The  reason for some candidates poor performance include wrong interpretation of the requirements of the questions, lack of drawing skills in responding to the questions, and inadequate knowledge in the material taught under the tested topics.

The feedback provided will enable educational administrators, school managers, teachers, students and other stakeholders to assess their teaching and learning environments. It will also help them recognize proper measures to be taken in order to improve the candidates' performance in future.

Finally, the Council would like to thank Examination Officers, Subject Teachers, and others who participated in analyzing the data used for writing this report, typesetting of the document, and in reviewing the report.

Dr Charles E. Msonde
**EXECUTIVE SECRETARY**

# 1.0    INTRODUCTION

This report provides an analysis of the performance of the candidates who sat for the Certificate of Secondary Education Examination (CSEE), 2019 in the Architectural Draughting subject. The examination paper was set according to the 2019 examination format developed from the 1994 Civil Engineering syllabus for Secondary School Education.

The examination paper had 13 questions which were categorised into three sections A, B, and C. Section A consisted of one (1) objective question, with ten items weighing 1 mark each. Section B had 10 short answer questions each carrying 6 marks. All questions in sections A and B were compasory. Section C had two (2) optional structured questions, each weighing 30 marks. The candidates were required to answer one (1) question from this section.

The total number of 326 candidates sat for Architectural Draughting in 2019. Among these, only 34 (10.43 %) candidates scored the credit pass grades B and C. The stastics shows that 126 (38.65 %) passed with grade D, while the majority (50.92 %) failed by scoring grade F. This implies that the general performance in this subject was poor. However, when the results are compared to 2018, a drop of 0.67 percent was observed since in 2018 the number of candidates who passed was 202 (49.75%).

Figure 1 shows the general distribution of scores and candidates' performance in the 2019 examination.
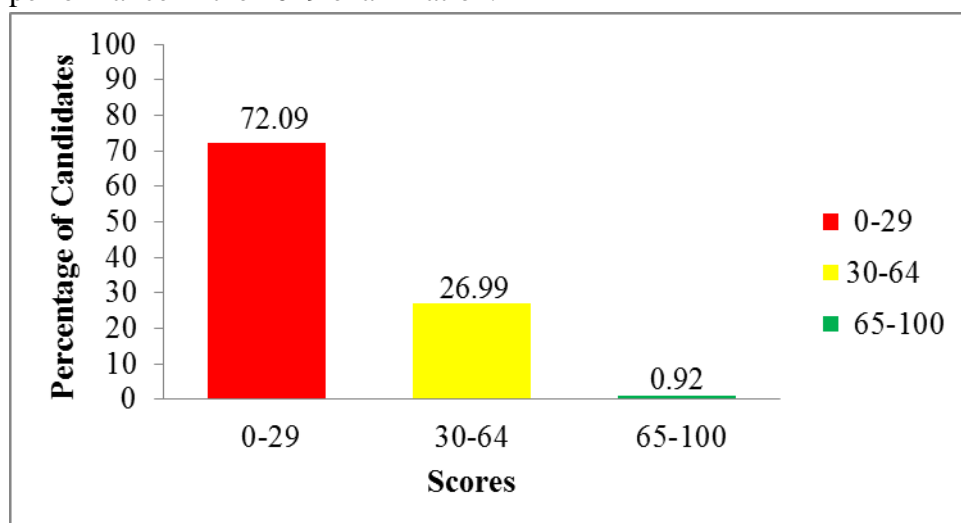


**Figure1:** *Candidates' performance in 2019*

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This report analyses the candidates' responses in regard to the demands of the questions. In the course of the analysis, a brief note on what the candidates were required to do, and the reasons for their performance are provided. The samples of candidates' good and poor responses are also inserted as extracts to illustrate the cases presented. Charts are also used to summarize the candidates' performance in a particular question. The analysis groups the performance as good, average and poor in the ranges of 65–100, 30–64 and 0–29 respectively. Green, yellow and red conclusion colours are respectively used to represent these groups of performance. Finally, the report presents conclusions and recommendations.

## 2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER QUESTION

### 2.1 SECTION A: Multiple Choice

#### 2.1.1 Question 1: Multiple - choice items

The question consisted of ten (10) multiple-choice items derived from various topics in the syllabus. The topics covered were *Architectural Scales, Foundation Plan, Residential House Planning, Sections, Roofs, Stairs and Staircase, Drainage System, Perspective Drawing, and Drawing Production.* The candidates were required to choose the correct answer from the given five alternatives (A to E).

A total of 325 (99.69%) candidates attempted this question, of whom 66 (20.31%) candidates scored marks from 0 to 2. The candidates who scored from 3 to 6 were 249 (76.61%), whereas 10 (3.08%) scored from 7 to 10 marks. The performance of candidates in this question is summarised in Figure 2.
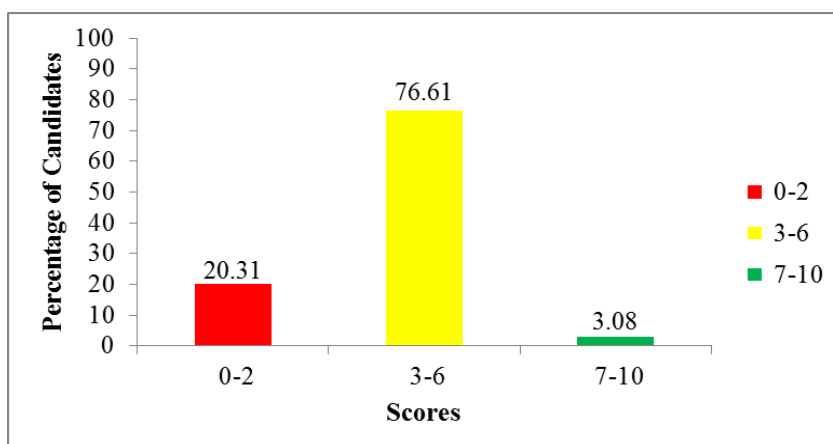
**Figure 2**: *The performance of candidates in question 1.*

The candidates' performance in this question was good as only 20.31 percent of the candidates scored below 2 marks as shown in Figure 2. Majority of the candidates 257 (79.7%) scored from 3 to 10 marks. This suggests that, most candidates managed to choose the correct answer in many items. However, 66 (20.31%) of the candidates performed poorly. The analysis done in the script of the candidates shows that, some of these candidates faced difficulties in responding items (ii) and (ix).

Item (ii) states that: *Reliable and clear information in a drawing for constructing the simple residential house up to ground floor level is given by*
  A.  *Elevations.*                      B.  *Floor plans.*
  C.  *Sections.*                        D.  *Site plan.*
  E.  *Foundations plans.*

The item tested the candidates knowledge in the types of drawings used to give reliable and clear information for constructing a house up to ground floor level. The correct answer was C 'Sections', since section drawings gives information on heights and relationships between floors, ceilings, spaces, walls, and in some instances details of the specific construction techniques used. Other options were not correct because  A 'Elevations' are used to show a vertical surface or plane seen from a point of view perpendicular to the viewers' picture plane. B, 'Floor plans', are used to show information about the design and construction of a building or space. Alternative  D, 'Site plan', is used to show the extent of the site for an existing or proposed development, and E 'Foundations plans' are used to

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show the location and size of footing, piers, columns, foundation walls and supporting beams.

Item (ix) states that: *To ensure good planning and development of a town, who is the owner responsible for drains directed to sewer?*

A Sanitation authority  B District commission
C An individual person  D Water authority
E Local authority

The item tested the candidates' knowledge in drainage systems. The correct response was B, 'An individual person.' Other options were not correct because A 'Sanitation authority', B' 'District commission', D 'Water authority' and E 'Local authority' are institutions which can own the main sewer.

## 2.2 *SECTION B: Short Answer Questions*

This section consisted of ten (10) short answer questions, each question weighed six (6) marks. The score ranges used for grading performance of the candidates for each question in this section are indicated in Table 1.

**Table 1:** Score Ranges for Candidates' Performance in Question 2 to 11.

| Scores range | General Performance | |
|---|---|---|
| | Remark | Grade |
| 0 – 1.5 | Weak | F |
| 2- 3.5 | Average | C - D |
| 4 - 6 | Good | A - B |

### 2.2.1 Question 2: Electrical supply and distributions

The question required the candidates to list four factors considered to ensure the correctness of an electrical installation before connecting to the national grid.

The result of the analysis shows that, 271 (83.13%) candidates attempted this question. Out of these, 254 (93.73%) scored from 0 to 1.5 marks. The number of candidates who scored from 2 to 3.5 marks was 17 (6.27%). Data analysis shows that there were no candidates who scored 4 to 6 marks. Figure 3 presents the performance in this question.
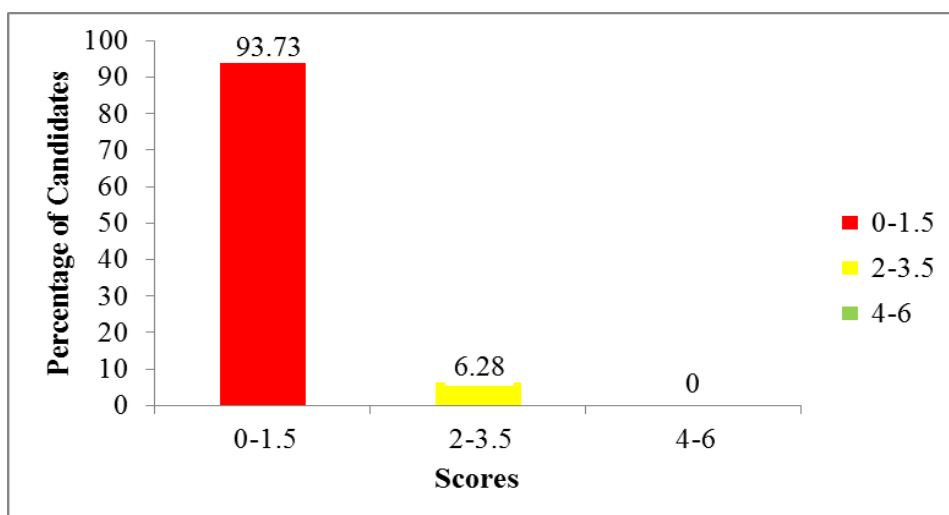
**Figure 3**: *The performance of candidates in question 2*

Figure 3 shows that the general performance in this question was poor as 93.73 percent of the candidates scored below 2 marks. The analysis shows that the majority of the candidates who scored low marks (0 to 1.5) in this question gave at least one correct answer. The correct responses were: *Polarity, Earthing, Insulation resistance,* and *wiring circuit continuity.* Further analysis revealed that the candidates who scored a 0 mark resorted to writing anything, regardless of whether it is meaningful or not, while others left the question unanswered. This is an indication that candidates in this categories lacked knowledge in electrical installation required for buildings. Extract 2.1 provides a sample of a candidate's poor response.



**Extract 2.1:** *A sample of the candidates' poor responses in question 2*

Extract 2.1 shows a sample of a response by a candidate who wrote factors considered when selecting a site for construction of a building instead of factors considered in ensuring the correctness of an electrical installation before connecting to the national grid.

However, the candidates who had an average score (2 to 3.5) were able to list at least two out of four factors considered to ensure the correctness of an electrical installation before connecting to the national grid. Some of the candidates were able to list: *wires should be insulated* and *presence of main switch* as factors considered in ensuring the correctness of an electrical installation before connecting to the national grid.

### 2.2.2 Question 3: Building specifications

The question required the candidates to list six items that must be shown in the building specifications document. The question was meant for examining candidates' knowledge in preparing building specifications.

The statistics shows that 309 (94.78%) candidates attempted this question. Out these 285 (92.23%) scored from 0 to 1.5 marks. The candidates who scored from 2 to 3.5 were 24 (7.77%). There was no candidate who scored above 3.5 marks. Figure 4 summarizes the candidates' performance in this question.
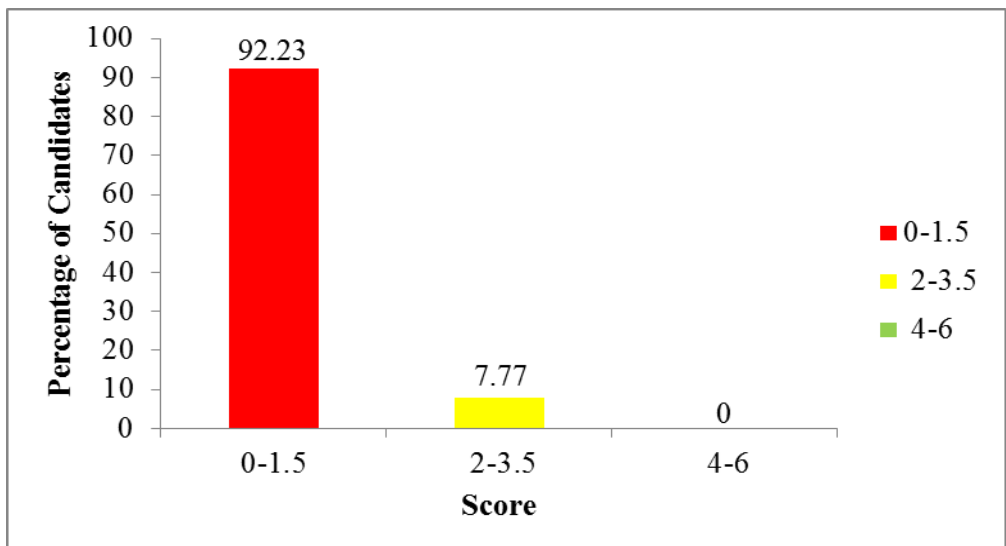


**Figure 4:** *The candidates performance in question 3*

The General performance of the candidates in this question was poor as Figure 4 illustrates. Majority of the candidates 285 (92.23%) who scored low marks (0 to 1.5) identified the quality material as one of the items to be shown in the building specification document. Many of the candidates who scored a 0 mark wrote the general design requirements for constructing of a building. The correct answers were: *Site description, Restrictions, Services, Material description, Workmanship, Name of subcontractor* and *Name of*

*supplier*. There are a number of factors which have contributed to the mass failure in this question. These factors include poor understanding of the subject matter, and wrong interpretation of the question. Extract 3.1 shows a sample of poor responses which were provided by one of the candidates.



**Extract 3.1:** *A sample of the candidates' poor responses in question 3*

Extract 3.1 shows a sample response from a candidate who listed the general requirements for constructing a hostel instead of items that must be shown in the building specifications document.

Conversely, the candidates who scored average marks (2 - 3.5) were able to list *quality of material and workmanship* correctly as items that must be shown in the building specifications document. The candidates who listed this response were aware that building specification document is the written document that describe in detail all parts of work for a construction project to be carried by a contractor as presented in Extract 3.2.



**Extract 3.1:** *A sample of the candidates' good responses in question 3*

Extract 3.2 shows a sample of responses by a candidate who was able to list the quality of materials and quality of workmanship as items to be shown in the building specifications document.

**2.2.3    Question 4: Drainage**

The question required the candidates to explain three locations of inspection chamber to satisfy its functions in drainage systems and requirements of good drainage systems.

This question was attempted by 320 (98.15%) candidates, of whom 128 (40%) scored from 0 to 1.5 marks. Data analysis indicates that, 81 (25.31%) candidates scored from 2 to 3.5 marks, while 111 (34.69%) candidates from 4 to 6 marks. There were 26 (8.13%) candidates who scored 6 marks. Figure 5 summarises the candidates' performance in this question.
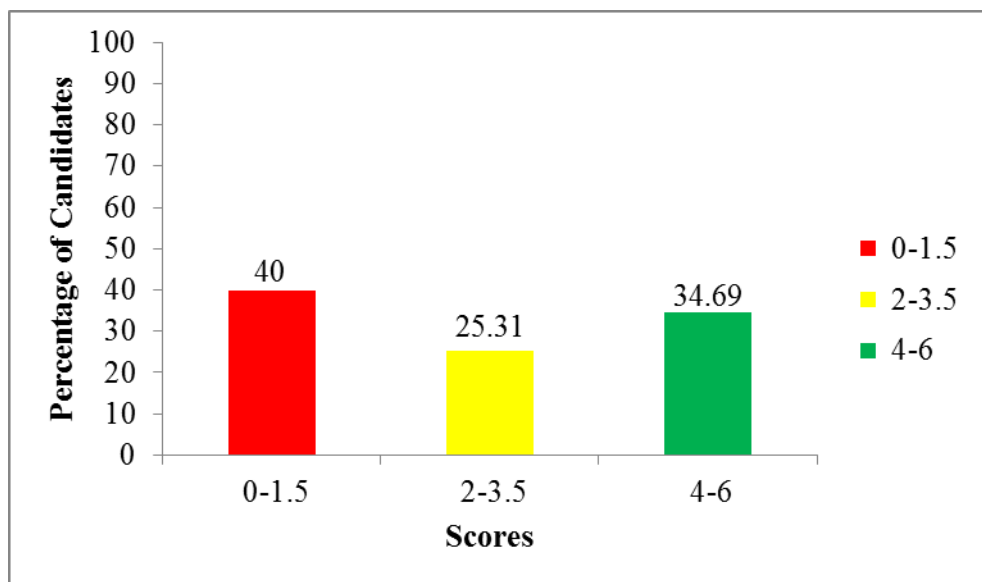


**Figure 5***: The candidates performance in question 4*

Generally, the performance was average as 192 (60%) of the candidates who attempted this question scored above 2 marks as shown in Figure 5. The candidates who scored low marks were able to explain the location of an inspection chamber in a drainage system, but failed to explain the requirement of a good drainage. These candidates failed to remember that an inspection chamber is part of a drainage system. They also failed to relate the question to real life where drainage systems exist for all types of buildings where humans live. This shows that, candidate's lack of

knowledge in drainage systems. Extract 4.1 shows a sample of poor responses which were provided by a candidate.



**Extract 4.1:** *A sample of the candidates' poor responses in question 4*

Extract 4.1 shows sample of responses by a candidate who failed to explain three locations of an inspection chamber to satisfy its functions in drainage system. Also they failed to explain requirements of a good drainage system.

Further analysis shows that the candidates who scored 2 marks and above, were able to explain the locations of inspection chamber to satisfy its functions in drainage system and requirements of good drainage system, as presented in Extract 4.2



**Extract 4.2:** *A sample of the candidates' good responses in question 4*

Extract 4.2 shows a sample of responses by a candidate who explained correctly three locations of an inspection chamber to satisfy its functions in drainage system. Also the candidates gave the requirements of a good drainage system.

#### 2.2.4 Question 5: Windows

The question required the candidates to provide six factors that guide in the selection of the size, shape, location and number of windows to be provided in the office design.

This question was attempted by 309 (94.79%) candidates, out of whom 171 (55.34%) scored from 0 to 1.5 marks. Data analysis indicates that 107 (34.63%) candidates scored from 2 to 3.5 marks, while 31 (10.03%) scored from 4 to 6 marks. Figure 6 illustrates the candidate's performance in this question.
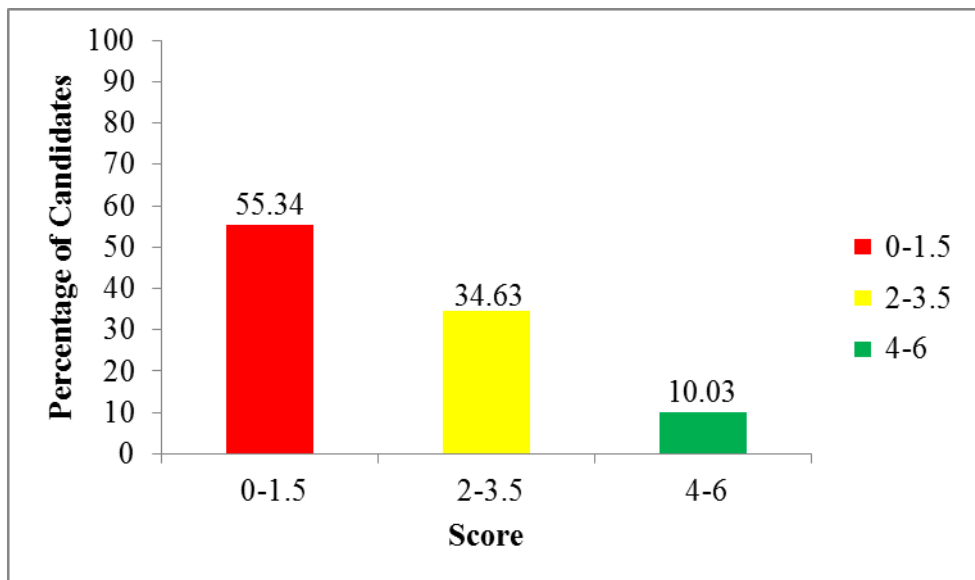


**Figure 6**: *The candidates' performance in question 5*

This question had an average performance because 44.66 percent scored above 2 marks as shown in Figure 6. The candidates who scored low marks were able to write almost two responses out of six. The responses required were: *Size of the room, Location of the room, Utility of the room, Direction of the wall, Direction of wind (orientation), Climatic condition* and *Requirements of the exterior view Architectural treatment to the exterior of the building*. Further analysis shows that, the candidates who scored 0 mark failed due to lack of knowledge and inability to identify the task of the question. Some of the candidates wrote the general requirements to be fulfilled for design of a house. For example, one candidate wrote: *number of occupant, length and size of the site, availability of materials for construction, features present in the area of construction, security and safe being of designed structures and affordability of designed materials.* These

candidates failed to realise that each component of a building has its own design requirements. Extract 5.1 shows a sample of poor responses provided by candidate.

| | | |
|---|---|---|
| 05. | i/ Number of occupants. | |
| | ii/ Length and size of the site. | |
| | iii/ Availability of materials per construction. | |
| | iv/ Features present in the area of construction. | |
| | v/ Security and safebeing of designed structure. | |

**Extract 5.1:** *A sample of the candidates' poor responses in question 5*

Extract 5.1 shows the response from one candidate who wrote the general requirements to be fulfilled for the design of a house, instead of the factors that guide the selection of the size, shape, location and number of windows to be provided in the office design.

However, further analysis reveals that, some candidates performed well and scored from 2 marks and above. These candidates managed to give factors that guide an architect to select the size, shape, location, and number of windows to be provided in the office design. These candidates were aware that each component required for the construction of a room has its own design requirements, as presented in Extract 5.2.

| | | |
|---|---|---|
| 5 | i/ The size of the room | |
| | ii/ Utility of the room | |
| | iii/ Location of the room | |
| | iv/ Climate /climatic condition of the area. | |
| | v/ Direction of the wind. | |
| | vi/ Appearance of the room. | |

**Extract 5.2:** *A sample of the candidates' good responses in question 5*

Extract 5.2 shows a response from one candidate who was able to provide the factors that will guide in selecting the size, shape, location and the number of windows to be provided in an office design.

## 2.2.5 Question 6: Architectural scales

The question required the candidates to interpret the given scales and conversion of actual dimensions to drawing dimensions. The question was

as follows: *(a) Give the interpretation of the following recommended scales: (i) 1:2 (ii) 50:1*
*(b) Present 1 metre of actual dimension to a drawing dimension by using the following scales (i) 1:1000 (ii) 1:50*

The results of the analysis show that, 281 (86.2%) candidates attempted this question, out of whom 179 (63.70%) scored from 0 to 1.5 marks. Further analysis indicates that 58 (20.64%) candidates scored from 2 to 3.5 marks, while 44 (15.66%) candidates scored from 4 to 6 marks. Figure 7 presents the candidates' performance in this question.
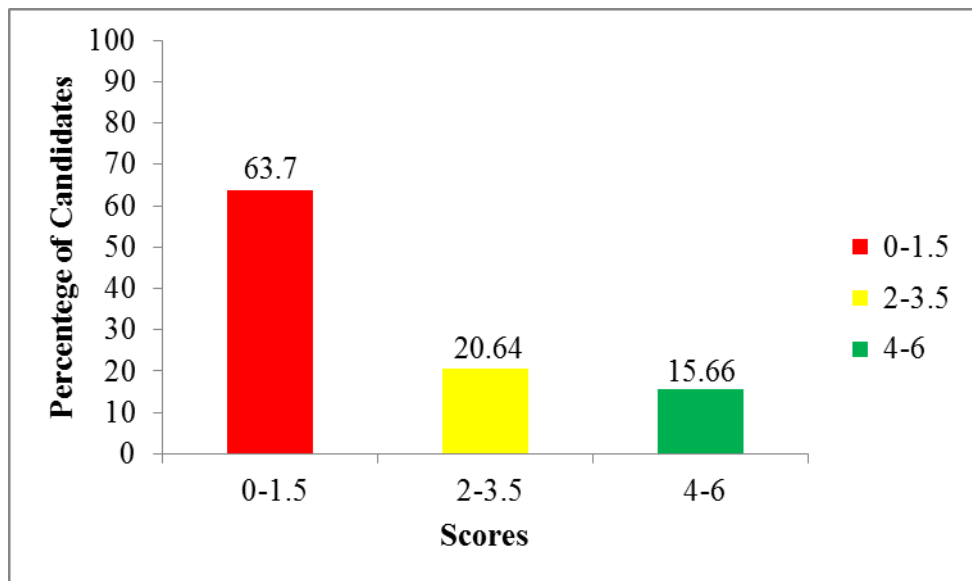


**Figure** 7*: The candidates performance in question 6*

Generally, the performance of the candidates was average because 36.3 percent scored above 2 marks as illustrated in Figure 7. The majority of the candidates, 179 (63.70%), who scored low marks (0 to 1.5) could not interpret the given scales, but converted the given actual dimensions to drawing dimensions. These candidates lacked the basic knowledge in architectural scale. The candidates who scored 0 failed to give the interpretation of scales, and could not convert the actual dimensions to drawing dimensions. This failure is an indicator that, the candidates were completely unaware of the architectural scales. The failure in this question might be attributed to inadequate exercises and practices in architectural drawings, which led them to score poor marks as the sample presented in Extract 6.1 shows.

```
6
i   1:2    =    1:20.

ii  50:1  =   5:1.

b
i   1:000 = 1:100.

ii  1:50  =  1:5.
```

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

Extract 6.1 shows a response from one of the candidates who failed to interpret the given scales, and convert the actual dimensions to drawing dimensions.

Furthermore, some candidates who scored full marks perfectly interpreted the given scales, and converted the actual dimensions to drawing dimensions. These candidates had adequate knowledge of architectural drawings. Extract 6.2 presents a sample of such poor responses.



```
6   a)
        i/ 1:2.
        1 millimetre on the map represents  2 millimetres on
    the ground.      OR
        ii/ 50:1.  1 unit of length on the map represents
    2 units of length on the ground.
    - Enlarging scale.
        ii/ 50:1
        50 millimetres on the map represents  1 millimeter
    on the ground.
    - Reducing scale.

    b)  1 metre = 1000 mm.
    from scale.
        1 mm = 1000 mm
          x  = 1000 mm
        x = 1000 mm mm
            1000 mm
        x = 1 mm

    .˙. On the drawing, 1 metre will be presented as
        1 millimetre  (1 mm)
```

**Extract 6.2:** *A sample of candidates' poor responses in question 6.*

Extract 6.2 shows a response from one candidate who was capable of interpreting the given scales and conversion of actual dimensions to drawing dimensions.

### 2.2.6 Question 7: Stair and staircase

The question required candidates to study carefully the typical details of a deck stair in order to calculate the total run of the stair, size of going and riser as well as to identify the type of stringer used in the stair. The question was as follows:

*Study carefully the typical detail of a deck stair shown in Figure 1, and answer the questions that follow.*



**Figure 1**
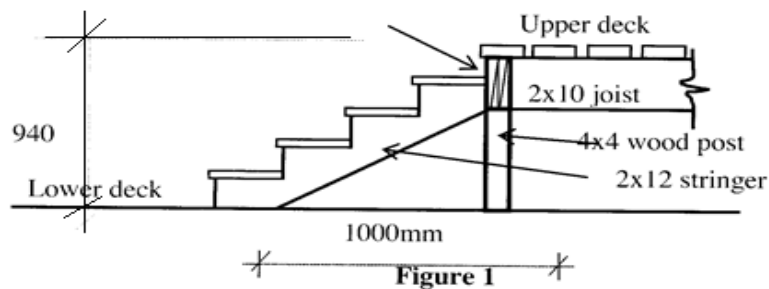
*(a) What is the run in millimetre (mm) of the stair between the decks?*
*(b) Calculate going and riser in millimetre.*
*(c) Identify a type of stringer used in this stair.*

This question was attempted by 260 (79.75%) candidates, of whom 166 (63.85%) scored from 0 to 1.5 marks. Further data analysis indicates that 39 (15%) candidates scored from 2 to 3.5 marks while 55 (21.15%) candidates scored from 4 to 6 marks. Figure 8 summarises the candidates' performance in this question.
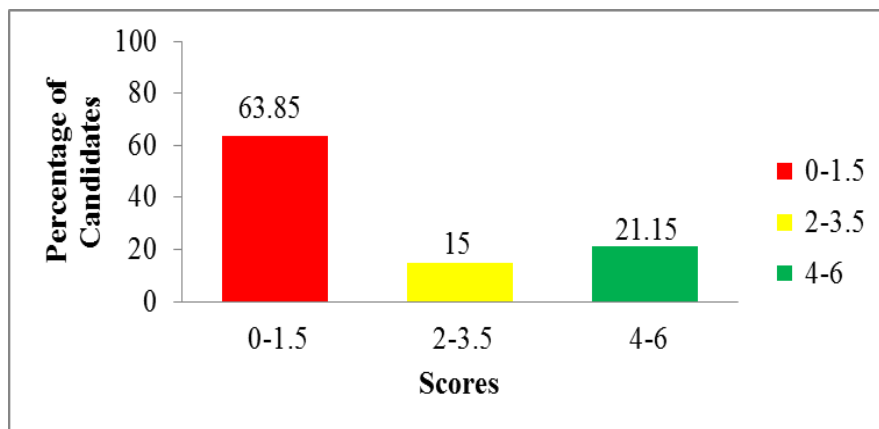


**Figure 8***: The candidates performance in question 7*

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Figure 8 shows that 94 (36.15%) candidates scored 2 marks and above, which indicates an average performance. The candidates who scored low marks (0 to 1.5) were able to interpret the staircase drawing, and calculate the total run of the stair. However, some of the candidates failed to calculate the size of going and riser of stair. They also failed to identify the type of stringer used in a stair. However, the candidates who scored a 0 mark failed to interpret the staircase drawing and calculate the total run, going and riser. They also failed to identify the type of stringer used for stairs. For example, one of the candidates wrote: *(a) total run/4, 1000/4 =250mm (b) the going is 100mm riser= 940mm and (c) wood stringer.* The responses presented by candidates in these categories correlation with the task posed in the question. This response indicates that the candidates were not adequately trained in both theory and practical, as a result they failed to apply the relevant knowledge acquired during the draughting course. A sample of such incorrect responses is presented in Extract 7.1



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

Extract 7.1 shows a sample response from a candidate who failed to calculate the total run of stair, the size of going and riser, and identify the type of stringer used in the stair.

Despite the poor performance, some candidates scored 2 marks and above. These candidates studied and interpreted the details of a drawing of deck stair and calculated total run of stair, size of going and riser. They also identified the type of stringer used in the stair. However some of them failed to score high marks because of incorrect substitution of data in calculating of riser, and going of a step. Extract 7.2 shows a sample of correct responses provided by one of the candidates.

**Extract 7.2:** *A sample of candidates' good responses in question 7*

Extract 7.2 shows responses from one of the candidates who calculated the total run of stairs, size of going and riser, and identified correctly the type of stringer used in the stair.

### 2.2.7   Question 8: Roof

The question required the candidates to sketch the treatments of the following roof eaves: (i) Open (ii) Close and, (iii) Flush eaves.

The result of the analysis shows that 268, (82.20%) candidates attempted this question, out of whom, 95 (35.45%) scored from 0 to 1.5 marks. The number of candidates who scored from 2 to 3.5 marks is 85 (31.71%), whereas 88 (32.84%) scored from 4 to 6 marks. Figure 9 presents the candidates' performance in this question.
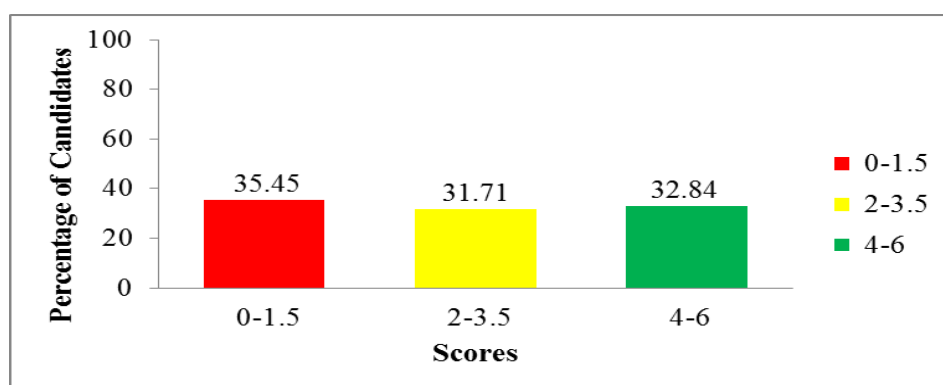


**Figure 9:** *Candidates' performance in question 8*

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The candidates' performance in this question was good because 64.55 percent of the candidates scored above 2 marks as shown in Figure 9. The majority of the candidates performed well because they used their surrounding buildings, with pitch roofs, to recall and draw the open, close and flush eaves. These candidates have adequate knowledge of roof construction. Extract 8.1 shows a sample of candidates' good responses.
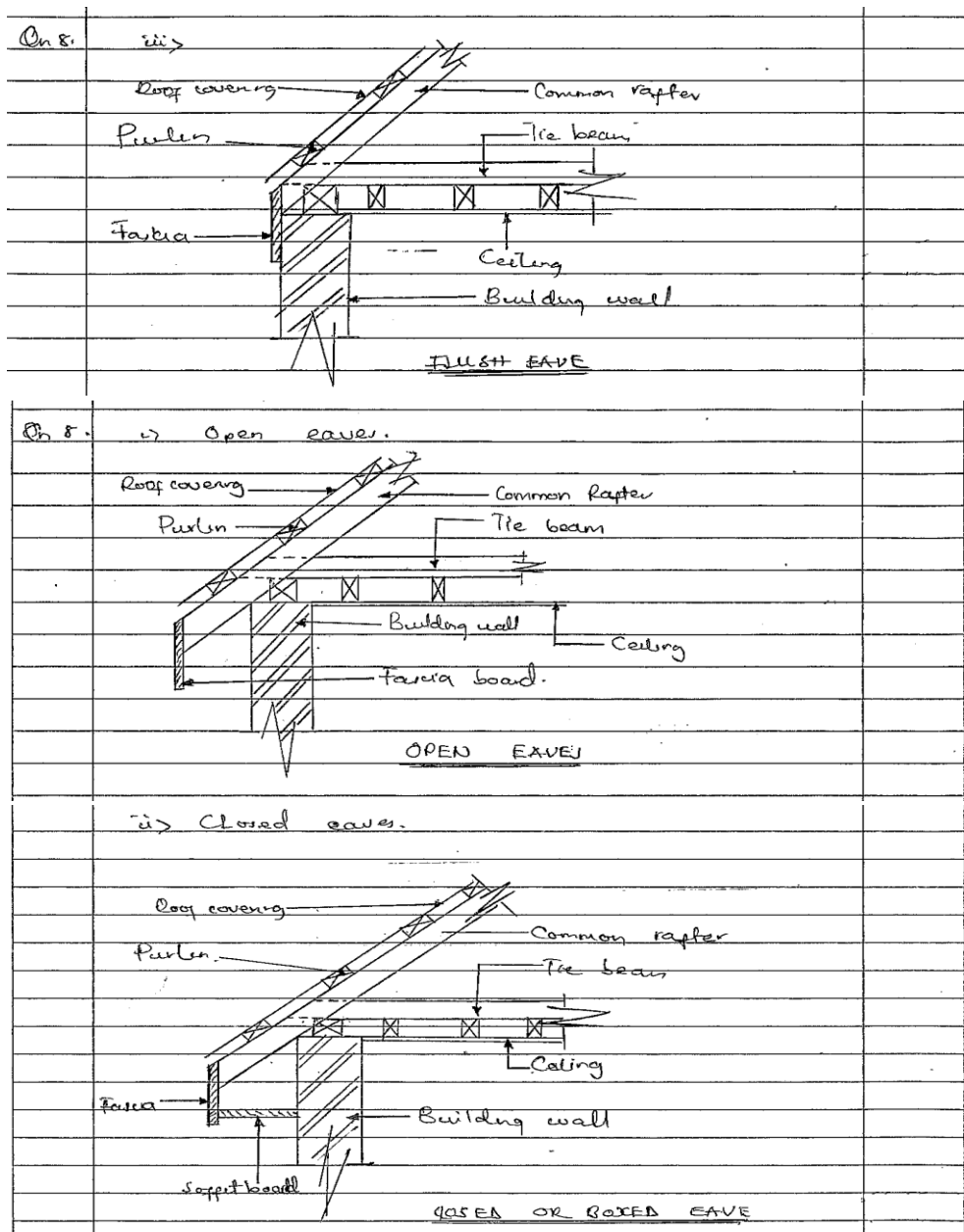


**Extract 8.1:** *A sample of candidates' good responses in question 8*

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Extract 8.1 shows a response from one of the candidates who was able to recall and draw the open, closed and flush eaves.

Furthermore, the candidates who scored low marks were able to draw open and close eaves, but failed to draw the flush eave. The candidates, who scored 0 mark had misconception on the question as they sketched a pitched roof structure and labeled its parts as open, closed and flush eaves. Extract 8.1 shows a sample of candidates' poor responses.
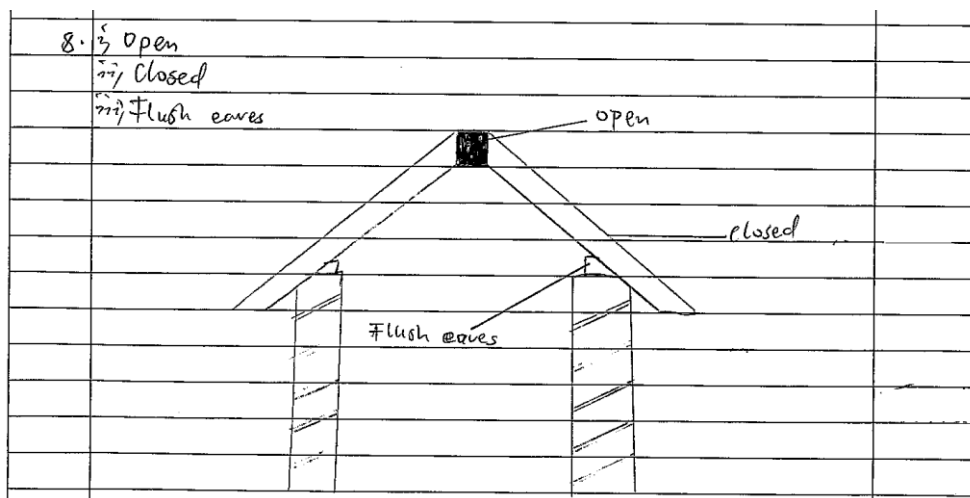


**Extract 8.2:** *A sample of candidates' poor responses in question 8*

Extract 8.2 shows a sample of candidates who sketched a pitched roof structure and labelled a ridge as open, a rafter as closed, and a wall plate as flush eave.

### 2.2.8 Question 9: Roof

The question required the candidates to differentiate between single and double roof. The question is as follows: *Suppose you want to show the artisans the basic differences in roofs construction. Use sketches to make your artisans understand how to differentiate between single and double roofs.*

The analysis shows that 296 (90.8%) candidates attempted this question out of whom, 270 (91.22%) candidates scored from 0 to 1.5 marks. The candidates who scored from 2 to 3.5 marks were 22 (7.09%), whereas 4 (1.69%) candidates scored 4 to 6 marks. Figure 10 shows the performance of the candidates in this question.
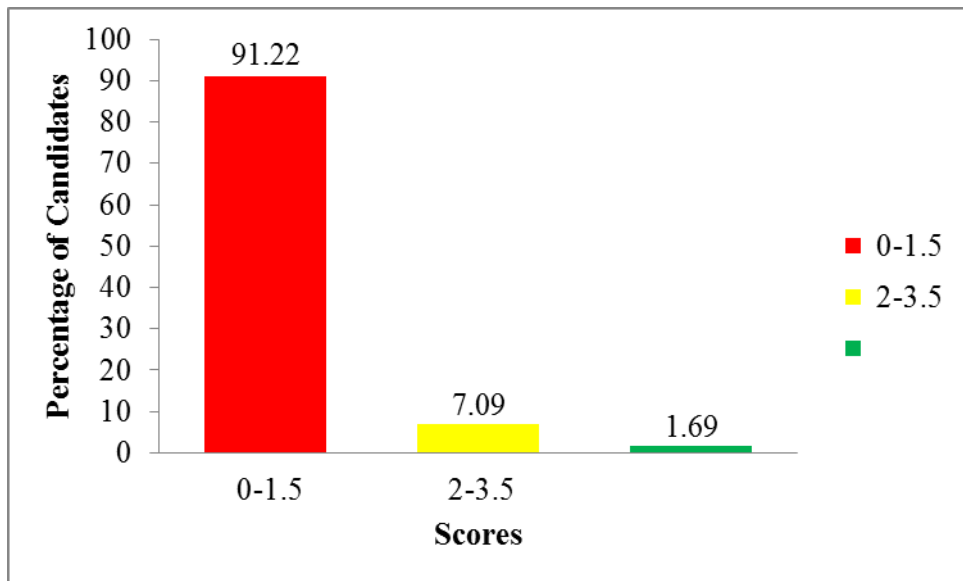
**Figure 10***: The **c**andidates' performance in question 9*

The general performance in this question is poor, as 91.22 per cent of the candidates scored below 1.5 marks as shown in Figure 10. Some of these candidates were able to draw a single roof, because any form of a simple pitch roof can be a single roof. Some of the candidates drew *a lean to roof, couple roof* and *close couple roof*. These candidates failed to remember that a double roof has a horizontal timber that is supported by the external walls of the roof structure to stiffen the rafters. Further analysis done on candidates' responses shows that, the candidates who scored a 0 mark provided an irreverent answer to the question. For example, one of the candidates wrote: *single roof it promoting to building and one place of make covering upper the building and double roof it promote building and two place of make covering upper the building, single roof using one place covering upper the building but double roof using two place covering upper the building*.
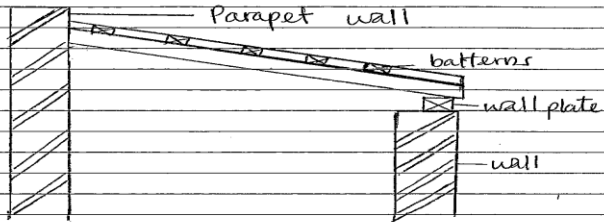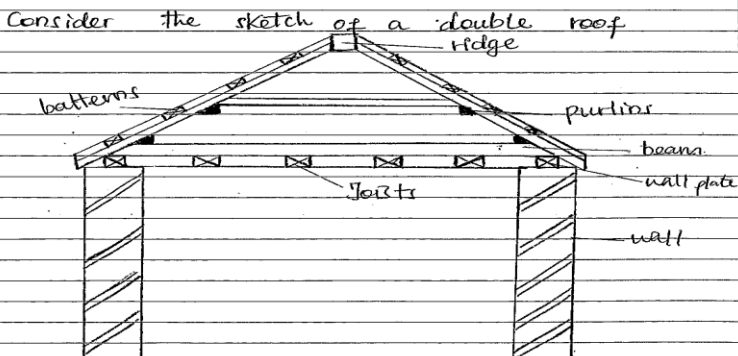
The candidates were not focused, and hence gave blunt answers which did not satisfy the requirements of the question. These candidates lacked knowledge in all types of roofs, which led them to sketch and differentiate single from double xroofs. Extract 9.1 presents a sample of incorrect answer.

**Extract 9.1:** *A sample of candidates' good responses in question 9*

Extract 9.1 is a sample of the response from one of the candidates who failed to differentiate between single and double roof, and wrote irreverent answers.

However, a few candidates, 26 (8.78%) were able to sketch a single and double roof. Also they failed to provide an explanation. Only one candidate who scored full marks was able to differentiate between single and double roof as seen in Extract 9.2



**Extract 9.2:** *A sample of candidates' good responses in question 9*

Extract 9.2 is a sample of the candidate who was able to differentiate between single and double roofs.

### 2.2.9 Question 10: Residential house planning

The question required the candidates to enumerate six steps to follow when preparing a residential house sketch.

The result of the analysis shows that, 266 (81.6%) candidates attempted this question, out of whom, 218 (75.17%) scored from 0 to 1.5 marks. The number of candidates who scored from 2 to 3.5 marks is 67 (22.76%), whereas 5 (2.07%) candidates scored from 4 to 6 marks. Figure 11 presents the performance in this question.
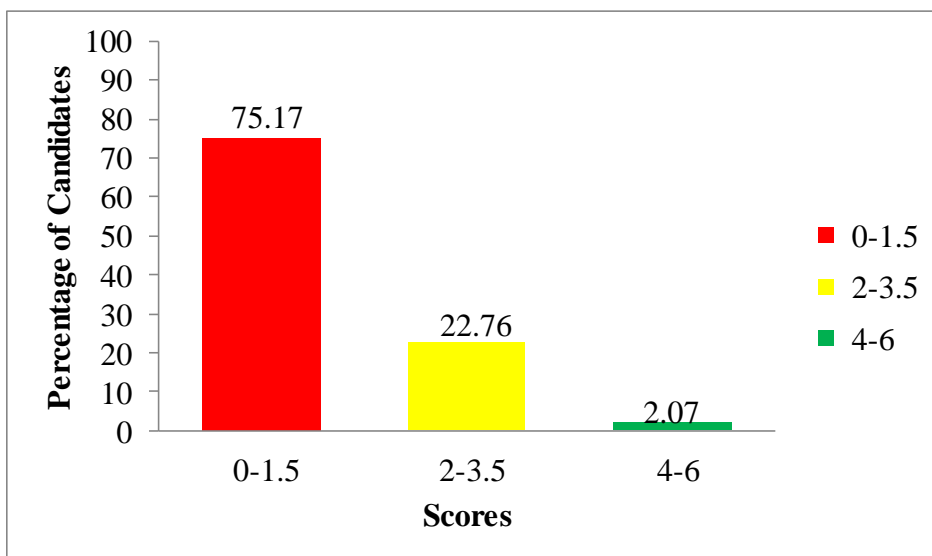


**Figure 11:** *The candidates' performance in question 10*

Figure 11 shows that 218 (75.17%) of the candidates scored low marks (0 to 1.5) of whom 143(49.31%) candidates scored a zero which indicates poor performance. The analysis shows that, the majority of the candidates who scored from 0 to 1.5 marks did not understand the requirement of the question. For instance, in responding to this question, one candidate wrote; *prepare instruments pencil ruler and eraser and paper, write your information on the paper and your name, draw floor plan draw the section, draw foundation plan and draw site plan.* This response is a mixture of up the issues of steps to be followed when preparing a sketch in a drawing office with the steps to be followed when design a residential house. The responses given by candidates in this category indicate that they lacked

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knowledge and skills in the required steps to follow when designing a residential house. This can be revealed by a response from one of the candidate as shown in Extract 10.1.

| | | |
|---|---|---|
| b. | i) Prepare instrumenti example Pencil, ruler and eraser and paper | |
| | ii) Write your information on ti Paper and your name. | |
| | iii) Draw floor Plan | |
| | iv) Draw ti Section | |
| | v) Draw foundation Plan | |
| | vi) Draw Site Plan | |

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

Extract 10.1 is a sample of responses from the candidate who wrote down the steps to be followed when preparing a sketch of building in a drawing office instead of the steps to be followed when preparing residential house sketch.

Furthermore, the candidates who scored above 2 marks were relatively able to enumerate the steps to follow when preparing residential house such as *as first, you must design a sketch of how the building will be, the individual requirements of the building like number of bedroom, sitting room, dining room toilets and others, take scale which will be suitable for the building, you will start drawing a floor plan and room should be arrange in a systematic order, after floor plan you can draw the roof plan and the section of the build of possible and finery, you can draw elevations to show the side of the building after the completion of the construction.* Extract 10.2 is an illustration of a good response from a candidate's script.

| 10· | | |
|---|---|---|
| | (i) First, you must design a sketch of how the building will be. | |
| | (ii) The Individual requirements of the building like number of bedrooms, sitting room, dining room, Toilet and others. | |
| | (iii) Take a Scale which will be suitable for the building | |
| | (iv) You'll start drawing a floor plan and rooms should be arranged in a Systematic order | |
| | (v) After floor plan you can draw the roof plan and the section of the build if possible. | |
| | (vi) And finally, you can draw elevation to show the side of the building after the completion of the construction. | |

**Extract 10.2:** *A sample of candidates' good responses in question 10*

Extract 10.2 shows a sample of responses from the candidate who was capable of enumerating the steps to follow when preparing a residential house sketch.

### 2.2.10 Question 11: Water supply

The question required the candidates to recommend to clients a stable water supply system for a residential building with irregular water supply and to give three advantage of the system.

This question was attempted by 266 (81.58 %) candidates, of whom 203 (76.32%) scored from 0 to 1.5 marks. Data analysis indicates that 39 (14.66%) candidates scored from 2 to 3.5 marks, while 24 (9.02%) candidates scored from 4 to 6 marks. Figure 12 illustrates the candidates' performance in this question.
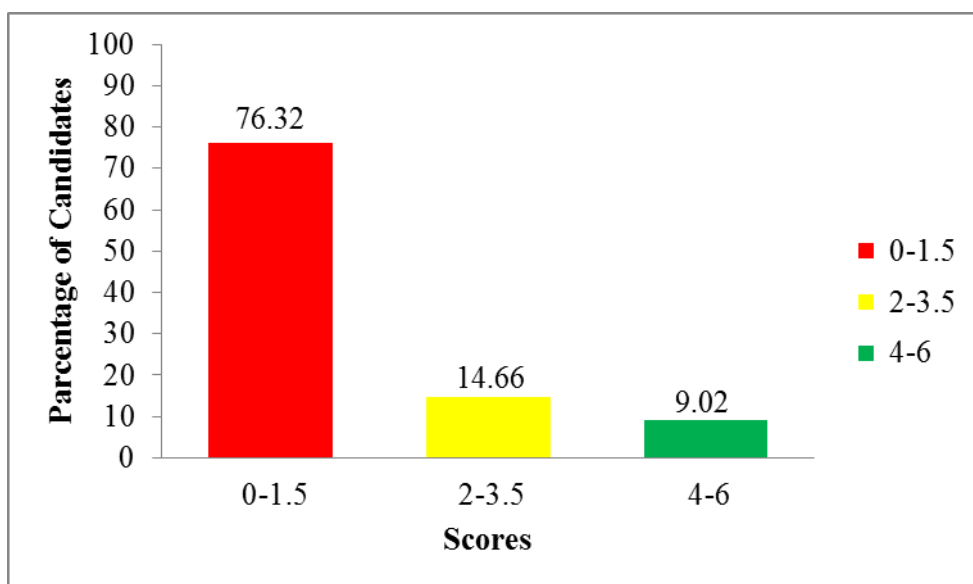
**Figure 12***: The candidates performance in question 11*

The general performance of the candidates in this question is poor as Figure 12 illustrates. Majority of the candidates, 203 (76.32%) who scored low marks mentioned the layout water supply distribution network for a town. Some of the candidates provided the following answers: *suitable type of water supply system to the area with irregular water supply is dead end system/tree system and advantage of dead end/ tree system is it simple in construction, it is not cost full and it is easy to enlarge when desired.* This shows that there is misconception of the question by the candidates. Further analysis shows that, the candidates who scored 0 failed to recommend and give the advantages of the water supply system to be used in an area with irregular water supply. Most of the students provided irreverent answers which were completely out of context. Example of such response is presented in Extract 11.1. Such response is an indication that the candidate was not conversant enough with the water supply topic.



**Extract 11.1:** *The candidates' poor responses in question 11*

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Extract 11.1 shows a sample of candidates' response who wrote the layout water supply distribution network for a town, instead of type of water supply system for a residential building in an area with irregular water supply.

However, responses from some of the candidates who scored 2 marks and above identified the suitable type of water supply system and gave advantages of that system for design a cold water supply. Some of the candidates wrote: *I recommend to the client indirect water supply system because it has the following advantage has constant supply of water in case there is cut off, has no possibility or air lock, it causes no convenience or disturbance with other consumers because an individual his/her on tank.* This suggests that the candidate had enough knowledge on drainage system as seen in Extract 11.2.



**Extract 11.2:** *A sample of candidates' good responses in question 11*

Extract 11.2 is a the sample of response from a candidate who was capable of identifying a suitable type of water supply system, and gave the advantages of that system for design a cold water supply.

## 2.3    SECTION C: Structured questions

This section consisted of two questions, and the candidates were required to attempt only one question. Each question carried 30 marks. The score ranges used for grading performance of the candidates for the questions in this section is indicated in Table 2.

**Table 2:** Score ranges for candidates' performance in Question 12 and 13.

| Scores range | General Performance | |
| --- | --- | --- |
| | Remark | Grade |
| 0 – 8.5 | Weak | F |
| 9 - 19 | Average | C - D |
| 19.5 - 30 | Good | A - B |

### 2.3.1 Question 12: Windows

In this question the candidates were required to draw in scale of 1:10 a front elevation, vertical section, and horizontal section of casement window. The question was as follows:

*A client wanted to construct an office building with a casement window. According to the client's requirements, the following are suggested dimensions:*

*(a) The size of the window is 1500mm wide, and 1800 mm in height*

*(b) The window frame is divided into two equal parts vertically*

*(c) The size of the vent light is 450 mm high cutting the full length of a window frame*

*(d) The size of timber member for window frame members is 50mmx150mm*

*(e)  The size of timber member for sashes is 50 mm x 50 mm*

*(f)   The size of rebate in head, cill, and jamb is 25 mm x 50 mm*

*(g) The size of the rebate in transom and mullion is 12.5 mm x50 mm*

*(h) The size of the rebate in the sashes member is 25 x 25 mm*

*(i)  Sashes are side and top hang in a vent light*

*(j)  The window is glazed with 6 mm clear glass fixed with putty.*

*Using a scale of 1:10 draw:*

*(i)  Front elevation of the casement window.*

*(ii) Vertical section Y-Y of the window.*

*(iii)Horizontal section X-X of the window*

*In your drawing show the jamb, mullion, stile, bottom rail cill, head and transom*

The candidates were supposed to draw a front elevation, vertical, and horizontal section of a casement window using the information given.  The basic test of the question was the proper use of architectural scale, quality of lines, dimensioning, and the usage of data to produce the anticipated drawing.

The candidates were exposed to the drafting profession where they were supposed to apply technique of drafting to demonstrate the acquired practical knowledge and skills that can be practised to produce an elevation and section drawing of a casement window.

This question was attempted by 219 (67.18%) of the candidates. Out of these candidates 146 (66.67%) scored from 0 to 8.5 marks while 5 (2.28%)

scored a 0 mark. The number of candidates who scored from 9 to 19 marks is 66 (30.13%) and only 8 (3.2%) scored from 19 to 30 marks.
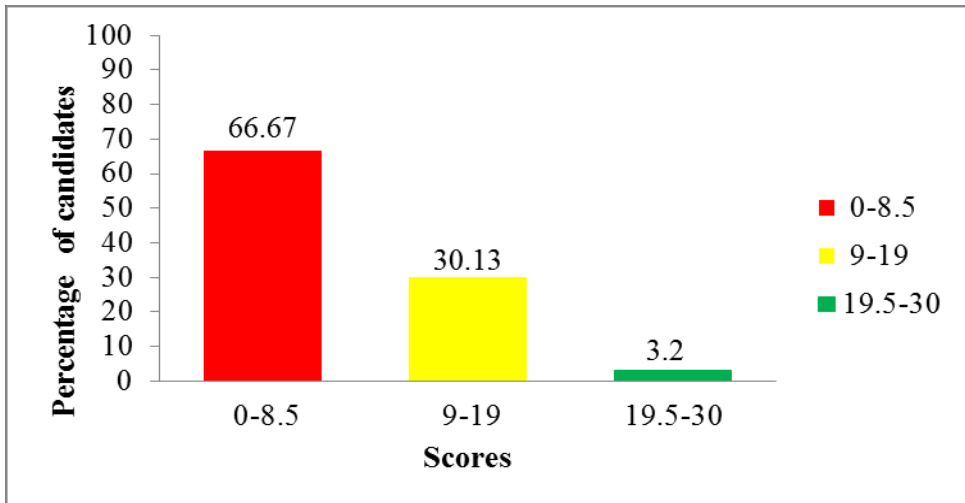


**Figure 13***: The performance of candidates in question 12*

Generally, the performance of the candidates is average, because 33.33 percent scored more than 8.5 marks as illustrated in Figure 13. The majority of the candidates 66.67 percent failed to score high marks because of poor pencil works and failure to recall the procedure of presenting the drawing on a standard drawing paper as seen in Extract 12.1
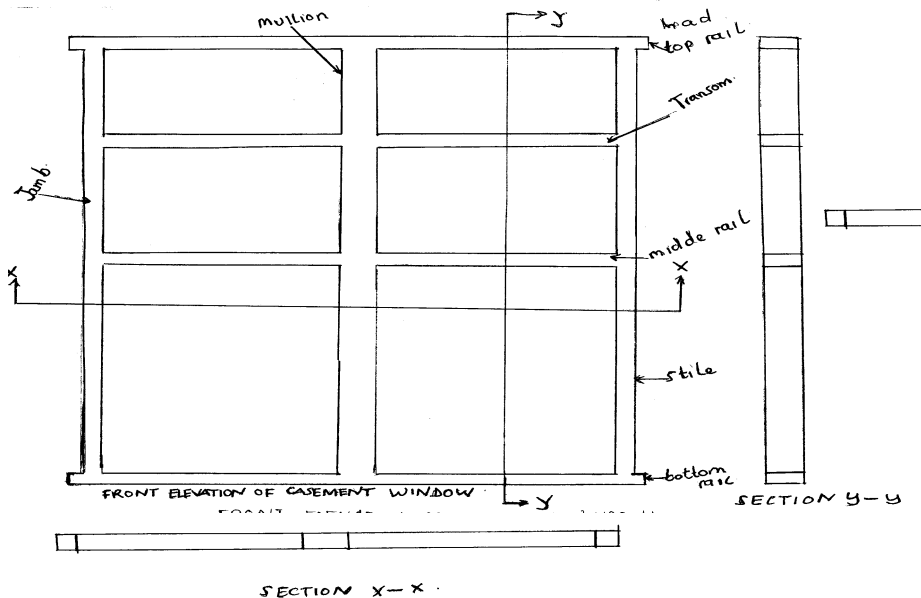


**Extract 12.1:** *A sample of the candidates' poor responses in question 12*

Extract 12.1 shows a sample of poor response from one candidate who failed to draw the front elevation, vertical section and horizontal section of casement window by using the given information.

However, there were candidates who scored above 19.5 marks. These candidates managed to demonstrate skills in interpreting the given information. They appropriately drew the elevation, vertical and horizontal section o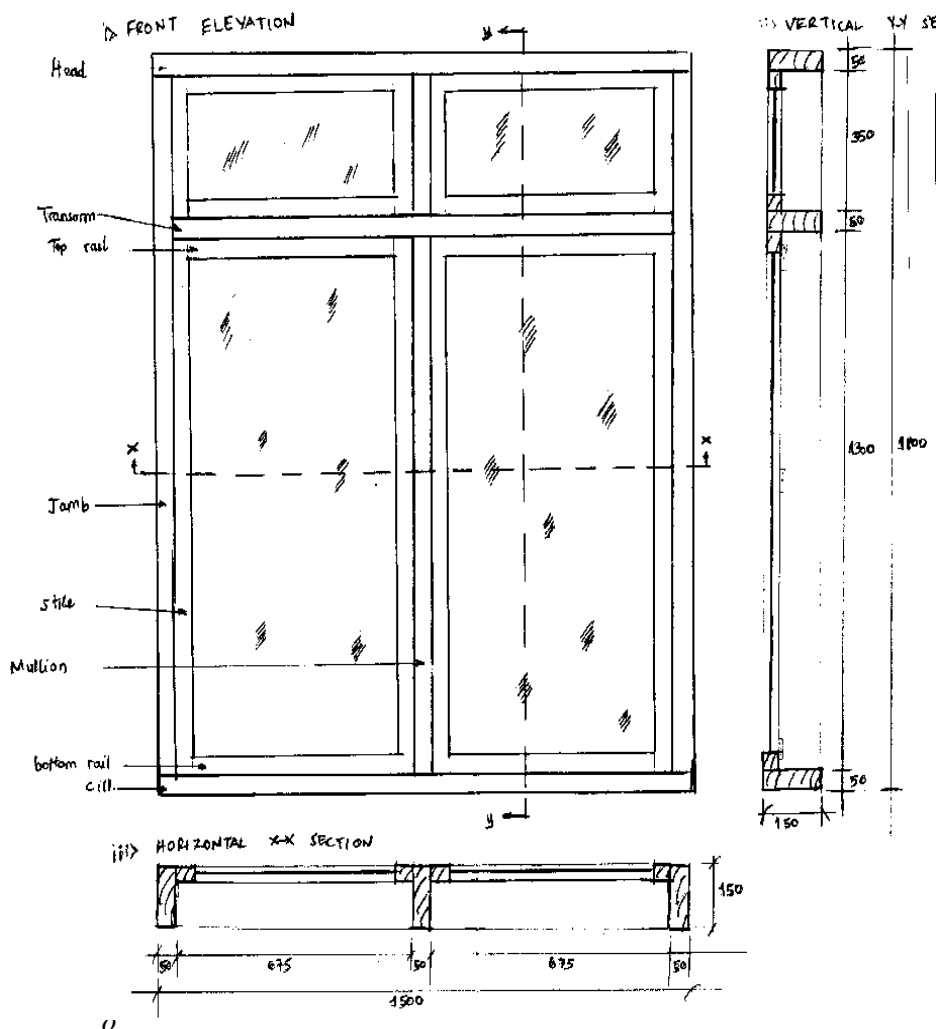f traditional casement window to the required scale and standard as shown in one of the sampled responses presented in Extract 12.2.



**Extract 12.2:** *A sample of candidates' good responses in question 12*

Extract 12.2 is a sample of response from one candidate who drew the front elevation, vertical section and horizontal section of a casement window by using the given information.

### 2.3.2 Question 13: Drainage

Part (a) of this question required the candidate to draw a combined sewer system showing the location of the rain water pipe, combined sewer disposal direction, and inspection chamber from a given roof plan. In part (b) candidates were required to draw a well labelled septic tank from the given information. The question was as follows:

*(a) A client complains that the use of separate sewer system is very expensive in construction. He therefore requires a combine system. As an expert of this area, use Figure 2 to draw a combined sewer system showing the location of rain water pipe, combined sewer disposal direction and inspection chambers.*



**Figure 2**
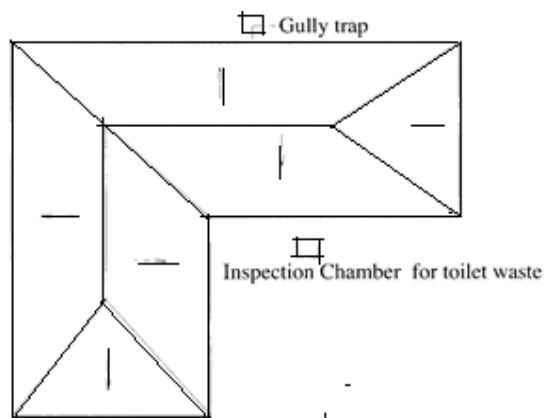
*(b) You are told that the construction is taking place at site and the builder found some difficulties in connecting waste water directly to the public main sewer and the only solution is to use septic tank for collection of waste. Assist the contractor by producing a longitudinal section of a septic tank at a scale of 1:20 by using the following details:*

*(i) The internal dimension of the septic tank is 1700 mm depth, and 2000 mm wide.*

*(ii) The upper slab thickness is 100 mm.*

*(iii) The slope of a septic tank concrete base is 1 in 20.*

*(iv) Cast iron cover is 600 x 600 mm for inspection chamber and 300 x 300 mm for septic tank.*

*(v)* Blok wall is 225 mm thick for septic tank and 100 mm thick for inspection chamber.

*(vi)* Drain pipe is 100 mm in diameter.

*(vii)* The size of inspection chamber is 600 x 600 mm and 500 mm deep.

*(viii)* Concrete base septic tank and inspection chamber is 100 mm thick.

*(ix)* Baffle wall is 50 mm thick and 900 mm high and is raised 600 mm from concrete base

*(x)* Baffle wall is located 1450mm from the inlet wall.

In part (a) the candidates were tested *on practical knowledge of the drainage system. They were supposed to recall the design and then draw* the combined sewer system.

In part (b), the candidates were expected to use the given design information of a septic tank *to draw in the given scale the longitudinal section of a septic tank. Basically, the candidates were tested on four crucial items including, the proper use of architectural scale, quality of lines, dimensioning and usage of data* to produce the anticipated drawing.

This question was attempted by 100 (30.67%) candidates who sat for the examination. Among these candidates 52 (52%) scored from 0 to 8.5 marks. The number of candidates who scored 9 - 19 marks is 41 (41%) and 7% scored between 19.5 and 30 marks.
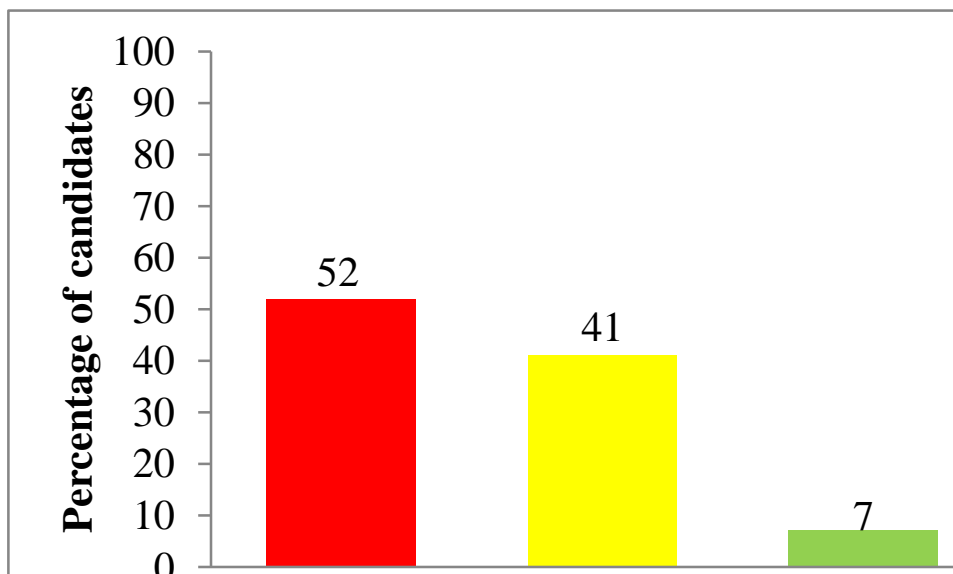


**Figure 14***: The performance of candidates in question 13*

The candidates' performance in this question is average because 48 percent of the students scored more than 9 marks as shown in Figure 14. The analysis of the candidates' responses shows that, the majority of the candidates who scored low marks did not comprehend with the demand of the question. Most of them failed to draw a combined sewer system as well as using the given information to produce a longitudinal section of a septic tank. This failure might be attributed to inadequate knowledge in drainage systems, and also failure to recall the procedure for presenting the drawing on a standard drawing paper. Extract 13.1 exemplifies this.
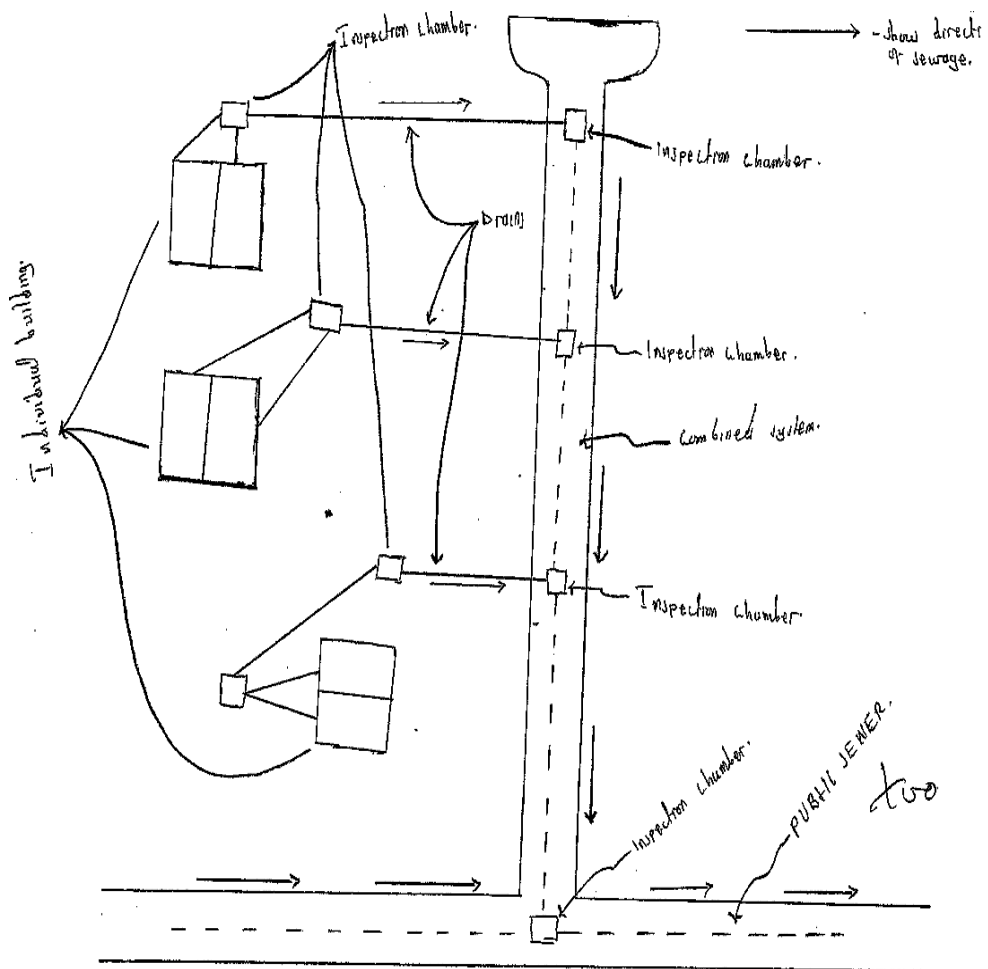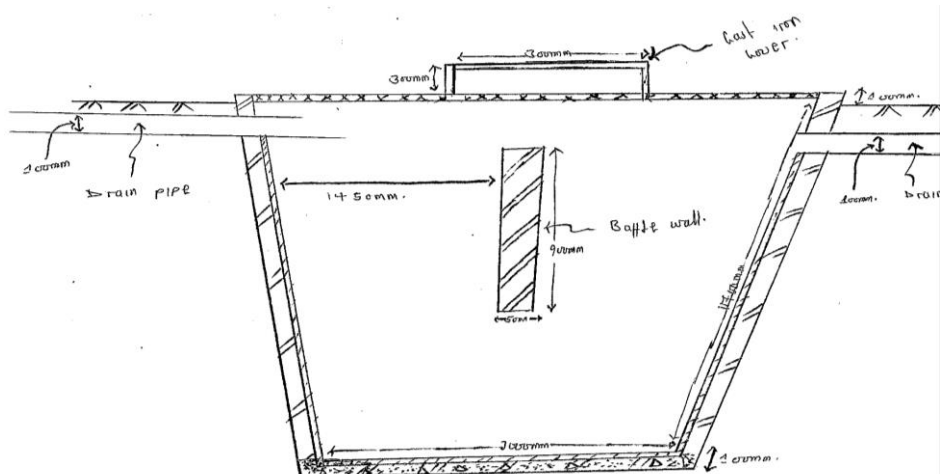
**Extract 13.1:** *A sample of candidates' poor responses in question 13*

Extract 13.1 is a sample of response from the candidate who failed to draw a combined sewer system, showing the location of the rain water pipe, combined sewer disposal direction, and inspection chamber from a given roof plan and a drawing of septic tank.

However, there were few candidates who were able to design and draw a combined sewer system. They were also able to draw a longitudinal section of a septic tank as presented in Extract 13.2.

Labels on the drawing:
- 600 x 600 mm Cast iron cover
- 200 x 200 mm Cast iron cover
- 100 mm Slab.
- 100 mm Block wall
- Slum.
- 100mm Drain outlet
- 100 mm Drain Inlet
- 960mm x 50 mm Baffle wall.
- Fin to slope
- 225mm Block wall
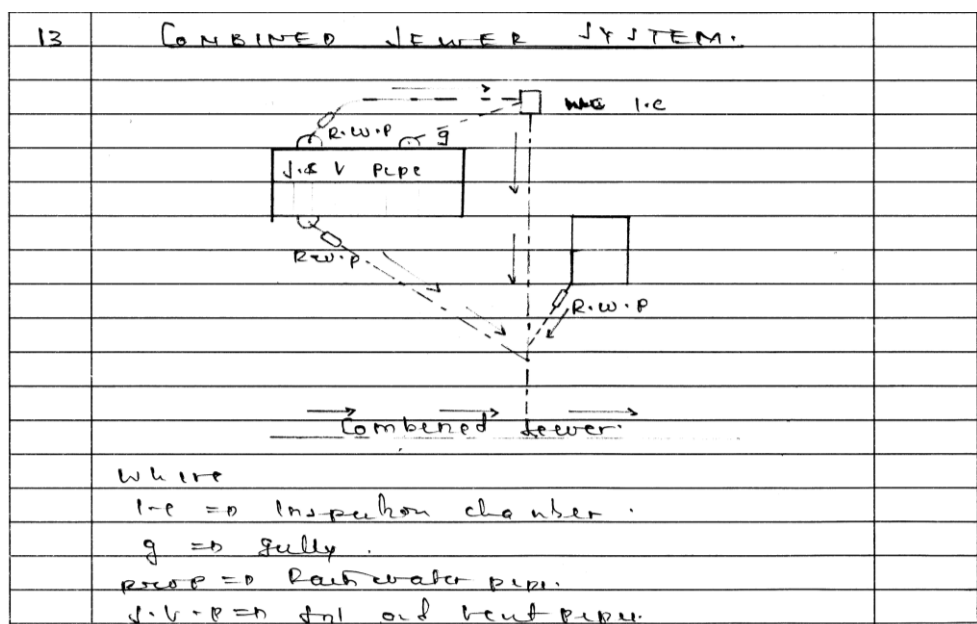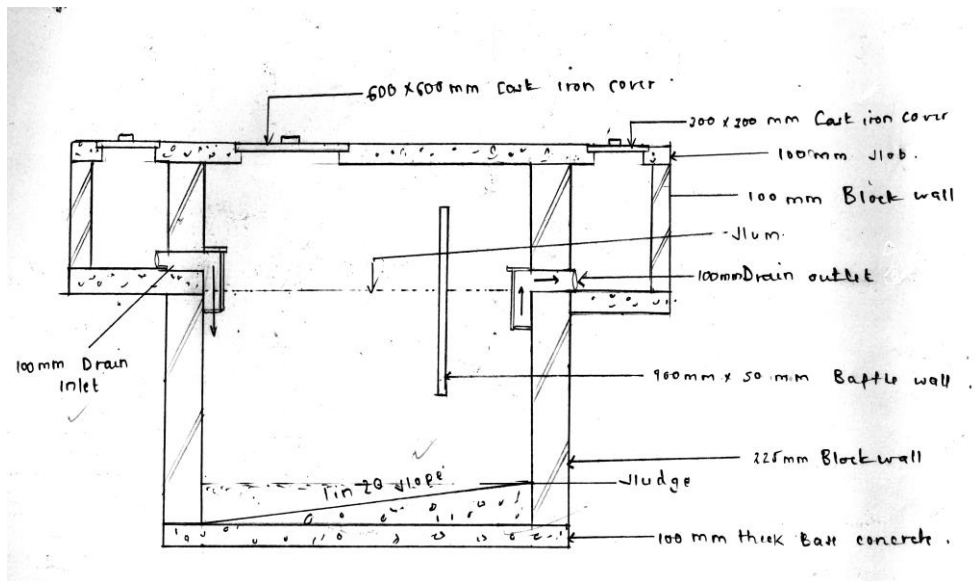- Sludge
- 100 mm thick Base concrete.

**Extract 13.2:** *A sample of candidates' poor responses in question 13*

Extract 13.2 is a sample of a response from a candidate who was able to draw a combine sewer system showing the location of rain water pipe, combine sewer disposal direction, and inspection chamber from a given roof plan, and a drawing of septic tank.

## 3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER TOPIC

A total of 17 topics were examined in the Architectural Draughting paper. The analysis shows that the candidates had good performance in question 1 and 8, with the performance of 79.7% and 64.6% respectively. The questions comprised the topics of *Architectural Scales, Floor Plan, Sections, Elevations, Fireplace and Flue, Water Supply, Electrical Supply and Distribution, Drainage System, Schedules* and *roof.* The good performance in the stated topics was attributed by adequate knowledge and correct interpretation of the requirements of the questions.

In contrary there are the four (4) topics, namely *Drainage, Windows Architecture scales, Stairs and Staircases* that were tested in questions 4, 5, 6, 7, 12 and 13 had an average performance. However, the performance was poor in following topics: *Electrical supplies, Building specifications, Roofs, Water supply and Residential house planning which were* tested in question 2, 3, 9, 10 and 11. Furthermore, poor performance was attributed to insufficient knowledge and skills in the concepts taught under the stated topics, wrong interpretation of the requirement of the question and lack of practical skills. The performance of the candidates in different topics is summarized in Appendix A.

# 4.0 CONCLUSION AND RECOMMENDATIONS

## 4.1 CONCLUSION

The analysis of candidates' performance was done in all the questions that were examined in CSEE, of Architectural Draughting examination paper. In general, the performance of the candidates in 072 - Architectural Draughting paper was poor as only 91 (27.91%) candidates were able to score pass mark and above.

The candidates' performance in questions 1 and 8 is 'Good' while the performance in questions 4, 5, 6, 7, 12 and 13 was "Average". The poorly performed questions were 2, 3, 9, 10, and 11.

Poor performance of the candidates might be due to the following reasons: failure to interpret correctly the tasks of questions, partial attempt of the questions; inadequate knowledge on the topic tested, lack of practical skills, poor command of English language, and inadequate site practice.

Provision of drawing equipment and more involvement in industrial practical works are required for the improvement of the prospective candidates' performance as it will help them catchup with the logical and technical understanding of the relevant topic matter.

## 4.2 RECOMMENDATIONS

### 4.2.1 Recommendations for Students

Based on the performance observed in this analysis, the following recommendations can be made for students:

(a) It was observed that some candidates failed to adhere to the demands of the questions they attempted. Hence, it is recommended that future students be encouraged to read carefully the instructions before answering the questions.

(b) It is advised that students should be encouraged to search, practice and read relevant books/media in order to widen their knowledge, especially in the areas where most of the candidates demonstrated lack of knowledge.

### 4.2.2   Recommendations for Teachers

(a)   In order to improve candidate's performance, teachers should be encouraged to set enough exercises and tests for their students before students sit for national examinations.

(b)   Some of the students demonstrated lack of knowledge in aspects that require prior practical skills it is therefore recommended that such skills should be provided to students so that they can relate theories and practical experience and hence acquire the expected competences.

**Analysis of the Candidates' Performance Questionwise**

| S/N | Topic | Question Number | Percentage of Students who Scored 30% o More | Remarks |
|---|---|---|---|---|
| 1 | Drainage and foundation Architectural scales, Foundation plan, Residential house planning, Sections, Roofs, Stairs and stair case, Drainage system, Perspective drawing, and Drawing production. | 1(Multiple Choice Items) | 79.7 | Good |
| 2 | Roofs | 8 | 64.6 | Good |
| 3 | Drainage | 4 | 60 | Average |
| 4 | Drainage | 13 | 48 | Average |
| 5 | Windows | 5 | 44.7 | Average |
| 6 | Architectural Scales | 6 | 36.3 | Average |
| 7 | Stairs and Stair Case | 7 | 36.2 | Average |
| 8 | Windows | 12 | 33.3 | Average |
| 9 | Residential house planning | 10 | 24.8 | Weak |
| 10 | Water supply | 11 | 23.7 | Weak |
| 11 | Roofs | 9 | 8.7 | Weak |
| 12 | Building specification | 3 | 7.7 | weak |
| 13 | Electrical supply and distribution | 2 | 6.2 | weak |