



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



**CANDIDATES' ITEM RESPONSE ANALYSIS
REPORT FOR THE ADVANCED CERTIFICATE OF
SECONDARY EDUCATION EXAMINATION
(ACSEE) 2020**

136 COMPUTER SCIENCE



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



**CANDIDATES' ITEM RESPONSE ANALYSIS
REPORT FOR THE ADVANCED CERTIFICATE OF
SECONDARY EDUCATION EXAMINATION (ACSEE)
2020**

136 COMPUTER SCIENCE

Published by:

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

© The National Examinations Council of Tanzania, 2020

All rights reserved.

TABLE OF CONTENTS

FOREWORD.....	iv
1.0 INTRODUCTION	1
2.0 ANALYSIS OF THE CANDIDATES' RESPONSE PER QUESTION	2
2.1 136/1 COMPUTER SCIENCE 1	2
2.1.1 Question 1: Data Representation	2
2.1.2 Question 2: C++ Programming.....	5
2.1.3 Question 3: Website Development	9
2.1.4 Question 4: Information Systems	13
2.1.5 Question 5: Visual Basic Programming	16
2.1.6 Question 6: Computer Security and Privacy	19
2.1.7 Question 7: Computer Basics	23
2.1.8 Question 8: Problem Solving and C++ Programming	27
2.1.9 Question 9: Data Communication and Networking.....	32
2.1.10 Question 10: IT Environment	37
2.2 136/2 COMPUTER SCIENCE 2.....	42
2.2.1 Question 1: C++ Programming.....	42
2.2.2 Question 2: Visual Programming and Access	48
2.2.3 Question 3: Web Site Development	54
3.0 PERFORMANCE OF THE CANDIDATES PER TOPIC	61
4.0 CONCLUSION AND RECOMMENDATIONS	61
4.1 Conclusion	61
4.2 Recommendations.....	61
APPENDIX.....	63

FOREWORD

The National Examinations Council of Tanzania is pleased to issue the Candidates' Item-Response Analysis (CIRA) report on Computer Science for the Advanced Certificate of Secondary Education Examination (ACSEE) 2020. The analysis provides feedback to the students, teachers, parents, policy makers and other education stakeholders on how the candidates responded to the questions.

The Advanced Certificate of Secondary Education Examination marks the end of the two years of advanced level of secondary education. It is a summative evaluation which shows, among other things, the effectiveness of the education system in general and education delivery system in particular. Essentially, the candidates' responses are strong indicator of what the education system has been able or unable to offer to the candidates in their two years of advanced secondary education.

The analysis presented in this report is intended to contribute towards understanding of some of the reasons for the candidates' observed performance. The reasons for good performance include sufficient knowledge of the content in the concepts tested and correct interpretation of the questions. The reasons for some candidates' poor performance include wrong interpretation of the requirements of the questions, lack of practical skills in responding to the questions and inadequate knowledge on the materials taught under the tested topics.

The feedback provided in this report will enable the educational administrators, school managers, teachers and the students to identify proper measures to take in order to improve the candidates' performance in future examinations administered by the Council.

Finally, the Council would like to thank everyone who participated in the preparation of this report.



Dr. Charles E. Msonde
EXECUTIVE SECRETARY

1.0 INTRODUCTION

This report presents an analysis of the candidates' performance in the 2020 Computer Science for the Advanced Certificates of Secondary Education Examination (ACSEE). The examination assessed knowledge and competences acquired by the candidates at the advanced level of secondary education.

The examination had two papers, Computer Science 1 (Theory) and Computer Science 2 (Practical). The theory paper had two (2) sections; A and B. Section A consisted of seven (7) compulsory questions of 10 marks each. Section B had three (3) optional questions with 15 marks each. The candidates were asked to attempt two (2) questions. The practical paper had three (3) questions of 25 marks each. The candidates were required to attempt two (2) questions, including question one.

A total of 39 candidates sat for the Computer Science examination in 2020. Out of these candidates, 32 (82.05%) passed the examination and 7 (17.95 %) failed. In 2019, a total of 35 candidates sat for the Computer Science examination, of these candidates, 33 (94.29%) passed and 2 (5.71%) failed. This means that there is a decrease in performance by 12.24 per cent in 2020.

This report provides feedback to education stakeholders on the candidates' performance; showing both candidates' strengths and weaknesses. The candidates' performance on each question/topic has been categorized using the ranges of 0 to 34 (poor performance), 35 to 59 (average performance) and 60 to 100 (good performance). These intervals stand for the per cent of the candidates who scored 35 per cent or above of the marks allocated to different questions. In this report, the candidates' performance is also presented in different charts in which red colour stands for poor performance, yellow colour for average performance and green colour for good performance.

The analysis of the candidates' performance is done by showing the requirements of the questions, what the candidates wrote and the mistakes they made while attempting the questions. Furthermore, the extracts of candidates' responses are provided to illustrate the cases presented. Finally, the report presents conclusions and recommendations.

2.0 ANALYSIS OF THE CANDIDATES' RESPONSE PER QUESTION

2.1 136/1 COMPUTER SCIENCE 1

2.1.1 Question 1: Data Representation

In this question, the candidates were required to; (a) use standard distinctive symbols to outline the main three Boolean Operators, (b) draw a logic gate circuit for the Boolean expression $AB'+C'(A+B)$ and (c) simplify the Boolean expression $f = (AB'(A+C))' + A'B(A+B'+C)'$, use NOR gates only to draw a logic gate circuit of the simplified Boolean expression.

A total of 39 (100%) candidates attempted this question, out of whom 3 (7.7%) scored from 0 to 3 marks, 13 (33.3%) scored from 3.5 to 5.5 marks and 23 (59.0%) scored from 6 to 10 marks out of the 10 marks allocated. Figure 1 illustrates the candidates' performance in this question.

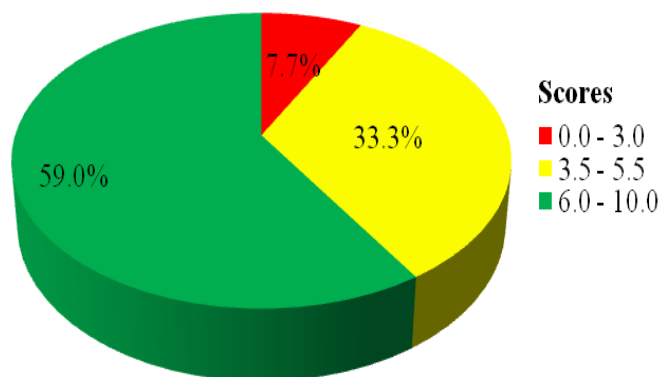

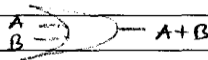



Figure 1: *The candidates' performance in question 1 of paper 1.*

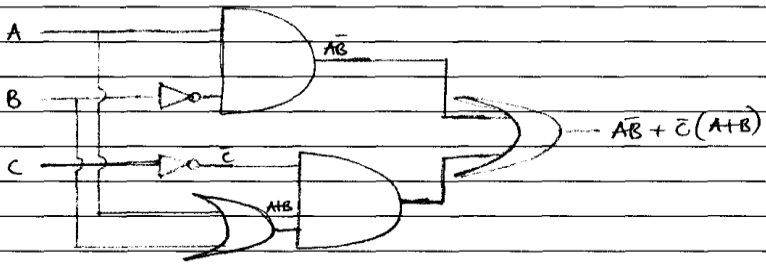
The general performance in this question was good because 92.31 per cent of the candidates scored above 3.0 marks. The analysis from the candidates' responses showed that the candidates (59.0%) who scored high marks clearly identified the main Boolean operators and drew their respective symbols, drew the logic gate circuit of the given expression and clearly showed each of the Boolean operator symbols. They also simplified the given Boolean expression by following the Boolean Algebra rules and provided simplified circuit. However, some of these candidates failed to draw the simplified Boolean expression using NOR gates only, some used AND gates while others used OR-NOT gates. For example, one of the

candidates drew correctly logic gate circuits and outlined the three main Boolean operators but failed to draw their distinctive symbols. The candidate drew the electrical circuit with switches to represent Boolean operators instead of OR gate, NOT gate and AND gate. Another candidate simplified the Boolean expression accordingly but failed to reach to the final answer, due to the candidate's inability to use of the identity law of the Boolean Algebra. This indicates that the candidate had knowledge on Boolean operators but lacked knowledge and skills on Boolean Algebra rules. Extract 1.1 represents a sample of a good response.

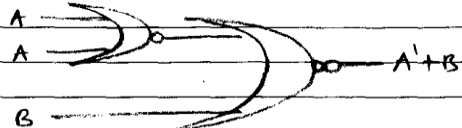
1 a Boolean operators are

- AND operator 
- OR operator 
- NOT operator 

b. $A\bar{B} + \bar{C}(A+B)$



c.

$$\begin{aligned}
 f &= (AB'(A+C))' + A'B(A+B'+C')' \\
 &= A' + B + (A+C)' + A'B(A'BC) \quad \text{de-morgan's law} \\
 &= A' + B + A'C' + A'BC \quad BB = B \\
 &= A'(1+C'+BC) + B \quad A+1 = 1 \\
 &= \underline{A' + B}
 \end{aligned}$$


Extract 1.1: A sample of correct answer to question 1 of paper 1.

In Extract 1.1 the candidate correctly used distinctive symbols to outline the main three Boolean operators, simplified the given Boolean expression and drew the logic gates circuit from the given expression, but was unable to draw the simplified expression using NOR gates only.

Further analysis from the candidates' responses reveals that the candidates (33.3%) who had an average performance were able to outline and draw the distinctive symbols of the main three Boolean operators. They were also able to draw the logic gate circuits of the given expression but failed to simplify the given Boolean expression. For example, one candidate could not use effectively De-Morgan's law while simplifying the Boolean expression. For example, one candidate wrote $(AB' (A+C))' = A'B (A'+C')$ which is logically incorrect based on De-Morgan's 'law. This candidate lacked the clear understanding of the application of De-Morgan's law. Another candidate failed to understand part 1(a) of the question and answered the three main Boolean operators “+,-,*” which are mathematical operators instead of AND, OR and NOT. This signifies that the candidate lacked knowledge on differentiating mathematic operators from Boolean operators.

On the other hand, few (7.7%) candidates had low performance. The analysis shows that these candidates were unable to outline the main Boolean operators and draw the symbol of the main Boolean operators. They even failed to apply the basic rules of Boolean expression. For example, one candidate wrote; *Distributive law*, *Commutative law* and *De Morgan's law* as Boolean operators which is completely different from the demand of the question. The candidate was supposed to give the basic Boolean operators which are AND operator, OR operator and NOT/Invert operator. This candidate had mixed up the basic rules of the Boolean Algebra with Boolean operators. Furthermore, some candidates who performed lowly in this question failed to simplify the given Boolean expression. However, the candidates who scored low marks managed to correctly respond to few items. Extract 1.2 provides a sample of such incorrect responses.

1	(a) Boolean operators
	(i) NOT gate
	(ii) OR gate
	(iii) AND gate
1	(b) $A\bar{B} + \bar{C}(A+B)$
	When $y = A\bar{B} + \bar{C}(A+B)$

Extract 1.2: A sample of an incorrect answer to question 1 of paper 1.

In Extract 1.2, the candidate was able to outline the main three Boolean operators, but failed to draw their distinctive symbols and the logic gate circuit of the given expression.

2.1.2 Question 2: C++ Programming

In this question, the candidates were required to; (a) define the term function as applied in programming languages, (b) outline the roles of user defined functions, (c) read the block of code and then; (i) give the name of the function given, (ii) give out number of parameters used in that function, (iii) state if the code will perform a required task or not by giving reasons, and (d) with the aid of an example of a code statement, give two similarities and differences between 'cin' and 'cin.getlin' keywords as applied in programming languages.

A total of 39 (100%) candidates attempted this question, out of whom 15 (38.5%) scored from 0 to 3 marks, 13 (33.3%) scored from 3.5 to 5.5 marks and 11 (28.2%) scored from 6 to 10 marks out of the 10 marks allocated. Figure 2 illustrates the candidates' performance in this question.

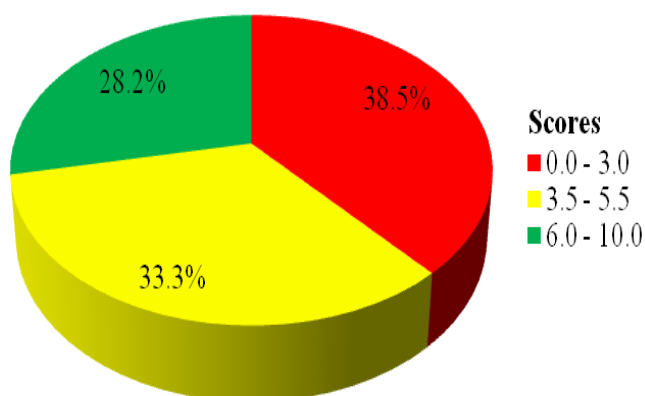


Figure 2: The candidates' performance in question 2 of paper 1.

Figure 2 illustrates that the general performance for this question was good as 61.5 per cent of the candidates scored above 3 marks. The analysis shows that 28.2 per cent of the candidates were able to give the correct responses to most parts of the question by identifying the roles of user defined functions as applied in programming languages, managed to define the meaning of a function, and differentiate between 'cin' and 'cin.getline' keywords as applied in programming languages. However, few candidates could not score full marks because they failed to; (i) give the name of the function, (ii) give out number of parameters used in that function and (iii) state if the code will perform a required task or not by giving reasons. For example, in part 2 (c), one of the candidates wrote, *there are two parameters which are area and r* which was not the correct answer hence could not score full marks. This candidate had difficulty in differentiating between the variable declared within the function and the parameters passed as arguments in the function. Extract 2.1 provides a sample of good responses.

2 a.	Function is the grouping of segments in which, each performing specific task in programming.	
b.	i) To perform (execute) the user needs that are non-primitive	
	ii) To increase functionality of language when used.	
	iii) Provide means of calling the return or non-return value in the program.	

c.	i) The name of the function is <code>areacircle</code> .	
	ii) There are three (3) formal parameters.	
	iii) No, because there is no declaration of <code>r</code> and codes will not call the area anywhere.	
d.	Similarities	
	- All are used to input data, example <code>cin >> a;</code> <code>cin.getline(str);</code> .	
	- All are declared in programming through <code>#include <iostream></code> , it means <code>istream</code> as <code>cin</code> .	
	Differences	
	- <code>cin</code> inputs only one integer, or character (datatype value) while <code>cin.getline</code> inputs long including with spaces example <code>cin >> a;</code> <code>cin.getline(str)</code> <code>str = "Advanced mathematics"</code> .	

Extract 2.1: A sample of correct answer to question 2 of paper 1.

In Extract 2.1, the candidate gave the correct definition of the function, roles of user defined function, the name of the function and the reason for a function not to perform the required task and provided the number of parameters used in the function. However, the candidate failed to give clear similarities between `cin` and `cin.getline`.

The candidates (33.3%) who scored average marks were able to give the correct name of the function, the number of parameters used in that function and to state if the code will perform the required task or not. However, these candidates failed to identify the roles of user defined functions which resulted to scoring average marks. For example, one candidate wrote, *to give the name of the function* as one of the roles of a function which was not correct. This shows that the candidate did not understand the meaning of a function as well as the name of the function is found and how it is named.

On the other hand, the candidates (38.5%) who scored low marks were not able to define the term function as applied in programming languages, identify the roles of user defined functions, and give two similarities and

differences between 'cin' and 'cin.getlin' keywords as applied in programming languages. For example, one of the candidates mentioned *it help in making logic decision* as one of the roles of function which is not correct. This indicates that the candidate lacked the knowledge of the built in functions and user defined functions. The analysis reveals that other candidates wrote the similarity between 'cin' and 'cin.getline' as *both are used to enter integers*, which was wrong. The candidate did not understand that cin.getline does not deal with integers but deals with strings and 'cin' deals with various data types like float, integers and double. However, few of these candidates gave correct name of the function and the number of parameters that were used in the function but failed in the rest of the parts of the question, which made them score low marks. Extract 2.2 represents a sample of poor responses provided by the candidates.

2	a/	function - Is a mathematical expression that is Used to find a solution by Using defined Variables.	
	b/	Roles <ul style="list-style-type: none"> • To set conditions for the Output eg If • To find Optimum Solution • To Utilize the Variables set 	
2c/	i/	Syntax function.	
	ii/	One formal parameters	
	iii/	No, Since Return 0 is not not written not Return Area.	
2	d/	Similarities <ul style="list-style-type: none"> • Both Input data. • Both are C++ code statements. Differences. <ul style="list-style-type: none"> • Cin is not limited to some any Inputs while Cin . getline is limited to some Inputs. • Cin is more accurate in numerical representation Cin . getline is less accurate compared to Cin eg decimals. 	

Extract 2.2: A sample of an incorrect answer to question 2 of paper 1.

In Extract 2.2, the candidate failed to identify the roles of user defined function as applied in programming languages, to give the name of the function and number of parameters in the function, but managed to state one correct similarity and reason for a function not to perform the required task.

2.1.3 Question 3: Website Development

The question required the candidates to; (a) describe the web server, (b) outline four steps to be followed when creating a website, and (c) by using HTML and JavaScript codes, develop HTML form with one input field named ‘number’ and a submit button called ‘process’. Check if the value entered in a form is a number and it is greater than 0’. If not alerts ‘Error: Provide a number greater than 0’. If it is an even number, it alerts ‘The number provided is divisible by 2’. Otherwise it alerts ‘The number provided is not divisible by 2’.

A total of 38 (97.4%) candidates attempted this question, out of whom 14 (36.8%) scored from 0 to 3 marks, 21 (55.3%) scored from 3.5 to 5.5 marks and 3 (7.9%) scored from 6 to 10 marks out of the 10 marks allocated. Figure 3 illustrates the candidates' performance in this question.

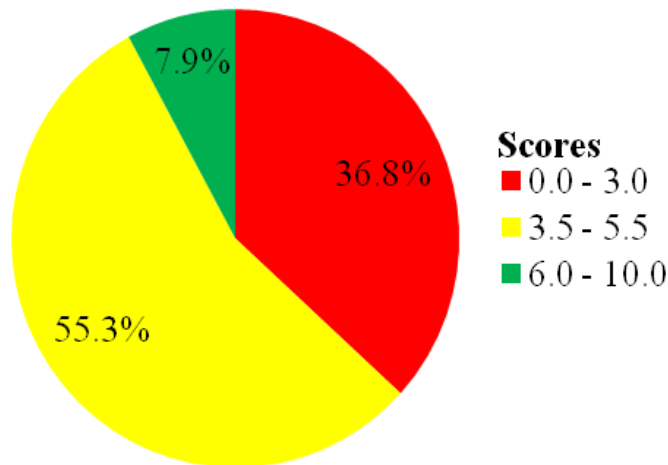


Figure 3: *The candidates' performance in question 3 of paper 1.*

Figure 3 illustrates that the performance in this question was good as 63.2 per cent of the candidates scored above 3 marks. The analysis of the candidates' responses showed that some of the candidates (7.9%) who

scored high marks clearly described a web server and outlined correctly the four steps to be followed when creating the website. They were also able to write the required codes and tags. However, some of those who could not score all marks had difficulty in writing HTML and JavaScript codes, while others had the problem of insufficient knowledge on the concepts tested. The candidates mixed up the concept of Microsoft computer software which allows computer operations with the web server which led to loss of marks. Extract 3.1 represents a sample of good response.

03. (a) Webserver - is a special computer (server) that stores all data, information and receiving requests of from a user of a given website; They have accessible space for data storage.

03. (b) *

- * Website goal or need
- * Website Audience (User requirement) define
- * Website contents to be displayed.
- * Website contents broken into pages or different pages
- * Pages contents linkage within a website, to working as a hypertext system.
- * Website testing and implementation.

03. <!DOCTYPE HTML>
 <HTML>
 <Title> Greater and type of number </Title>
 <Body> <h3> Checking even and odd of number </h3>
 <h1 id="Memo"> </h1>
 <Script>
 function My function
 {
 for (n >= 0)
 (get document By Id (Memo).value;
 else ; !Alert ; }

```

03 (c) { for (n/2 = (n/2)
        getdocument byId ( ).Value = "number
        is divisible by 2 ".}

        else; { System = " Alert = "Not divisible by 2" "}

        }

</script>
<form>
    Enter number : <input type = "number" value = "number">

    <input type = "button" Oncheck = "My function()"
    value = "process" >SUBMIT</input>

</form>
</Body>
</HTML>

```

Extract 3.1: A sample of correct answer to question 3 of paper 1.

In Extract 3.1, the candidate managed to define a web server, outlined the four steps followed when developing a website, but failed to integrate JavaScript in HTML tags.

On the other hand, the candidates (55.3%) who got average marks were able to describe a web server in part (a) and outlined one step to be followed when creating the website correctly in part (b). They were also able to write some of the required codes and tag in part (c), but failed to outline other three steps to be followed when creating the website. For example, one candidate wrote, *write source codes in html or JavaScript of the website, check for error if any, and publish the website if necessary* as the steps to be followed when creating the website, which is wrong. Also, others failed to write JavaScript codes in part (c) which made them score low marks.

Further analysis from the candidates' responses reveals that the candidates (36.8%) who performed poorly failed to define clearly the meaning of web server, failed to outline four steps to be followed when developing a website. For example, one of the candidates wrote (i) *open and close the tags* (ii) *write the heading of a file* (iii) *write details in the main body*, and (iv) *write the title of the website* as the steps for creating a website. This shows that the candidate had inadequate knowledge about website development. The analysis shows that some of the candidates managed to give the meaning of web server but failed to attempt correctly parts 3(b) and 3(c), while some were able to write codes using HTML codes but failed to integrate JavaScript codes in HTML tags. For example, one of the candidates wrote;

```
“<html><head></head><form action>
<input type="text" name="number"/>
<input type="submit" value="process"/>
<script type>
<function process></html>”.
```

The response indicates that the candidate had knowledge on web development by using HTML codes but lacked adequate knowledge on JavaScript codes. Extract 3.2 also shows poor response provided by another candidate.

3.	a) web server refers to the server which display the webpages to the client after been requested towards the server.	
	b) The four steps to be followed when creating a website	
	i) Identification of the problem.	
	ii) Implementing of program website coding	
	iii) Debugging and testing of website if there are errors.	
	iv) Representation of website	

c)	<html>	
	<head>	
	<script>	
	var x = document.getElementById (innerHTML = x)	
	if (x % 2 == 0)	
	document.write = the ("The number is even")	
	else if the x = 0	
	document.write = ("The number provided is not divisible by 2")	
	if (x > 2) then	
	document.write = ("Number greater than 2")	
	else if ; document.write = ("Error")	
	</script> <title> </title>	
	<form>	
	<input type = "textbox" >	
	</form>	
	</html>	

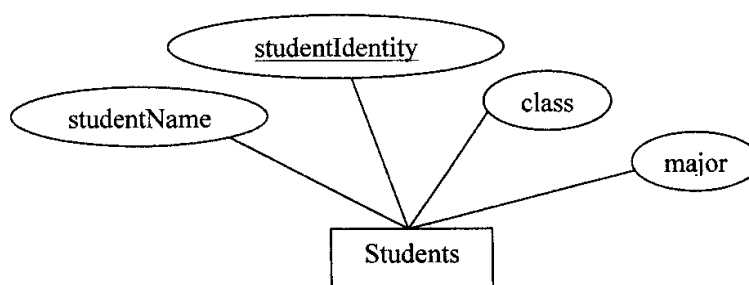
Extract 3.2: A sample of an incorrect answer to question 3 of paper 1.

The responses of candidate provided in Extract 3.2 shows how the candidate failed to outline the correct four steps followed when developing a website, and to write HTML and JavaScript codes. However, the candidate managed to describe web server and little parts of HTML tags.

2.1.4 Question 4: Information Systems

The question required candidates to;

- explain four elements of information systems.
- explain the meaning of relational database query
- use the following entity set with its attributes to answer the questions



- i. represent entity set into its equivalent relation table,
- ii. write SQL query to create students database table,
- iii. write SQL insert data into students table and
- iv. write SQL query required to retrieve data from students table.

A total of 38 (97.4%) candidates attempted this question, out of whom 27 (71.1%) scored from 0 to 3 marks and 11 (28.9%) scored from 3.5 to 5.5 marks out of the 10 marks allocated. Figure 4 illustrates the candidates' performance in this question.

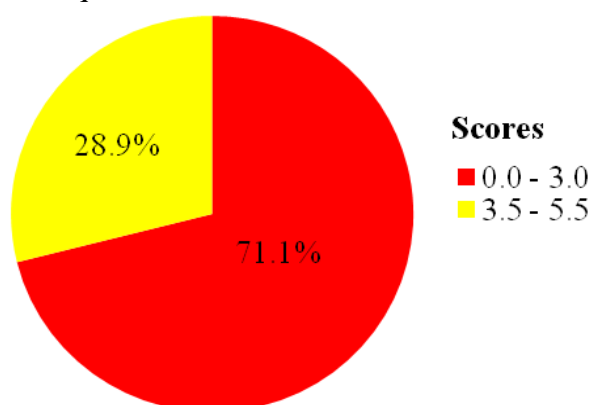


Figure 4: *The candidates' performance in question 4 of paper 1*

The general performance in this question was poor because 71.1 per cent of the candidates scored below 3.5 marks. The analysis from the candidates' responses shows that the candidates (71.1%) who scored low marks, were able to list correctly the four elements of information systems without any explanation, but failed to answer other parts of the question. However, some candidates managed to represent entity set into its equivalent relation table, but few of them failed to understand the requirements of the question and gave incorrect answers. For example, one of the candidates drew tables

instead of writing the required queries to create tables. Also, another candidate wrote the components of data transmission process (communication process) such as *sender, medium, receiver and feedback*, as components of information systems instead of explaining on hardware, software, data, procedures, people and communication. Extract 4.1 represents a sample of poor responses from one of the candidates.

4	Information System is the system where by provide the information in the computer system when to output the information			
	(i) Audio - is the information system that used to provide information by using the sound			
	(ii) Image - is the information element of information system that provide information by using the picture			
	(iii) Text - is the element of information system that used the writing the message or word.			
4	(iv) Graphical - is the element of information system that using the graphical to present the information.			
4	(v) Relational database query is the type of database that using the required any thing to the database information stored.			
4	(vi)			
	(ii) Students			
	Student/identity	Student name	class	Major
	X x x	X x x	xx	xxx
	X x x	X x x	xx	xxx
	X x x	X x x	xx	xxx

(iii)			
Students			
Student Identity	Student Name	Class	Major
S.234P.2018	Changé Moshé	Form IVB	Science
(iv)			
Students			
Major			
Science Subject			

Extract 4.1: A sample of incorrect answers to question 4 of paper 1.

In Extract 4.1, the candidate wrote the components of multimedia instead of components of information systems. Also, drew a table instead of writing SQL queries. However, he/she was able to represent entity set into its equivalent relation table.

On the other hand, the candidates (28.9%) who scored average marks explained correctly the four elements of information systems. Few of them were able to write the correct query to create a table and insert data into the table. However, most of them failed to explain relational database query. For example, one of the candidates wrote, *relational database query is a query used to create relationship between two or more tables* which is incorrect. The candidate confused the creation of a relation database table with that of a relational database query. The analysis also shows that some candidates failed to understand the question's requirement. Moreover, some candidates did not answer part 4 (c) of this question. This shows that the candidates lacked knowledge on writing SQL query statements which involve activities such as creating table, inserting data into the table and creating a query using a given criteria.

2.1.5 Question 5: Visual Basic Programming

This question required a candidate to; (a) explain three purposes of procedures in Visual Basic programs, (b) mention four control structures supported by visual basic, (c) explain why is it necessary to choose Standard.Exe file command from the file menu when creating a Visual Basic project, and (d) write a VB program to display current date and time in a Form while showing the number of procedures used.

A total of 35 (89.7%) candidates attempted this question, out of whom 34 (97.1%) scored from 0 to 3 marks and 1 (2.9%) scored from 3.5 to 5.5 marks out of the 10 marks allocated. Figure 5 illustrates the candidates' performance in this question.

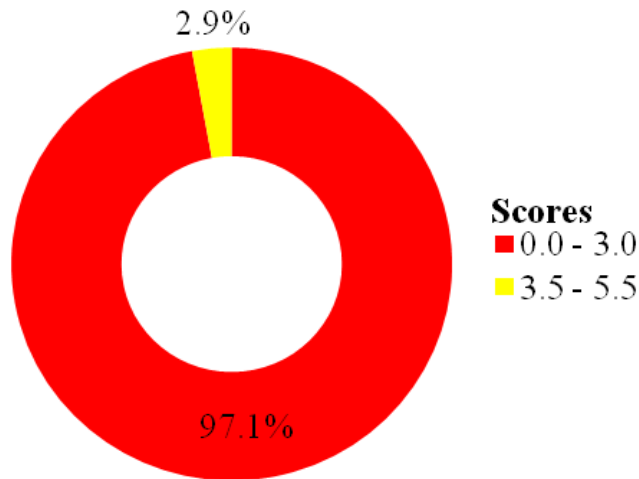


Figure 5: *The candidates' performance in question 5 of paper 1.*

The general performance of the candidates in this question was poor because 97.1 per cent scored below 3.5 marks. The analysis of the candidate's responses indicates that most of the candidates (97.1%) who scored low marks totally failed to attempt any part of this question. In part (a), most of them wrote the steps for opening Visual Basic software instead of purposes of procedures in Visual Basic programs. For example, one of the candidates wrote *the purpose of procedures in Visual Basic is to make the program more interactive and to differentiate one procedure from another*. In this response the candidate provided advantages of Visual Basic software rather than purposes of procedures in Visual Basic programming. Also, in part (b), very few candidates managed to mention correctly few Visual Basic control structures such as "IF.....Then.....Else", "For.....Next Loop" and "Do While.....Loop". In response to part (c), majority of the candidates failed to state that Standard.Exe enables access to an integrated development environment when creating a Visual Basic project. These candidates were not aware of the function of Standard.Exe file command. For example, one of the candidates wrote *Standard.Exe file command allows easy execution of the program*, which is not correct.

Moreover, in part (d), most of the candidates failed to write codes that would display the current date and time when a Form is loaded. They ended up writing pseudocodes instead of Visual Basic programming codes. This indicates that the candidates had inadequate knowledge of Visual Basic programming. Extract 5.1 represents a sample of poor responses from one of the candidates.

5	(a) (i) By making program to be understandable because in any procedure have meaningful.
	(ii) Creating calendar of the year
	(iii) To make calculation.
	(b) Four control structures are
	(i) Iteration.
	(ii) Selection.
	(iii) Case selection.
	(iv) Nested if. / Sequence
	(c) Because it should help to execute the program to run it successful.
	(d) Displaying of current data and time.
	Dim X as Boolean.
	Dim X,z as Integer
	X = Format (YYYY/MM/DD, Now).
	Z = Format (HH:MM, Now).
	End sub.

Extract 5.1: A sample of an incorrect answer to question 5 of paper 1.

Extract 5.1 shows a sample of response from a candidate who failed to explain the purposes of procedures in Visual Basic programs, the Visual Basic control structures, and to write the VB programming codes for the current date and time.

Further analysis of the candidates' responses discloses that very few candidates (2.9%) scored average marks. These candidates were able to

explain some of the purposes of procedures in Visual Basic programs. For example, in response to part (a), one of the candidates wrote *procedures in Visual Basic makes it easier to debug errors when arise*. Likewise, other candidates stated correctly the necessities of choosing Standard.Exe when creating a visual basic project. For example, in response to part (c), one of the candidates wrote *when creating a visual basic program, it is necessary to choose Standard.Exe command from the file menu as it provides a designing interface to the programmer*. Nevertheless, most of the candidates failed to mention control structures supported by Visual Basic in part (b) and to write Visual Basic codes that will activate a Form to display current date and time in part (d). This indicates that the candidates' failure is not only attributable to their inappropriate knowledge on Visual Basic concepts but also to their lack of practical skills and techniques that hindered them from writing appropriate Visual Basic codes for designing and activating a Form.

2.1.6 Question 6: Computer Security and Privacy

This question required the candidates to; (a) differentiate piracy from privacy terms as applied in data security, (b) list two ways of reducing piracy, (c) explain two control measures used to enforce data and information security against an unauthorized access, and (d) list four points addressed by the use of copyright laws over hardware and software protection.

A total of 38 (97.4%) candidates attempted this question, out of whom 9 (23.7%) scored from 0 to 3 marks, 13 (34.2%) scored from 3.5 to 5.5 marks and 16 (42.1%) scored from 6 to 10 marks out of the 10 marks allocated. The general performance for this question was good because 76.3 per cent of the candidates scored above 3 marks. Figure 6 illustrates the candidates' performance in this question.

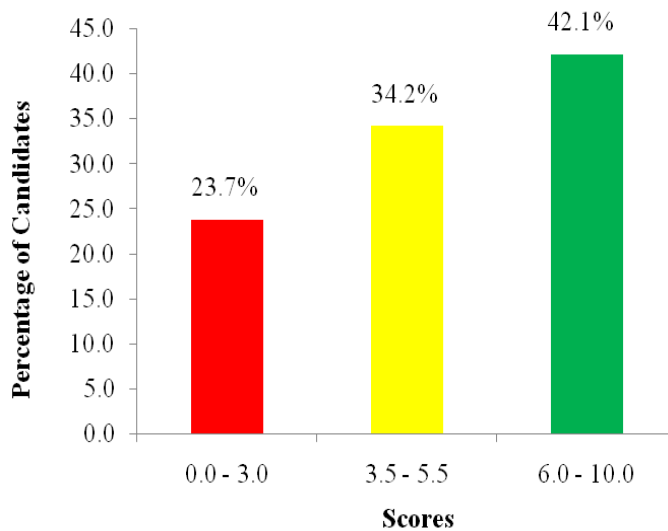


Figure 6: *The candidates' performance in question 6 of paper 1.*

The analysis of the candidate's responses shows that the candidates (42.1%) who scored high marks were able to differentiate the terms 'piracy' from 'privacy' as applied in data security in part (a), list two ways of reducing piracy in part (b) and to correctly explain the control measures used to enforce data and information security against an unauthorized access in part (c). However, some of the candidates failed to list correctly all four points addressed by the use of copyright laws over hardware and software in part (d). Hence they could not score all the marks. Extract 6.1 represents a sample of a good response from the candidate who answered this question correctly.

6a)	Piracy is the illegal use, distribution, and changing of licensed software or hardware, without the producers permission while.	
	Privacy is the security of information and data, accessible to only authorized personnel with required criteria.	
b)	-Setting of punishments against use, and distribution of pirated software -Using of licence keys for activation of products, to prevent use of pirated goods which will not have a licence key.	

c)	- using of passwords	
	This is used to prevent unauthorized access to confidential information in systems, so as to prevent leaking of information. Only those with the right password can access the information.	
	- Data encryption	
	This involves changing data format and type using a special key that will be used to return the data to its original value.	
d)	- It is the right of the author to permit or refuse the use, distribution and upgrading of their property.	
	- The author has the ability to validate the use and changes to his or her work by other parties, according to his own reasons.	
	- It is illegal to use or change licensed property without producer's permit.	

Extract 6.1: A sample of a correct answer to question 6 of paper 1.

In Extract 6.1, the candidate was able to differentiate piracy from privacy, list the ways of reducing piracy and explain correctly control measures used to enforce data and information security against unauthorized access. However, he/she listed only three instead of four points addressed by the use of copyright laws correctly.

Further analysis shows that the candidates who scored average marks (34.2%) managed to differentiate the terms 'piracy' from 'privacy' as applied in data security. They also managed to explain two control measures used to enforce data and information security against an unauthorized access. However, some candidates confused the measures used to enforce data and information security against an unauthorized access with those of ways of reducing piracy. For example, one of the candidates wrote, *by using encryption method and by using strong password*, which are measures used to enforce data and information security against an unauthorized access. This indicates that the candidate had inadequate knowledge on the two concepts.

Moreover, the candidates (23.7%) who scored low marks were unable to list ways of reducing piracy in part (b). They listed the ways of protecting

data against malware or unauthorized access. In part (d), the candidates gave answers which were not related to the demand of the question. For example, one of the candidates wrote, *year of publications, using privacy, government promotion, marked or symbol for software or hardware* as the copyright laws over hardware and software protection. However, a few of the candidates managed to list few measures to enforce data and information security against unauthorized access in part (c), but failed to give clear explanations as per question demand. This made them score low marks in this question. Extract 6.2 represents a sample of poor responses from one of the candidates.

6	a/	Piracy .	Privacy terms .
		-Invading a system without prior permission or Authorisation for personal Interest .	-Are conditions and regulations set to keep the User Information in private manner .
6	b/	• Fire walls • Data Encryption .	
	c/	• Building Fire walls • Data Encryption . • Data copyright and Trademark .	
	/	Building fire walls • Data Encryption . • Data copyright and Trademark .	
6	d/	• The name should Only be Used by the Co-owner . • Product formed should not be copied by another producer with same Competitions (percentage) • Product should Only be produced with prior Authorisation from the Owner . • No one is allowed to Use the same Technology in production .	

Extract 6.2: A sample of an incorrect answer to question 6 of paper 1.

In Extract 6.2, the candidate failed to supply correct answers to parts b, c and d. However, he/she correctly differentiated the terms piracy from privacy in part (a).

2.1.7 Question 7: Computer Basics

This question required candidates to;

- (a) explain four common features of Graphical User Interface (GUI) available in Microsoft word.
- (b) differentiate SUM from SUMIF functions as used in Microsoft excel.
- (c) write the syntax of SUM and SUMIF functions.
- (d) write the functions required to find the total amount from north region of the given sales table.

	A	B	C	D
1	Sales Table			
2	Date	Region	Units	Total Amount
3	24/06/2016	North	186	Tsh. 50, 592.00
4	4/6/2016	East	356	Tsh. 96, 832.00
5	2/7/2016	West	907	Tsh. 200,000.00
6	1/7/2017	South	190	Tsh. 51,000.00
7	24/07/2017	North	717	Tsh. 180,900.00
8	15/06/2016	West	550	Tsh. 149,900.00

A total of 39 (100%) candidates attempted this question, out of whom 27 (69.2%) scored from 0 to 3 marks, 9 (23.1%) scored from 3.5 to 5.5 marks and 3 (7.7%) scored from 6 to 10 marks out of the 10 marks allocated. The candidates' general performance in this question was poor because 69.2 per cent of the candidates scored below 3.5 marks. Figure 6 illustrates the candidates' performance in this question.

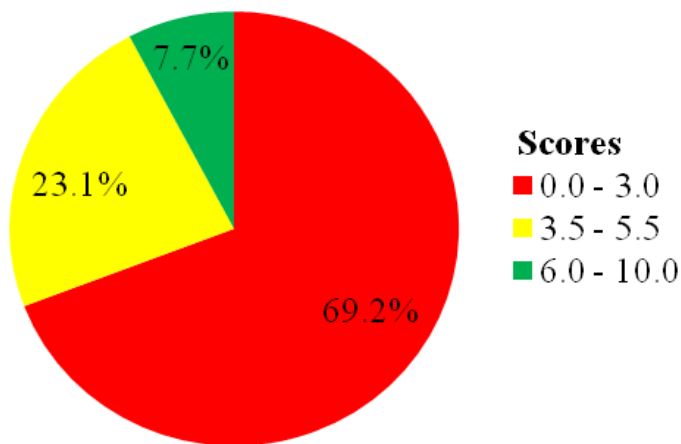


Figure 7: The candidates' performance in question 7 of paper 1.

The analysis shows that majority of the candidates (69.2%) who scored low marks had difficulty in explaining the common features available in Microsoft word in part (a). They explained submenu features such as layout, design view, files, pictures and table instead of title bar, menu bars, toolbars, document window, status bars, scroll bars, task pane and ruler bars. This indicates that the candidates had insufficient knowledge on common Graphical User Interface features. In part (b), some candidates managed to explain SUM function, but failed to respond to other parts of the SUMIF function clearly. In part (c), very few candidates only managed to write the syntax of SUM, but failed to write the syntax of SUMIF. For example, one of the candidates wrote "*SUMIF (C1>20)*" instead of =SUMIF (Range, criteria, [Sum_range]). Moreover, in part (d), it was observed that majority of the candidates failed completely to write the function required to find the total amount from North region in the given Sales table. Most of them wrote the SUM function, and some used formula instead of function. For example, one of the candidates wrote "*=SUM (D3, D8)*" which is wrong. The candidate was supposed to know that for the proper use of conditions/criteria with the appropriate cell range, the correct response was =SUMIF (B3:B8,"North", D3:D8). The candidates' failure indicates that they had insufficient practical knowledge and skills in using SUMIF function. Extract 7.1 represents a sample of a poor response provided by a candidate.

7	(a) Four common features are
	(i) Format : In microsoft word GUI can format the word.
	(ii) Editing : Edit by colouring or italic word.
	(iii) Font : Can be used as word to make big or design
	(iv) Sorting
	(b) SUM used as a simple operation in Microsoft Excel example (=sum(B3 : D8)). while SUMIF used the operation that included some condition example =sum IF (D3 > D8).
	(c) Syntax of sum
	= SUM (D1 : D2) or = SUM (D1 + D2).
	Syntax of sum IF
	= SUM IF (D1 < D2).

	(d) Total amount from North.
	= (C3 * D3).

Extract 7.1: A sample of an incorrect answer to question 7 of paper 1.

In Extract 7.1, the candidate wrote submenu features instead of the common Graphical User Interface features, and also failed to write the syntax of SUMIF function, but managed to differentiate between SUM and SUMIF.

Further analysis of the candidates' responses shows that most of the candidates (23.1%) who had an average performance failed to explain the common features of Graphical User Interface (GUI) available in a Microsoft word in part (a). They also failed to differentiate SUM from SUMIF functions in part (b). Furthermore, some candidates were able to write the correct syntax of SUM and SUMIF in part (c), but failed to write the function required to find the total amount from North region in part (d). For example, one of the candidates wrote " $=SUMIF(D3:D8)$ " and another wrote " $SUMIF(A9>70:F9)$ " as the syntax of SUMIF instead of $=SUMIF(\text{range}, [\text{criteria}], [\text{sum_range}])$. Likewise, some candidates failed to write correctly the function of SUMIF for finding the total amount from the North region. For example, one of the candidates wrote " $SUMIF(B3+B7)$ " while another wrote " $=SUMIF((C3>C8)(C3:C8))$ " as functions for finding the total amount from the North region. This shows that these candidates had inadequate practical knowledge and skills in using SUMIF function in excel which hindered them from scoring full marks.

Furthermore, the analysis shows that the candidates (7.7%) who scored high marks managed to write common features of Graphical User interface available in Microsoft word in part (a), differentiate SUM from SUMIF and to write the function for finding the total amount from North region from a given sales table. However, few of them failed to write the syntax of SUMIF. Extract 7.2 represents a sample of a good response provided by one of the candidates.

7a.	Graphical User Interface features available in Microsoft Word.	
	i) Title Bar.	
	This is common feature as it describes name of an active Microsoft Word window or document.	
	ii) Menu Bar.	
	It is common feature as Graphical user interface offer out option and user freely choose any option of his/her kind. In Microsoft Word, there is menu bar with several options for user to choose.	
	iii) Tool Bar.	
	This feature carries essential tools required by user to work in Microsoft Word.	
7b.	SUM is used to find total of all values from within a specified cells.	
	WHILE	
	SUM IF is used to find Total of only few selected values with respect to given condition but within a specified Range.	
c.	Syntax of SUM:	
	= SUM (X4 : X4)	
	where X - represents row name	
	Y - column name	
	for example	
	= SUM (B15 : B18)	
7d.	Function Required is = SUM (B3, B7).	

Extract 7.2: A sample of a correct answer to question 7 of paper 1.

Extract 7.2, shows a sample of response from a candidate who had knowledge on features of Graphical User Interface available in Microsoft office word, SUM and SUMIF functions.

2.1.8 Question 8: Problem Solving and C++ Programming

This was an optional question which carried a total of 15 marks. The question required the candidate to draw a flowchart and write C++ program that reads a given set of integers and then prints the number of odd and even integers. The program should also generate the number of zeros.

The statistics shows that 23 (59.0%) candidates attempted this question, of which 5 (21.7%) scored from 0 to 5 marks, 14 (60.9%) scored from 5.5 to 8.5 marks and 4 (17.4%) scored from 9 to 15 marks out of the 15 marks allocated. Figure 8 summarizes the candidates' performance in this question.

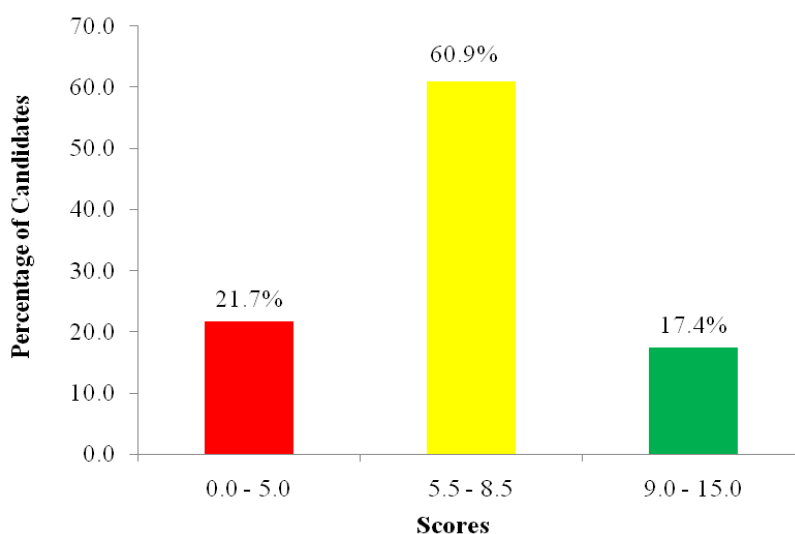
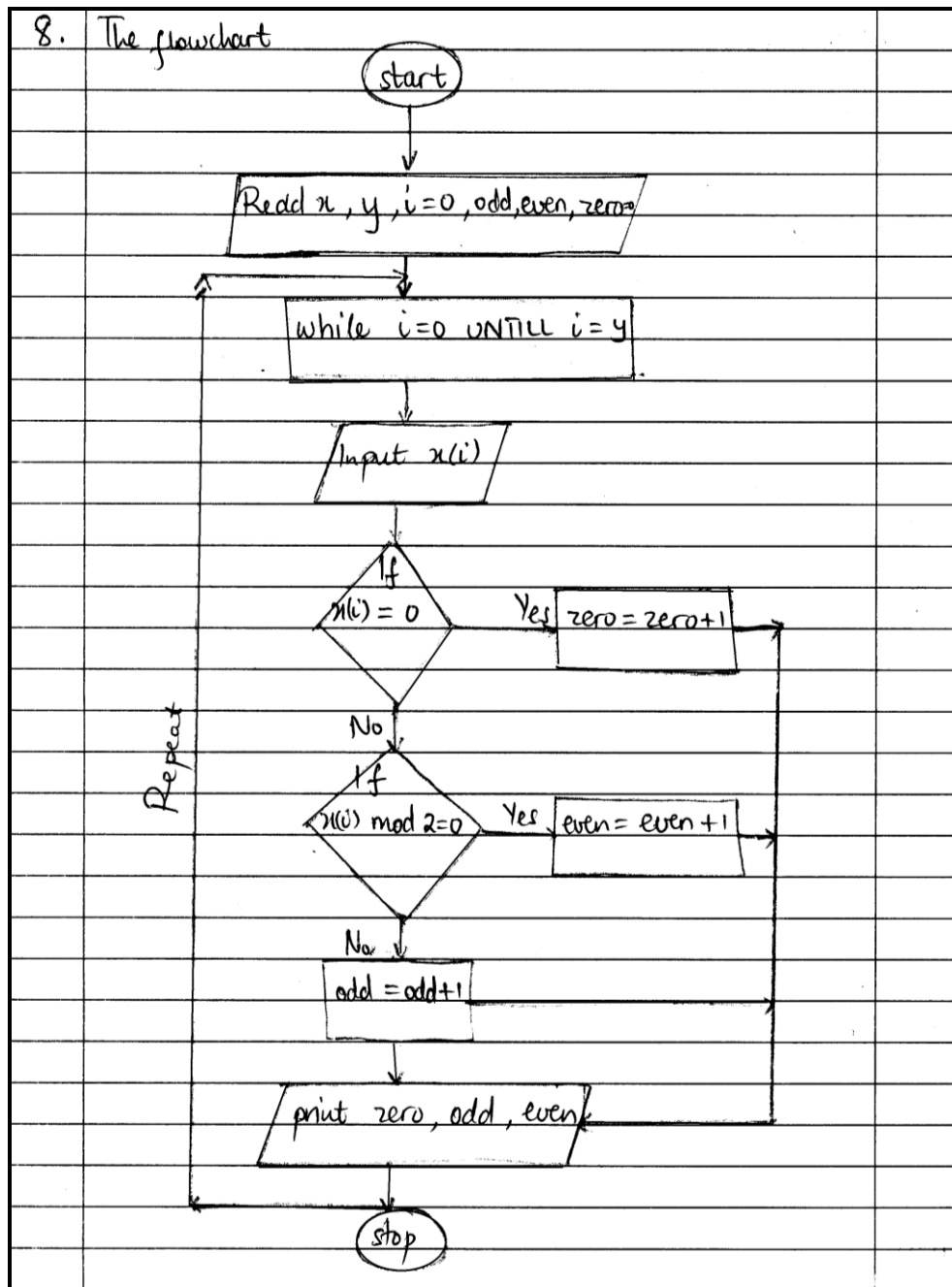


Figure 8: *The candidates' performance in question 8 of paper 1.*

The general performance of the candidates in this question was good because 78.3 per cent of the candidates scored above 5 marks. The analysis of the candidates' responses shows that the some candidates (17.4%) who scored high marks managed to draw correctly flowchart diagrams using correct symbols such as start symbol, input/output symbol, process symbol and decision symbols, and gave the required operation on every stage. Also, the candidates were able to relate the correct operations in flowcharts such as $N \% 2 == 0$, $r == 0$, $event = event + 1$, $odd = odd + 1$, $count = count + 1$ and $count < set$. Furthermore, some of these candidates were able to transform flowchart symbols to their corresponding C++ programming codes. This shows that the candidates had adequate knowledge of flowchart as well as

C++ programming codes. However, few candidates failed to give some requirement of the question and this made them lose some marks. Extract 8.1 represents a sample of a good response provided by one of the candidates.



8	C++ program	
	#include <iostream>	
	using namespace std;	
	int main ()	
	{	
	int x[10], y, odd=0, even=0, zero=0;	
	for (int i=0, i<=	
	int	
	cin >> y;	
	for (int i=0; i<= y; i++)	
	{	
	cin >> x[i];	
	}	
	for (int i=0; i<= y; i++)	
	{	
	if (x[i]==0)	
	{	
	zero = zero+1;	
	}	
	else if (x[i]%2==0)	
	{	
	even = even+1;	
	}	
	else odd = odd+1;	
	}	
	cout << even << odd << zero;	
	system("pause");	
	return 0;	
	}	

Extract 8.1: A sample of a correct answer to question 8 of paper 1.

In Extract 8.1, the candidate was able to draw a flowchart diagram and write the corresponding C++ program that reads a given set of integers and then prints the number of odd, even integer and number zero, but failed to give correct expression in the process and decision symbols in a flowchart.

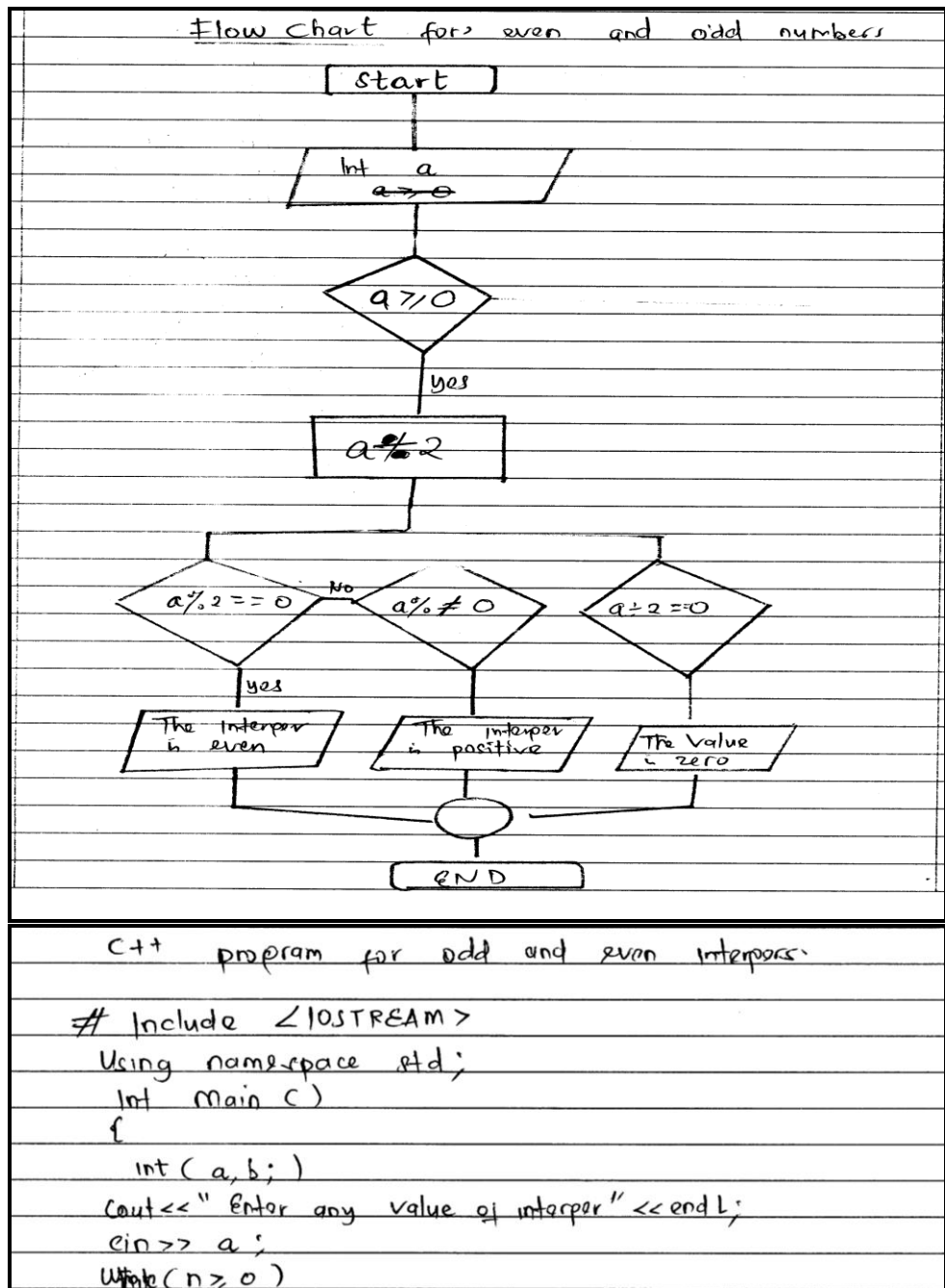
Most of the candidates (60.9%) who scored average marks were able to draw some flowchart symbols but failed to interpret the uses of some of the symbols in a flowchart. Also, few of the candidates exchanged the position of symbols in the diagram while others drew symbols correctly but failed to give correct logical expressions (operations) in the tasks (activities) to be performed. For example, one of the candidates wrote, *input/output symbols, process symbols and decision symbols*, correctly, which enabled him/her to score some marks while another, candidate managed to transform some of the symbols in C++ syntax. For example, one of the candidates wrote C++ codes as;

```
#include<iostream>
using namespace std;
int main()
{ int a,b;
cout<<"enter any number"
cin>>a;
b=a%2;
if (b==0)
{ cout<<a<<"is even number\n"
} else
{ cout<<a<<"Is an odd number\n"
} return 0; }
```

The candidates managed to write the correct C++ syntax in some parts. However, some of them failed to assign seven integers variable while others assigned only two variables. Also, the program required initializing four parts of the variable but the candidates failed to assign even a single part of it, which made this candidate score low marks in this part.

On the other hand, the candidates (21.7%) who scored low marks failed to give correct symbols in drawing a flowchart and failed to transform flowchart symbols into their corresponding C++ syntax (codes). For example, one of the candidates drew the symbols in wrong positions by exchanging the input/output symbols instead of an assignment symbol, also the process symbols instead of decision symbols. This shows that they lacked adequate knowledge on flowchart symbols. Another candidate wrote `#include iostream()` as input/output header files instead of writing `#include<iostream>`. This shows that the candidate lacked adequate

knowledge of writing properly the programming syntax in C++ and transforming them into their corresponding C++ programming syntax (codes). Extract 8.2 represents a sample of a poor response provided by one of the candidates.



```

if (n%2 == 0)
{ cout << "The value is even interper" << endl;
  Else if (n%2 != 0)
  { cout << "The value is pdd interper" << endl;
    Sta Gato
    while (n/2 == 0)
    { cout << "The value is zero not pdd or oven" << endl;
    }
  }
  Return 0;
}

```

Extract 8.2: A sample of an incorrect answer to question 8 of paper 1.

In Extract 8.2, the candidate failed to draw a flowchart diagram correctly and wrote incorrect C++ program that could read properly a given set of integers and then prints the number of odd, even integer and number of zeros.

2.1.9 Question 9: Data Communication and Networking

This was an optional question which carried a total of 15 marks. The question required the candidates to describe three classifications of data transmission media in the guided and unguided media.

The statistics shows that 19 (48.7%) of the candidates attempted this question, of which 7 (36.8%) scored from 0 to 5 marks, 5 (26.4%) scored from 5.5 to 8.5 marks and 7 (36.8%) scored from 9 to 15 marks out of the 15 marks allocated. Figure 9 summarizes the candidates' performance in this question.

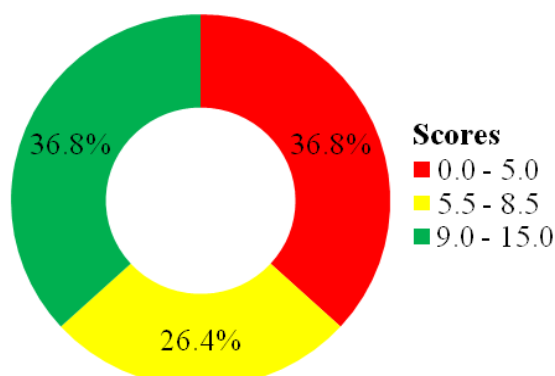


Figure 9: The candidates' performance in question 9 of paper 1.

Figure 9 illustrates that the general performance for this question was good as 63.1 per cent of the candidates scored above 5 marks. The analysis of the candidates' responses shows that the candidates (36.8%) who scored high marks managed to describe correctly data transmission media in the guided and unguided media. This indicates that the candidates had adequate knowledge on Data Communication and Networking. It was also observed that some candidates managed to classify the transmission media and describe them correctly but failed to give clear introduction, and some failed to give clear conclusion which deprived them of full marks. Extract 9.1 is one of the good responses from one of the candidates.

9.	<p>Data transmission refers to all activities that enable data to move from one person to another via communication devices. Data can be transmitted through networking that can be classified based on its media, Geographical proximity through guided and unguided, Personal area Network, Local area Network, Metropolitan area Network and Wide area network respectively. It can be facilitated with devices like bridges, router modem or Network interface cards. The following are the three classification of data transmission media in both the guided and unguided media; respectively. The guided media transmission involves the use cables and wires to ensure movement of data while the unguided involves the use of radio or microwaves.</p> <p>The use of twisted pair cables; these are cable wires that are twisted to prevent the interference of data. There are two types of the twisted pair cable the shielded twisted pair cable that is more expensive than the unshielded and it is stronger than the unshielded twisted pair. They contain pairs of brown and white, green and white, blue and white wires. These can be used in schools or any organisation of bus and star topologies.</p>	
----	---	--

The coaxial cable wires ; these are wires that are usually connected to the receiver from the antennae they ensure data movement from waves. They are better than unguided media. the coaxial cable wires are made of copper at the inner part and have layers of

foil the is plastic to ensure no data is lost.

The optic fiber cables ; involves the use of glass to transmit data through light indexes. This is the most expensive to install, it is yet very efficient it allows large amounts of data to pass through them in a short period of time. These wires are usually immersed in the ground or in water bodies ~~at~~ bottom line so they can not be tampered with.

Through radio waves ; are types of wave responsible for data transmission through television, radio stations, telecommunication through phones. This is an unguided media where data is transmitted through ionic waves from the troposphere and the ionosphere. It has facilitated media through television and radio stations.

Through micro waves ; this are waves that enable transmission of data to facilitate communication in the globe. It is usually full duplex. They involve the use of antennae installation and satellite dishes that transmit information do different parts of the world, Thus enables the movement of mass information globally through stations like BBC, Al Jazeera. Through Frequency that determines its strengths.

The use of satellite dish ; this is usually extended to the outer atmosphere (ionosphere) where it ensures data transmission via the parabolic satellite dish involves the data transmission ~~for~~ through waves that are either of digital or analog signals. This is another unguided media of transmission of data.

	Data transmission also enquires	
	management, thus there are two way through	
	which data is manage between computers. Peer	
	to peer networking or client / server networking	
	describes various ways on how data is managed	
	by its media.	

Extract 9.1: A sample of a correct answer to question 9 of paper 1.

Most of candidates (26.4%) who had an average performance managed to classify data transmission media in both guided and unguided media, but failed to give clear description of the transmission. For example, one of the candidates wrote; *coaxial cables are the cables used in telecommunication network to transmit voice signals*, instead of coaxial cables that are the cables used to transmit both voice signals and images and that are similar to the cable used to connect television antennae to a television set'. Another candidate wrote *the classification of data transmission media includes; shielded transmission media, unshielded transmission media and wireless transmission media*. The candidate categorized all grounded media into two regardless of the different cables functionalities in data transmission. For instance, fiber optic cable does not carry data using electromagnetic signals like other cables such as two open line cables, twisted pair cables and coaxial cable. The fiber optic cable utilizes light to transmit data from one point to another. The given responses indicate that candidates lacked adequate knowledge of Data Communication and Networking.

On the other hand, the candidates (36.8%) who scored low marks failed to understand the requirement of the question. Some of these candidates outlined the transmission media without descriptions while others had insufficient knowledge. For instance, one of the candidates wrote *three classification of data transmission media are wired connection, wireless connection and hybrid connection*, instead of describing three guided media and three unguided media. Such responses deprived the candidates of the right to score full marks in this question.

Moreover, the candidates failed to interpret the meaning of guided media and unguided media. For example, one of the candidates wrote "*grounded media includes microwave transmission, Bluetooth, infrared and cables and ungrounded media is satellite*". Also, some candidates misconceived

on the concept of guided media. The candidates interpreted the term guided as something on ground or land while unguided as something on air or sky. These candidates lacked enough knowledge on Data Communication and Networking which made them score low marks. Extract 9.2 represents a sample of poor response.

9.	<p>Transmission media: These are instruments which used to transfer, distributing the information from one generation to another generation. Example from muana to Songes. The following are the classifications of data transmission media which are:</p> <p>Electronic Media: This involve the use of technology which involve the use of phone, radio, Television and other devices which help to push the information forward.</p> <p>Print media: Also the information can be transmitted from one place to another place through printed materials such as magazine and the other printed information.</p> <p>Traditional Media: This is the way of transmitting information from one place to another through sending one tradition music like dancing, dram, Ngoma and other ways which is in traditionally. And those transmission media work together in order to make sure that all information from the Sender or from the original place are reached to the point concerned.</p> <p>Therefore in order of the information to be transmitted from one place or generation to another place or generation the media are required in order to fulfill the transmission of the data and information.</p>
----	---

Extract 9.2: A sample of an incorrect answer to question 9 of paper 1.

Extract 9.2 shows a sample response from a candidate who misinterpreted the requirement of the question and explained the communication media instead of data transmission media in the guided and unguided media.

2.1.10 Question 10: IT Environment

This was an optional question which carried a total of 15 marks. The candidates were required to explain how Information and Communication Technology has brought about different career opportunities to most of Tanzanians by referring to at least six career opportunities.

The statistics shows that 36 (92.3%) of the candidates attempted this question, of which 11 (30.6%) scored from 0 to 5 marks, 5 (13.8%) scored from 5.5 to 8.5 marks and 20 (55.6%) scored from 9 to 15 marks out of the 15 marks allocated. Figure 10 summarizes the candidates' performance in this question.

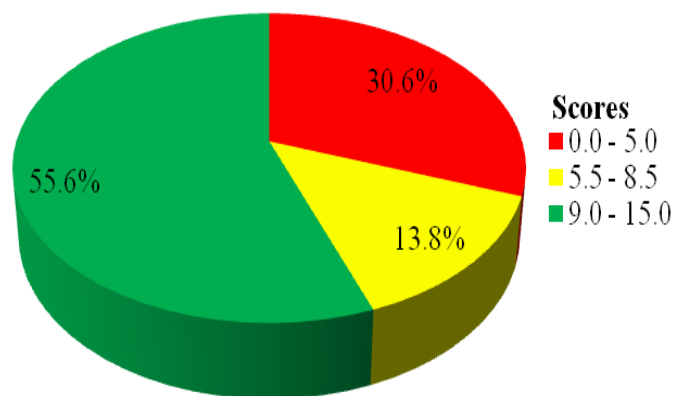


Figure 10: The candidates' performance in question 10 of paper 1.

Figure 9 illustrates that the general performance in this question was good as 69.4 per cent of the candidates scored above 5 marks. The analysis of the candidates' responses indicates that the candidates who scored high marks (55.6%) managed to argue for the six career opportunities brought by Information and Communication Technology to most of Tanzanians. The career opportunities provided by most of the candidates include; *Computer operators, Computer technician, System analyst, software engineer, Database administrators, computer engineer, computer trainer, web administrator/web master, graphic designer, typesetters, network administrator, computer sales representatives and ICT self employed*. Even though, these candidates managed to mention and explain correctly the six career opportunities brought by ICT, they failed to give clear introduction and others failed to give clear conclusion which hindered them from scoring full marks. Extract 10.1 is an example of one of the good responses.

10	<p>Information and communication technology is the Science of data management, analysis and data transfer from one place to another. Information technology is responsible in globalisation of the world since it makes things look easier and spread in a short time. Information and communication technology helps in engaging into a Useful career.</p> <p>The following are some of Useful careers that most Tanzanians can engage;</p> <p><u>System Analyst</u>. Is a career that a person is responsible in detecting a problem and analysing the ways to tackle the problem and come up with an Idea of analysing data, and processing of Information. A system Analyst can be found in Schools as a bursar, or in banks.</p> <p><u>Software Engineer</u>. Is a person who deals in the formation of Software part of computer System such as a program, Artificial intelligence such as Siri in iPhones and network Interface developers. These Software Engineers are mostly Employed in big Companies such as banks and large Commercial Institutions since they need large Softwares to sort out large data of money in a simplified manner.</p> <p><u>Computer Teacher</u>. Is a person who teaches people with passion of knowing how a Computer Intakes data, processes and Outputs the right Information at right time. A good example is Our Wonderful computer Science Teacher Mr. Mbwatu. who learned alot about Computer Information and communication technology and teaches Us with pleasure and passion.</p>
----	---

10	<p>Database Management officer. Is a carrier of a person to check and analyse the data intake and manage data integrity and avoid data redundancy so as to have a very efficient system that summarises bulk data to simpler forms. These (DMO) Database Management officers are employed in large Institution business such as Banks, schools and Trading Companies such as MO companies.</p> <p>Network developers. Is a carrier of a person to develop a network that transfers data and information from one point to another. He is also responsible in knowing all the requirement for Network developments such as protocols, connectors and Servers. These carriers are highly needed in communication companies such as Mawaritano towers and also Military Bases.</p> <p>Computer programmer. Is a person that uses high or low level language to program, and get a solution for the problem set. Computer programmer uses applications such as C++ to debug and compile the data units to get a whole program that runs smoothly and with concise and timely. These carriers are found mostly in Car Manufacturing Industries so as to program a car in security and control measures such as BMW.</p> <p>All in all, Careers offered in the Computer Science and Information technology is highly paid and very much into trade Market, I advise other people to take computer technology as a career since it is very beneficial.</p>	
----	---	--

Extract 10.1: A sample of a correct answer to question 10 of paper 1.

In Extract 10.1, the candidate provided satisfactory explanations on the career opportunities brought about by Information and Communication Technology to most of Tanzanians.

On the other hand, the candidates (13.8%) who had an average performance in this question managed to argue for the statement by correctly explaining some of the career opportunities brought about by Information and Communication Technology. For instance, one candidate wrote *Computer programmer and developer, Web designer, Hackers, Cracker, computer engineer, computer technician and computer teachers*. The candidate confused it with the people who illegally get access to other peoples' properties as a way of increasing their income. Hacker and cracker are illegal computer users who invade other peoples' privacy either for fun or for malicious purpose. This indicates that the candidates had knowledge about ICT career opportunities but failed to give the proper responsibilities of that career.

Further analysis shows that few candidates (30.6%) who scored low marks failed to understand the requirement of the question. For instance, one of the candidates wrote *ICT can be used in Offices, in Banks, In Education, In Industries and in transport*. The candidate response was based on the application areas of ICT in different fields in Tanzania instead of career opportunities. Such responses indicate that the candidate lacked knowledge of IT. Extract 10.2 is one of the incorrect responses from one of the candidates.

10	Information Communication	
	Technology is the science that improves the information, communication and technological sectors in every aspect. This involves the use of computers. Though it is very useful, Information, communication Technology has been a boon to most career opportunities to Tanzanians. The following are the effects of Information, communication technology on various career opportunities;	

	<p>Replaced various teaching staff, Since it involves integrated and interconnected computers through the network, now students can study online from various parts and so some of the teachers remain unemployed are ^{are} they computers can also involve teaching and learning for example e-learning programs.</p> <p>Replaced human labour in industrial activities. The field of information, communication and technology is very wide and most used in industrial processes and activities such as programmed machinery and automated working that make many individuals useless in an industry and only remain the computer programmers.</p> <p>Replaced human labour in agricultural activities. Also information and communication technology has reinvented various means to involve machinery in agricultural activities such as harvesting and planting by installation of computing devices in various machines that may program a machine to work as ordered. This results in the use of machinery instead of human labour as it was before.</p>	
--	--	--

10

Replaced human in various communication companies. The communication companies now do not rely on human labour and instead are highly investing in the information communication technology much as possible since it is the easiest way for data base management system and managerial and for various statistical data compared to humans who are now less reliable.

Replaced human labour in various offices. Some offices also have unemployed people and installed some information communication technological facilities to perform certain works or activities, for example the security of a certain firm may be relied on a fingerprint lock instead of a fully loaded security guard, the fire arms are replaced with better invented fire fighting devices.

Replaced human labour in various architecture works and designing tentors. Most individuals nowadays do not employ architecture to design their house or decorate and instead use the internet and search for various decorations, designs and various architecture works and employ some constructors. For example various firms do not use engineers to design their infrastructure and instead use technology.

Conclusively, Information communication technology has disturbed or distorted various human career opportunities though being more effective and efficient than human.

Extract 10.2: A sample of an incorrect answer to question 10 of paper 1.

In Extract 10.2, the candidate explained negative impacts of ICT on employment instead of the career opportunities brought about by ICT.

2.2 136/2 COMPUTER SCIENCE 2

2.2.1 Question 1: C++ Programming.

This was a compulsory question which carried a total of 25 marks. Candidates were required to;

- Use an “Array” and “For loop” to create a C++ program which prompt a user to enter marks of five subjects for three students. The program should display the total marks, average and grade for each student as well as overall average marks. Use the grading system given in table 1 to assign average grades.

Table 1

Average Range	Grade
75 - 100	A
65 - 74	B
55 - 64	C
45 - 54	D
35 - 44	S
0 - 34	F

- (b) Construct a C++ program that requests a user to enter the number of rows, columns and the matrix elements. The program should display the entered matrix and find its transpose. (HINT: For transpose matrix rows are changed into columns and columns into rows).

A total of 38 (97.4%) candidates attempted this question, out of whom 3 (7.9%) scored from 0 to 8.5 marks, 10 (26.3%) scored from 9 to 14.5 marks and 25 (65.8%) scored from 15 to 25 marks out of the 25 marks allocated. The general performance in this question was good as 92.1 per cent of the candidates scored above 8.5 marks. Figure 11 illustrates the candidates' performance on this question.

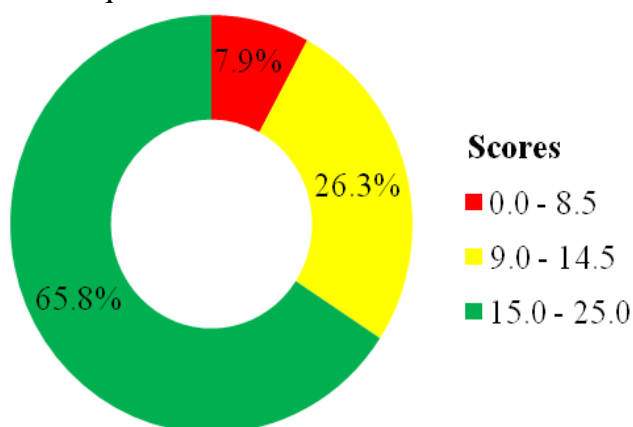


Figure 11: *The candidates' performance in question 1 of paper 2.*

The analysis of the candidates' responses shows that the candidates (65.8%) who scored high marks managed to write the program using array and for loop as the question required in part (a). In part (b), the candidates managed to construct C++ program that request a user to enter the number of rows, columns and matrix elements as required. Also, they managed to

write the formula to display transpose of matrix. However, some of them wrote the formula for finding the average of single student as well as the formula for finding total marks of single student instead of writing formula for overall class average and total marks of the entire class in part (a). This hindered them from scoring a full marks in this question. Extract 11.1 represents a sample of good response.

```
#include<iostream>
using namespace std;
int main()
{
    int marks[5], i;
    float sum=0, avg;

    cout<<"\n Enter Marks of Student \n";
    cout<<"Subject 1 : "<<endl;
    cin>>marks[0];
    cout<<"Subject 2 : "<<endl;
    cin>>marks[1];
    cout<<"Subject 3 : "<<endl;
    cin>>marks[2];
    cout<<"Subject 4 : "<<endl;
    cin>>marks[3];
    cout<<"Subject 5 : "<<endl;
    cin>>marks[4];

    for(i=0;i<5;i++)
    {
        sum=sum+marks[i];
    }
    cout<<" Total Marks of Student = "<<sum<<endl;
    avg=sum/5;
    cout<<" Average = "<<avg<<endl;
    cout<<" Grade = "<<endl;

    if(avg>75)
    {
        cout<<"A"<<endl;
    }
    else if(avg>65 && avg<=74)
    {
        cout<<"B"<<endl;
    }
    else if(avg>55 && avg<=64)
    {
        cout<<"C"<<endl;
    }
}
```

```

        else if(avg>45 && avg<=54)
        {
            cout<<"D"<<endl;
        }
        else if(avg>35 && avg<=44)
        {
            cout<<"S"<<endl;
        }
        else
        {
            cout<<"F"<<endl;

```

```

#include<iostream>
using namespace std;
int main()
{
    int a[10][10], transpose[10][10], row, column, i, j;

    cout << "Enter rows of the matrix: ";
    cin >> row ;
    cout << "Enter columns of the matrix: ";
    cin >>column;

    cout << "Enter elements of the matrix: " << endl;

    for (int i = 0; i < row; ++i) {
        for (int j = 0; j < column; ++j) {
            cout << "Enter element a " << i + 1 << j + 1 << ": ";
            cin >> a[i][j];
        }
    }

    cout << "Entered Matrix: " << endl;
    for (int i = 0; i < row; ++i) {
        for (int j = 0; j < column; ++j) {
            cout << " " << a[i][j];
            if (j == column - 1)
                cout << endl << endl;
        }
    }

    for (int i = 0; i < row; ++i)
        for (int j = 0; j < column; ++j) {
            transpose[j][i] = a[i][j];
        }
}

```

```

cout << "Transpose of the Matrix: " << endl;
for (int i = 0; i < column; ++i)
    for (int j = 0; j < row; ++j) {
        cout << "    " << transpose[i][j];
        if (j == row - 1)
            cout << endl << endl;
    }
    system("pause");
    return 0;
}

```

Extract 11.1: A sample of a correct answer to question 1 of paper 2.

Further analysis shows that 26.3 per cent of the candidates (26.3%) who attempted this question scored average marks. In part (a), the candidates managed to write the program with clear declaration of the variables, but failed to write correct syntax of loop condition, the formula for displaying total marks of the student, average marks of a student, and class average marks of all students. Also, in part (b) they managed to construct C++ program that request a user to enter the number of rows, columns and matrix elements as required but failed to write the correct formula to display transpose of matrix. For example, one candidate wrote correct codes for the formula of matrix but repeated the same code for transpose matrix which was incorrect. He/she was supposed to reverse the formula for matrix in order to transpose the matrix. This indicates that the candidate had inadequate knowledge on transpose matrix.

The analysis also shows that the candidates (7.9%) who scored low marks in part (a) were able to write libraries, initialize the program, declare variables and to end program. However, some candidate wrote the program codes using different conditions such as if condition instead of using for loop and array as per the requirement of the question. This indicates that the candidates did not understand the requirement of the question. Thus, they failed to distinguish between the uses of if condition and for loop which made them score low marks. However, in part (b), some candidates managed to write pre-processor (***#include<iostream>***), ***use namespace std***, ***int main()*** and ***return 0*** but failed to use for loop and array to generate the matrix and its transpose. Extract 11.2 represents a sample of an incorrect response provided by one of the candidates.

```

#include<iostream>
using namespace std;
int main()
{
    int marks;
    cout<<"The program which show the marks of five subject of the three students"<<endl;
    cout<<"Enter those marks"<<endl;
    cin>>marks;
    switch(marks)
    {
        case 75 ... 100:cout<<"It is grade A"<<endl;
        break;
        case 65 ... 74:cout<<"It is grade B"<<endl;
        break;
        case 55 ... 64:cout<<"It is grade C"<<endl;
        break;
        case 45 ... 54:cout<<"It is grade D"<<endl;
        break;
        case 35 ... 44:cout<<"It is grade S"<<endl;
        break;
        case 0 ... 34:cout<<"It is grade F"<<endl;
        break;
        default:
            cout<<"invalid grade"<<endl;
    }
    return 0;
}

```

```

#include <iostream>
using namespace std;
int main()
{
    int x,y;
    cout<<"Enter the size of the rows  ";
    cin>>x;
    cout<<"Enter the size of the columns  ";
    cin>>y;
    int A[x][y];
    cout<<"Enter the element of array"<<endl;
    for(int i=0;i<x;i++)
    {
        for(int j=0;j<y;j++)
        {
            cin>>A[i][j];
        }
    }
    cout<<"the element entered are"<<endl;
    for(int i=0;i<x;i++)
    {
        for(int j=0;j<y;j++)
        {
            cout<<A[i][j];
        }
    }
}

```

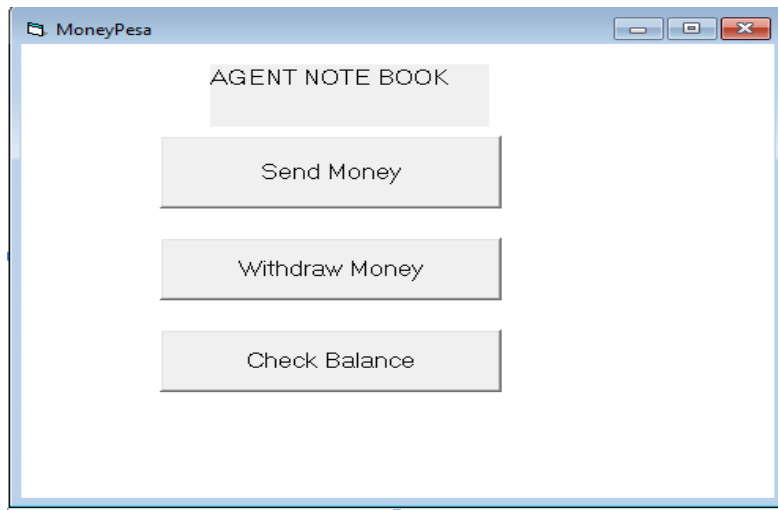
Extract 11.2: A sample of an incorrect answer to question 1 of paper 2.

Extract 11.2, represents a sample of poor response provided by the candidate who used switch case instead of for loop in part (a) and failed to write the correct syntax of transpose matrix in part (b).

2.2.2 Question 2: Visual Programming and Access

This was an optional question which carried a total of 25 marks. The candidates were required to;

- (a) Use Visual Basic program to create the following interface of Agent Note Book:



- (b) Construct Visual Basic codes which will activate the interface created in part (a). The interface should enable an agent to send money to three customers and provide new balance for a customer and an Agent. Use the information given in table.

NAME	PHONE NUMBER	BALANCE
Agent	0	100,000
Customer 1	1	12000
Customer 2	2	10000
Customer 3	3	25000

- (i) Use prompt box to ask a user to enter customer phone number and the amount to be sent after clicking Command button “Send Money”.
 - (ii) Use message Box to display new customer balance and agent balance after each transaction.
 - (iii) Use prompt box to withdraw money and display the agent amount remained in a message box.
 - (iv) Display Message Box “Your balance is 100,000” when a user clicks a command button “Check Balance”.
- (c) The following table shows Form V midterm test records from a certain Secondary School.

Student							
StudentID	StudentName	Physics	Chemistry	Mathematic	Total	Average	Grade
1001	Musa	20	78	89	187	62	B
1002	Joseph	45	60	78	183	61	B
1003	Mombasa	78	22	12	112	37	D
1004	Tanje	81	42	98	221	74	B
1005	Wago	91	83	71	245	82	A
*							

- (i) Use Microsoft Office access to create a table which contains the information above.
- (ii) Use appropriate data type for each field. Save a table as “Student” and save database as “Shule”.
- (iii) Create a form and save as **StudentForm**.
- (iv) Create query and its report for students who got Grade B. Save it as **GradeB** and **ReportB** respectively.
- (v) Activate your form so that Total Marks and Average Marks can be calculated automatically on it.

A total of 16 (41.0%) candidates attempted this question, out of whom 5 (31.3%) scored from 0 to 8.5 marks, 6 (37.4%) scored from 9 to 14.5 marks and 5 (31.3%) scored from 15 to 25 marks out of the 25 marks allocated. The general performance for this question was good as 68.7 per cent of the candidates scored above 8.5 marks. Figure 12 illustrates the candidates' performance in this question.

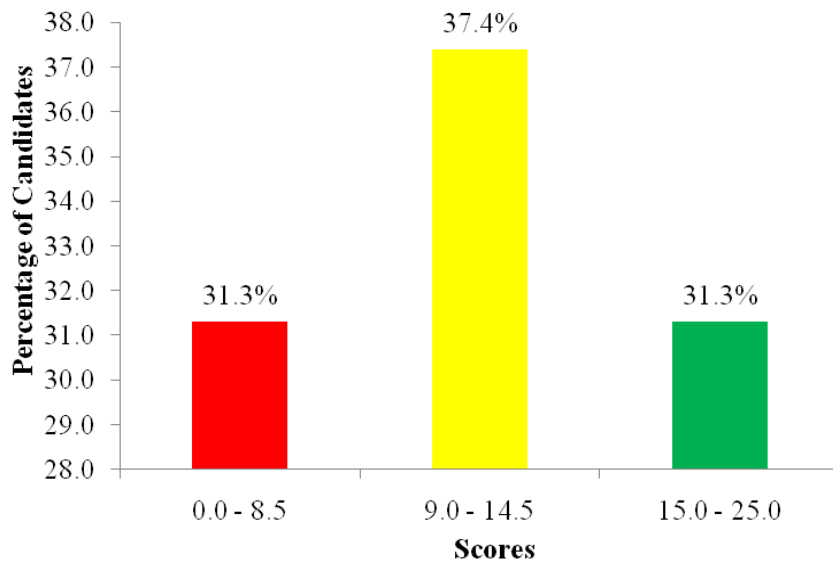


Figure 12: The candidates' performance in question 2 of paper 2.

The analysis of the candidates' responses shows that the candidates (31.3%) who scored high marks were able to create interface of an Agent Note Book with name of **MoneyPesa** and command button **Send Money, withdraw and check balance** in part (a). In part (b), some of these candidates were able to write codes to display Message Box of **Your Balance is 100,000** after clicking check Balance button, to prompt user to enter customer phone number and amount to be sent after clicking Send Money button. Also, they were able to write code to withdraw money but displayed wrong amount of the Agent remained due to the wrong formula used to Withdraw money, as one of the candidates wrote code **balance = balance + amount, agentbalance = agentbalance + amount** instead of **balance = balance – amount**. Moreover, in part (c), some of the candidates were able to use Microsoft access to create database and table with appropriate data type of each field and save as required by the question. Furthermore, they created form and saved as **StudentForm**, created a query and its report and saved as required. However, all the candidates failed to activate the form to give automatically the Total and Average Mark of the student; hence no candidate scored all 25 marks in this question. The candidates' failure in this part indicates they lacked sufficient knowledge on database. Extract 12.1 represents a sample of a relatively good response.

Form1

AGENT NOTE BOOK

Send Money

Withdraw Money

Check Balance

```

Dim pno As Integer
Dim amount As Integer
Dim agentbalance
Dim balance As Integer

Private Sub cmdcheck_Click()
MsgBox ("Your Balance is 100000")
End Sub

Private Sub cmdsend_Click()
agentbalance = 100000
pno = InputBox("Enter customer phone number")
amount = InputBox("Enter amount to be sent")
If pno = 1 Then
balance = 12000
balance = balance + amount
agentbalance = agentbalance + amount
MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
ElseIf pno = 2 Then
balance = 10000
balance = balance + amount
agentbalance = agentbalance + amount
MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
ElseIf pno = 1 Then
balance = 25000
balance = balance + amount
agentbalance = agentbalance + amount
MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
End If
End Sub

```



```

Private Sub cmdwithdraw_Click()
    agentbalance = 100000
    pno = InputBox("Enter customer phone number")
    amount = InputBox("Enter amount to be sent")
    If pno = 1 Then
        balance = 12000
        balance = balance - amount
        agentbalance = agentbalance - amount
        MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
    ElseIf pno = 2 Then
        balance = 10000
        balance = balance - amount
        agentbalance = agentbalance - amount
        MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
    ElseIf pno = 1 Then
        balance = 25000
        balance = balance - amount
        agentbalance = agentbalance - amount
        MsgBox ("Customer balance = " & balance & " Agent balance = " & agentbalance)
    End If
End Sub

```

Student	
Field Name	Data Type
StudentID	Number
StudentName	Text
Physics	Number
Chemistry	Number
Mathematics	Number
Total	Number
Average	Number
Grade	Text

Field:	StudentID	StudentName	Physics	Chemistry	Mathematics	Total	Average	Grade
Table:	Student	Student	Student	Student	Student	Student	Student	Student
Sort:								
Show:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteria:								Like "B"
or:								

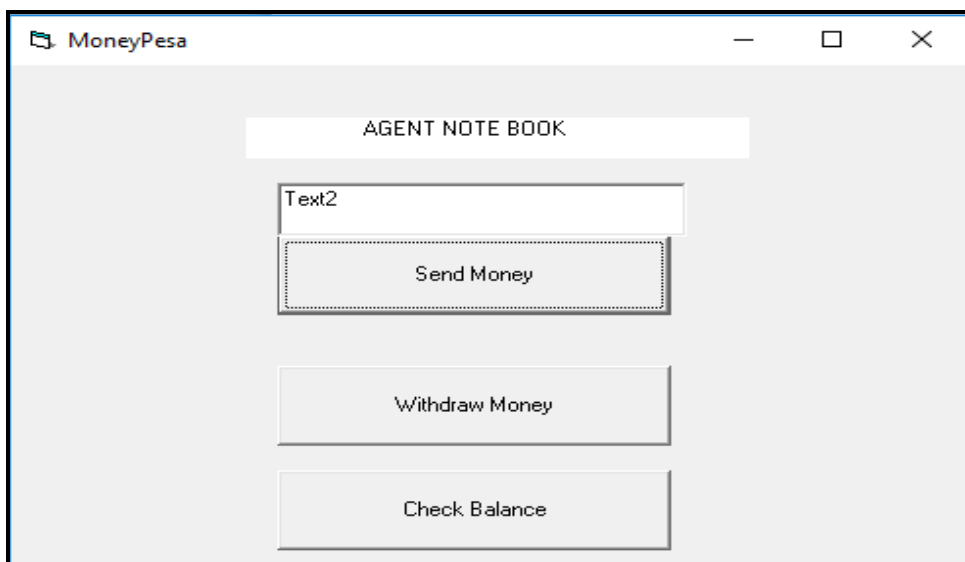
GradeB							
StudentID	StudentName	Physics	Chemistry	Mathematics	Total	Average	Grade
1001	Musa	20	78	89	187	62	B
1002	Joseph	45	60	78	183	61	B
1004	Tanje	81	42	98	221	74	B

Extract 12.1: A sample of a correct answer in question 2 of paper 2.

In Extract 12.1, the candidate managed to create an interface form of an Agent Note Book in part (a). In part (b), the candidate managed to construct visual basic codes which intended to activate the interface created in part (a). Also, in part (c), the candidate managed to create the field name, appropriate data type, query, Name of query “**GradeB**” and set the criteria for the students with grade B.

The majority (37.4%) of candidates who scored average marks managed to create an interface form of an Agent Note Book in part (a), but failed to activate the form in part (b). Likewise, in part (c), they managed to create database and table with appropriate data type of each field, query, form and report with appropriate name. However, most of them failed to complete the other part of the question.

Further analysis shows that the candidate (31.3%) who scored low marks managed to create part of the interface of an Agent Note Book, but failed to construct the visual basic code to activate the interface created in part (a). However, they managed to create a database called shule, create table, but failed to assign the appropriate data type and to activate the form to give automatically total and average marks of the students. This indicates that some candidates had insufficient knowledge of visual basic programming language. Extract 12.2 represents a sample of an incorrect response provided by one of the candidates.



<pre>Dim Num As Double Dim Withdraw As Double Dim Balance As Double Dim Money As Double</pre>
<pre>Private Sub checkbalance_Click() Balance = Money - Withdraw Print Balance End Sub</pre>
<pre>Private Sub sendmoeny_Click() Print Enter; your; Number And Amount Money = display.Text2 End Sub</pre>
<pre>Private Sub withdrawmoney_Click() Withdraw = Amount Withdraw = display.Text2 End Sub</pre>

Extract 12.2: A sample of an incorrect answer to question 2 of paper 2.

In Extract 12.2, the candidate failed to create appropriate interface of an agent note book in part (a) and failed totally to write the code for activating the Agent Note Book in part (b).

2.2.3 Question 3: Web Site Development

This was an optional question which carried a total of 25 marks. The question had two parts; (a) and (b). In part (a), the candidates were required to use HTML frame codes and basic HTML tags to create a given web page with the specified page descriptions. In part (b), the candidates were required to create a form which would enable a user to calculate the Maximum, Minimum and both Maximum and Minimum using JavaScript and HTML codes for three entered Numbers. Also, a user should provide a 'Reset button' option so as to clear the data entered.

A total of 23 (59.0%) candidates attempted this question, out of whom 6 (26.1%) scored from 0 to 8.5 marks, 15 (65.2%) scored from 9 to 14.5 marks and 2 (8.7%) scored from 15 to 25 marks out of the 25 marks allocated. The general performance in this question was good as 73.9 per cent of the candidates scored above 8.5 marks. Figure 13 illustrates the candidates' performance in this question.

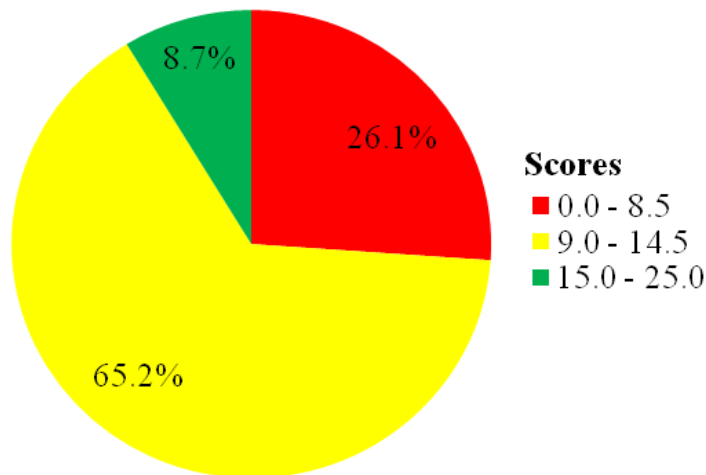


Figure 13: *The candidates' performance in question 3 of paper 2.*

The analysis shows that the candidates (8.7%) who scored higher marks managed to create the web page with the correct layout and activated the web page using JavaScript codes. This shows that these candidates had clear theoretical and practical knowledge of Web Page Development. However, in part 3(a), some of the candidates were unable to create ordered and unordered list, and in part 3(b), some of the candidates were unable to activate some buttons especially in function for finding “Both” maximum and minimum which made them not to score full marks. Extract 13.1 represent a sample of a good response from one of the candidates.

```

1 <html>
2 <iframe src="head.html"width="98.9%"height="10%"></iframe>
3 <iframe src="menu.html"align="right"width="25.3%"height="60%"></iframe>
4 <iframe src="typesoftech.html"align="left"width="74%"height="60%"></iframe>
5 <br>
6 <iframe src="copyright.html"width="98.9%"height="20%"></iframe>
7 </html>

```

```

1 <html>
2 <head>
3 <font style="color:white">
4 <body bgcolor="sky-blue"><h1><center><b>A WEBPAGE CREATED BY USING FRAMES</b></center></h1></body>
5 </font>
6 </head>
7 </html>

```

```

1 <html>
2 <h3>Types of Web Development Technologies</h3>
3 <ol type="a">
4 <li>Basic HTML Tags </li>
5 <li>ASP.net</li>
6 <li>PHP and HTML</li>
7 <li>HTML and JAVASCRIPT</li>
8 <li>PHP and MYSQL</li>
9 <li>AJAX</li>
10 </ol>
11 </html>

```

```

1 <html>
2 <head><h2>HTML Menu</h2></head>
3 <ul type="disc">
4 <li>Menu item 1</li>
5 <li>Menu item 2</li>
6 <li>Menu item 3</li>
7 </ul>

```

```

1 <html>
2 <font style="color:white">
3 <h5 style="background-color:green;"><center>Copyright &copy S/XXXX/XXXX | All rights Reserved.</b>
4 </font>
5 </head>
6 </h5>
7 </html>

```

A WEBPAGE CREATED BY USING FRAMES

Types of Web Development Technologies

- a. Basic HTML Tags
- b. ASP.net
- c. PHP and HTML
- d. HTML and JAVASCRIPT
- e. PHP and MYSQL
- f. AJAX

HTML Menu

- Menu item 1
- Menu item 2
- Menu item 3

```

1 <!DOCTYPE html>
2 <html>
3 <head>
4 <title>Finding Minimum and Maximum Number </title>
5 <style type="text/css">
6 body {margin: 30px;}
7 </style>
8 <script>
9 function Minimum()
10 {
11     num1 = document.getElementById("firstNumber").value;
12     num2 = document.getElementById("secondNumber").value;
13     num3 = document.getElementById("thirdNumber").value;
14     if((num1<num2)&&(num1<num3))
15     document.getElementById("result").innerHTML=("The minimum number is " +num1);
16     else if((num2<num1)&&(num2<num3))
17     document.getElementById("result").innerHTML=("The minimum number is " +num2);
18     if((num3<num1)&&(num3<num2))
19     document.getElementById("result").innerHTML=("The minimum number is " +num3);
20 }
21 }
22
23 function Maximum()
24 {
25     num1 = document.getElementById("firstNumber").value;
26     num2 = document.getElementById("secondNumber").value;
27     num3 = document.getElementById("thirdNumber").value;
28     if((num1>num2)&&(num1>num3))
29     document.getElementById("result").innerHTML=("The maximum number is " +num1);
30     else if((num2>num1)&&(num2>num3))
31     document.getElementById("result").innerHTML=("The maximum number is " +num2);
32     if((num3>num1)&&(num3>num2))
33     document.getElementById("result").innerHTML=("The maximum number is " +num3);
34 }
35
36 </script>
37 </head>
38 <body>
39 <form>
40 <p><u>Finding Minimum and Maximum Number</u></p>
41 1st Number : <input type="text" id="firstNumber" /><br><br>
42 2nd Number: <input type="text" id="secondNumber" /><br><br>
43 3rd Number: <input type="text" id="thirdNumber" /><br><br>
44 <input type="submit" value="Reset">
45 <input type="button" onClick="Minimum()" Value="Minimum" />
46 <input type="button" onClick="Maximum()" Value="Maximum" />
47 <input type="button" onClick="Minimum()" "Maximum()" value="Both">
48 </form>
49 <p><b>The Results</b></p><br>
50 <div style="border:solid;border-color:black;width:'100';height:'100'">
51 <span id = "result"></span>
52 </div>
53 </body>
54 </html>

```

Finding Minimum and Maximum Number	Finding Minimum and Maximum Number
1st Number : <input type="text" value="54"/>	1st Number : <input type="text" value="45"/>
2nd Number: <input type="text" value="78"/>	2nd Number: <input type="text" value="78"/>
3rd Number: <input type="text" value="35"/>	3rd Number: <input type="text" value="23"/>
<input type="button" value="Reset"/> <input type="button" value="Minimum"/> <input type="button" value="Maximum"/> <input type="button" value="Both"/>	<input type="button" value="Reset"/> <input type="button" value="Minimum"/> <input type="button" value="Maximum"/> <input type="button" value="Both"/>
The Results	The Results
<input type="text" value="The maximum number is 78"/>	<input type="text" value="The minimum number is 23"/>

Extract 13.1: A sample of a correct answer in question 3 of paper 2.

Extract 13.1 shows the line of codes from the candidate who managed to write the HTML frames for home page, background colour, title of the frames, ordered list, unordered list and copyright sign as required in part (a), but failed to divide the frame with specific size. In part (b), the candidate managed to create and activate the form required by using JavaScript and HTML codes. However, the candidate failed to write correct codes for activating the “both” button for maximum and minimum functions.

Moreover, those candidates (65.2%) who scored average marks managed to create the web page, inserting a required back ground colour in specified area, but failed to divide page into three frames, namely top, middle and bottom with the required specifications in part (a). In part (b), the candidates were able create the interface of the form with all required buttons, but failed to create JavaScript code for activating the buttons. This shows that these candidates had insufficient knowledge of basic HTML tags and its attributes as well as JavaScript programming.

On the other hand, the candidates (26.1%) who scored low marks in this question created a table instead of creating frames as required in part (a). The problem was also observed in part (b) where the candidates created HTML form but failed to write the corresponding codes to activate the forms by using JavaScript. This shows that these candidates lacked knowledge on HTML frames as well as JavaScript programming. Extract 13.2 represents a sample of poor response in question 3 of paper 2.

```

1 <html>
2 <head>
3 <table cellspacing="20%" border="10%" height="100%" width="100%">
4 <tr bgcolor="sky blue" height="20%">
5 <td colspan="2"><h1><center><font color="white">A WEBPAGE CREATED BY USING FRAMES</font></center></h1></td>
6 </tr>
7
8 <tr height="60%">
9 <td width="75%"><h3>Types of Web Development Technologies</h3>
10 <ol type="a">
11 <li> Basic HTML Tags</li>
12 <li>ASP.Net</li>
13 <li> PHP and HTML</li>
14 <li> HTML and JAVASCRIPT</li>
15 <li>PHP and MYSQL</li>
16 <li>AJAX</li>
17 </ol>
18 </td>
19
20 <td width="25%"><h3>HTML Menu</h3>
21 <ul>
22 <li>Menu item 1</li>
23 <li>Menu item 2</li>
24 <li>menu item 3</li></ul>
25 </td>
26 </tr>
27
28 <tr bgcolor="green">
29 <td colspan="2" height="20%">
30 <center><p><font color="white"> copyright &copy; S/XXXX/XXXX | All rights Reserved.</font></p></center>
31 </td>
32 </tr>
33
34 </table>
35 </head>
36 </html>

```



```

1 <html>
2 <head>
3 <h4 align="right"><u>Finding Minimum and Maximum Number</u></h4>
4 <script>
5     function Rese(){
6         var n1=document.getElemntById("firstnumber").value;
7         var n2=document.getElemntById("secondnumber").value;
8         var n3=document.getElemntById("thirddnumber").value;
9         document.getelementById("firstnumber").value=" ";
10        document.getelementById("secondnumber").value=" ";
11        document.getelementById("thirddnumber").value=" ";
12    }
13    function maximum(){
14        var n1=document.getElemntById("firstnumber").value;
15        var n2=document.getElemntById("secondnumber").value;
16        var n3=document.getElemntById("thirddnumber").value;
17    }
18 </script>
19 </head>
20 <body>
21 <form>
22 <table align="right">
23 <tr>
24 <td>First Number<input type="text" id="firstnumber"></br>
25 </td>
26 </tr>
27 <tr>
28 <td>Second Number<input type="text" id="secondnumber"></br>
29 </td>
30 </tr>
31 <tr>
32 <td>Third Number<input type="text" id="thirddnumber"></br>
33 </td>
34 </tr>
35 <tr>
36 <td>
37 <input type="button" onclick="Rese()" value="Reset">
38 <input type="button" onclick="Maximum()" value="Mximum">
39 <input type="button" onclick="Minimum()" value="Minimum">
40 <input type="button" onclick="Both()" value="Both"></br>
41 <b>The Results</b>
42 <textarea></textarea>
43 </td>
44 </tr>
45 </table>
46 </form>
47 </body>
48 </html>

```

Extract 13.2: A sample of an incorrect answer to question 3 of paper 2.

Extract 13.2 shows a sample line of codes from a candidate who failed to use the HTML frame codes as required in part (a), and also failed to use the JavaScript and HTML codes to create and activate form in part (b).

3.0 PERFORMANCE OF THE CANDIDATES PER TOPIC

The analysis done in relation to each topic showed that the candidates performed well in 7 topics, average in 1 topic and poor in 2 topics . It was observed that the candidates performed well in the following topics: *Data Representation* (92.3%), *Problem Solving* (78.3%), *C++ Programming* (76.8%), *Computer Security and Privacy* (76.3%), *IT Environment* (69.4%), *Website Development* (68.6%) and *Data Communication and Networking* (63.1%). The good performance is a result of the correct interpretation of the questions and the candidates' good practical skills. The candidates' performance was average in the question based on the topic of *Visual Programming* (35.8%). This performance is due to insufficient knowledge on the concepts taught under this topic. The candidates' performance was poor in the question based on *Computer Basics* (30.8%) and *Information Systems* (28.9%). The poor performance in these topics is attributable to the candidate's lack of practical skills on the topics. The *Appendix* shows the performance of the candidates for each topic.

4.0 CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

Generally, the candidates' performance in the 2020 Computer Science Examination was good as 82.05 per cent of the candidates passed. The candidates demonstrated good performance in 8 out of 10 topics examined, in Paper 1 and 2. The candidates performed well in this examination because they managed to identify the demands of the questions, followed the required instructions and had a sufficient knowledge of the subject matter. In contrast, other candidates did not performed well because had insufficient knowledge on the tested concepts, lacked practical skills, and failed to understand the demands of the questions.

4.2 Recommendations

In order to improve the candidates' performance in the Computer Science subject on the topics of Information System and Computer Basic, the following are recommended:

- (a) Teacher share to guide the students through question and answer in order to enable them to identify components of Information system.

- (b) Teachers should encourage the students to practice the database updating and retrieving from database using SQL.
- (c) Teachers should assist the students in groups to discuss the elements of entity - relationship model in consideration with entities, relationship and attributes.
- (d) Teachers have to lead students through practical work to use advanced features of spread sheet.
- (e) Since the data analysis showed that there was for lack of knowledge on some topics, it is recommended that teachers should provide students with more exercises and tests to enhance their mastery of both theoretical concepts and practical skills.
- (f) The candidates should read the examination instructions and questions carefully so as to understand clearly the requirements of the questions before answering them.

APPENDIX

Analysis of Candidates Performance per Topic

S/n	Topic	No. of Questions	Percentage of Candidates who Scored 35% Marks or Above	Remarks
1	Data Representation	1	92.3	Good
2	Problem Solving	1	78.3	Good
3	C++ Programming	2	76.8	Good
4	Computer Security and Privacy	1	76.3	Good
5	IT Environment	1	69.4	Good
6	Website Development	2	68.6	Good
7	Data Communication and Networking	1	63.1	Good
8	Visual Programming	2	35.8	Average
9	Computer Basics	1	30.8	Poor
10	Information Systems	1	28.9	Poor

