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

CANDIDATES' ITEM RESPONSE ANALYSIS REPORT ON THE CERTIFICATE OF SECONDARY EDUCATION EXAMINATIONS (CSEE) 2021

ELECTRICAL DRAUGHTING

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FOREWORD

The Certificate of Secondary Education Examination (CSEE) is administered by the National Examinations Council of Tanzania (NECTA) to mark the end of four years of secondary education. It intends to show the effectiveness of the education system which is a summative evaluation. The National Examinations Council of Tanzania is therefore pleased to issue the Candidates' Item Response Analysis (CIRA) report to give feedback on the candidates' performance. This analysis report aims to give reflection to candidates, teachers, examiners and other education stakeholders on the general performance, specific areas of weakness and recommendations for future improvement.

The report is based on the analysis of responses from candidates' scripts and statistical data processed by NECTA. The candidates' responses for each question have been analysed and the factors which hinder the candidates' good performance have been identified. The analysis done in this report indicates that the general performance of the candidates in 2021 was good since most of them (80.2%) passed while few (13.8%) failed. The factors observed include the inability of the candidates to interpret the requirement of the questions, and lack of enough knowledge and skills in various topics. The observed factors have been clarified by using extracts selected from the candidates' scripts for more illustrations.

The National Examinations Council of Tanzania hopes that the feedback provided in this report will be useful to education stakeholders and that, the suggestions and recommendations offered will enable them to take appropriate measures to enhance teaching and learning of the Electrical Draughting subject.

The National Examinations Council of Tanzania would like to thank various education stakeholders who devoted their energy and time in providing important inputs that have been used in preparing this report.

Dr Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report presents the analysis of the candidates' responses on the Certificate of Secondary Education Examination (CSEE) 2021 in Electrical Draughting subject.

The paper comprised of sections A and B. Section A had two (2) questions: Question 1 was a multiple choice question with a total of 10 items, each item carried 1 mark making a total of 10 marks. The items were from the topics of *Basic Concept of Orthographic Projection, International Standard Organisations (ISO) and Drawing Sheets, Auxiliary Views, Lettering, Scales, Geometrical Construction in Plane Geometry Lines, Pictorial Drawing,* and *Drawing Instruments and Equipments*. The candidates were required to answer all items from this question. Question 2 was set from the topic of *Pictorial Drawing* which weighed 30 marks.

Section B of the paper consisted of 5 structured questions, with 15 marks each. The candidates were required to answer only 4 questions from this section, making a total of 60 marks. The questions were set from the topics of *Consumer Circuits, Printed Circuit Board, Power Supply, Technical Drawing* and *Electrical and Electronics Symbols*.

A total of 341 (100%) candidates sat for the Electrical Draughting paper in the year 2021. Among them, 294 (86.2%) passed while 47 (13.8%) candidates failed. In this report green, yellow and red colour are used to show good, average and weak performances respectively. The candidates' performance in a question is considered to be good if the percentage of candidates who scored from 30 percent and above is at least 65 percent, it is regarded as average if the percentage is from 30-64 percent and is considered to be poor if the candidates' performance is below 30 percent.

Finally, the report provides recommendations for future improvement of candidates' performance.

2.0 ANALYSIS OF CANDIDATES' RESPONSES IN EACH QUESTION

This section analyses the performance of the candidates in each question. It covers the type of questions, topic from which the questions were constructed, requirements of the questions as well as the performance of the candidates in each question. The candidates' performance has been termed as weak, average and good depending on the candidates' scores.

2.1 Section A: Objective Questions

This section is comprised of two questions. Question 1 is a multiple-choice item from general concept of *Technical Drawing*, and Question 2 is on *Pictorial Drawing*.

2.1.1 Question 1: Multiple Choice Items

In this question the candidates were required to choose the correct response from the given alternatives A to E and to write its letter beside the item number in the answer booklet provided.

A total of 341 (100%) candidates attempted this question. Among them, 38 (11.1%) scored from 0 to 2 marks, 266 (78%) scored from 3 to 6 marks, and the remaining 37 (10.9%) candidates scored from 7 to 10 marks. The performance of the candidates in this question was average since 88.9 per cent of the candidates scored above average. This performance is illustrated in Figure 1.

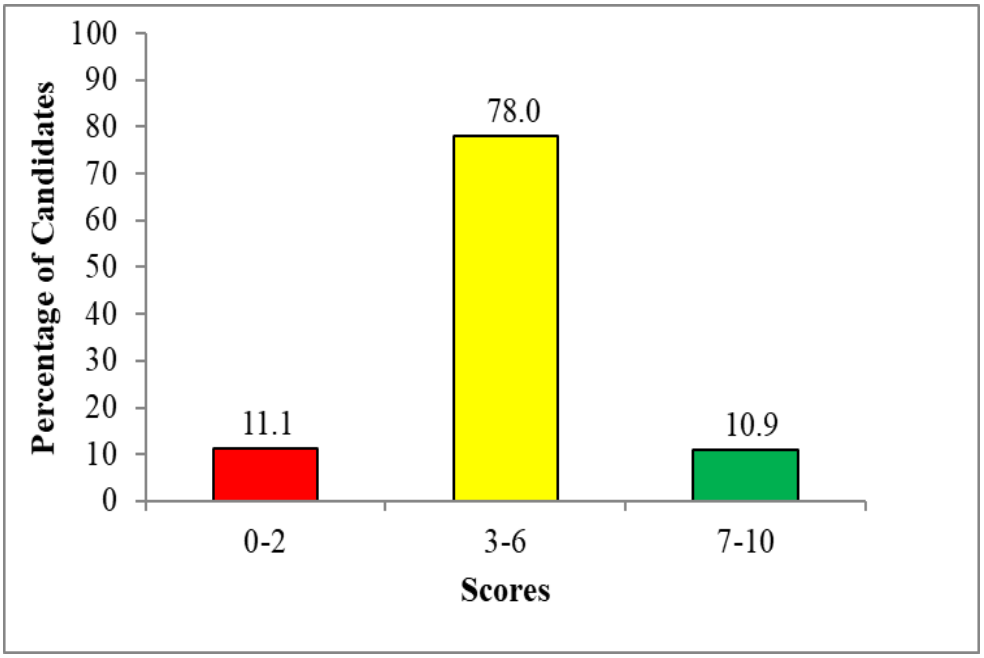


Figure 1: *Candidates' Performance in Question 1*

The analysis of the candidates' responses to this question shows that 88.9 per cent of the candidates managed to choose the correct answer in items (i-x). This indicates that the majority of the candidates were aware of the basic concepts of Engineering Drawing.

In item (i), the candidates were required to state the number of principal views developed from the object by using orthographic projection drawings. The question was: *An object is constructed by using an orthographic projection. How many principal views can be developed from the object by using this type of drawing?*

A Two *B Four* *C Six* *D Eight* *E Ten*

The correct response was alternative C, *Six.* Most of the candidates chose the correct answer. This shows that the candidates had enough knowledge on the orthographic projection drawings. Those who selected alternative A, *Two* remembered the two types of projection views which are first angle projections and third angle projections are the two main types of orthographic drawing, also referred to as 'working drawings'. Some of the candidates opted for alternative B, *Four* because there are four most used

views produced from block. Some of the candidates who selected alternative C, *Six* remembered six views of orthographic drawings such as front, top, left, right, bottom and rear produced from the blocks. No candidate opted for alternative D, *Eight* and alternative E, *Ten* since these concepts are not found in the topic.

In item (ii) the candidates were required to classify the largest paper size according to International Standard Organisation (ISO). The question was as follows:

According to International Standard Organization (ISO), the drawing sheets are classified according to their sizes. Which of the following is the largest paper size?

A A_0 *B* A_1 *C* A_2 *C* A_3 *D* A_4

The correct answer was alternative A, A_o. Few candidates selected the correct answer since this type of paper is not frequently used sheets in drawings. Most candidates selected D, A_3 because it is a common paper size used in drawing figures. Some of the candidates opted for alternative E, A_4 because it is a common paper type used in daily life applications like printing. Very few candidates opted for alternatives B, A_1 and C, A_2, because these papers are not commonly used in drawing they are used in advertisement. Most candidates were not aware of the application of these types of paper

In item (iii) the candidates were required to select the view obtained on the auxiliary plane which is parallel to the inclined surface of an object. The question was: *The view obtained on the auxiliary plane which is parallel to the inclined surface of an object is called*

A inclined surface *B auxiliary plane* *C perpendicular plane*
D parallel plane *E vertical plane*

Most of the candidates opted for the correct response B, *auxiliary plane*. This plane is drawn to get the true shape of the inclined surface (often parallel to Principal Plane). Some of the candidates wrongly opted for alternative A, *inclined surface plane*, which is a flat supporting surface tilted at an angle, with one end higher than the other, and is used as an aid for raising or lowering a load. The candidates who selected alternative C,

perpendicular, were wrong because a perpendicular plane is a surface that is perpendicular (or at 90-degree angle) to one of the principal planes. Those who selected alternatives D and E did not know that these are examples of auxiliary planes and are not correct answers to the question.

In item (iv) candidates were given an object drawn in third angle projection and were required to mention the type of view that will be obtained if the auxiliary vertical plane is placed to the right of the object drawn in third angle projection. The question was as follows: *Suppose you are given an object drawn in third angle projection. If the auxiliary vertical plane is placed to the right of the object, what view will be obtained?*

A Left side view *B Right side view* *C Bottom side view*
D Top side view *E Horizontal side view*

Most of the candidates selected the correct answer B, *Right side view*. They knew that the right side view of an object shows the depth and the height dimensions. Few candidates selected alternative A, *Left side view*, which is the position or region direct to the left of an object of reference. These candidates confused with the first angle projection views. No candidate selected responses E, *Horizontal side view*, C, *Bottom side views* and D, *Top side view* since the auxiliary vertical plane is placed to the right of the object drawn. Thus they easily discovered that the answer is either right side views or left side views.

In item (v), candidates were required to identify a typical slope angle for inclined lettering. The question was as follows: *What would be your advice on the typical slope-angle for inclined lettering.*

A $7^1/_2{}^o$ *B* $67^1/_2{}^o$ *C* 78^o *D* $70^1/_2{}^o$ *E* 66^o

The correct answer was alternative B, $67^1/_2{}^o$ which is inclination degrees from the horizontal. Most of the candidates who selected this alternative had enough knowledge on the topic of lettering in the drawing. Those who selected alternatives C, 78^0 , D, $70^1/_2$ and E, 66^o were guessing the answer since inclination angle starts from 45^0 to 90^0 . No candidate selected alternative A $7^1/_2{}^0$ since it is out of range of typical slope angle for inclined lettering.

In item (vi) the candidates were required to choose one item which does not represent machine lettering in class among the given alternatives. The question was: *Suppose you are required to present machine lettering in a class. Which of the following does not represent machine lettering?*

A Template	*B CAD lettering*	*C Photo typesetting*
D Dry transfer	*E Typewriter*	

Most of the candidates selected the correct alternative A, *Template*, since they had sufficient knowledge of the machines used to draw letters. Some of the candidates selected alternative B, *CAD lettering* which is wrong because this is a machine used to draw text and numbers automatically. No candidate selected alternative C, *Photo typesetting* which is a method of setting type, and is becoming obsolete with the popularity of the personal computer and desktop publishing software. It uses a photographic process to generate columns of type on a scroll of photographic paper. Few candidates selected wrongly response D, *Dry transfer* since it is a machine which is applied to almost every surface, including glass, metal, paper, plastic, and wood. No candidate selected E, *Typewriter*, since this is a machine which is very common in the offices. Most of the candidates have enough knowledge of its function.

In item (vii) the candidates were required to mention the scale used to construct a drawing with a scale of one half of the actual size. The question was as follows: *You are required to construct a drawing with a scale of one half of the actual size. Which scale will you use for the drawing?*

A 2:1	*B 1:1*	*C 1:2*	*D 2:3*	*E 4:2*

Most of the candidates opted for alternative C, *1:2* which is the correct answer. Some of the candidates selected wrong alternative A, *2:1* as they confused with the correct ratio. No candidate selected other alternatives since they are far away from the correct answer.

In item (viii) candidates were required to state the name of drawing which is bounded by two radii and an arc. The question was as follows: *A student was assigned to draw a part of a circle bounded by two radii and an arc. What actually a student was supposed to draw?*

A A chord	*B An arc*	*A Plane*
D A concentric circle	*E A sector*	

Most candidates chose the correct answer which was alternative E, *A sector*. This shows that the candidates had sufficient knowledge on the parts of a circle. Some of the candidates selected distractor A, *A chord*, which is geometrical drawing. The candidates failed to realise that a chord is constructed by a straight line joining two points on a curve. No candidate opted for response C, *A plane* since it is obvious that a plane is a flat surface on which a straight line joining any two points would wholly lie and not a part of a circle. Few candidates selected alternative D, *A concentric circle* which was wrong because these are circles with a common centre.

In item (ix) the candidates were required to identify the type of line which is used to draw the outline border in engineering drawing. The question was as follows: *In engineering drawings, which type of line is used to draw the outline?*

A Thin long chain line *B Short zigzag line* *C Thick wavy line*

D Thick line *E Thin short line*

Most of the candidates selected the correct answer D, *Thick line.* This reveals that they had sufficient knowledge of the types of drawing lines. Some candidates wrongly opted for alternative C, *Thick wavy lines*. These lines are used for irregular boundaries or short break lines and not outline borders. Those who selected alternative E, *The thin short line* had insufficient knowledge on the uses of these lines. These lines are drawn to represent hidden or invisible edges of the objects. Few candidates selected alternative A, *A thin long chain line* which used to show the cutting position in the corresponding figure. No student opted for B, *Zigzag* since these are lines which show a break line and not outline borders.

In item (x) candidates were asked to mention the number of views to be drawn when drawing a pictorial drawing. The question was: *Suppose you are required to draw a pictorial drawing of a block diagram. How many views will you construct?*

A One view *B Two views* *C Three views*

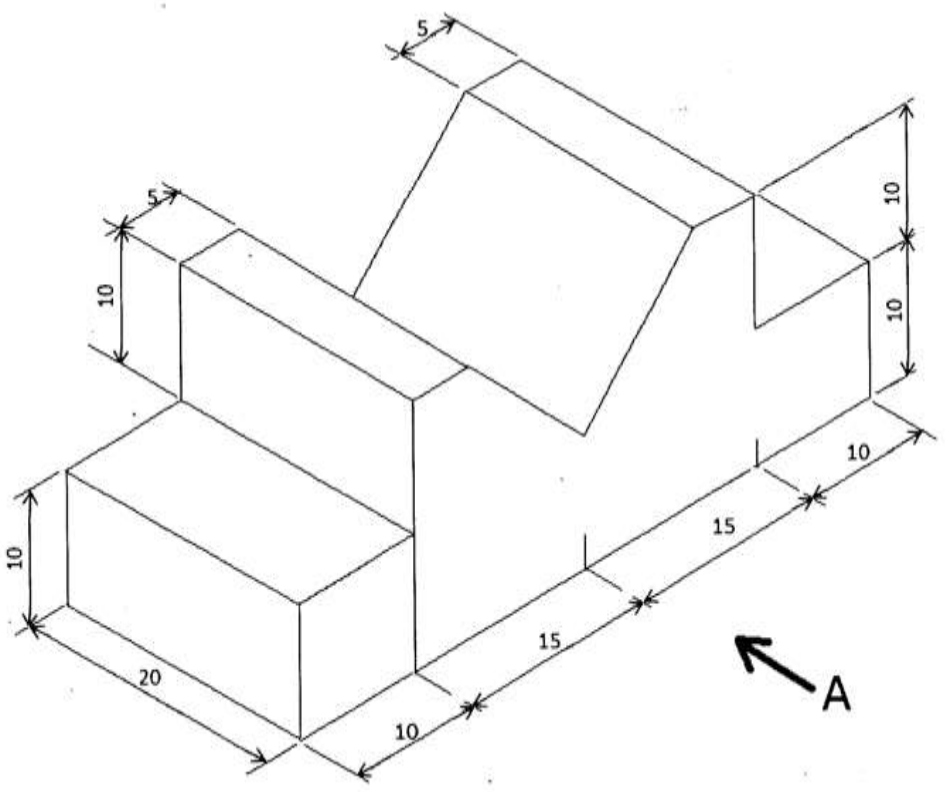
D Four views *E Six views*

Most of the candidates chose the correct alternative C, *Three views*, indicating that they were very familiar with the topic of pictorial drawing.

Some of the candidates opted for E, *Six views* because in orthographic drawing there are six types of drawings. They failed to grasp a particular type of drawing. Few candidates selected option D, *Four views* instead of three since some of the questions ask them to draw four views of drawing of a block diagram. No candidate opted for one and two views.

2.1.2 Question 2: Pictorial Drawing

In this question, the candidates were provided with a block diagram shown below. They were asked to draw in first angle projection the front view, plan and end view of the block in the direction of arrow A. All construction lines must be clearly shown.



The question was attempted by 341 (100%) candidates who sat for this paper. Their scores were as follows: 35 (10.3%) candidates scored from 0 to 8.5 marks, 79 (23.2%) candidates scored from 9 to 19 marks and 227 (66.5%) candidates scored from 19.5 to 30 marks. The performance of the candidates was good since 89.7 per cent of the candidates scored above average. Figure 2.1 summarizes the candidates' performance in Question 2.

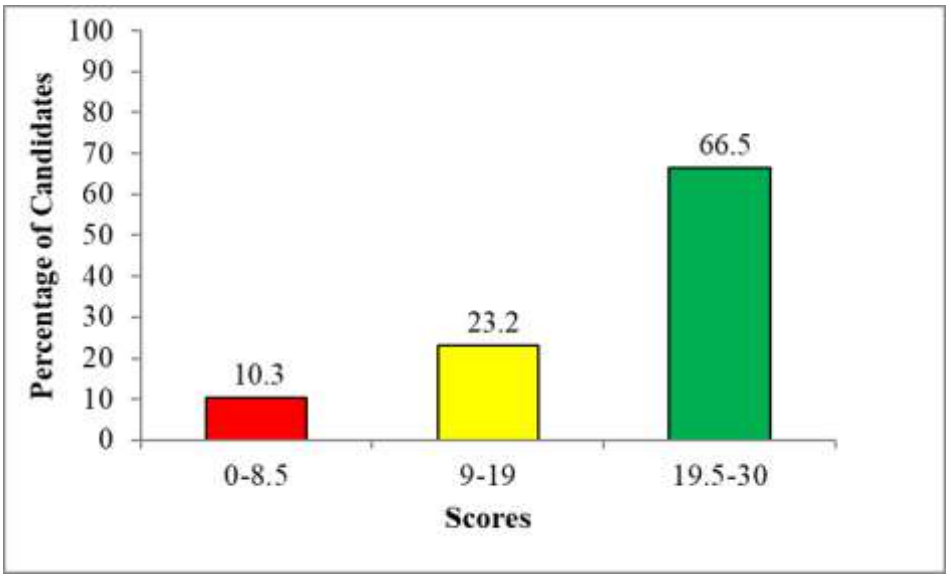
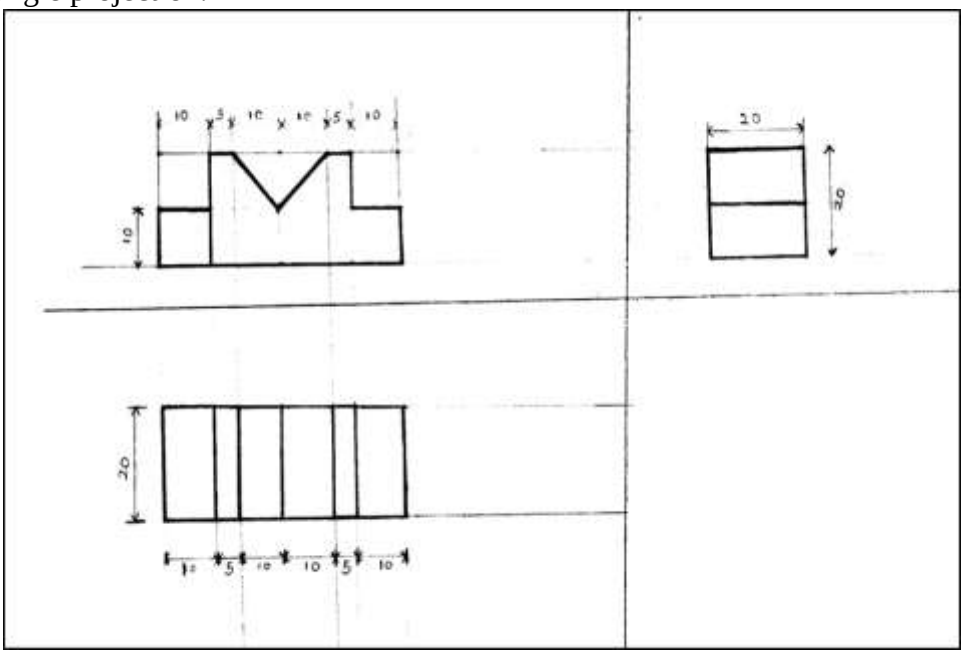


Figure 2: *Candidates' Performance in Question 2*

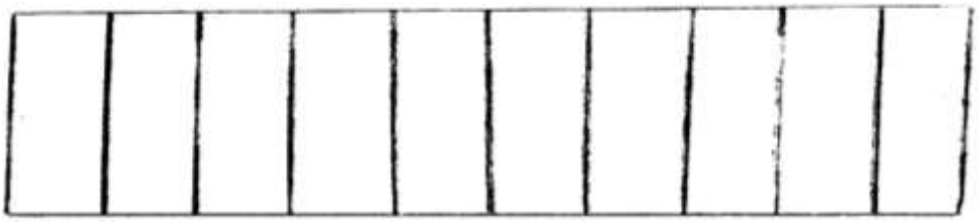
The analysis on the responses shows that majority of the candidates drew correctly in first angle projection the front, plan and end views of the given block. This implies that they had sufficient knowledge of pictorial drawing. Extract 2.1 is a sample of a good response from one of the candidates who correctly drew the views of the given block in the first angle projection.



Extract 2.1: A sample of correct responses to Question 2

Extract 2.1 is a sample of good responses from the candidate who correctly drew the views of the given block in the first angle projection.

Furthermore, the analysis of responses shows that 10.3 per cent of the candidates failed to draw in first angle projection the front, plan and end view of the given block diagram. For example, one candidate only drew the separate parts as it appears in the question, instead of producing the required views. Some of the candidates drew views in third angle projection without considering the construction lines and measurements. Another candidate only drew the vertical lines which were not related to the intended response. This implies that the candidates had insufficient knowledge of pictorial drawing. Extract 2.2 illustrates the incorrect response to Question 2.



Extract 2.2: A sample of incorrect responses to Question 2

Extract 2.2 shows an incorrect response from the candidate who drew vertical lines rather than the front, plan and end views of the given block.

2.2 SECTION B: STRUCTURED QUESTIONS

2.2.1 Question 3: Consumer Circuits

In this question the candidates were given the following scenario: "*A tenant's family lives in a house which has four rooms. The house has a long corridor illuminated with two filament lamps which can be controlled from any of the four rooms".* They were requested to represent the set-up using assembled representation and schematic circuit diagrams to control the lamps.

The question was attempted by 315 candidates which is equivalent to 92.4 per cent. Among them 223 (70.8%) scored from 0 to 4 marks; 50 (15.9%) scored from 4.5 to 9.5 marks and 42 (13.3%) scored from 10 to 15 marks. Therefore, the performance was poor because 70.8 per cent of the

candidates scored below average. Figure 3 summarizes the performance of the candidates in this question.

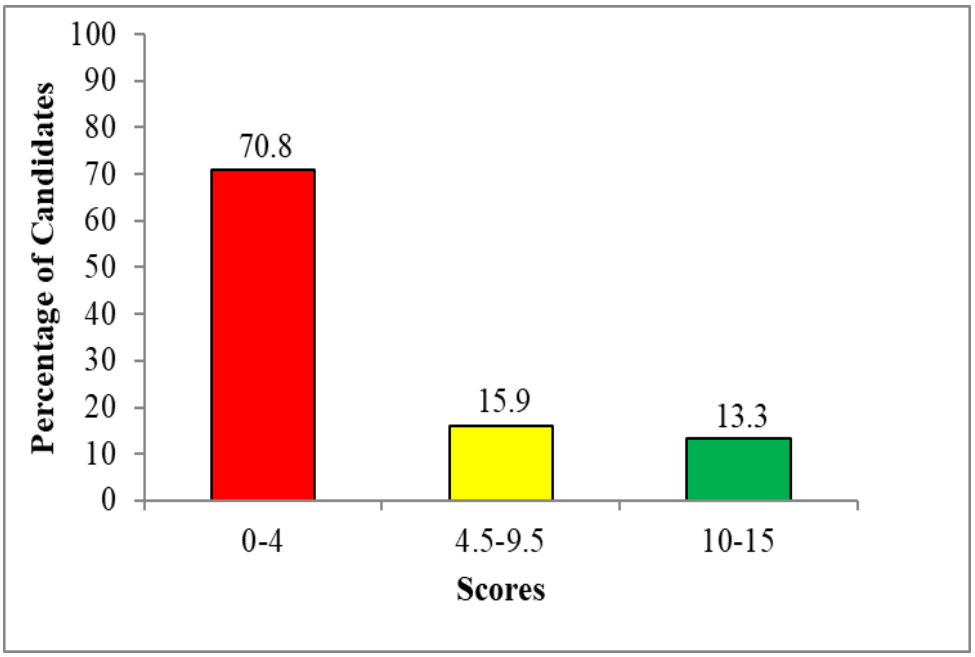
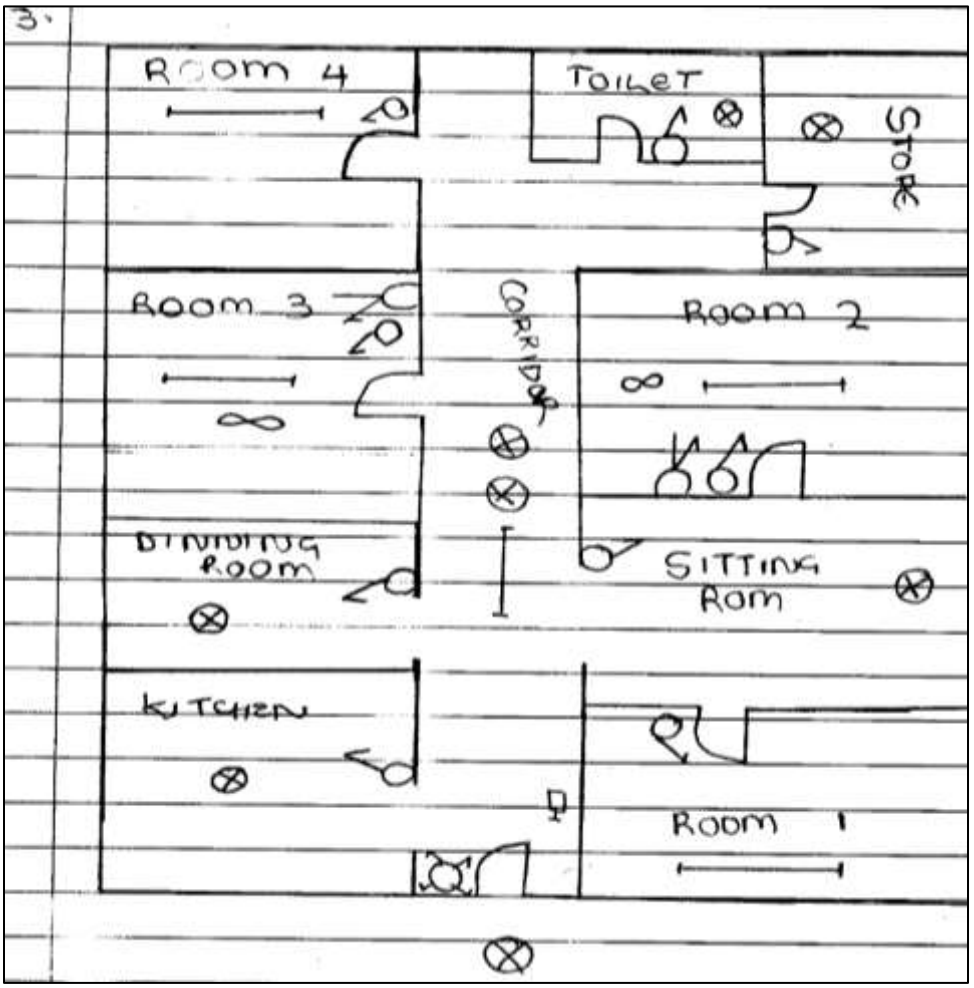


Figure 3: *Candidates' Performance in Question 3*

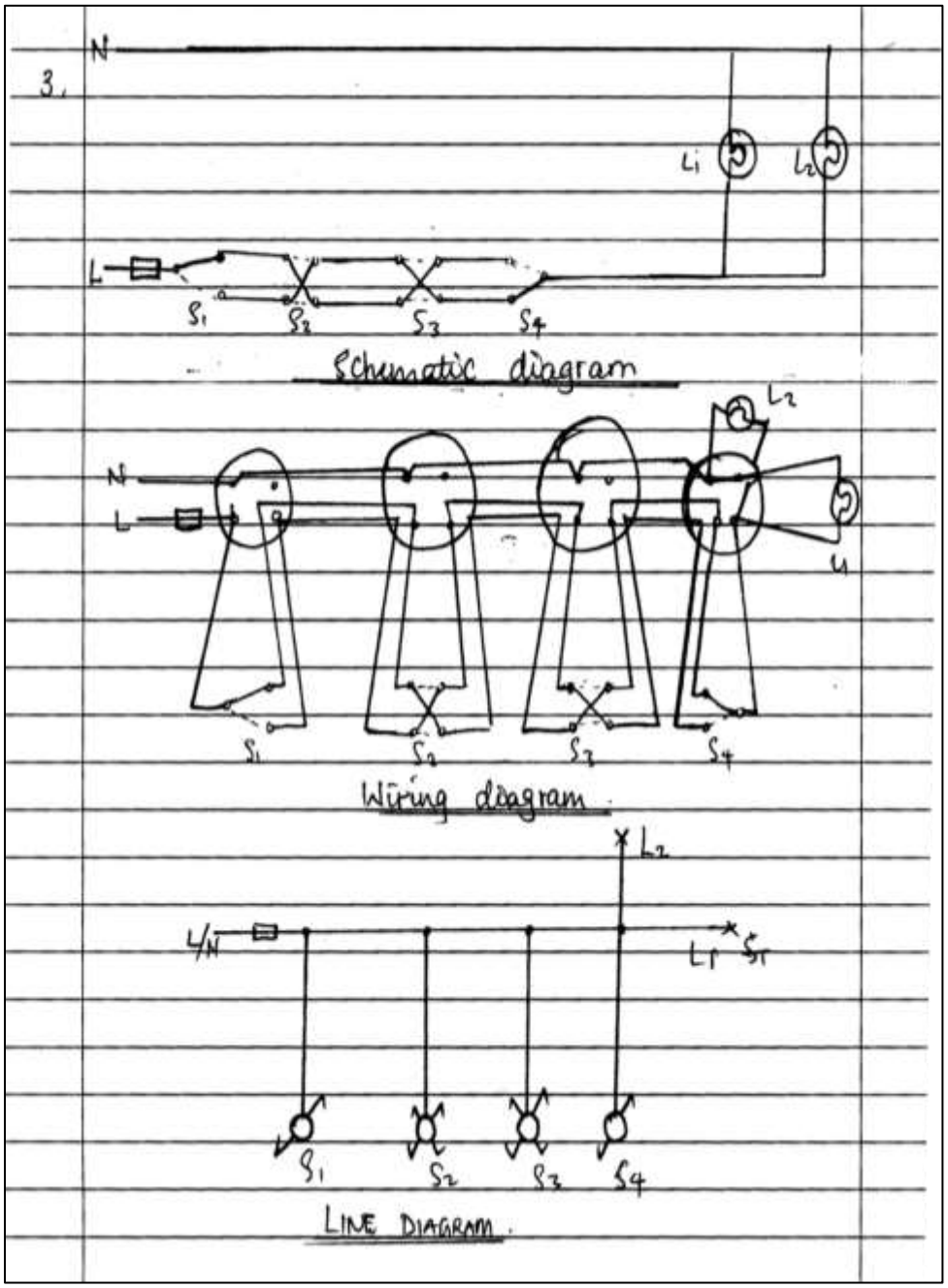
The analysis reveals that majority (70.8%) of the candidates failed to draw the correct assembled representation and schematic circuit diagrams that control the lamps from four different positions. Instead some of them drew line diagram with one switch and two lamps. Furthermore, some of them either drew a schematic diagram to control two lights at two positions or drew a two-way switch to control one light. In addition, some of the candidates drew a line diagram with a live line and neutral with four switches. This implies that they had little knowledge of the topic of consumer circuits. For instance, one of the candidates misinterpreted the question and drew the wiring floor plan which was not the requirement of the question. Extract 3.1 is a sample of incorrect responses to the question.



Extract 3.1: A sample of incorrect response to Question 3

Extract 3.1 shows that the candidate drew the wiring floor plan of the house instead of assembled and schematic diagrams as required by the question.

However, about 13.3 per cent of the candidates correctly interpreted the given scenario; hence they managed to draw the assembled representation and schematic circuit diagrams to control the lamps from four different positions. This implies that the candidates had sufficient knowledge and skills on the topic of consumer circuits. Extracts 3.2 is a sample of good responses from one of the candidates who correctly responded to the question.



Extract 3.2: A sample of correct response to Question 3

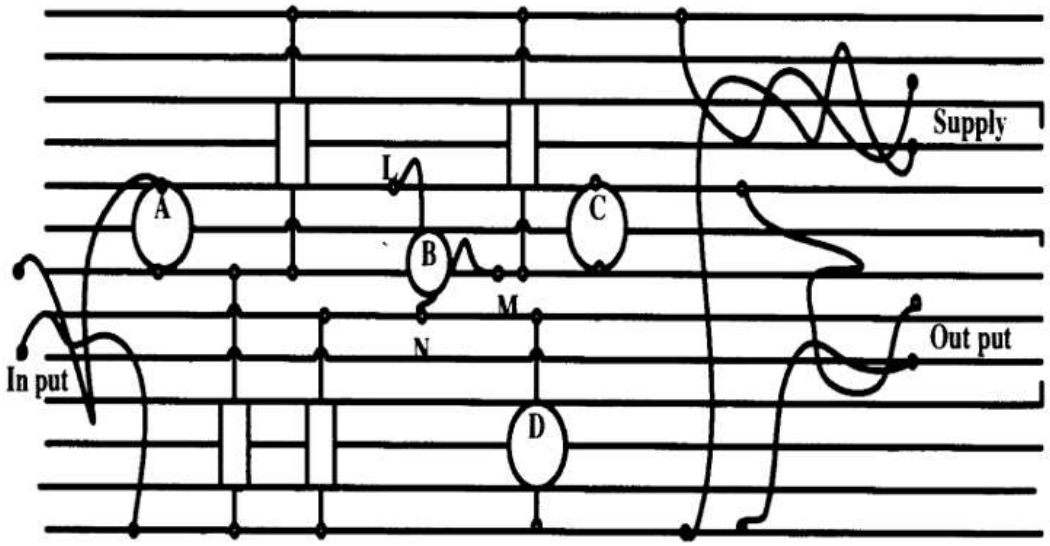
Extract 3.2 is a sample of correct response from one of the candidates who managed to draw the assembled representation and schematic circuit diagrams which control the lamps from four different positions.

2.2.2 Question 4: Printed Circuit Board

This question was comprised of two parts: In part (a) the candidates were asked to state the use of component assembly drawing and in part (b) the candidates were required to study the components side of the stripboard unit from the given figure and answer the questions that followed. The circuit arrangement was for the NPN transistor amplifier stage with input and output leads. The candidates were asked to:

(i) Identify the components A, B, C, D and terminals L, M, N of component B.

(ii) Draw a schematic diagram of the amplifier.



A total of 262 candidates, corresponding to 76.8 per cent attempted the question. However, 79 (23.2%) candidates did not attempt this question. The data analysis shows that 122 (46.6%) candidates scored from 0 to 4 marks; 86 (32%) scored from 4.5 to 9.5 marks whereas 54 (20.6%) candidates scored from 10 to 15 marks. The trend of performance portrays the average performance in this question since 53.4 per cent of the candidates scored average and above. The candidates' performance in this question is presented in Figure 4.

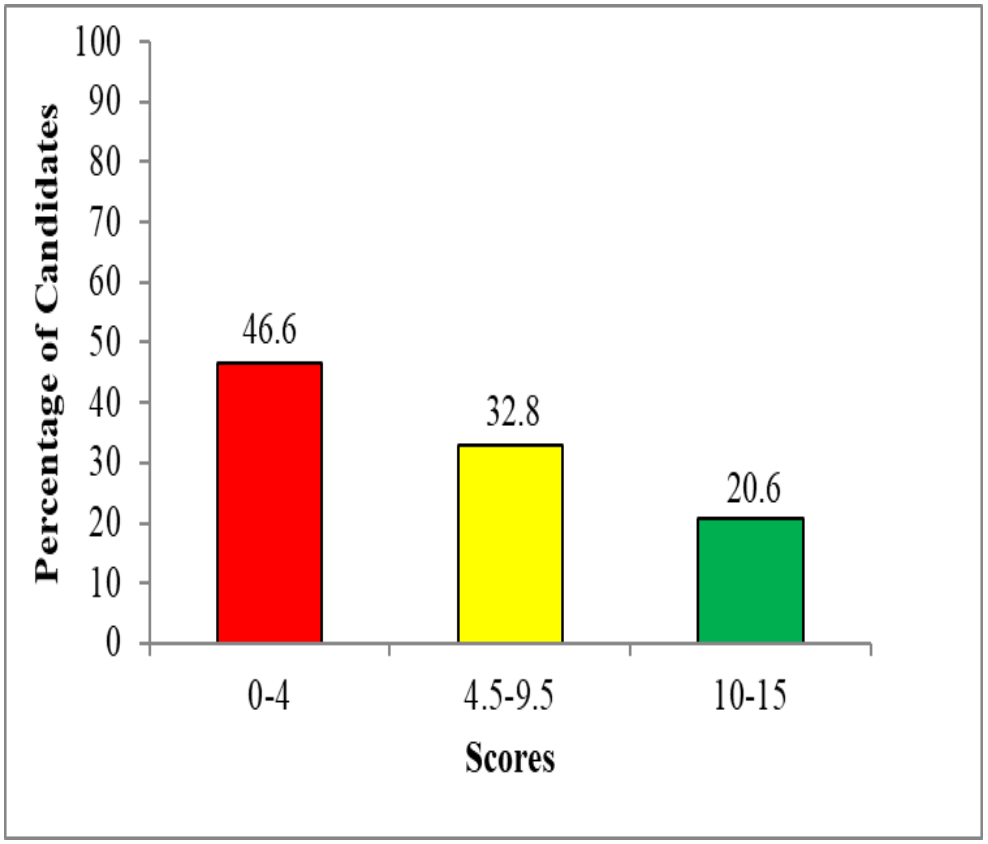
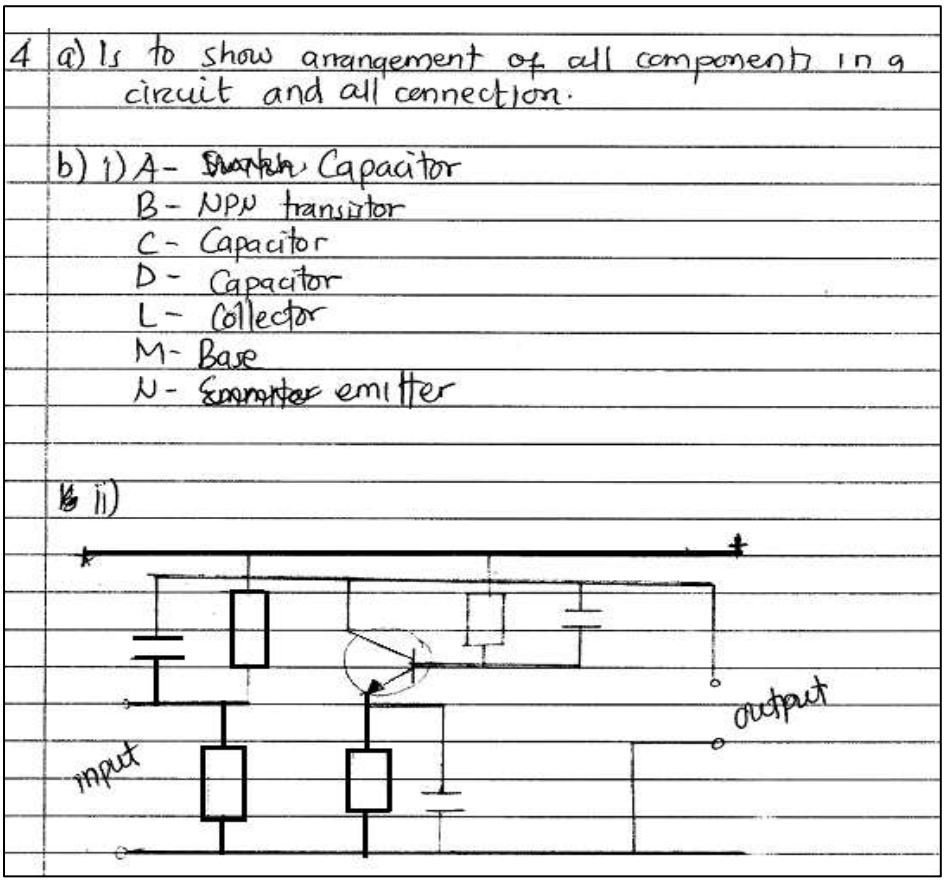


Figure 4: *Candidates' Performance in Question 4*

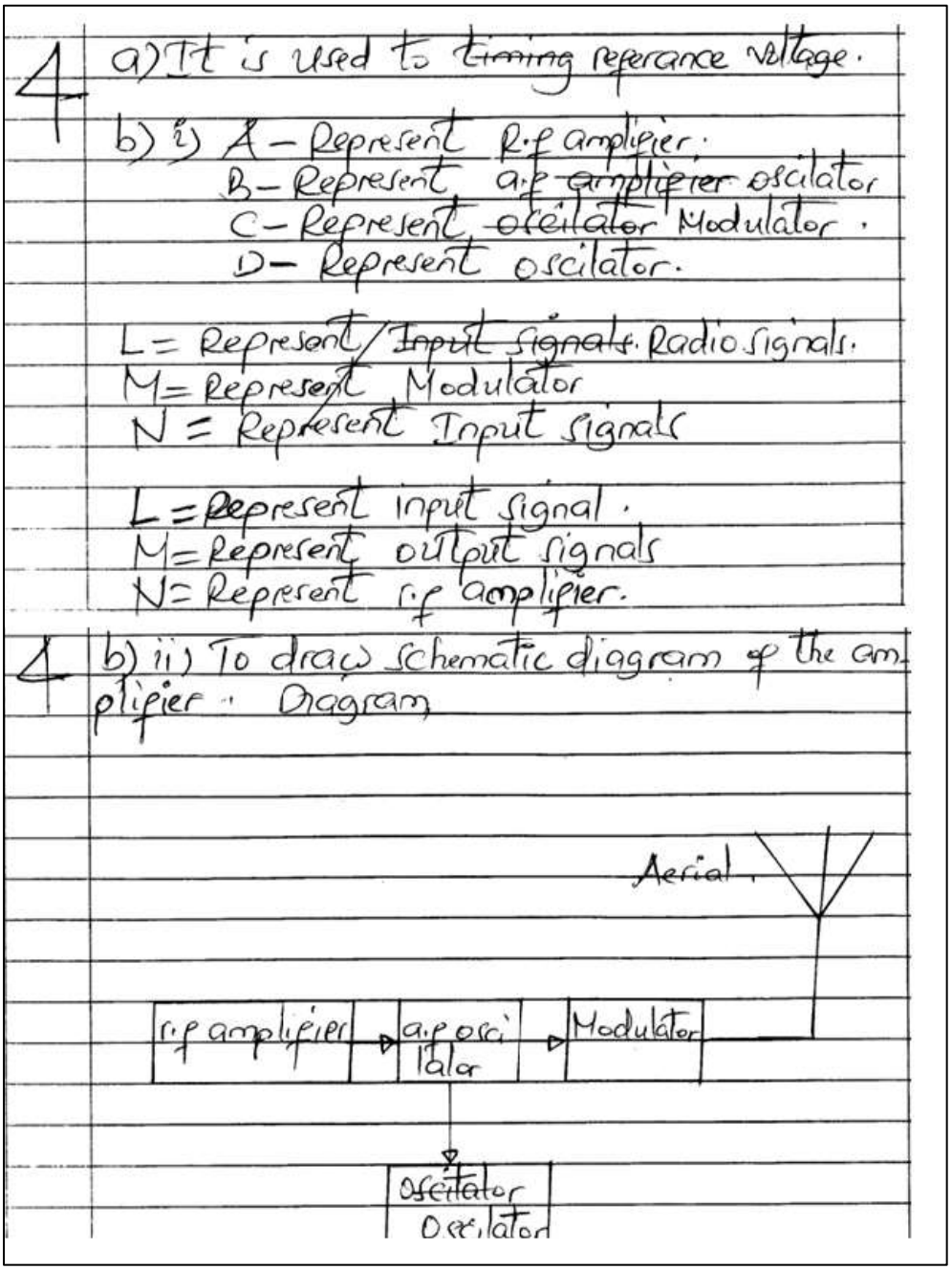
Although the majority of the candidates performed averagely, there were some of them (20.6%) had good performance. In part (a) the candidates identified correctly the labelled symbols and in part (b) they correctly drew the schematic diagram of the amplifier. This indicates that they had adequate knowledge on the printed circuit boards and transistor amplifiers. One of the candidates' good responses is illustrated in Extract 4.1.



Extract 4.1: A sample of correct response to Question 4

Extract 4.1 is a sample of good responses extracted from one of the candidates' script who managed to identify the labelled symbols and correctly drew the schematic diagram of amplifier.

Further analysis shows that 46.6 per cent of the candidates performed poorly by scoring 0 to 4 marks out of 15 marks allotted to the question. For example, one of the candidates wrongly identified all the parts in part (a) and in part (b) the candidate drew a wrong block diagram of the radio frequency (r.f) transmitter instead of the required schematic diagram of amplifier. Some of the candidates who failed to draw a schematic diagram drew incorrect transistor amplifier. Others drew a wrong transistor, instead of NPN bipolar transistor they drew N-Chanel JFET transistor. This implies that candidates had little knowledge on the component assembly drawing but they lacked knowledge on printed circuit board and amplifier circuits. Extract 4.2 is a sample of incorrect responses from one of the candidates.



Extract 4.2: A sample of incorrect responses to Question 4

Extract 4.2 shows responses from one of the candidates who failed to identify all the labelled parts and drew an incorrect schematic diagram.

2.2.3 Question 5: Power Supplies

In this question the candidates were required to;

(a) Design a linear power supply with 220/9V transformer, 4 power diodes, electrolytic capacitor, zener diode and a load resistor.

(b) (i) Name the type of power supply designed in (a).

(ii) Draw a well-labelled block diagram of the power supply.

The question was attempted by 321 (89.2%) candidates. The data shows that 81 (25.2%) candidates scored low marks from 0 to 4. There were 94 (29.3%) candidates who scored from 4.5 to 9.5 marks, and the remaining 146 (45.5%) candidates scored from 10 to 15 marks. The general performance in this question was good because 74.8 per cent of the candidates scored from average and above. Figure 5 summarises the candidates' performance in Question 5.

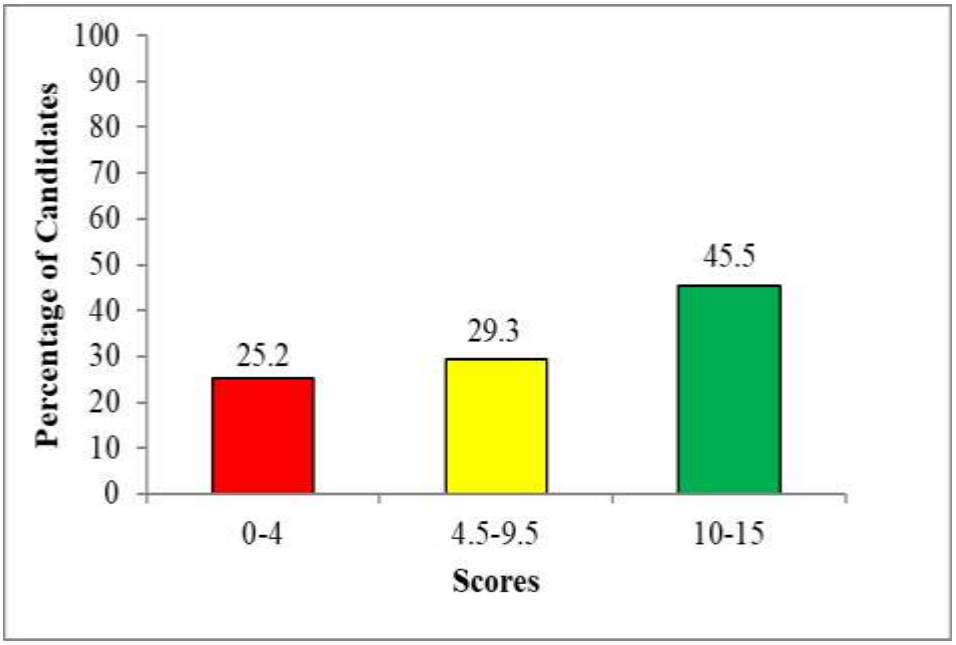
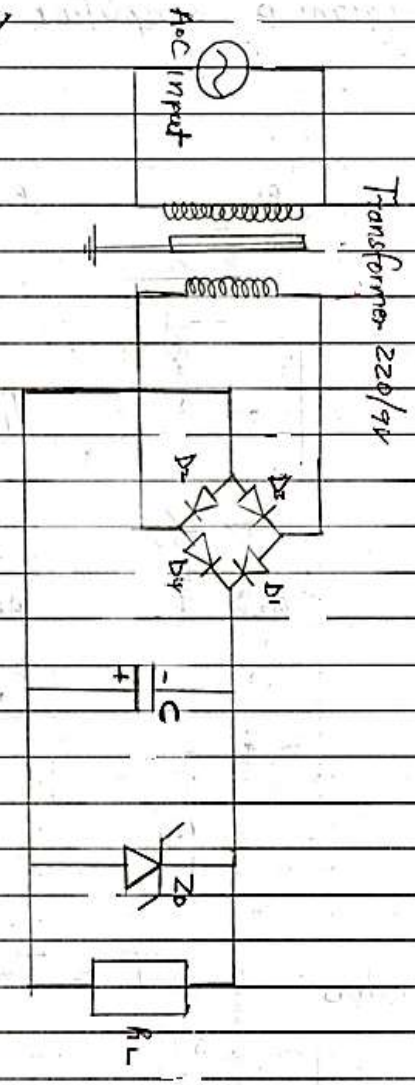


Figure 5: *Candidates' Performance in Question 5*

The candidates who had good performance in this question gave correct responses to all parts of the question. Most of them correctly designed the linear power supply using the given components. They drew the circuit and its block diagram correctly. This implies that these candidates had adequate knowledge about the topic of power supply. Extract 5.1 illustrates a sample of candidates' good responses to this question.

5a Power Supply

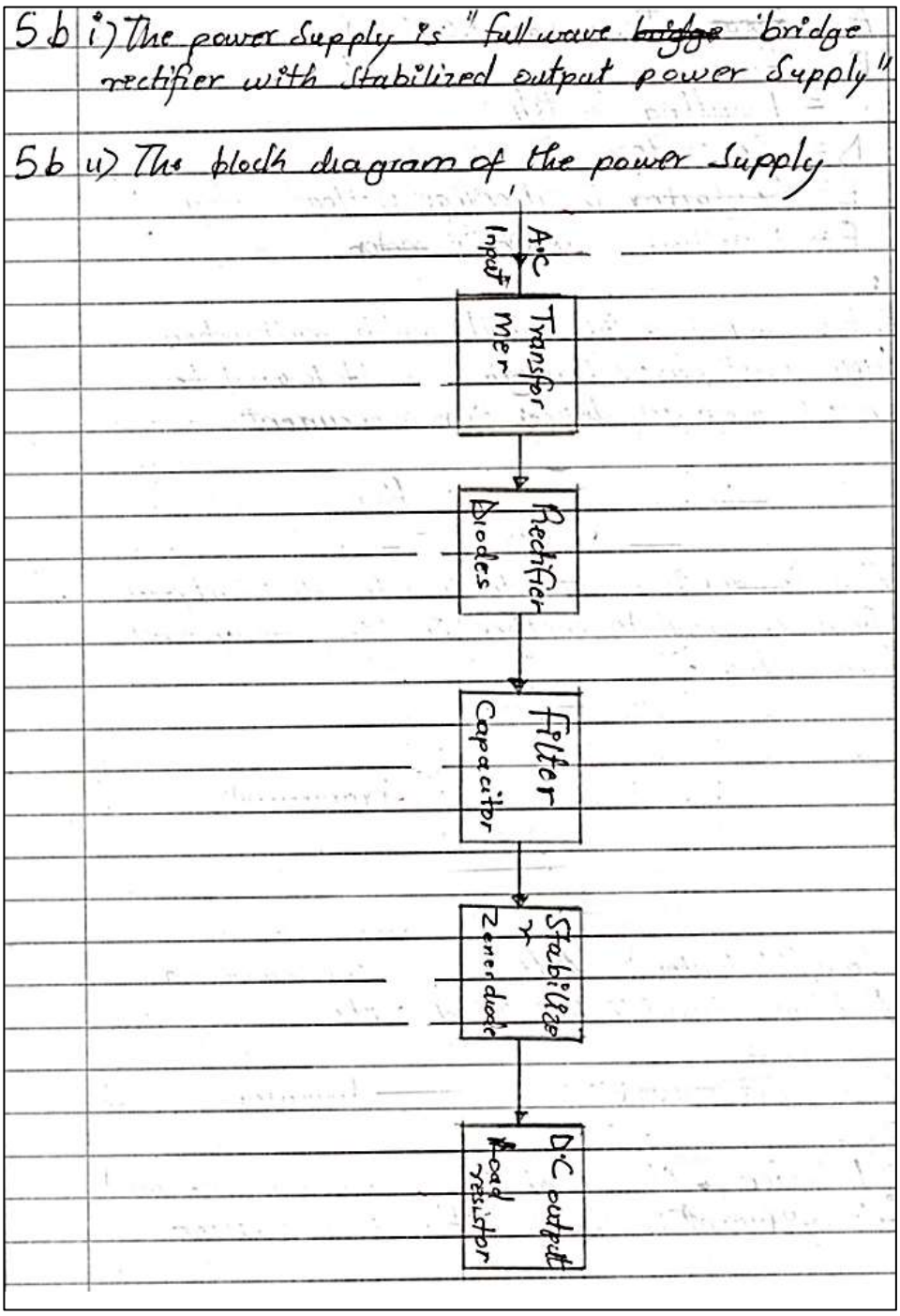


D = Diodes

R_L = Load resistor

Z_D = Zener diode

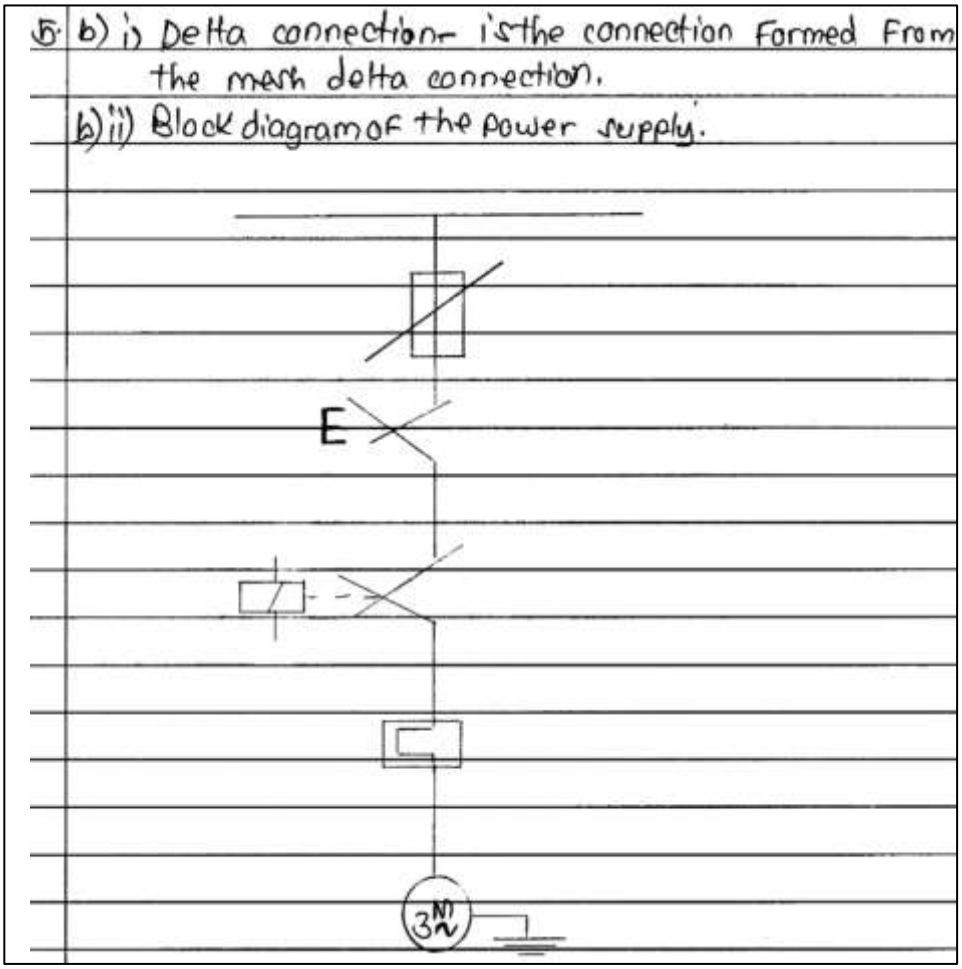
C = Capacitor



Extract 5.1: A sample of correct responses to Question 5

Extract 5.1 is a sample response from one of the candidates who correctly designed the linear power supply using the given components, named properly the drawn circuit and drew its block diagram.

Those who had weak performance could not design a linear power supply using the given components, consequently they could not name properly the drawn circuit as well as block diagram of power supply. For example one of the candidates drew a block diagram of a house lighting system showing supply, junction box, switches and lamps which was not the requirement of the question. Another candidate drew an incorrect bridge rectifier and placed a zener diode and filter capacitor in the wrong position. Other candidates drew a center tapped full wave rectifier with the wrong direction of diodes. This signified that the candidates had inadequate knowledge and skills on the topic of power supply. Extract 5.2 illustrates a sample of candidates' incorrect responses.

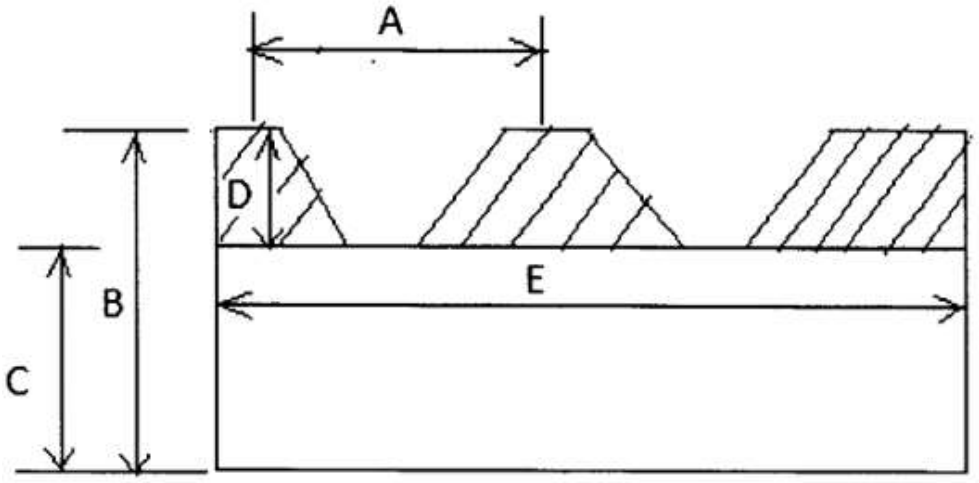


Extract 5.2: A sample of incorrect responses to Question 5

Extract 5.2 is a sample response from one of the candidates who failed to design a linear power supply using the given components.

2.2.4 Question 6: Technical Drawing

This question consisted of two parts (a) and (b). In part (a) the candidates were given a thread below and were requested to identify the parts labelled by letter A – E.



In part (b) the candidates were given the following scenario: "*A client asked you to make bolts and screw listed in (i) – (v) for industrial use*". They were requested to sketch the bolts and screws as requested by a client as follows:

(i) Round head
(ii) Cheese head
(iii) Counter sunk head
(iv) Hexagon head
(v) Socket head

A total of 133 (39.0%) candidates responded to the question and their scores were as follows: 104 (78.2%) candidates scored from 0 to 4 marks, 24 (18%) scored from 4.5 to 9.5 marks and 05 (3.8%) candidates scored from 10 to 15 marks. The candidates' performance in this question was weak because 78.2 per cent of the candidates scored below average. The data is summarized in Figure 6.

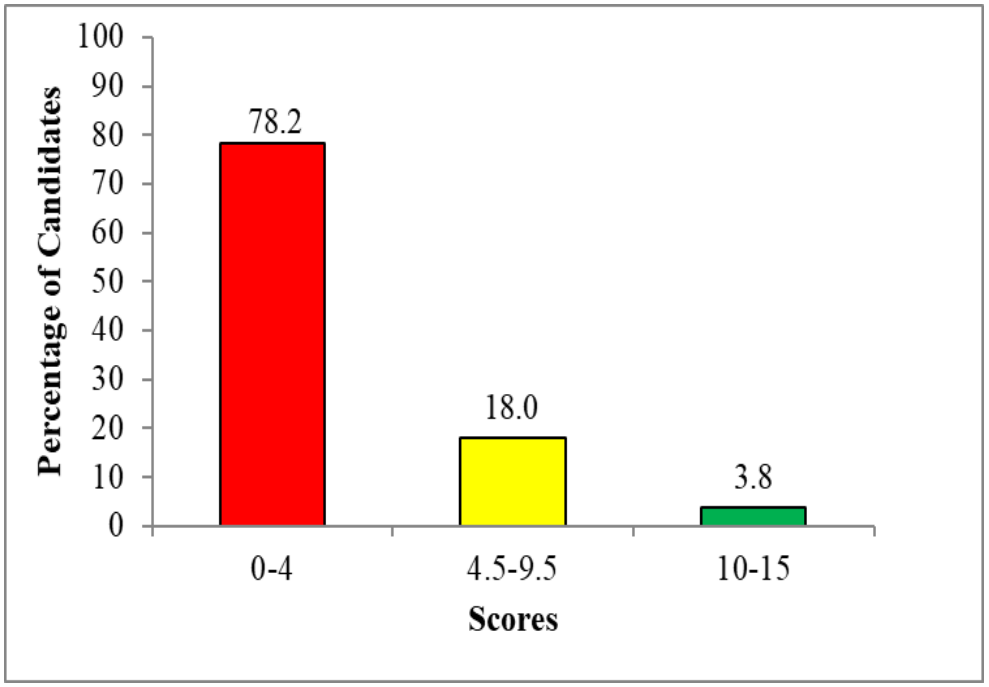
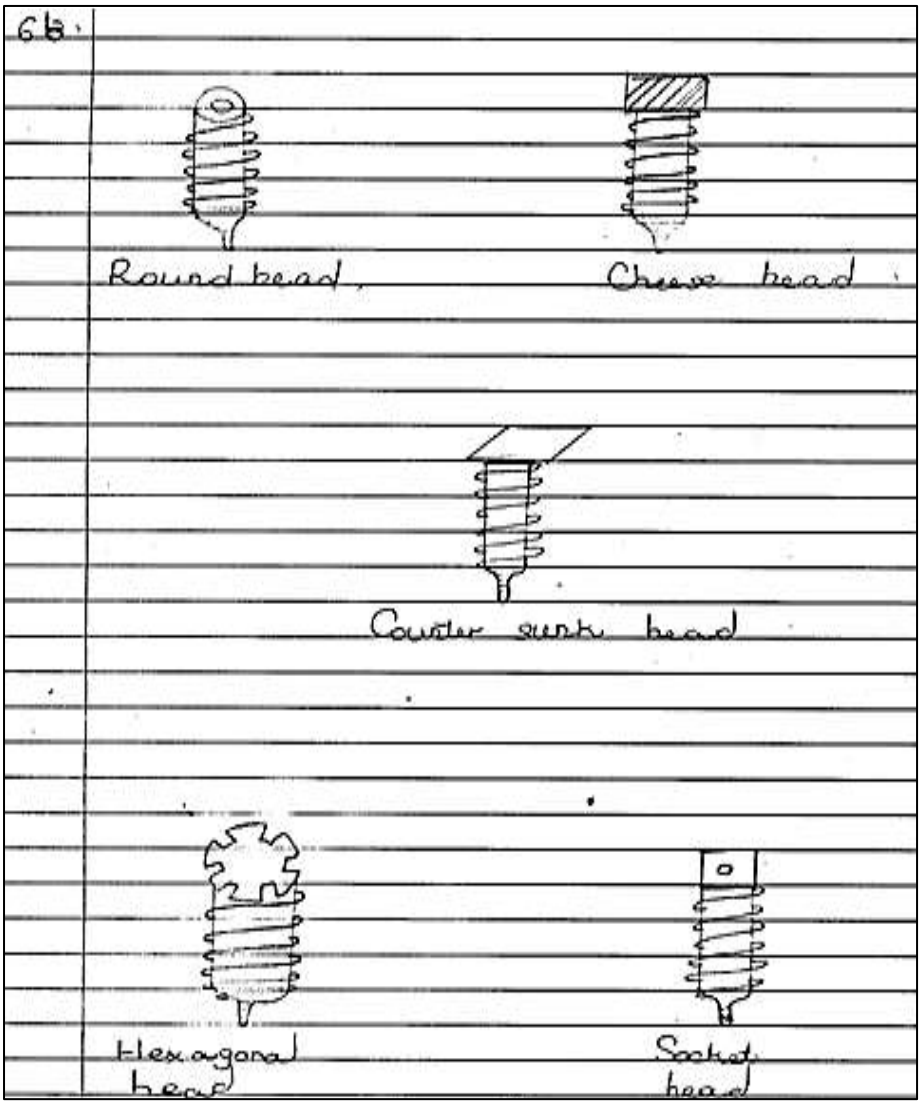


Figure 6: *Candidates' Performance in Question 6*

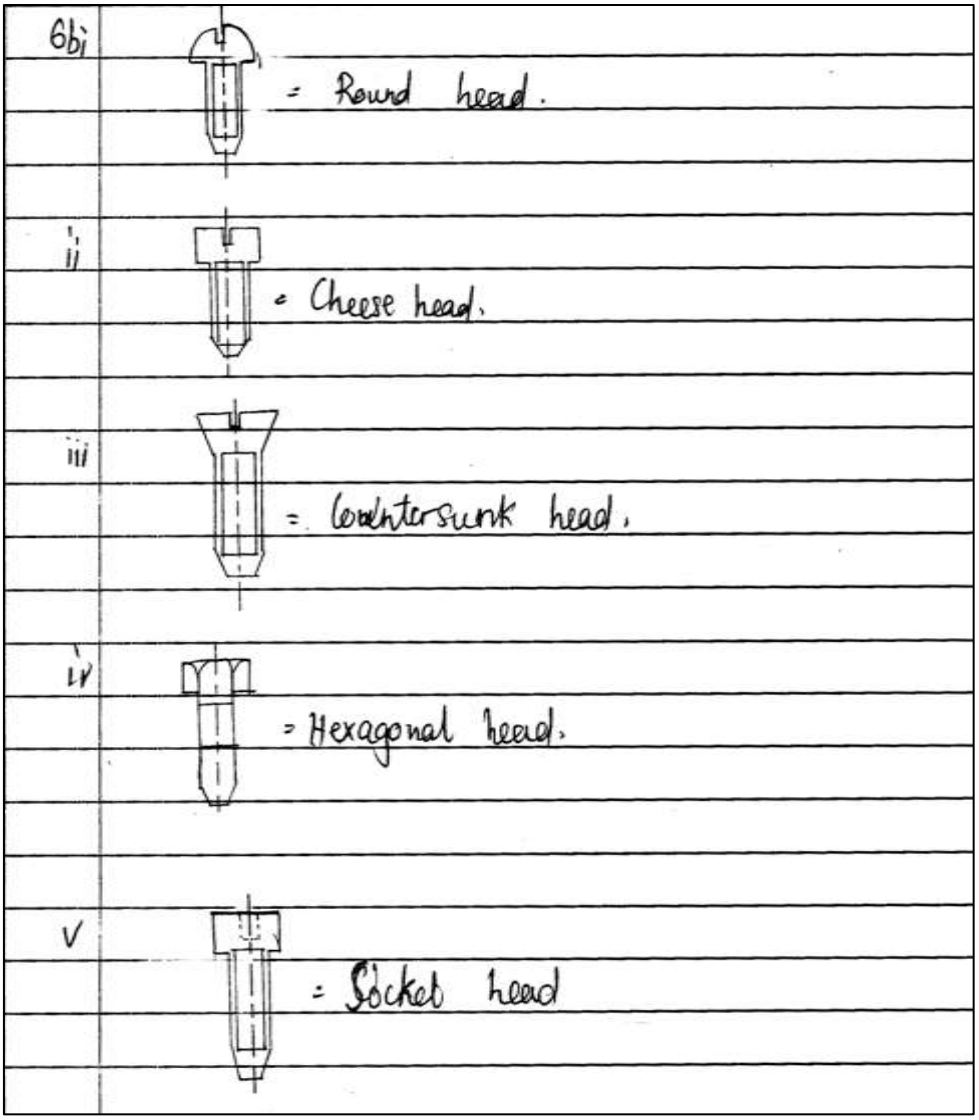
The response analysis shows that 78.2 per cent of the candidates performed poorly by scoring low marks which is 0 to 4 marks. These candidates lacked knowledge on Technical Drawing, especially in the subtopic of bolts and screws. Some of them drew letters to represent screw instead of sketching bolts and screws. For example one of the candidates wrote RH for round head, CH for cheese head and Hex H for Hexagonal head. Other candidates drew screws with star head instead of the countersunk head. In addition, some of them drew a picture of socket with three-dot instead of socket screw. Also there were candidates who skipped part (a) and incorrectly responded to part (b). Extract 6.1 illustrates the candidates' weak responses to the question.



Extract 6.1: A sample of incorrect response to Question 6

Extract 6.1 is a sample of poor responses extracted from one of the candidates who incorrectly responded to Question 6. The candidate drew irrelevant shapes of screws.

The analysis of the candidates' responses depicts that most of them failed to identify the labelled parts of the given thread diagram in part (a), but correctly sketched the mentioned bolts and screws in part (b). These candidates demonstrated partial knowledge on Technical Drawing. Extract 6.2 presents a sample of average responses to the question.

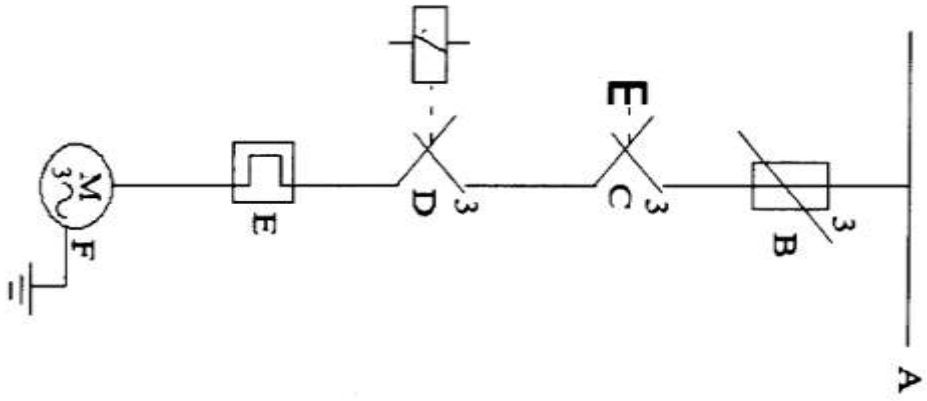


Extract 6.2: A sample of average responses to Question 6

Extract 6.2 is a sample of average responses to Question 6 provided by one of the candidates who correctly sketched the bolts and screws in part (b). The candidate skipped part (a) of the question.

2.2.5 Question 7: Electrical Accessories and Symbols

This question was comprised of two parts (a) and (b). In part (a) the candidates were required to identify the component represented by letters A, B, C, D and F as shown in a single line diagram given below.



In part (b) the candidates were required to draw symbols that represent each of the following components and their functions.

(i) Fuse
(ii) Transformer
(iii) Lamp (Indicator)
(iv) Inductor
(v) Variable resistor

The analysis shows that out of 341 candidates who sat for this paper, 333 (97.7%) attempted this question and their scores are as follows: 20 (6.0%) candidates scored from 0 to 4 marks, 169 (50.8%) candidates scored 4.5 to 9.5 marks and 144 (43.2%) candidates scored from 10 to 15 marks. This data suggests that the performance of the candidates was good since 94.0 per cent scored average and above. Figure 7 presents the candidates' performance.

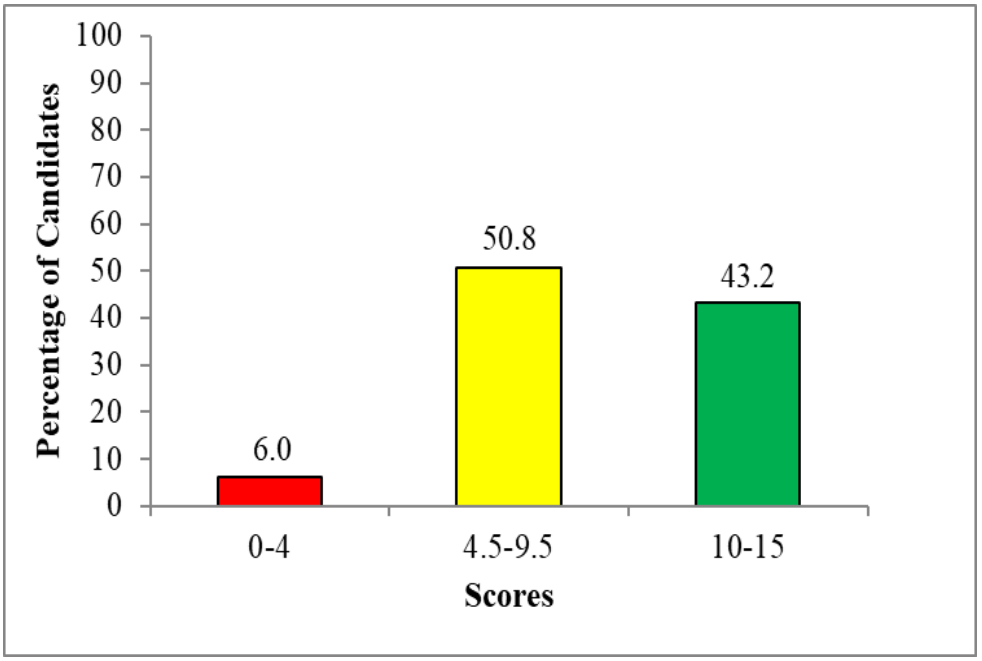
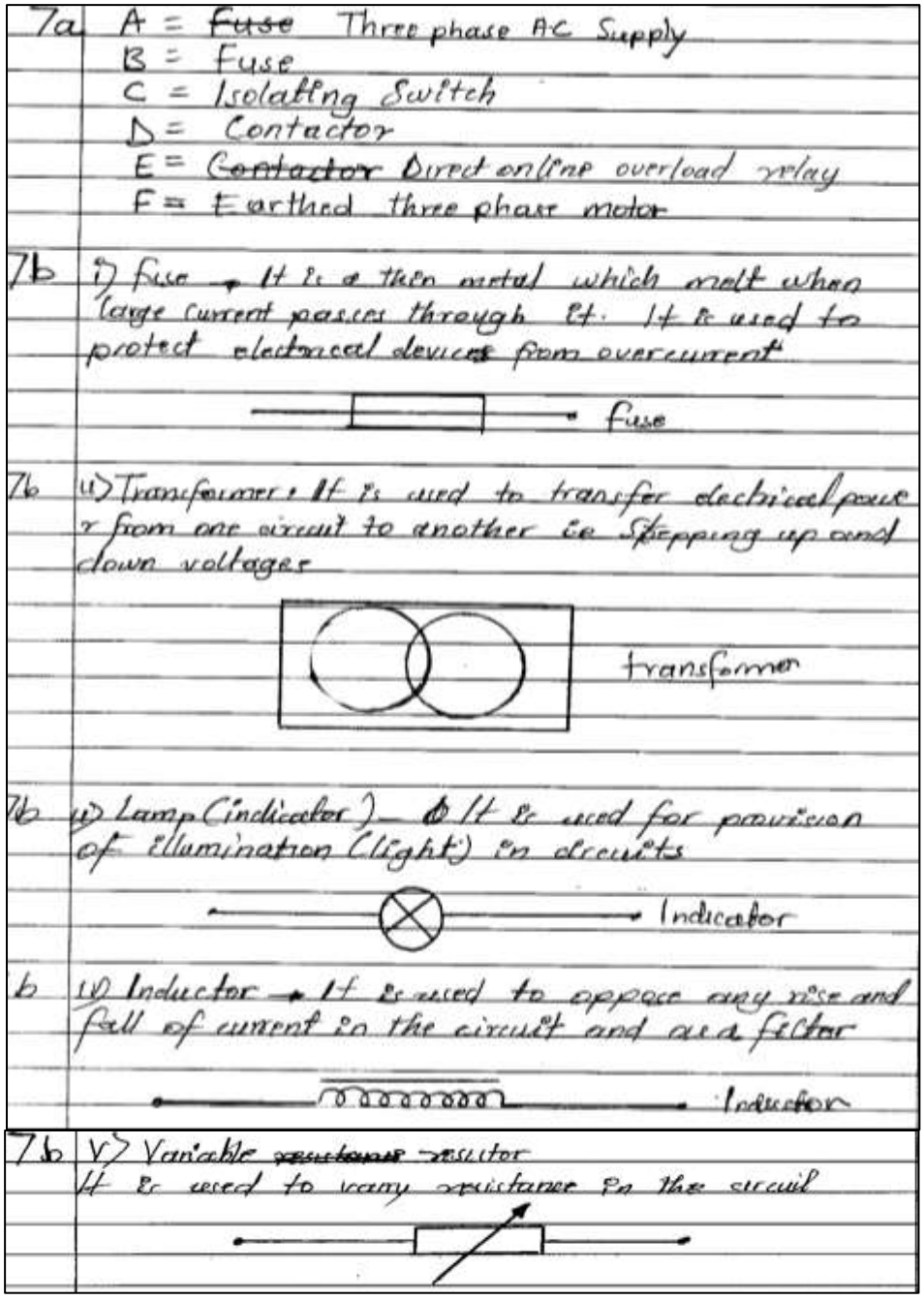


Figure 7: *Candidates' Performance in Question 7*

The analysis reveals that 43.2 per cent of the candidates performed well by scoring from 10 to 15 marks out of 15 marks allotted to the question. The candidates correctly identified the components labelled in the single line diagram as requested in part (a). They also correctly drew symbols of the given list of components and provided their functions. Extract 7.1 present a sample of good responses from the candidate who correctly identified the component labelled in the single line diagram and managed to draw symbols of the given list of components and their functions.

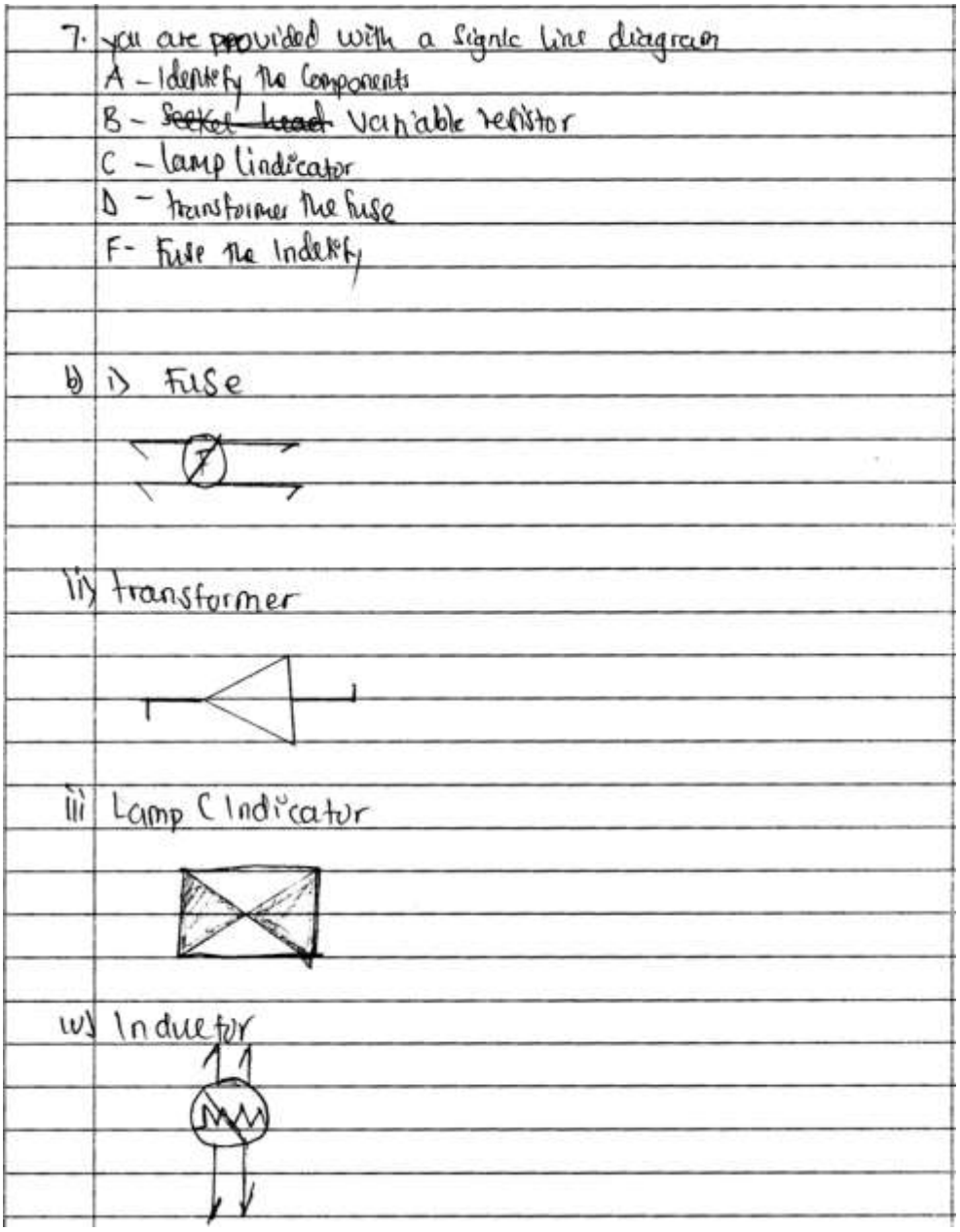


Extract 7.1: A sample of correct responses to Question 7

Extract 7.1 shows responses from one of the candidates who correctly identified the components labelled in the single line diagram, drew symbols of the given list of components and was able to provide functions of the given components.

Despite the overall good performance in this question, 6.0 per cent of the candidates performed poorly. These candidates failed to identify the components labelled in the single line diagram as requested in part (a). The expected answers were supposed to be A for *Bus bar/line/Power supply*, B for *3 pole fuse*, C for *3 pole isolator*, D for *Contactor*, E for *Thermal motor protection* and F for *Motor*. Instead some of the candidates deviated completely from the expected answers. For example, one of the candidates wrote A for *Capacitor/create/conducting wire*, B for *Resistor/amplitude/variable resistor*, C for *Transistor*, D for *Transistor/depth/switch*, F for *Lamp/height/power supply* and *Switch/length/lamp* respectively. In part (b) the candidates incorrectly drew symbols of the given list of components and failed to state their functions. Some of the candidates drew preset resistor instead of fuse. Other candidates drew a main switch instead of an inductor and another candidate drew a fixed resistor instead of a variable resistor. Some of the candidates gave wrong functions of the symbols. For instance, one candidate explained the function of a variable resistor as to apply resistor; transformer as to stop electric current; lamp as to cut and protect electricity; fuse as to prevent electricity current from reading electricity/lighting and that of a resistor as to oppose current. Some of the candidates copied some words from the question and use them as responses to the question.

Extract 7.2 shows responses from a candidate who incorrectly identified the labelled components in (a) and drew incorrect symbols of the given list of components in (b).



Extract 7.2: A sample of incorrect responses to Question 7

Extract 7.2 shows responses from one of the candidates who failed to identify the components labelled in the single line diagram, incorrectly drew symbols of the given list of components and failed to provide the functions of the given components.

3.0 ANALYSIS OF CANDIDATES' PERFORMANCE PER TOPIC

The analysis of performance in the topics which were assessed in Electrical Draughting subject for the year 2021 indicates that candidates performed well in three topics, average in two topics and weak in two topics.

The topics that were performed well include *Pictorial Drawing (89.7%)*, *Power Supply (*74.8%) and *Electrical Accessories and Symbols (*94.0%). The good performance in these topics signifies that the candidates had enough knowledge, skills and competence on the concepts tested.

The topics in which the candidates performed averagely were *Basics of Technical Drawing* (78.9%) from which the multiple-choice items were constructed and *Printed Circuit Boards* (53.4%). The average performance in these topics shows that the candidates had partial knowledge, skills and competence on these topics.

The candidate performed poorly in the sub-topic *Bolt, Threads, Nuts and Screws* (21.8%) and *Consumer Circuits* (29.2%). It seems candidates had insufficient knowledge on these topics

The summary of the candidate's performance in each topic is shown in the Appendix.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The performance of the candidates on the Electrical Draughting examination in the year 2021 was generally good. Out of 341 candidates who sat for the paper 294 (86.2%) passed while 47 (13.8%) failed.

The analysis of the candidates' responses depicted a few challenges the candidates faced when responding to the questions. These include the candidates' lack of adequate knowledge in responding to some of the questions and lack of drawing skills as question which required the candidates to draw bolts and nuts, was poorly performed.

Another weakness observed was the inability of some of the candidates to understand the requirements of the questions which led them to provide irrelevant responses, especially in the question concerning assembled and schematic diagrams.

4.2 Recommendations

In order to improve the performance of the candidates, it is recommended that:

(i) Candidates should do enough exercise and tests, especially on areas of consumer diagrams and mechanical drawings (bolt, nuts and threads). This will strengthen their abilities in those areas.

(ii) Teachers should practice a "competency-based" mode of material delivery in various topics and they should ensure that candidates gain practical skills. This is important because "practice makes perfect".

(iii) The candidates should be well oriented in common terms used in composing questions. This will enable them to understand the requirements of the questions.

Appendix

A Summary of Candidates' Performance per Topic in Electrical Draughting Subject in the Year 2021

S/n	Topic	Qn. Number	Percentage of Candidates who scored 30% and above per each Level of performance	Remarks
1	Electrical Accessories and Symbols	7	94.0	Good
2	Pictorial Drawing	2	89.7	Good
3	Basics of Technical Drawing	1	88.9	Good
4	Power Supply	5	74.8	Good
5	Printed Circuit Boards	4	53.4	Average
6	Consumer Circuits	3	29.2	Weak
7	Technical Drawing (Bolts, Threads and Nuts)	6	21.8	Weak