THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CANDIDATES' ITEM RESPONSE ANALYSIS REPORT FOR THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATION (CSEE) 2015

072 ARCHITECTURAL DRAUGHTING
(For School Candidates)

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FOREWORD

The Candidates' Item Response Analysis Report on the performance of candidates in the Architectural Draughting subject, in the Certificate of Secondary Education Examination (CSEE) 2015, was prepared in order to provide feedback to students, teachers, parents, policy makers and the public in general about the performance of the candidates and the challenges that they faced in attempting examination questions.

The Certificate of Secondary Education Examination marks the end of a four-year course in Ordinary Secondary Education. It is a summative evaluation which, among other things, shows the general effectiveness of education system and assessment of its delivery system. Essentially, the candidates' responses to the examination questions is an 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 towards understanding of possible reasons behind the candidates' responses in Architectural Draughting subject. The report highlights the factors that made the candidates fail to score high marks in the questions. Such factors include failure to identify the task of the question, inability to follow instructions and lack of the knowledge and skills on the concepts related to the subject. The feedback provided will enable the educational administrators, school managers, teachers, students and other stakeholders to assess their teaching and learning environment and then identify proper measures to be taken in order to improve the candidates' performance in future examinations administered by the Council.

The National Examinations Council of Tanzania will highly appreciate comments and suggestions that can be applied in improving future CSEE analysis reports. Constructive comments are expected from across categories of stakeholders including teachers, education officers, students, school quality controllers, curriculum developers and the public in general.

Finally, the Council would like to thank the Examinations Officers, Statisticians, Subject Teachers and others who participated in analysing the data, typesetting the document and reviewing the final report.

Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report analyses the performance of the candidates in 072-Architectural Draughting for the candidates who sat for the Certificate of Secondary Education Examination (CSEE) in 2015. The paper covered the Civil Engineering Syllabus for Secondary Education of 1994 and it was set in accordance with the Examination Format of 2008.

Architectural Draughting paper had 15 questions which were distributed into three (3) sections A, B and C. The candidates were required to answer all questions in section A and B and two (2) questions from section C. Question 1 and 2 in section A weighed 10 marks each and questions in section B weighed 4 marks each while questions in section C carried 20 marks each.

A total number of 452 candidates sat for this subject in 2015, while the number of candidates in 2014 was 273, reflecting an increasing of 179 candidates which is equivalent to 65.6 percent in the year 2015. Out of 452 candidates who sat for the examination, only 22 candidates (5.0%) were able to score the credit pass of grade C and 122 candidates (27.0%) passed at grade D, while the majority 308 candidates which is equivalent to 68.0 percent failed and got grade F. In comparison to 2014 results, the candidate's performance in this year has dropped by 0.37 percent. Generally, only 144 candidates (32.0%) passed and 308 candidates (68.0%) failed. Table 1 below illustrates the distribution of scores across the population and Figure 1 indicates the distribution of performance percentagewise.

Table 1: General Performance in Architectural Draughting - CSEE 2015

GENERAL PERFORMANCE		
Scores	Frequency	Percent
0 - 29	308	68.0
30 - 44	122	27.0
45 - 100	22	5.0
Total	452	100.0

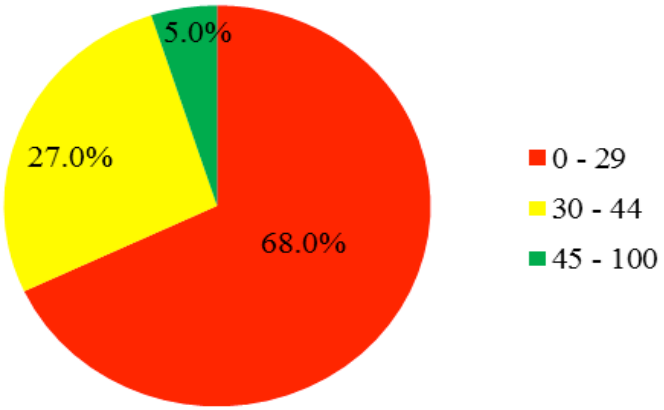


Figure 1: Distribution of candidates' Performance in Percentage

This report provides the analysis of candidates' performance on each question. Samples of the candidates' responses with extracts from the actual scripts have been inserted so as to show the requirements of the question, the way the candidates responded to the questions and reasons for their failure to score higher marks. On the other hand, the samples show responses for good performers and reasons for their achievements.

The aim of this report is to provide feedback to the general public, including educational stakeholders, prospective candidates, teachers, and parents on the performance of the candidates. It is also expected that the report will stimulate the stakeholders to assume their public responsibilities and take appropriate measures in order to improve the teaching and learning processes in the Architectural Draughting Subject.

2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER QUESTION

2.1 SECTION A: Multiple Choice and Matching Items

2.1.1 Question 1: Multiple Choice Items

This question consisted of ten (10) multiple choice items derived from various topics in the syllabus. The candidates were required to choose one correct answer from the given five alternatives by writing its letter beside the item number.

This question was attempted by 451 candidates (99.8%); whereby 32.6 percent scored from 0 to 2 marks, of which 16 percent scored 0 mark; 256 candidates (31.3%) scored from 3 to 5 marks while only 10.6 percent were able to score from 5 to 9 marks out of 10 marks allotted to the question. No single candidate scored full 10 marks in this question and only one candidate scored 9 marks. The general performance in this question was weak as the majority of candidates scored less than 50 percent of the allotted marks. The summary of candidate's scores in this question is presented in Figure 2.

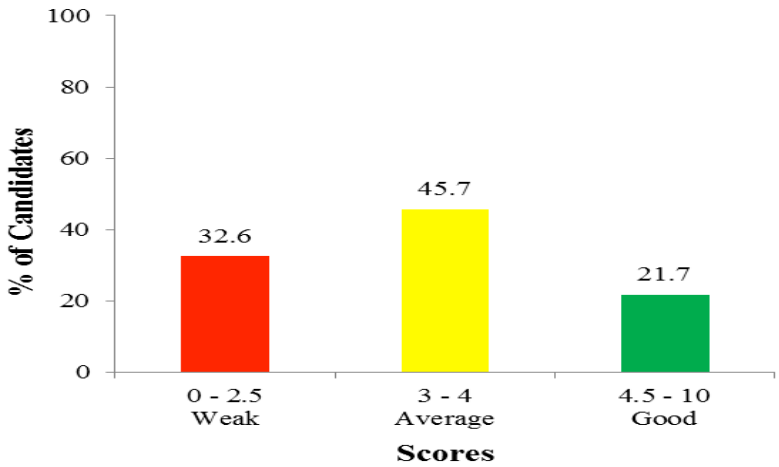


Figure 2: bar chart graph presenting the trend of performance in question 1.

The analysis of the responses shows that the items which were correctly answered by the majority of the candidates were items: (ii) on 'Foundations', (iii) on 'Sections', and (iv) on 'Stairs' while items: (i), (v), (vii), and (x) were poorly performed. It was further observed that items (vi) on 'Water Supply', (vii) on 'Drainage System' and (ix) on 'Building Specifications' were averagely performed by the candidates. This was an indication that, the candidates were moderately familiar with materials in the topics under the mentioned items. The remaining items were poorly performed.

Further analysis of the candidates' responses in this question show that items: (i), (v), (viii) and (x), which were poorly performed. In item (i), the candidates were required to identify the importance of consulting the client exhaustively on his/her wishes before implementing the project. This question tested the candidates' knowledge about the composition of the

‘Building Team’ in construction projects. The majority of candidates wrongly opted for B ‘to avoid slower and unorganized work on part of the architect’, while the correct option was D ‘to avoid rushed preparation and insufficiently detailed scheme going to tender’. The candidates were attracted to the incorrect option probably because the destructor contained an architect as a person who is traditionally responsible for initial consultations with the client during design stage.

In item (v), the candidates were required to identify the purpose of brick jambs on either side of a fire place. This question tested the candidates knowledge about techniques applied in construction of structures of fire place. The correct answer was E ‘to contain the fire and support chimney breast’ but the majority of the candidates opted for B ‘to contain fuel of fireplace below the burning chamber’. The analysis of the candidates’ choice shows that, the majority of the candidates missed the correct answer probably because they lacked the basic knowledge about structural components of a fire place.

In item (viii), the candidates were required to define ‘schedule’ as applied in architectural business. This item was drawn from the topic of ‘Schedules’ which aims at providing knowledge and skills on defining materials and expected components (products) to be used by the contractor in the implementation of the project. The correct option was B, ‘Descriptive chart of materials and products’ but the majority of the candidates chose option E ‘Table of descriptive construction notes’. The majority of the candidates were attracted to the incorrect option probably because the statement in the distractor contained the word ‘Table’ which is the style commonly used in presentations of schedules.

In item (x), the candidates were required to identify the title of a person who is responsible to supply schedules. This question tested the candidates’ practical knowledge about the composition and responsibilities of personnel in the ‘Building Team’. The correct answer was E, ‘Architect’ but the majority of the candidates opted for B ‘Quantity surveyor’. The analysis on the candidates’ choices in this item suggests that, the majority of the candidates lacked basic skills in the topics defining roles of personnel in the Building team in the construction project. Most of the candidates chose ‘Quantity surveyor’ because in practice is the one using schedules for costing the work. They failed to recall the fact that architect is

an innovator of the project. Actually he/she is the one supposed to supply schedules.

2.1.2 Question 2: Matching Items

This question required the candidates to match the meaning of staircase items (i – x) in List A with the responses in List B by writing the letter of the correct response beside the item number. Each item in this question carried 1 mark, making a total of 10 marks. The question was designed 'homogeneously' on timber staircase and required the candidate to identify an item corresponding to the given meaning. The question tested the candidates' knowledge and practical skills about timber work, especially methods of fixing staircase and standards of construction.

The responses given in List B were: A 'Header', B 'Run', C 'Soffit', D 'Nosing', E 'Scotia', F 'Headroom', G 'Going', H 'Landing', I 'Rise', J 'Step', K 'Checkered grooves', L 'Cleat', M 'Winder', N 'Riser', O 'Pitch'.

This question was attempted by 450 candidates (99.6%). Among these 10.0 percent scored a 0 mark, 32.2 percent scored from 1 to 3 marks, 13.6 percent scored from 3 to 4 marks and 43.1 percent scored from 5 to 10 marks. Most items in this question were correctly matched by the candidates. The candidates were able to match the given staircase items with correct definitions from List B.

Further analysis shows that, the correct and incorrect matches were evenly distributed throughout the items probably because stairs and staircases are common structures in domestic and public buildings. A few mismatches observed in this question were likely caused by failure to recall some of the components asked in the examination. The mismatch might be attributed to a lack of adequate practice on construction of staircase structures.

Generally, the performance was good because 57.2 percent of the candidates were able to score above the pass mark. This was an indication that, they had adequate knowledge about 'Stairs and staircases'.

2.2 SECTION B: Short Answer Questions

2.2.1 Question 3: Drawing Instruments and Equipment

This question required the candidates to list four characteristics considered for a quality tracing paper, and the question weighed a total of 4 marks. The

question tested the candidates' knowledge and practical skills about standard tracing papers. The answer to this question was supposed to capture some key words concerning appearance of the standard tracing paper, strength, toughness, transparency, erasing qualities, smoothness, quality of colour, flexibility, etc.

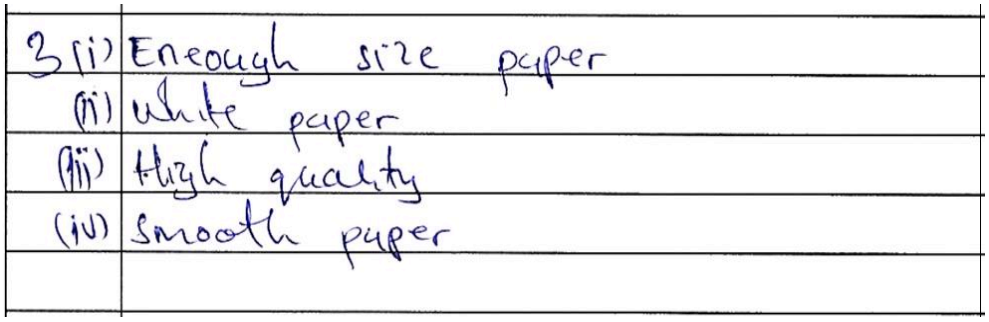
The question was attempted by 378 candidates (83.6%) out of all 452 registered candidates. Among these candidates, 340 (89.9%) scored a 0 mark and only 2 candidates (0.5%) were able to score 1.5 marks out of 4 marks allotted to the question. No single candidate scored above 1.5 marks. The summary of candidates' scores in this question is presented in Table 2.

Table 2: Distribution of Candidates' Scores in Question 3

Scores	Remarks	Candidates	
		Number	Percentage (%)
0 – 1	Weak	376	95.5
1.5 – 2.5	Average	2	0.5
3 – 4	Good	0	0.0
N = 378			

The analysis shows that the candidates who scored a 0 mark failed to establish the characteristics considered for a quality tracing paper and instead they just provided general statements, as seen in Extract 3.1.

Extract 3.1

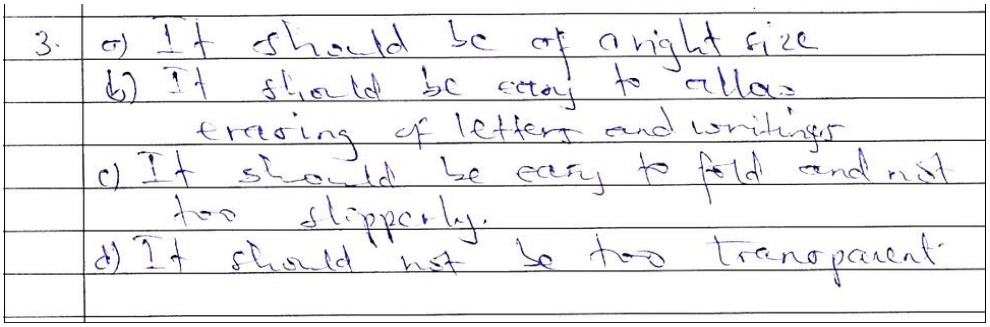


Extract 3.1 shows a sample of the response by one of the candidates who provided general statements about papers.

The candidates who scored from 0.5 to 1.5 marks were able to provide some of the characteristics for determining the quality of tracing papers but

failed to express themselves clearly due to poor command of English Language, as seen in a sample presented in Extract 3.2.

Extract 3.2



Extract 3.2 shows a sample of the response by a candidate who did not score high marks because he/she could not use the key words when answering the question.

2.2.2 Question 4: Architectural Lettering

The question required the candidates to mention the four classifications of letters as applied in architectural lettering. In order for the candidate to give correct answers for this question, he/she was required to have enough be knowledge on the basics of letters classifications, especially for 'architectural lettering' business.

In this question, the candidate was required to provide the four classifications of letters, which are traditionally applied in architectural lettering. These include Roman, Gothic, Script and Text.

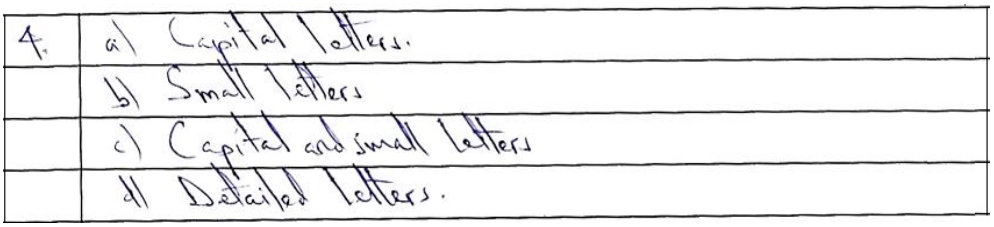
The question was attempted by 84.3 percent of the candidates. Out of these, 73.0 percent scored a 0 mark, 13.6 percent scored from 0.5 to 1.5 marks and 13.4 percent scored from 2 to 4 marks. Only 2 candidates (0.5%) were able to score full 4 marks allotted to the question. The summary of candidates' scores in question 4 is presented in Table 3.

Table 3: Distribution of Candidates' Scores in Question 4

Scores	Remarks	Candidates	
		Number	Percentage (%)
0 – 1	Weak	330	86.6
1.5 – 2.5	Average	30	7.9
3 – 4	Good	21	5.5
N = 381			

The candidate who scored a 0 mark were unable to mention the four classifications of letters as applied in architectural lettering, as seen in Extract 4.1.

Extract 4.1

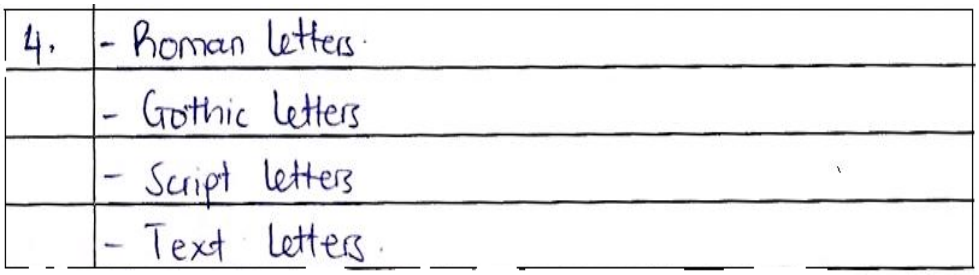


Extract 4.1 shows a sample of the response by a candidate who failed to mention the correct classifications of letters as used in lettering, but instead mentioned types of letters as used in normal office writing.

The candidates who scored from 0.5 to 2 marks tried to provide the classifications in layman's terms without taking care of the technical classifications of letters as applied in Architectural Lettering.

The candidates who responded correctly were able to provide correct four classifications of letters as applied in architectural lettering. Extract 4.2 shows a sample of response by a candidate who was able to provide the relevant classifications of letters as applied in Architectural Lettering.

Extract 4.2



Extract 4.2 shows a sample of the response by a candidate who was able to mention the four classifications of Architectural Letters.

2.2.3 Question 5: Site Plan

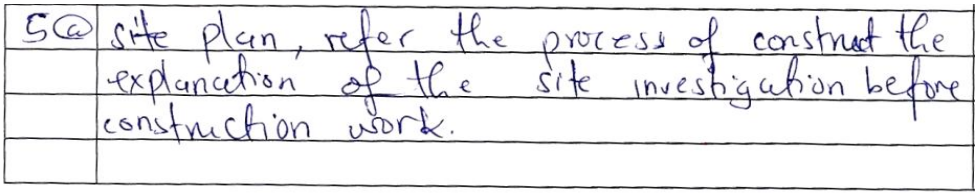
This question had two parts, (a) and (b), weighing a total of 4 marks. In part (a), the candidates were required to define 'Site Plan', and in part (b) to explain briefly the function of 'beacon' in the Site Plan.

The question tested the candidates' knowledge about the general technical concept of 'plot of land' in the construction industry. The candidates were supposed to know the application of the local authority by-laws governing the relationship between a plot of land and the building on it.

This question was attempted by 412 candidates, which is 91.2 percent of all the candidates who sat for the examination. Among these, 304 candidates (73.8%) scored a 0 mark, 13.4 percent scored from 0.5 to 1.5 marks and 12.9 percent scored from 2 to 4 marks.

The analysis of the responses shows that, the candidates who scored a 0 mark failed to define 'Site plan' and were unable to give brief explanations on the function of 'beacon' in the site plan. Extract 5.1 is a sample of the response of a candidate who did not provide any relevant point.

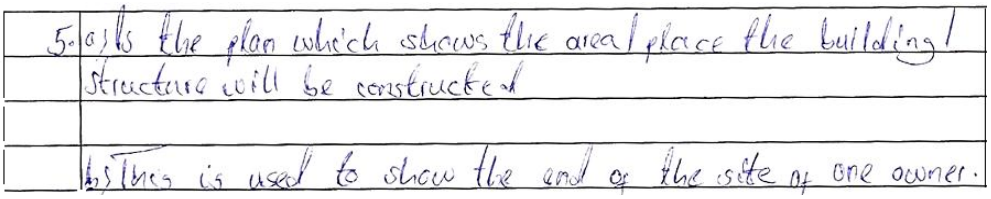
Extract 5.1



Extract 5.1 shows a sample of the response by a candidate who did not describe 'site plan' correctly. The candidate referred site plan as an investigation before construction works.

On the other hand, a few candidates who scored from 2 to 4 marks were able to define 'site plan' and explain briefly the term 'beacon' in site plan. The sampled response by a candidate who provided correct answers in both parts of the question is presented in Extract 5.2

Extract 5.2



Extract 5.2 shows a sample of the response of a candidate who provided a relatively correct answer and scored high marks. The candidate demonstrated adequate knowledge of 'site plan' as location of a building on a plot of land and that a 'beacon' is for locating demarcations of a plot.

2.2.4 Question 6: Doors

The question required the candidate to outline the four basic steps followed in the construction of a framed, braced and battened door.

The question tested the candidates' basic knowledge and practical skills about the structural make-up of the boarded doors known as framed, braced and battened. The expected responses from the candidates were outline of the four basic steps from assembling to the finishing stage of a framed, braced and battened door.

The question was attempted by 367 candidates and all of them scored a 0 mark. The candidates lacked relevant knowledge and skills about the subject matter and hence were not able to outline sequentially the four basic steps followed in the construction of a framed, braced and battened door. Table 4 shows the failure of candidates in categories of scores by percentage.

Table 4: Distribution of Candidates' Scores in Question 6

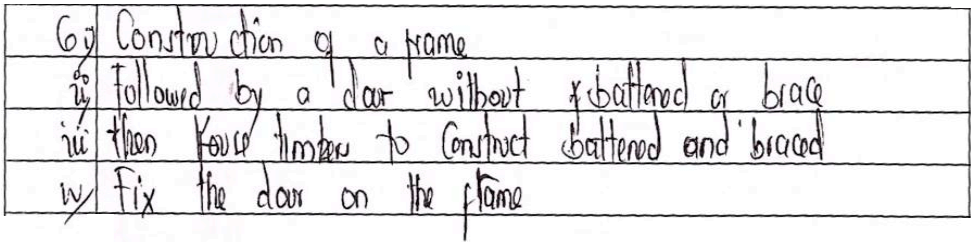
Scores	Remarks	Candidates	
		Number	Percentage (%)
0 – 1	Weak	367	100.0
1.5 – 2.5	Average	0	0.0
3 – 4	Good	0	0.0
N = 367			

The analysis of the responses presented by the candidates shows that, there were great misconceptions on the use of the word 'frame'. Most of the candidates explained the construction steps considering the framing in the context of providing frame to a door opening. For example, one of the candidates outlined these steps: *fixing the frame*, *fixing the door panel*, *hanging the panel by using strong hinges* and *plastering to the frame*.

There were also a few candidates who completely lacked the basic knowledge about the structural arrangement of the named door. For example, one candidate outlined the steps by copying sequentially the words used to ask the question, which are: *construction of the frame, framing, bracing* and *battening*. This response is irrelevant because it has no logical relationship with the actual practice of door constructions.

Extract 6 presents a sample of the response by a candidate who failed to outline sequentially the four basic steps followed in the construction of a framed, braced and battened doors.

Extract 6



Extract 6 shows the response provided by a candidate who could not differentiate between the two concepts of 'door frame' and 'framed door panel'. As a result, he/she listed the steps which did not display any construction step related to the door asked.

2.2.5 Question 7: Drainage System

This question required the candidates to write down four principles applied when locating septic tank to a building area.

The question tested the candidates' knowledge about the principles governing selection of the location for a septic tank on the building premises. The responses expected from the candidates were listing of the four principles applied on selection of the location for a septic tank.

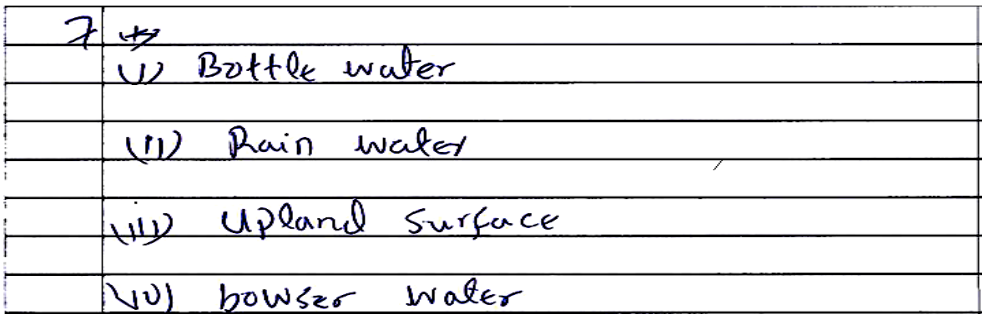
The question was attempted by 357 candidates which is 79.0 percent of all the registered candidates. Among these candidates, 96.9 percent scored a 0 mark, 2.8 percent scored from 0.5 to 1.5 marks and only one candidate which is 0.3 percent scored 2 out of the 4 marks allotted to the question.

The analysis of the responses by the candidates who scored a 0 mark shows that, the candidates were not aware of the existence of the principles governing location of a septic tank to a building area; as a result, were unable to write a single principle applied to locate the same.

Further analysis of the responses by the candidates who scored a 0 mark shows that, there were misconception between two concepts, 'principles applied to locate the septic tank' and the 'locations of inspection chambers (manholes) in the drainage system'. In answering this question, some of the candidates listed locations of inspection chambers in the drainage system, which was not asked in the question. For example, one candidate provided the following irrelevant responses: *at the corner; when changes slope; at distance of 30 metres* and *at the joints.* This answer could be correct if the candidate had been asked to list possible locations of inspection chambers.

A sample of the response presented by the candidate who provided irrelevant points as an answer to the question is seen in Extract 7.

Extract 7



Extract 7 shows a sample of the response from the script of a candidate who presented irrelevant points. The candidate's response was trying to answer a quite different question because he/she mentioned some sources of water which were not required.

On their part, the candidates who scored from 0.5 to 1.5 marks were able to answer the question partially, where in some parts of the question they went astray; as a result missed some points. Generally, these candidates had some idea about the principles applied to select location of a septic tank,

but could not recall all the facts and practice probably because of inadequate exercises.

The only candidate who scored 2 marks in this question was able to state 2 out of 4 principles of locating the septic tank to a building area. The two principles provided were: *should be near the main road* and *the distance from the main building to be more than 5 metres.* On the other hand, the candidate failed to state correctly the other two principles where he/she wrote: *should be deep enough* and *should have buffer wall*. These two irrelevant points were not required because they are concerned with construction set-up of the septic tank and not the principles governing its location as asked in the question. This mixture of correct and incorrect responses suggests that, the candidate had inadequate knowledge about the location of a septic tank on the site plan.

2.2.6 Question 8: Building Specifications

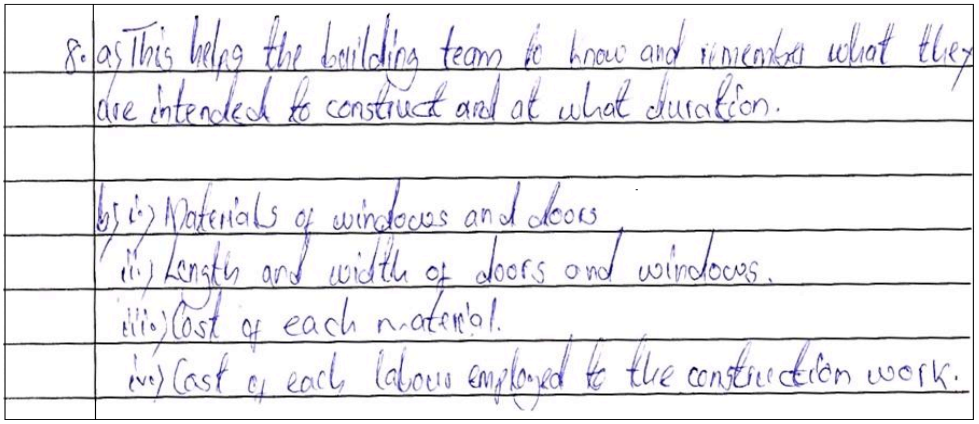
The Question had two parts: (a) and (b). In part (a), the candidates were required to explain the importance of building specifications to the construction team and part (b) to mention four issues that are described in the building specifications.

In part (a), the candidates were supposed to explain the importance of building specifications which included 'specifying materials for the work' and 'giving details of the constructional works'. In part (b), they were to mention the four (4) issues that are described in the building specifications, which included 'specification of building materials', foundation design, roof and floor design and application of building materials'.

The question was attempted by 356 candidates which is 78.8 percent of all registered candidates. Out of these, 82.3 percent scored a 0 mark, 17.1 percent scored from 0.5 to 1.5 marks and only 2 candidates which is 0.6 percent scored 2 marks out of the 4 allotted to the question.

The analysis of the responses shows that the candidates who scored a 0 mark failed to explain the importance of building specifications and were unable to mention four issues that are described in the building specifications. Extract 8 shows a sample of the poor response.

Extract 8


8. a) This helps the building team to know and remember what they are intended to construct and at what duration.

b) i) Materials of windows and doors
ii) Length and width of doors and windows.
iii) Cost of each material.
iv) Cost of each labour employed to the construction work.

Extract 8 shows a sample of response by the candidate who failed to explain the importance of building specifications. He/she also failed to mention four issues that are described in the building specifications.

For the candidates who scored from 0.5 to 1 mark, the analysis shows that they partially explained the importance of building specifications and could mention some issues that are described in the building specifications. These candidates answered all parts of the question but were unable to score full marks in all parts of the question. Most of these candidates either provided a correct point in part (a) or two points part (b).

Further analysis shows that the candidates who scored from 1.5 to 2.0 marks correctly answered part (b) of the question where most of them were able to mention the four issues that are described in the building specifications. Among these candidates, only two candidates mentioned all the issues and scored 2 marks while the rest missed one out of the four issues, hence ended-up scoring 1.5 marks.

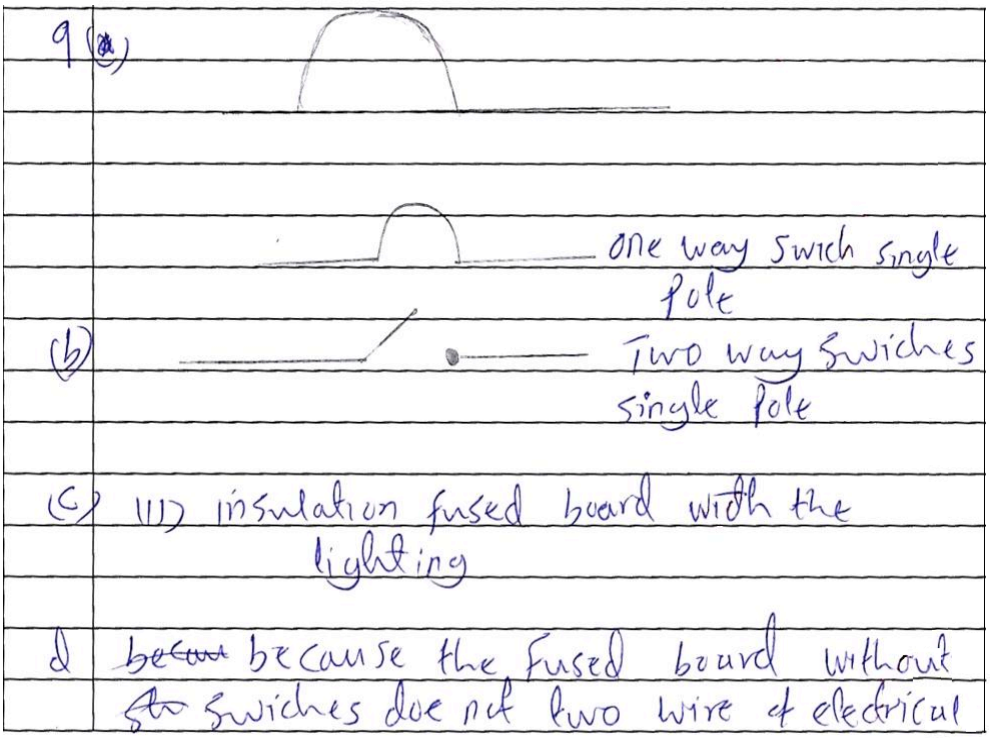
2.2.7 Question 9: Electric Supply

This question had four parts, (a) to (d) which required the candidates to draw symbols for the given different electrical components. The question tasted the candidates' ability to apply the international conventional symbols, which are commonly used in electrical drawings to convey message to the contractors and other users for construction purposes.

The question was attempted by 324 candidates which is 71.7 percent of all registered candidates. Among these, 283 candidates (87.3%) scored a 0 mark.

The analysis of the responses shows that, the candidates who scored a 0 mark completely failed to draw correct symbols for the electrical components given, as seen in Extract 9.1.

Extract 9.1

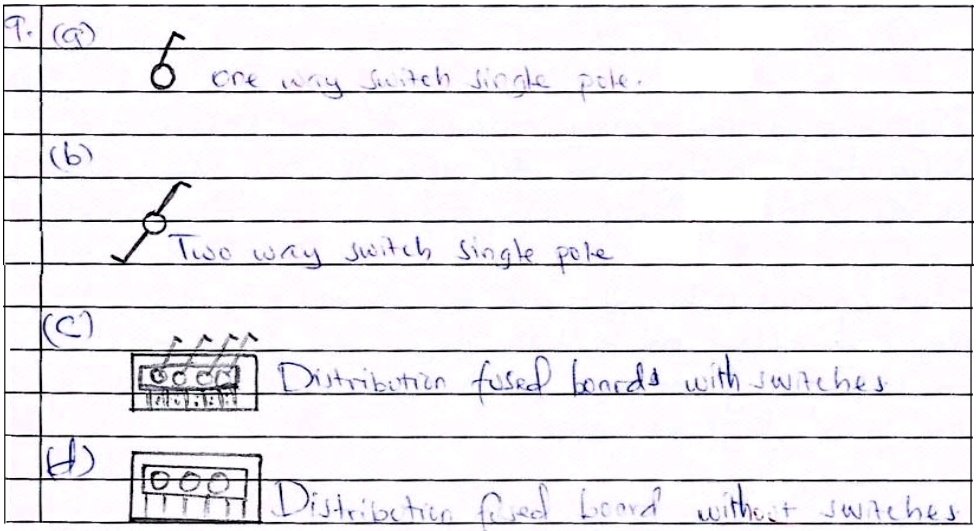


Extract 9.1 shows a sample of the response by a candidate who presented irrelevant points in question 9. The candidate could not recall the symbols for the given electrical components.

Further analysis of the responses shows that a few candidates 6.8 percent who scored from 0.5 to 1 mark had some idea about the symbols of electrical components. However, they were unable to recall properly all the symbols. They just drew whatever came in their minds about the given electrical component.

On their part, the 19 candidates (5.9%) who scored from 1.5 to 2 marks were able to make some correct but incomplete drawings representing the given electrical components, as seen in one of the responses in Extract 9.2.

Extract 9.2



Extract 9.2 shows a sample of the response from the script of a candidate who provided some correct answers in parts (a) and (c). The candidate did not score full marks because he/she could not recall properly how to present the symbols.

2.2.8 Question 10: Electric Supply

The question had two parts, (a) and (b). Part (a) required the candidates to describe the standard colour codes for electric wires and part (b) required the candidates to explain earthing.

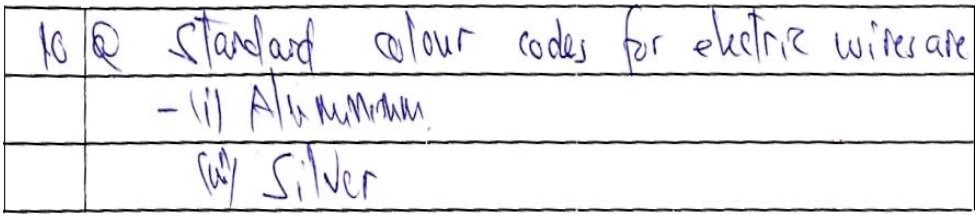
This question tested the candidates' knowledge about standard identifications of different types of electric wires in relation to safe electrical installations in residential buildings. The candidates were expected to identify standard colour codes as related to charges, i.e. *live, neutral* and *earth* and their behavior in the flow of electric current.

The question was attempted by 71.7 percent of all registered candidates, of which 27.8 percent scored a 0 mark, 24 percent scored from 0.5 to 1.5 marks and 51.2 percent scored from 2 to 4 marks. Only four candidates scored full 4 marks allotted to the question. The performance in this question was good as 179 candidates which is equivalent to 51.2 percent scored above the pass mark, i.e. from 2 to 4 marks.

The candidates who scored a 0 mark failed to describe the standard colour codes for electric wires and were completely not able to explain earthing. Most of the candidates in this category mentioned the raw materials used to

make electric wires instead of standard colour codes. These candidates misinterpreted the question by assuming that the required information was raw materials for making electric wires. Some of them answered the question by mentioning a number of metals. For example, one candidate provided this response: *electric wires are silica, bronze and aluminium.* This response indicates that, there were some misconceptions between the two phenomena; *standard colour codes* and *raw materials for electric wires*. A sample of such responses is presented in Extract 10.1.

Extract 10.1

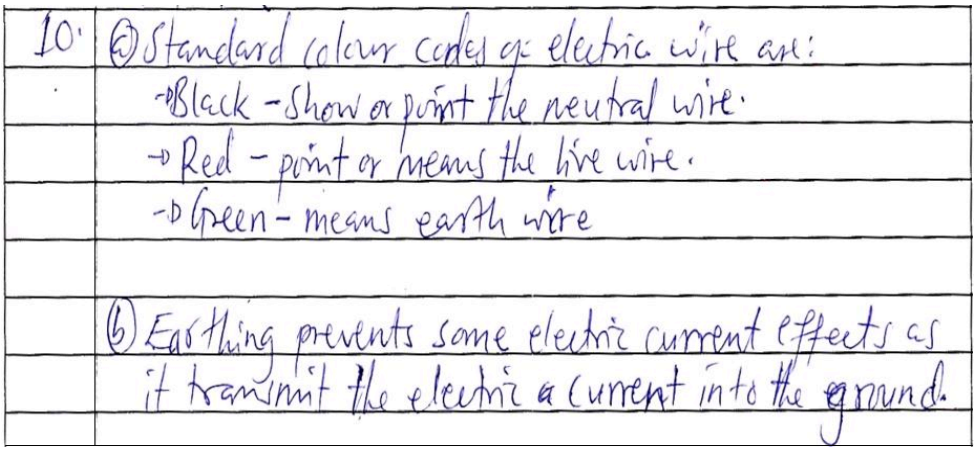


Extract 10.1 shows the sample of the response of the candidate who misinterpreted the question; instead of identifying the standard colour codes of wires as required, he/she listed *aluminium* and *silver* as raw materials used in making electric wires.

Further analysis shows that, the candidates who scored from 0.5 to 1.5 marks were knowledgeable about the whole concept of standard colour codes of electric wires but were unable to recall them properly. In their responses, they were able to mention all three colour codes with their respective charges but failed to explain the function of earthing.

On their part, the candidates who scored from 2 to 4 marks indicate that they were able to mention the colour codes for electric wires with their relevant charges. In addition to that, they were able to give relevant explanations of earthing. Some candidates in this category missed some points and therefore failed to score high marks. Only four candidates (1.1%) were able to score full 4 marks allotted to the question. One of the examples of good responses which were awarded high marks is presented in Extract 10.2.

Extract 10.2



Extract 10.2 shows a sample of the response by a candidate who was able to mention the colour codes for electric wires with relevant charges and correctly explained the function of earthing.

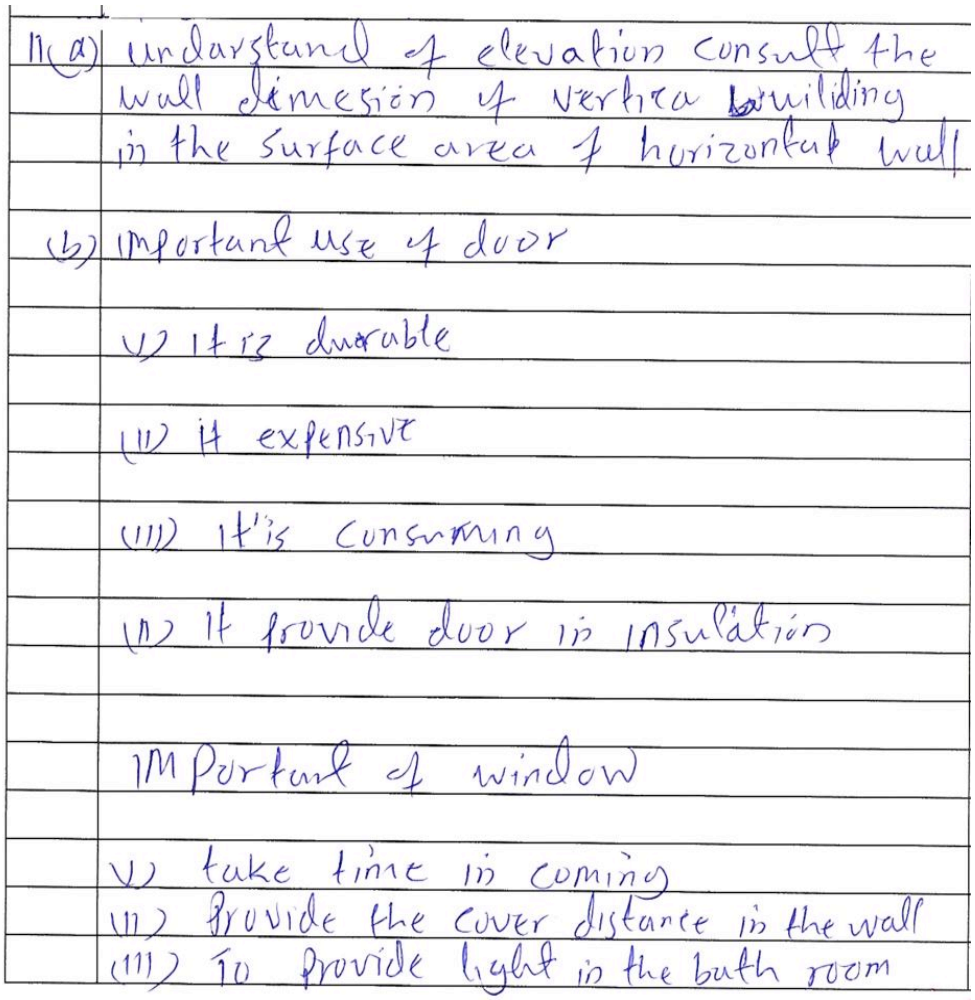
2.2.9 Question11: Schedules

The question had two parts, (a) and (b). In part (a), the candidates were required to give the main purpose for presenting the schedule for working drawing. In part (b), they were required to state the important uses of door and window schedule in building construction.

This question was attempted by 390 candidates which is 86.3 percent of all registered candidates. Among these, 295 candidates equivalent to 75.6 percent scored a 0 mark, 55 candidates equivalent to 14.1 percent scored from 0.5 to 1.5 marks and 40 candidates which is equivalent to 10.3 percent scored from 2 to 4 marks. The performance in this question was poor, as only 10.3 percent of all candidates attempted it scored above the pass mark.

The analysis of the responses show that, the candidates who scored a 0 mark demonstrated inadequate basic knowledge and practice about schedules. They not only failed to explain the main purpose of presenting schedules but also failed to explain the use of door and window schedules in building construction, as seen in Extract 11.1.

Extract 11.1



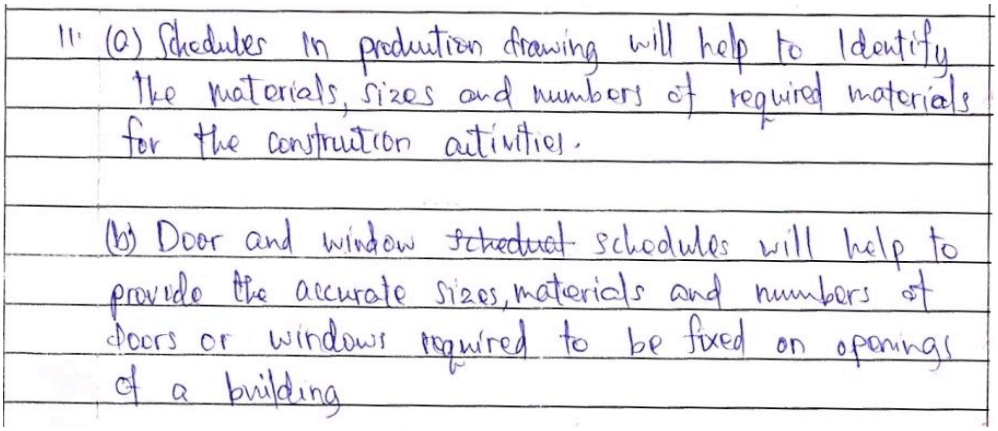
Extract 11.1 shows a sample of response from a script of one of the candidates who did not comprehend the requirements of the question. The candidate was not aware of the concept of 'schedules'. In part (a), he/she wrote a meaningless phrase. In part (b), he/she randomly listed two requirements of a door and on the part of a window he/she wrote one function of a window. All these were not the requirement of the question.

The responses of the candidates who scored from 0.5 to 1.5 marks show that they had some idea about the concept of schedules on building construction. Most of them tried to explain the main purpose of presenting schedule for working drawings but could not recall all the required points.

Further analysis shows that the candidates who scored from 2 to 4 marks were better in using English language, for were able to outline the main purpose for presenting schedule and explained the important use of door

and window schedules in building construction. Extract 11.2 is a sample of the good response from the script of one of the candidates.

Extract 11.2


11. (a) Schedules in production drawing will help to identify the materials, sizes and numbers of required materials for the construction activities.

(b) Door and window ~~structure~~ schedules will help to provide the accurate sizes, materials and numbers of doors or windows required to be fixed on openings of a building

Extract 11.2 shows a sample of the good response presented by the candidate who comprehended the requirements of the question and was able to express himself/herself in simple and straight forward English. In part (a), he/she explained the purpose of presenting schedules and in part (b) briefly explained the main use of door and window schedules.

2.2.10 Question 12: Concrete

This question had parts (a) and (b). In part (a), the candidates were required to explain the reason for curing concrete floor slab for seven days while in part (b) they were required to explain how wet concrete is consolidated and cured.

This question tested the candidates' competence about the applications of the characteristics of cement as a building material and the treatment of its behavior in different conditions. In order for the candidates to provide correct answers, they were supposed to be knowledgeable enough and well skilled in the general properties of cement in its dry and wet conditions, especially when mixed with water to make concrete.

The question was attempted by 387 candidates which is equivalent to 85.6 percent of all candidates registered for the examination. Among these, 127 candidates (31.8%) scored a 0 mark, 180 candidates (46.5%) scored from 0.5 to 1 mark while 42 candidates (10.9%) scored the pass mark of 1.5 marks and only 42 candidates (10.8%) scored from 2 to 4 marks. None of the candidates scored full 4 marks allotted to the question. The performance

in this question was weak as 78.3 percent of the candidates scored below the pass mark.

The analysis shows that the candidates who scored a 0 mark could neither explain the reason for curing concrete floor slab nor show how wet concrete is consolidated and cured.

Further analysis of the responses shows that, the candidates who scored from 0.5 to 1.5 marks responded well to part (a) of the question as were able to explain the reason for curing concrete floor slab but failed to explain the methods of consolidation and curing of concrete asked in part (b) of the question. Most of the candidates failed to score high marks probably because of inadequate field practice as part (b) of the question required practical skills on concrete site works.

Lack of field practice was also demonstrated by the candidates who scored from 2 to 4 marks. These candidates were able to explain comprehensively the reason of curing concrete floor slab for seven days but partially explained the ways wet concrete is consolidated and cured.

2.3 SECTION C: Structured Question

2.3.1 Question 13: Perspective Drawing

This question was divided into two parts, (a) and (b). In part (a), the candidates were required to: (i) define 'perspective' as applied in architectural drawing, (ii) identify five key concepts of architectural perspective, (iii) explain the base of categorization of perspective drawing and (iv) giving illustrations of the three basic categorization of perspective drawings in Architectural Draughting. In part (b), they were required to state using illustrative sketches on the size of an image formed when on object is placed at several positions, such as; in front of the picture plane, in the picture plane and in the back of the picture plane. This question weighed a total of 20 marks.

The question tested the candidates' knowledge of the concept of perspective drawing and the behavior of projections of perspective views at different positions for presentation purposes.

The question was attempted by 90 candidates which equivalent to 19.9 percent of all registered candidates. This question was poorly done as 73

candidates (81.1%) scored a 0 mark, 17 candidates (18.8%) scored from 1 to 5 marks, of which only one candidate equivalent to 1.1 percent scored 5 marks. The pass mark in this question was 5. The trend of performance in question 13 is as summarized in Table 5.

Table 5: Distribution of Candidates' Scores in Question 13

Scores	Remarks	Candidates	
		Number	Percentage (%)
0 – 5.5	Weak	90	100.0
6.0 – 8.5	Average	0	0.0
9 – 20	Good	0	0.0
N = 90			

The analysis of the responses shows that the candidates who scored a 0 mark were unable to define perspective, failed to give key concepts of architectural perspective and could neither explain nor illustrate the base of categorization of perspective drawing. For example, one of the candidates defined perspective as: *lines meeting at the centre*. The other candidate defined 'perspective' as follows: *perspective is collection of very fine lines on the drawing.* Another example of responses about the base of categorization of perspectives was produced by one of the candidates who wrote: *small, normal and big*. Another candidate provided this incorrect response: *very close the eye, far little the eye and very far the eye*.

On illustrative sketches in regard to the size of image formed, most of the candidates drew intricate images of house without paying any attention to the size of image required to be depicted in regard to the directed position.

Further analysis shows that the candidates who scored from 1 to 5 marks had some knowledge about the perspective drawings. Some of these candidates could define and explain the three bases of categorization of perspectives but were unable to sketch illustrations as required.

Generally, the analysis of the candidates' responses revealed that the majority of candidates were not conversant with rules and principles of making perspective drawings. More than 80 percent of the candidates scored a 0 mark in this question which indicates that, they lacked basic knowledge and practical skills on perspectives, hence could not

demonstrate the behavior of perspective views in relation to positions. This failure could be attributed to inadequate practice during the course.

2.3.2 Question 14: Development of Floor Plan

This question had three parts (a), (b) and (c). In part (a) the candidates were required to enumerate four general classes of architectural drawing; in part (b) to explain briefly the general classes of architectural drawing mentioned in part (a) and in part (c) to explain the main causes of changes occurring on design and appearance of buildings through the ages.

The question tested the candidates knowledge about the procedures applied in preparation of architectural drawings for the construction project. The question required the candidates to demonstrate the acquired practical knowledge and skills on the sequence of preparing drawings for presentation and project implementation.

The expected response in this question was the outline and explanations of general classes of architectural drawings, which includes *preliminary sketches drawings; scheme design drawings; working drawings* and *detailed drawings.* On the main causes of changes occurring through the ages, the candidates were expected to highlight on the influence of *construction materials* and *innovations of construction methods.*

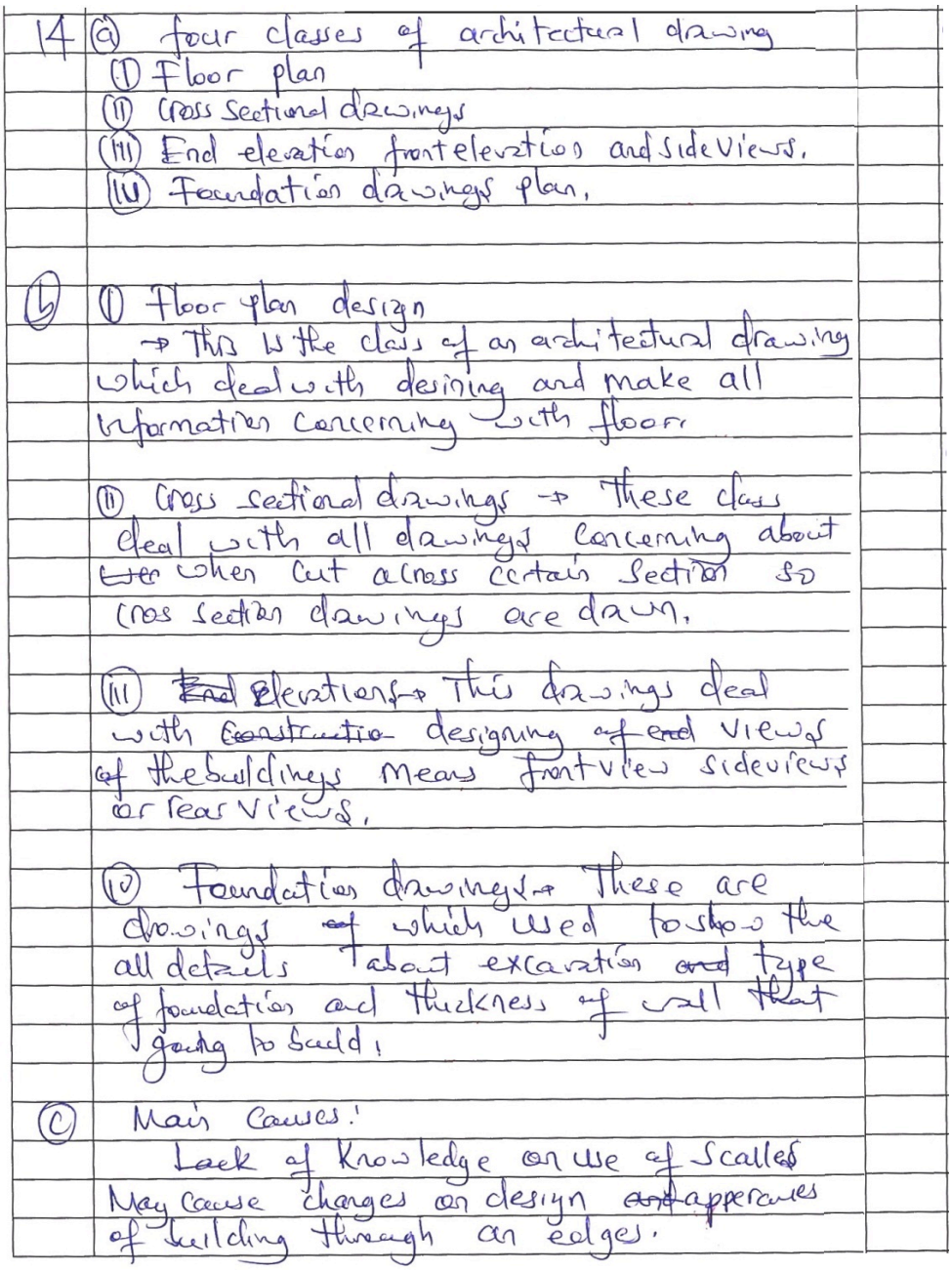
This question was attempted by 261 candidates which is equivalent to 57.7 percent of all registered candidates. Out of these, 152 candidates (58.2%) scored a 0 mark, 103 candidates (40.2%) scored from 0.5 to 5.5 marks and 4 candidates (1.6%) scored from 6 to 8 marks which was the highest score. The performance in this question was weak as 98.4 percent of all the candidates scored below the pass mark. The trend of performance in this question is summarized in Table 6.

Table 6: Distribution of Candidates' Scores in Question 14

Scores	Remarks	Candidates	
		Number	Percentage (%)
0 – 5.5	Weak	257	98.5
6.0 – 8.5	Average	4	1.5
9 – 20	Good	0	0.0
N = 261			

The candidates who scored a 0 mark failed to enumerate and explain the basic classes of architectural drawing. They also failed to explain the main causes of changes occurring on design and appearance of the buildings through the ages. This failure was an indication that the training of candidates lacked the basic practice in the field. Extract 14 is a sample of the response of the candidates who failed to identify the general classes of architectural drawings and could not explain the main causes of changes occurring on design and appearance of the buildings through the ages.

Extract 14


14 (a) four classes of architectural drawing
(i) Floor plan
(ii) Cross Sectional drawings
(iii) End elevation front elevation and side Views.
(iv) Foundation drawings plan.

(b) (i) Floor plan design
→ This is the class of an architectural drawing which deal with desining and make all information concerning with floor.

(ii) Cross sectional drawings → These class deal with all drawings concerning about ~~the~~ when cut across certain section so cross section drawings are drawn.

(iii) ~~End~~ Elevations → This drawings deal with ~~Construction~~ designing of ~~and~~ views of the buildings means front view side views or rear views.

(iv) Foundation drawings → These are drawings ~~of~~ which used to show the all details about excavation ~~and~~ type of foundation and thickness of wall ~~that~~ going to build.

(c) Main Causes:
Lack of Knowledge on use of Scales May cause changes on design ~~and~~ appearances of building through an edges.

Extract 14 shows a sample of the response by a candidate who failed to identify and explain classes of architectural drawings. He/she could not explain the main causes of changes occurring on design and appearance of buildings through ages. The candidate misinterpreted the question by mentioning titles of drawings instead of classes of drawings. The mentioned titles are subsets in some classes of drawings.

On their part, the candidates who scored above the pass mark, that is, from 6 to 8 marks demonstrated that they had some knowledge about procedural presentations of architectural drawings. They were able to mention and explain some elements on the classes of architectural drawings; however they failed to recall all the details in the topic.

Moreover, in this question all candidates were not able to identify factors which are likely to influence the changes in design and appearance of the buildings through the ages. This failure could be attributed to lack of exposure in architectural offices and inadequate field practice to architectural trainees.

2.3.3 Question 15: Stairs and Staircases

In this question, the candidates were given details of a straight flight timber staircase and required to draw; in part (a) the plan of a stair and (b) the sectional elevation of a stair with well labelled parts. The details given were: total going (3800mm), total rise (2700mm) and the width of a stair (1200mm).

This question tested the candidates' knowledge about the manipulation of the field data to prepare working drawing. The drawing would be used for construction of a straight flight staircase which includes assembling of staircase members.

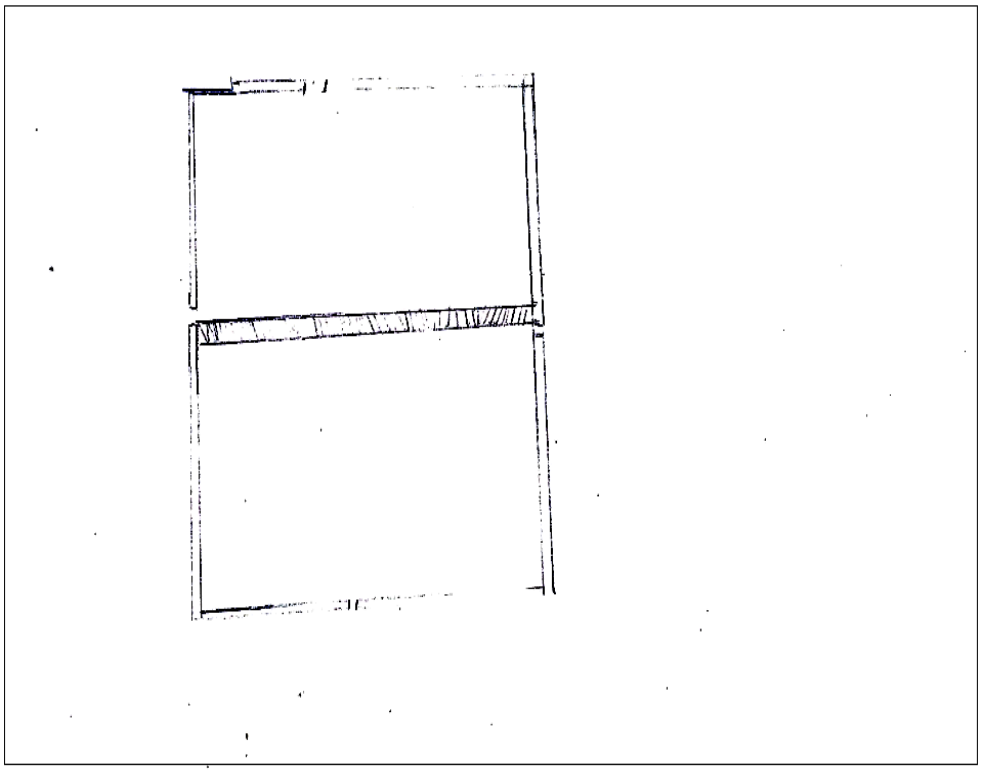
This question was the most opted among the three in section C. The question was attempted by 407 candidates which is equivalent to 90 percent of all registered candidates. The performance in this question was average as 71 candidates (17.3%) scored from 9 to 18 out of 20 marks allotted to the question. Moreover, 99 candidates (24.2%) scored from 6 to 8.5 marks and 237 candidates (58.5%) scored below pass mark, i.e. from 0 to 5.5 marks, of which 14 candidates (3.4%) scored a 0 mark.

The analysis of the responses in terms of drawings show that, the majority of the candidates had adequate knowledge about staircases but lacked presentation skills, especially the pencil work (sketching). The majority of the candidates (54.1%) who scored from 1 to 5.5 marks were able to draw the plan of the proposed staircase and labelled some few parts but failed to project the cross sectional elevation and vice-versa. Some candidates

mixed-up the ideas as they drew the plan and sectional elevation of a concrete stair which was not a part of the question.

The candidates who scored a 0 mark could not even understand the shape of a staircase. A sample of the response which was presented by the candidate with quite different interpretation of the question is seen in Extract 15.1.

Extract 15.1

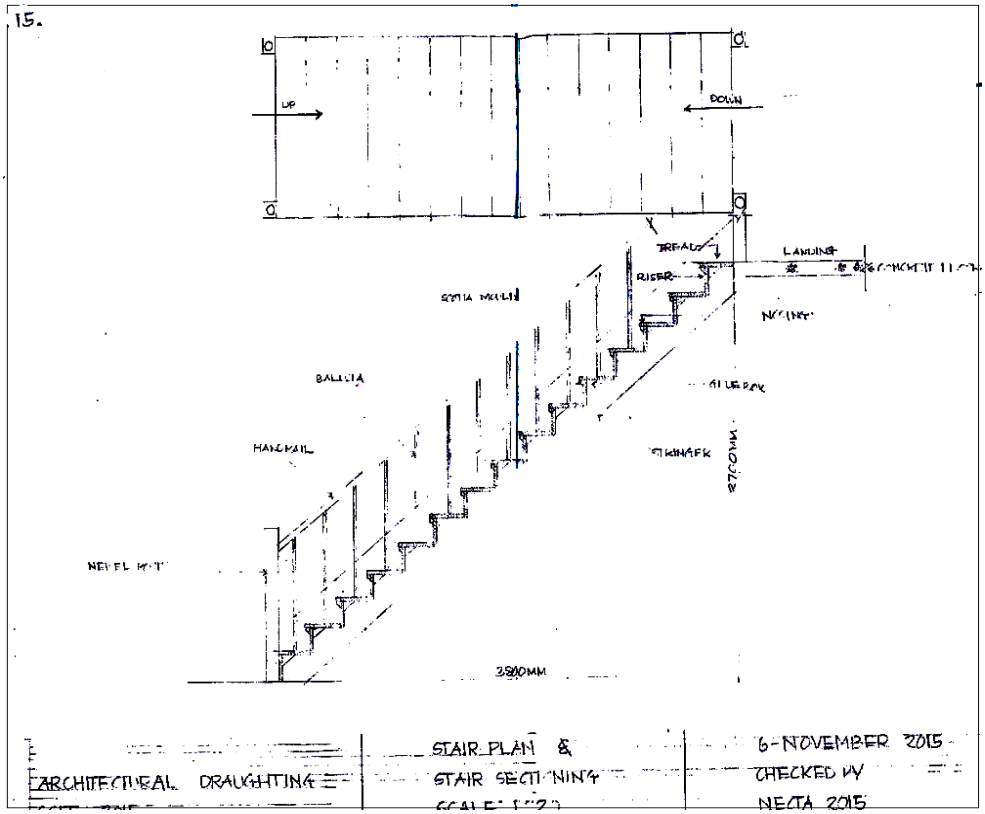


Extract 15.1 shows a sample of response by the candidate who failed to manipulate the given data to draw the plan and sectional elevation of a timber stair. Probably, the candidate had no idea of what was expected from the question. He/she just sketched a meaningless figure which was not awarded a mark.

Further analysis of the responses shows that the candidates who scored from 9 to 18 marks were able to comprehend the requirements of the question. The diversity of scores among these candidates was probably due to different capabilities in their art of presentation and sketching skills.

The candidates who scored from 9 to 18 marks were able to draw the plan and sectional elevation of the staircase and to a great extent labelled correctly parts of the stair, as seen in Extract 15.2.

Extract 15.2



Extract 15.2 shows a sample of the response by a candidate who was able to draw a stair plan. He/she was able to project from the plan to get the sectional elevation of a stair hence scored high marks.

3.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE PER TOPIC

The topics covered in Architectural Draughting for CSEE 2015 were: *Introduction, Foundations, Sections, Fire places, Water supply, Stairs and staircases, Electric supply, Concrete, Site plan, Architectural lettering, Perspective drawing, Schedules, Building specifications, Development of floor plan, Drawing instruments and equipment, Drainage systems* and *Doors.* The candidates' performance per topic is presented here-under and summarized in Appendix B..

3.1 On the topics of *Introduction, Foundations, Sections, Fireplaces* and *water supply* (multiple choice items), there were one item from each topic. The performance in these topics was good as generally the percentage of candidates who scored the pass mark and above was 67.4 percent of all valid candidates.

3.2 On the topic of *stairs and staircases* (which included a multiple choice item, a set of matching items and the structured one on drawing plan and sectional elevation). The performance in this topic was generally good as the average of candidates who scored 30 percent and above in this topic were 54.3 percent. The candidates' demonstrated mastery of the practical skills related to the topic.

3.3 On *electric supply* (identification of standard colour codes of electric wires and drawing symbols for electrical components). There were two questions drawn from this topic and the performance was generally weak as only 28.2 percent of all candidates scored above the pass mark. Most of the candidates could not interpret electrical components into drawings, which can be used during construction on site. The candidates' responses suggest that the candidates lacked skills on practical site works.

3.4 On *concrete* (reasons for curing floor slab; consolidation and curing of wet concrete). This topic was poorly done as only 21.7 percent of the candidates were able to score the pass mark (30%) and above. The failure in this topic could be attributed to inadequate knowledge and technical practice on the behaviour of wet concrete.

3.5 On s*ite plan* (definition and function of a beacon). The performance in this topic was weak as the candidates who scored above the pass mark were only 17.8 percent of all candidates. Responses of the candidates show that most of them lacked the basic knowledge about the distribution of responsibilities among local authorities and owners of the plots who designs site plan. In order to do better in future the candidates need to be more exposed to the actual practice on the site works.

3.6 On *architectural lettering* (classification of architectural letters). The performance in this topic was weak as 13.4 percent of the candidates scored 30 percent and above. The failure in this topic

was probably attributed to inadequate practice and the misconception between normal writing letters and architectural letters.

3.7 On *perspective drawings* (about definition, key concepts, base of categorizations and illustrations of perspective drawings). The performance in this topic was weak as only 12.2% of all candidates scored above the pass mark. The candidates badly performed in both theory and practical; most of them could not demonstrate skills on the behaviour of perspective views from different locations. This performance indicates that the candidates lacked basic practical skills on the principles of perspective projections.

3.8 On *schedules* (the general purpose and uses of door and window schedules). The performance in this topic was weak as 75.6 percent of all candidates scored a 0 mark and only 40 candidates which is equivalent to 10.3 percent scored above the pass mark. Most of the candidates were able to use schedules but could not design it. Such weakness is an indication that the candidates lacked adequate exposure and basic practical skills on the design of building components, and hence presentation of relevant schedules.

3.9 On *building specifications* (the importance and issues described in building specifications). Two questions were drawn from this topic and the performance of candidates was poor as only 2 percent scored above the pass mark. Most of the candidates were not able to explain and describe building specifications. The failure of candidates in this topic could be attributed to inadequate practice in live projects where candidates could have got on-site experience.

3.10 On *development of floor plan* (general classes of architectural drawings and main causes of changes occurring on design and appearance of buildings though the ages). The performance in this topic was weak as only 1.6 percent of the candidates were able to score above the pass mark. The candidates failed to demonstrate the basic skills in manipulating with the standard design parameters. The candidates' responses in this topic show that the failure could be attributed to inadequate practice in the design offices where candidates could have got exposure on project development.

3.11 On *drawing instruments and equipment* (characteristics for a quality tracing paper). The performance in this topic was very weak as only two candidates which is equivalent to 0.5 percent were able to score the pass mark. Most of the candidates were unable to identify the characteristics for a quality tracing paper. This failure could be attributed to inadequate office work practice during the course.

3.12 On *drainage systems* (principles applied on locating septic tanks and subsoil drainage). Two items were drawn from this topic and the performance was generally very poor as 96.9 percent of the candidates scored a 0 mark and only one candidate which is equivalent to 0.3 percent was able to score above the pass mark. The questions in this topic tested competence of the candidates about planning/designing criteria of drainage systems. Most of the candidates could not identify the principles of locating septic tanks on site plan. This failure might be attributed to inadequate practice on the designing procedures.

3.13 On *doors* (identification of steps followed in construction of a framed, braced and battened door). The performance in this topic was the worst as all the candidates scored a 0 mark. The candidates could not recall the steps followed in making the boarded door which is referred to as framed, braced and battened. Most of the candidates presented irrelevant materials in their responses. Analysis of the candidates' responses indicates that the candidates were not good in the practical part of door constructions; they lacked the basic practical skills on assembling the boarded type doors.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 CONCLUSION

The analysis of candidates' performance has been summarized in three categories as shown in appendix A where from 0 to 29 marks the performance is Weak, from 30 to 45 marks is Average and from 45 to 100 marks is Good. Generally, the performance in 072 - Architectural Draughting subject was poor. The quality of responses in some questions was below standard and the candidates scored below the pass mark.

The candidates' performance in three questions 1, 2 and 10 was 'Good' while the performance in question number 15 on *Stairs and Stair Cases* was 'Average' where 41.8 percent of the candidates scored above the pass mark. The poorly performed questions were question 6 from the topic of Doors, followed by question 7 (Drainage systems) and question 3 (Drawing instruments and equipment). In question 6 there was no candidate who was able to score above the pass mark while in question 7 and question 3, only 0.3 percent and 0.5 percent, respectively scored above the pass mark. Question number 4, 5, 8, 9, 12, 13 and 14 on *Architectural lettering, Site plan, Building specifications, Electric supply, Concrete, Perspective drawings* and *Development of floor plan* were also poorly performed. Some of the candidates failed because they partially answered the questions or omitted them. The most omitted question was number 13 where 80.1 percent of the candidates didn't attempt the question and for those who attempted it no one scored a pass mark of 6 marks out of the 20 allotted marks.

The reasons behind this failure could be attributed to the failure of understanding the demands of the question, poor command of English language and inadequate knowledge about the topics tested. Other reasons for the failure could be poor lettering and drawing/sketching skills; also poor interpretation of the demand of questions due to various misconceptions.

Architectural Draughting being a practical oriented subject needs a lot of practice in order to equip the students with the basic design and drawing principles covered in various Architectural Draughting topics. Practice in field works and exposure to various Design Offices may help students to better relate theories and practice on the ground.

4.2 RECOMMENDATIONS

Teachers:

(a) Should guide students on how to identify the requirements of questions.

(b) Should encourage students to do practice and develop more design and drawing skills.

(c) Should encourage students to search, practice and read relevant architectural Draughting books/media in order to widen knowledge.

The Ministry of Education/School Administrations:

(a) Should make sure that drawing materials equipment and tools are available in schools to enable students and teachers to practice the use of tools and equipment.

(b) Should make a close follow-up on the coverage of the syllabus and make sure that reference books are available.

Students:

(a) Should be disciplined to the basic requirements of the syllabus of the subject; and study hard to cover all the parts in time.

(b) Should search, practice and read relevant Architectural Draughting materials in order to improve innovation and speed of presentation.

Appendix A

Analysis of the Candidates' Performance Questionwise

S/N	Topic	Question Number	Percentage of Students who Scored 30% or More	Remarks
1	Introduction, Drainage system, Schedules, Building specifications, Foundations, Sections, Fire places, Stairs and staircases, Water supply	1(Multiple Choice Items)	67.4%	Good
2	Stairs and staircases	2 (Matching Items)	54.3%	Good
3	Electric supply	10	53.4%	Good
4	Stairs and staircases	15	41.8%	Average
5	Concrete	12	21.7%	Weak
6	Site plan	5	17.8%	Weak
7	Architectural lettering	4	13.4%	Weak
8	Perspective drawing	13	12.2%	Weak
9	Schedules	11	10.3%	Weak
10	Electric supply	9	5.9%	Weak
11	Building specifications	8	2%	Weak
12	Development of floor plan	14	1.6%	Weak
13	Drawing instruments and equipment	3	0.5%	Weak
14	Drainage system	7	0.3%	Weak
15	Doors	6	0.0%	Weak

Appendix B

The Candidates' Performance Topicwise

S/N	Topic	Number of Questions	Percentage of Candidates who Scored 30% or More	Remarks
1	Introduction	1	67.4%	Good
2	Foundations	1		
3	Sections`	1		
``	Fire places	1		
5	Water supply	1		
6	Stairs and staircases	3	54.3%	Good
7	Electric supply	2	28.2%	Weak
8	Concrete	1	21.7%	Weak
9	Site plan	1	17.8%	Weak
10	Architectural lettering	1	13.4%	Weak
11	Perspective drawing	1	12.2%	Weak
12	Schedules	3	10.3%	Weak
13	Building specifications	2	2%	Weak
14	Development of floor plan	1	1.6%	Weak
15	Drawing instruments and equipment	1	0.5%	Weak
16	Drainage system	2	0.3%	Weak
17	Doors	1	0.0%	Weak