

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**CANDIDATES' ITEM RESPONSE ANALYSIS REPORT
FOR THE ADVANCED CERTIFICATE OF SECONDARY
EDUCATION EXAMINATION (ACSEE) 2018**

136 COMPUTER SCIENCE

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136 COMPUTER SCIENCE

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FOREWORD

The National Examinations Council of Tanzania is pleased to issue the Candidates' Item-Response Analysis (CIRA) report in Computer Science subject for the Advanced Certificate of Secondary Education Examination (ACSEE) 2018. The analysis provides feedback to the students', teachers, parents, policy makers and other education stakeholders on how the candidates' attempted the questions.

The Advanced Certificate of Secondary Education Examination marks the end of the two years of secondary education. It is a summative evaluation which shows, among other things, the effectiveness of the education system in general and the education delivery system in particular. Essentially, the candidates' response are good indicator of what the education system was or was not able to offer the candidates in their two years of advanced secondary education.

The analysis presented in this report is intended to contribute towards understanding some of the reasons for the candidates' good performance. The reasons include sufficient knowledge of the content in the topics tested and correct interpretation of the questions. The report also presents some of the reasons for a few candidates to score low marks. The reasons include insufficient knowledge of computer basics and misinterpretation of the questions.

The feedback provided in this report will enable our educational administrators, school managers, teachers and the students' to identify measures to be taken in order to improve the candidates' performance in future examinations.

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 evaluation of the candidates' performance in the 2018 Computer Science Examination. The examination assessed the competences and knowledge acquired by the candidates.

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 ten (10) compulsory questions with 6 marks each. Section B had three (3) optional questions with 20 marks each. The candidates were asked to attempt two (2) questions. The practical paper had three (3) questions with 25 marks each. The candidates were required to attempt two (2) questions, including question one.

28 candidates sat for the 2018 Computer Science Examination. Out of these candidates, 92.9 percent passed the examination and 7.1 percent failed. In 2017, 14 candidates sat for the Computer Science Examinations. Of these candidates, 57.1 percent passed the examination and 42.9 percent failed. This means that the performance has improved by 35.8 percent.

This report provides feedback to our stakeholders on the candidates' performance; it shows the candidates' strengths and weaknesses. In the analyses, the candidates' performance in each question/topic is regarded as good, average or poor if the candidates who scored 60-100, 35-59 and 0-34 are 35 percent or more. In this report, the candidates' performance is presented in different charts/tables in which the red colour stands for poor performance, the yellow colour for average performance and the 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 for both correct and incorrect responses are included for illustration purposes. Finally, some conclusion and recommendations are given.

2.0 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 1

2.1 PAPER 1: THEORY

2.1.1 Question 1: Computer Basics

The candidates were required to describe four categories of data which can be entered on a Microsoft Excel sheet.

All the candidates (100%) attempted this question; 96.3 percent scored marks ranging from 0 to 2 and 3.7 percent scored 3.5 out of 6 marks. The statistics show that no candidate scored more than 3.5 marks. Figure 1 shows the candidates' performance in this question.

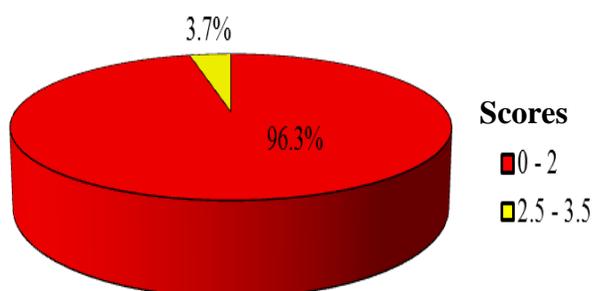


Figure 1: *The candidates' performance in question 1.*

The candidates' general performance in this question was poor, as Figure 1 shows. The majority of the candidates scored low marks (0 to 2) because they lacked knowledge of the types of data which can be entered on a Microsoft Excel sheet. Most of the candidates wrote alphanumeric and alphabetical as types of such data. These candidates mistook the types of the keys in the keyboard for the types of data entered on a Microsoft Excel sheet. They noted that alphanumeric data comprise numbers and symbols, while alphabetical data are in text form. Others wrote texts, numbers and memos of data in Microsoft Access rather than labels, values, formulae and functions. These responses indicate that the candidates misinterpreted the words *data* and *entered*. Extract 1.1 is a sample of incorrect responses to this question.

Extract 1.1

1	<p>i) <i>Employee's data</i>: One among data can be entered in Microsoft excel is employee data which Microsoft can find the salary, tax, interest for each employee.</p> <p>ii) <i>Student data</i>: Microsoft excel has a great important in simplify the work especially at school. Microsoft excel can find the total marks, average, grade and rank of students in a certain examination.</p> <p>iii) <i>Statistical data</i>: Also Microsoft excel can be used to present statistical data and it's graph e.g histogram, pie chart e-t-c Microsoft excel can find the number of people live in certain country.</p> <p>iv) <i>Customer data</i>: Microsoft excel also can be used in the large organisation e.g telephone company large hotel. Microsoft office determine the number of customer use the certain service, rate at which you lost or gain customer, which services have the lack of people.</p>
---	--

Extract 1.1 shows a response of a candidate who did not understand the question as he/she explained the function of Microsoft excel instead of giving the categories of data which can be entered in Microsoft excel sheet.

Only one candidate (3.7%) gave the correct data type (formula). However, this candidate could not score high marks because he/she wrote numeric data and texts which are examples of values and label data types. The candidate did not know that labels include any alphanumeric texts used as row or column headings and they cannot be manipulated mathematically.

2.1.2 Question 2: Visual Programming

The candidates were required to mention six components of the Integrated Development Environment (IDE) in Visual Basic and explain the function of IDE.

The results of the analysis show that 85.7 percent of the candidates attempted this question; out of such candidates, 66.7 percent scored from 0 to 2 marks, 12.5 percent from 2.5 to 3.5 marks and 20.8 percent from 4 to 4.5. The question carried 6 marks. No candidate scored more than 4.5 marks. Figure 2 presents the candidates' performance in this question.

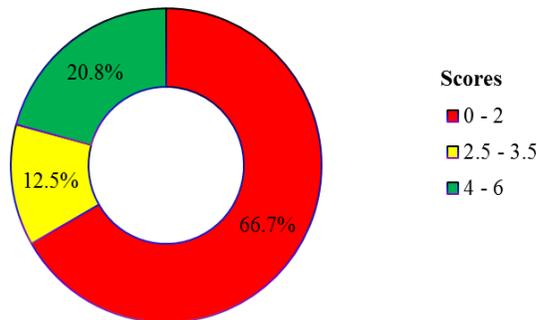


Figure 2: *The candidates' performance in question 2.*

The performance of the candidates in this question was poor, since only 33.3 percent scored more than 2 marks, as shown in Figure 2. Most of the candidates (66.7%) who scored low marks (0.5 - 2) mentioned a few components of IDE but could not explain the function of IDE at all. The components mentioned by many candidates were properties window, tool bar and form window. Others explained the function of IDE unsatisfactorily and did not provide the components of IDE. For example, one of the candidates wrote that *IDE provides interface medium for programming* instead of writing IDE describes the interface and environment that is used to create applications. Further analysis of the candidates' answers reveals that some of the candidates mentioned the features of a word processor window, including formatting tools, editing tools and a status bar. These candidates lacked knowledge of visual programming. Extract 2.1 is an example of an incorrect response given from one of the candidates.

Extract 2.1

Qn2.	(a) Properties box
	(b) Tool bar box
	(c) Menu bar box
	(d) Form
	(e) Debug message box
	(f) Title bar

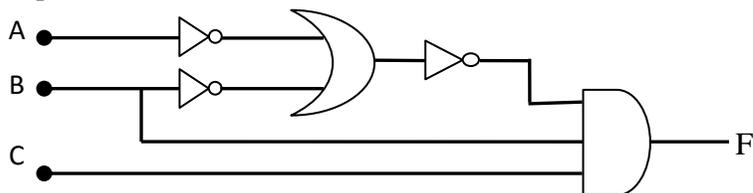
In Extract 2.1, the candidate got correctly one components of Integrated Development Environment (form) but failed to mention the rest components.

The candidates who scored high marks (3.5 - 4.5) (equivalent to 20.8%) mentioned the function of the target IDE. However, some of them could not give a clear function of IDE, which led them to lose some marks. For example, one of the candidates wrote that *IDE gives the programmer the environment to design the interface*. This candidate did not know IDE also enables a programmer to create codes. It was also observed that some of the candidates had insufficient knowledge of the components of IDE, which led them to mention the features of a word processor window rather than the components of IDE. The analysis shows that no candidate mentioned all the components of IDE.

2.1.3 Question 3: Data Representation

This question had two parts, (a) and (b). The candidates were asked to:

- Differentiate logic diagram from truth table.
- Study the following logic diagram and to answer the questions that follow:



The questions were:

- With clear steps, write a simplified Boolean expression for the output "F".
- Construct the equivalent truth table for the simplified expression.

A total of 28 candidates (100%) attempted this question. The analysis shows that 21.4 percent scored from 0 to 2 marks, 3.6 percent from 2.5

to 3.5 marks and 75 percent from 4 to 6 marks. The following figure presents a summary of the candidates' performance in this question.

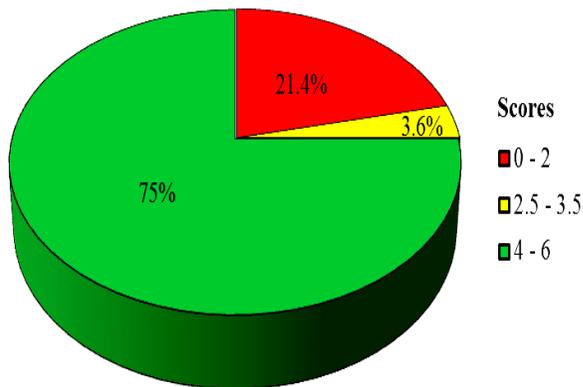


Figure 3: *The candidates' performance in question 3.*

The candidates' performance in this question was good, as 78.6 percent of the candidates scored more than 2 marks. In part (a), a few candidates (7.1%) differentiated a Logic Diagram from a truth table, wrote a correct simplified Boolean expression for the output "F" and constructed the equivalent truth table. 67.9 percent of the candidates who scored from 4 to 5.5 marks wrote a simplified Boolean expression in part (b).

However, the candidates had difficulty differentiating a logic diagram from a truth table in part (a). The candidates knew that a logic diagram includes logic gates and that a truth table shows the output of the logic gates. But they could not simplify Boolean expressions in part (b) due to having insufficient knowledge of data representation. The candidates should have known that a logic diagram is a diagrammatic representation of a logic circuit that shows the wiring and connections of each individual logic gate represented by a specific graphical symbol that implements the logic circuit. They should also have known that a truth table refers to the function of a logic gate that provides a short list of all the output states in tabular form, for each possible combination of input variables that the logic gate encountered. Extract 3.1 is an example of a correct response.

Extract 3.1

3a	Logic diagram is the logical circuit that is represented by special symbol called logic gate which represents logic expression while truth table is the table which use binary number 0 or 1 to represent logic expression.			
3b	$F = (\overline{A+B}) \cdot B \cdot C$			
i	$F = \overline{A} \cdot \overline{B} \cdot B \cdot C$ De Morgan			
	$F = A \cdot B \cdot C$ Complement			
	$F = A \cdot B \cdot C$ Idempotent			
	A	B	C	ABC
	0	0	0	0
	0	0	1	0
	0	1	0	0
	0	1	1	0
	1	0	0	0
	1	0	1	0
	1	1	0	0
	1	1	1	1

Extract 3.1 shows a sample of an answer of a candidate who differentiated the Logic Diagram from truth table and simplified the Boolean expression for the output "F". He/she also constructed the equivalent truth table correctly.

Furthermore, some of the candidates (21.4%) who scored low marks (0 to 2) could not explain the terms logic diagram and truth table in part (a). For example, one of the candidates wrote that *logic diagram uses the diagram to express the circuit while truth table uses the table to indicate the circuit*. This shows that the candidates had some knowledge of the two concepts. In part (b), some of the candidates gave the input values for A, B and C, but could not give the correct input value for the output ABC. Others had difficulty writing a simplified Boolean expression. As a result, they failed to construct a truth table.

Further analysis shows that some of the candidates studied the "OR gate" symbol and identified the $A' + B'$ expression but failed to study the NAND gate, which led them to provide an incorrect expression. For

example, one of the candidates gave the following expression: $A' + B' = D$, $(A' + B')' = D'$, $D'.B.C = F$. Some of them wrote a simplified Boolean expression but failed to construct its equivalent truth table. Extract 3.2 is an example of an incorrect response.

Extract 3.2

3	<p>a/ Logic gate is an electrical circuit that has high or low output by varying the value of the inputs.</p> <p>While, A truth table is the representation of the logic gates</p>															
	<p>b/ <u> </u></p> $(\bar{A} \cdot B) + ABC = F$ $(AB) + (ABC) = F$ $AB(C + C) = F$ $AB = F$ <p>\therefore Simplified Boolean expression $F = AB$</p>															
	<p>(i) Truth table</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>A</th> <th>B</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table>	A	B	F	0	0	0	0	1	0	1	0	0	1	1	1
A	B	F														
0	0	0														
0	1	0														
1	0	0														
1	1	1														

In Extract 3.2, the candidate did not extract logic gate from truth table. He/she also misinterpreted the OR gate in part (b) and provides input value (A and B) for the truth table instead of A, B and C.

2.1.4 Question 4: Problem Solving

The question had two parts, (a) and (b). The candidates were required to:

- (a) Explain the term Pseudocode.
- (b) Study the following scenario and answer the questions that follow:

Tanzania Youth Bank (TYB) pays 10% interest on shares exceeding Tsh. 200,000 and 2% on shares that do not meet this target. No interest

is paid on deposit in the member's bank account. Using a pseudocode, design an algorithm for program that would;

- (i) Prompt the user for shares, deposit of a particular member and the name.
- (ii) Calculate the interest and total savings.
- (iii) Display the interest and total savings on the screen for a particular member on the bank.

A total of 28 candidates (100%) attempted this question. The data shows that 25 percent of the candidates scored from 0 to 2 marks, 25 percent from 2.5 to 3.5 marks and 50 percent from 4 to 6 marks. Figure 4 shows the candidates' performance in this question.

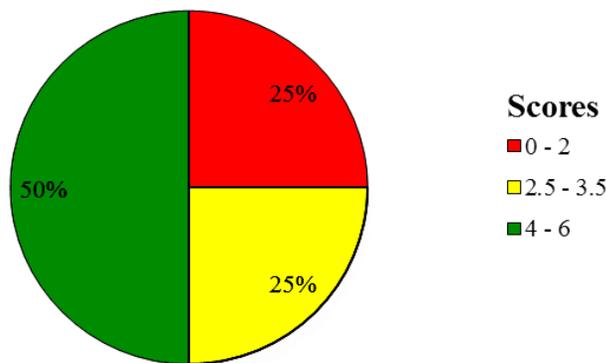


Figure 4: The candidates' performance in question 4.

Most of the candidates did very well. Only 25 percent of the candidates scored less than 2.5 marks, as shown in Figure 4. The candidates who scored high marks explained clearly the term pseudocode in part (a). In part (b), most of the candidates designed the right pseudocode, but some of them could not provide the correct formula for total savings. For example, one of the candidates wrote *Total savings = shares - 10% of shares* instead of writing *Total saving = Deposit + Shares + Interest*. Others knew that a Total savings formula is *Total saving = Shares + Interest*. Extract 4.1 is a correct response from one of the candidates.

Extract 4.1

4 a.	Pseudocode is the outline of the program using formal artificial language. From the name "Pseudo" it means false, thus it provide rough sketch of the program execution and computer or any higher language processor can execute them.
	(PSEUDOCODE)
4 b.	START
	INPUT Name, shares and deposit.
	READ shares and deposit.
	IF (shares > 200000) THEN
	Interest = $\frac{10}{100} * (10/100) * \text{shares}$.
	ELSE
	Interest = $(2/100) * \text{shares}$
	ENDIF
	Total savings = shares + deposit + Interest.
	PRINT Name, Interest and Total savings.

In Extract 4.1, the candidate wrote correct explanations of the term pseudocode and designed a pseudocode correctly.

Further analysis shows that most of the candidates (25%) who scored from 2.5 to 3.5 marks did not explain the term pseudocode satisfactorily. However, some of them provided the input, IF...THEN and output statements but did not provide the formula for both interest and total savings. This indicates that the candidates lacked mathematical skills.

On the other hand, some of the candidates (25%) who scored low marks explained the term pseudocode correctly in part (a) but designed a pseudocode with incorrect syntax in part (b). For example, one of the candidates wrote the following pseudocodes:

1. changing of amount greater of equal equal 20000 then

2. Interest is equal to Interest rate times 200,000
($10\% \times 200,000$)
3. Print interest
4. Saving is equal to interest plus shares
5. Print saving and interest
6. If amount is less than 200,000 then
7. Interest is equal to ($2\% \times 200,000$)
8. Print interest
9. Saving is equal to interest plus shares
10. Print saving and interest
11. Quit

Extract 4.2 is an example of an incorrect response.

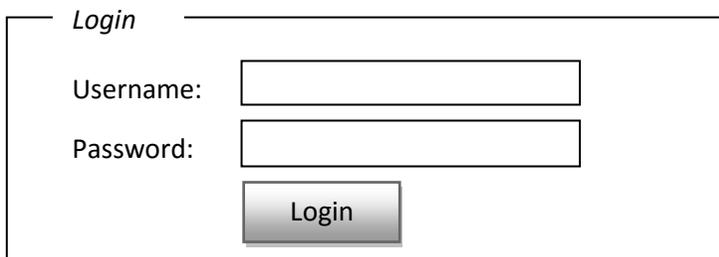
Extract 4.2

4	(a) Pseudocode refers to the set of instructions which explain the programming language with more detail than algorithms.
	(b) i/ Start
	ii/ Input N
	iii/ If N is greater than 200,000
	reduce 20,000, IP not
	reduce 4,000
	print $N \leftarrow N - 20,000$
	print N as savings
	print reduced as interest
	print N and se reduce.

Extract 4.2 shows a response of a candidate who wrote the explanations of a program instead of a pseudocode and wrote wrong pseudocode. This indicates that, a candidate lacked knowledge on the algorithm.

2.1.5 Question 5: Website Development

This question required the candidates to explain three types of HTML lists in part (a) and provide HTML codes which generated the following login form in part (b).



The image shows a login form within a rectangular border. At the top left, the word "Login" is written in a serif font. Below it, there are two input fields. The first is labeled "Username:" and the second is labeled "Password:". Both labels are in a serif font. Below the password field is a button with the text "Login" in a bold, sans-serif font. The button has a slight gradient and a shadow effect.

Out of 96.4 percent of the candidates who attempted this question, 22.2 percent scored from 0 to 2 marks, 44.5 percent from 2.5 to 3.5 marks and 33.3 from 4 to 6 marks. The candidates' performance in this question was good, as only 22.2 percent of the candidates scored less than 2 marks.

The candidates who scored from 2.5 to 3.5 marks (equivalent to 45%) mentioned the types of HTML lists in part (a) but could not explain them correctly. In part (b), some of them could not give appropriate tags for an ordered list ``, an unordered list `` and a definition list `<dl>` in their explanations. For example, one of the candidates wrote: *An ordered list is a list of items using numbers and that an unordered list is a list in terms of bullets.* Some of the candidates provided the HTML codes for a textbox, a password and a login button but did not provide the codes for a fieldset (legend) and a form.

Furthermore, some of the candidates who scored high marks (4 - 6) explained correctly the types of HTML lists in part (a) and gave correct codes for generating the login form in part (b). Some of them explained the ordered and unordered lists correctly, but failed to explain the definition list. Others provided a dropdown list instead of a definition list. This is due to the fact that ordered and unordered lists are commonly used in creating HTML pages. Extract 5.1 is an example of a correct response.

Extract 5.1

5a.	Three types of HTML lists are
i	Ordered list: Is the type of list in HTML which represent our items using a number. Examples are.
	<pre></pre>
	<pre> Mango </pre>
	<pre> Tomato </pre>
	<pre></pre>
	<p style="text-align: right;">output</p> <p>1. Mango</p> <p>2. Tomato</p>
ii	Un Ordered list: Is the type of list in HTML which represent the items using using a bullet instead of a number. Examples
	<pre></pre>
	<pre> Mango </pre>
	<pre> Tomato </pre>
	<pre></pre>
	<p style="text-align: right;">output</p> <ul style="list-style-type: none"> • Mango • Tomato
iii.	Description list: Is the type of list in HTML which show the details of the above list
	Example.
	<pre><dl></pre>
	<pre> Mango </pre>
	<pre><dd> Its small in size, and green colour </dd></pre>
	<pre> Tomato </pre>
	<pre><dd> Its red in colour </dd></pre>
	<pre></dl></pre>
	<p style="text-align: right;">output</p> <ul style="list-style-type: none"> • Mango Its small in size, and green colour • Tomato Its red in colour.

Cont.

5b	<html>
	<head>
	<title> </title>
	</head>
	<body>
	<fieldset>
	<legend> Login </legend> (table border="0").
	<tr><form>
	<td> Username: </td>
	<td> <input type="text" name="name"> </td>.
	</tr>
	<tr>
	<td> Password: </td>
	<td> <input type="password" name="pswd"> </td>
	</tr>
	<tr>
	<td> </td>
	<td> <input type="button" value="Login"> </td>
	</tr>
	</table>
	</form>
	</fieldset>
	</body>
	</html>
	text box
	∴ The table is for making ^{text box} it to be in
	sequence order.

In Extract 5.1, the candidate wrote correct lists of HTML and wrote the correct HTML codes to generate the login form.

On the other hand, the candidates (22.2%) who scored low marks from 0 to 2 marks provided two types of ordered and unordered lists in part (a), without correct explanations. Some of them gave incorrect types of lists. For example, one candidate provided a *linked list* and an *option*

list instead of Ordered List, Unordered List and Definition List. In part (b), some of the candidates gave codes for the login button but did not write codes for the textbox, <fieldset>, <legend>, <form> and <password>. The analysis shows that the candidates did not know the correct syntax of the intended codes. For example, one candidate wrote username: <input type = "box"> as the code for displaying the textbox of a username, instead of writing Username: <input type = "textbox" name = "username">. This indicates that the candidates had low practical skills. Extract 5.2 is an example of an incorrect response.

Extract 5.2

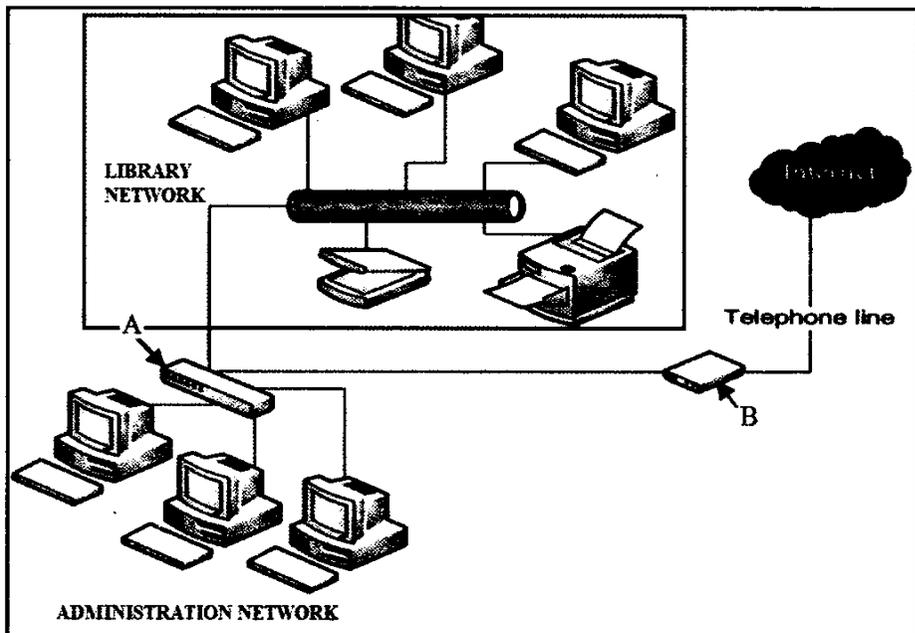
5	a) - Drop list
	This is the type of list in which it is hidden until when the cursor is directed to it it displays the list of items down
	- Combo list
	This is the type of list in which it is always display its composed items directly
	- Scroll list
	This is the type of list in which its items are stored in form of a scroll which can be up down scroll or left-right scroll.
5	b) <HTML>
	<title> </title>
	<head> </head>
	<body>
	<table>
	<tr>
	<td> login </td>
	</tr>
	<form>
	<tr>
	<td> Username : </td>

Extract 5.2 shows a sample of a candidate who wrote table tags instead of fieldset tags in part (b) and the responses provided in part (a) was wrong.

2.1.6 Question 6: Data Communication and Networking

The candidates were asked to:

- (a) Define the term wireless network.
- (b) Study the following figure and to answer the question that follow:



The questions were:

- (i) List the topologies used in the Figure studied.
 - (ii) Mention the names of device A and B.
 - (iii) Why it is necessary to have device B?
- (c) Give one advantage of the topology used in administration network.

A total of 28 candidates (100%) attempted this question; of such candidates, 14.3 percent scored from 0 to 2 marks, 60.7 percent from 2.5 to 3.5 marks and 25 percent from 4 to 5 marks. The candidates' performance in this question was good, since only 14.3 percent scored less than 2.5 marks. Figure 5 is an illustration of the candidates' performance in this question.

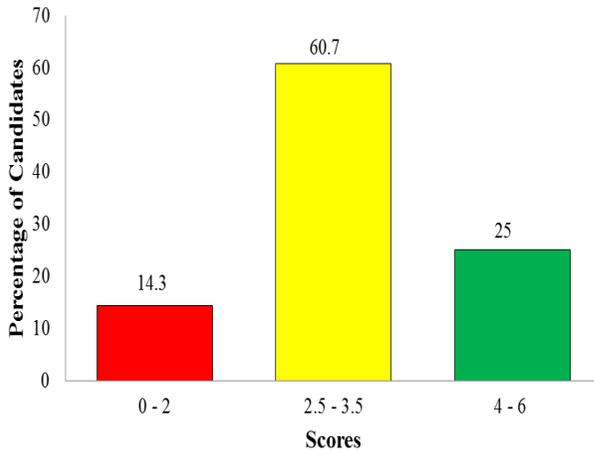


Figure 5: *The candidates' performance in question 6.*

The majority of the candidates scored from (2.5 - 3.5) marks (equivalent to 60.7%), as shown in Figure 5. Some of the candidates correctly defined a wireless network in part (a). Others did not identify all the topologies in the figure. They listed either star or bus topology in part (b) (i). Further analysis shows that some of the candidates had difficulty identifying device B in (b) (ii); hence they failed to explain its importance to the network. For example, one of the candidates wrote that device B is a *repeater* rather than a modem. However, the candidates who gave the correct type of topology in administration block mentioned its advantage in part (c).

Moreover, the candidates (25%) who scored from 4 to 5 marks defined a wireless network and listed the right network topologies. Some of the candidates mentioned the names of devices A and B that is, Switch/Hub and Modem, respectively. However, some of the candidates didn't give the name of device B and explain its importance in part (b) (iii). These candidates did not know the device used to connect a computer network to the Internet. The candidates mentioned the correct advantage of the topology (star) used in the administration network. Extract 6.1 is an example of a correct response.

Extract 6.1

6.	Wireless network is the communication created from one area to another without using cable.
6b.i	Bus topology in library network. Star topology in administration network.
6b.ii	device A - Switch. B - Modem.
6b.iii	Device B used to convert analog signal from telephone line to digital signal that computer process and vice versa.
6c.	No server, thus every one can access network without permission of server and no one can see the data sent or received to another.

Extract 6.1 shows a response of a candidate who defined the term wireless network, listed the topologies, mentioned network devices and gave the correct application of Modem in the network. However, the candidate wrote incorrect advantage of the star topology in part 6c.

On the other hand, the candidates who scored from 0 to 2 marks (equivalent to 14.3%) could not define the term wireless network in part (a). The analysis shows that such candidates knew the general meaning of the term wireless but failed to relate it to the network. For example, one of the candidates wrote: *Wireless network is the network that uses wireless connection* instead of a network setup by using radio signal frequency to communicate among computers and other network devices.

Some of the candidates did not know the features and functions of the components of the network given in the figure, which led them to list incorrect network topologies. For example, one of the candidates mentioned *Hybrid topology* and *Ring topology* in part (b) (i) instead of Bus topology and Star topology. Others mentioned device A (Switch/Hub) but failed to identify device B (Modem). For example, a

candidate called device B as a *Router* instead of Modem in part (b) (iii). This led them to write wrong importance of the device B. However, some of the candidates gave the target advantage of star topology. A few candidates mentioned the advantage of networking without giving any explanations, which led them to lose some marks. Extract 6.2 is an example of an incorrect response.

Extract 6.2

6a	Wireless network is the collection of different entity via wireless in order to resource sharing or for the purpose of communication. Wireless network can be bluetooth, microwave, satellite or others.
6b	- Local Area Network (LAN). - Metropolitan Area Network (MAN). - World wide Area Network (WAN).
ii	A = Switch. B = Hub
iii	It is necessary to have device B for distribution of signal

Extract 6.2 shows a sample of a candidate who had an idea of examples of wireless network but gave incorrect definition and wrote types of networks instead of types of network topologies.

2.1.7 Question 7: System Development

The candidates were asked to:

- Explain the term “requirement specifications” as used in software development.
- Explain three considerations to be included in the requirement specification stage.
- Describe two roles of testing phase in software development life cycle.

The analysis shows that a total of 28 candidates (100%) attempted the question. Twenty-five percent scored from 0 to 2 marks, 28.6 percent from 2.5 to 3.5 marks and 46.4 percent from 4 to 6 marks. The candidates' performance in this question was good, since 75 percent of the candidates scored more than 2 marks. Figure 6 is an illustration of the candidates' performance in this question.

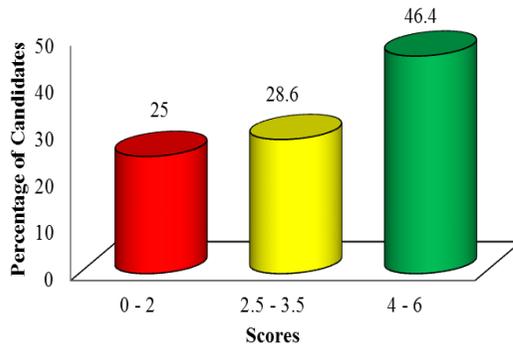


Figure 6: *The candidates' performance in question 7.*

The majority of the candidates (46.4%) who scored from (4 to 6) marks had difficulty explaining the term “requirement specifications” in part (a). The analysis of the candidates' responses shows that the candidates had an idea of the term but did not know what to include in the specifications, which led them to write incomplete explanations. For example, one of the candidates wrote: “*Requirement specification refers to the process of specifying things required in order to develop software*”. The candidates should have said that requirement specification is a document which specifies what services the proposed system provides, the conditions (e.g. time constraints, security) on those services and how the user will interact with the system.

However, some of the candidates mentioned the right considerations to be included in the required specification stage in part (b). Some of them mentioned a few correct considerations. Other candidates explained correctly the input specifications, hardware and software considerations but failed the rest. Others wrote correct descriptions on the roles of testing software in part (c). Responses such as debugging programs and finding out whether they meet all the requirements were provided by some of the candidates. Extract 7.1 is an example of a correct response.

Extract 7.1

7.	(a) Requirement specifications as in software development refers to the stage of software development in which the developer analyse and list all things required for the development of a particular software.
	(b) Three considerations to be included in the requirement specification stage:
	⊙ Output requirement. The system developer needs to select a proper output which will be suitable by considering the users of a particular system to be developed, either are elders or youth for example. The output can be soft copy or hard-copy.
	⊙ Hardware and software requirement. The system developer need to choose the proper and user friendly hardware and software and which is based on the current technology which can be easily available, and thus the system can be well developed and easily used by the users.
	⊙ Input requirement. The system developer need to clearly specify what needs to be input & fed to the system and the methods used either through typing or voice commands, but which can be easily used by the users to which the system will be operated.
	⊙ Roles of testing phase in software development life cycle:
	⊙ Checks whether the system work as it is supposed to and give out the expected output. This will thus increase customer's reliability and satisfaction.
	⊙ Checks for the defects and errors made

In Extract 7.1, the candidate explained correctly the term "requirement specifications" and gave the correct considerations to be included in the requirement stage as well as the roles of testing phase in the software development.

Further analysis of the candidates' responses indicates that 28.6% of the candidates who scored from 2.5 to 3.5 marks explained the term requirement specification correctly in part (a). However, some of them listed the right considerations in part (b), without explaining them. Some of the candidates could not differentiate program designing stages from requirement specification stages in a software development life cycle. For example, one of the candidates wrote *ensure security for the program and writing codes* instead of input specification, output specification, hardware as well as software requirements. A few candidates described only one role correctly.

Twenty-five percent of the candidates who scored low marks (0 to 2) lacked adequate knowledge on system development, which led them to define the term requirement specification wrongly. For example, one candidate wrote that *requirement specification means materials which should be used in developing software*. Some of the candidates wrote considerations for good software rather than requirement specifications. For example, the response of one of the candidates was "*compatibility, user friendly and cost instead of Input/output specifications, Hardware specifications and Software specifications* rather than output specifications, Files/data stores, input specifications. Others listed hardware and software specifications without explaining them, whereas others gave only one correct role. This indicates that the candidates had insufficient knowledge of software development.

2.1.8 Question 8: Computer Security and Privacy

The candidates were required to: (a) differentiate data availability from data confidentiality and (b) describe four physical threats to data security.

A total of 28 candidates (100%) attempted this question; 46.4 percent scored from 0 to 2 marks, 28.6 percent from 2.5 to 3.5 marks and 25 percent from 4 to 6 marks. Figure 7 is a summary of the candidates' performance in this question.

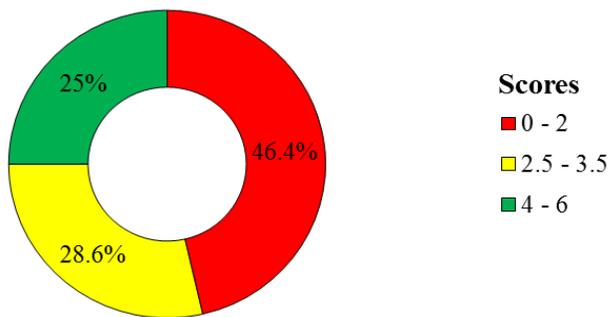


Figure 7: *The candidates' performance in question 8.*

The candidates had average performance, as 53.6 percent of them scored more than 2 marks, as shown in Figure 7. However, 46.4 percent of the candidates scored from 0 to 2 marks. In part (a), some of them gave a direct translation of the terms data availability and data confidentiality, instead of providing a correct scientific meaning of them as they are used in data security. For example, one of the candidates wrote “*Data availability means that data is available for use while data confidentiality means data is hidden.*” This shows that the candidate lacked adequate knowledge of data security.

The majority of the candidates did not understand the question (part (b)), as they wrote software threats such as *malicious software* and *piracy*, instead of giving physical threats. However, a few candidates gave one or two target physical threats. Others mentioned ways of preventing software threats, instead of describing physical threats. This indicates that the candidates could not differentiate physical threats from software threats. Extract 8.1 is an example of an incorrect response.

Extract 8.1

8	b/ i) Hacking - This is a threat which involves an individual accessing the password used to prevent data leakage.
	ii) Cybercrime, illegal activity done using the internet where there is leakage of individual's personal informations.
	iii) Cracking, This involves penetrating through the firewalls that have been set up to protect the data.
	iv) Data inconfidentiality, This means the data is open to different individuals. The individuals can have good or bad intentions with that data obtained.

Extract 8.1 shows an answer of a candidate who described computer fraud instead of physical threats.

The candidates (28.6%) who scored from 2.5 to 3.5 marks differentiated correctly data availability from data confidentiality in part (a). Some of them had an idea of data availability but thought that data availability means the kind of data to which anybody has access. These candidates should have known that data availability does not mean that there are no restrictions on access to data. Some of the candidates could not describe any physical threats in part (b). Others described only two target physical threats, while others could not explain the threats satisfactorily. This shows that the candidates had insufficient knowledge of data security.

Moreover, 25% of the candidates who scored from 4 to 6 marks differentiated data availability from data confidentiality and described correctly physical threats. However, some of the candidates mistook software threats for physical threats. This might be due to the fact that

software threats are more common to the candidates than physical threats. Extract 8.2 is an example of a correct response.

Extract 8.2

8a)	While data confidentiality means + is a principle of information security which means that information owned by an organization should not be accessed or seen by unauthorized people.
b)	i) Hardware failure: When parts of the computer fail such as the memory, the security of data may be lost.
	ii) Stealing or burglary of the computers: When the computers are stolen then the security of data is at risk since the robber or burglar can do anything with it.
	iii) Network failure: If the data is stored on a network and if the network breaks down then the security of data will be at risk.
	iv) Power outages such as blackouts, brown outs and surges may lead to loss of data.

In Extract 8.2, the candidate distinguished the data availability from data confidentiality and wrote correct descriptions of physical threats to data security.

2.1.9 Question 9: Data Representation

The candidates were required to:

- (a) Explain the presentation of hexadecimal number system and give the range of digits and letters used to represent hexadecimal numbers.
- (b) Convert $A90F_{16}$ number system into:
 - (i) its binary equivalent.
 - (ii) its decimal equivalent.

A total of 28 candidates (100%) attempted this question. The statistical analysis shows that 10.7 percent of the candidates scored from 0 to 2 marks, 21.4 percent from 2.5 to 3.5 marks and 67.9 percent from 4 to 6 marks. The candidates' overall performance in this question was good, as only 10.7 percent of the candidates scored less than 2.5 marks. Figure 8 illustrates the candidates' performance in this question.

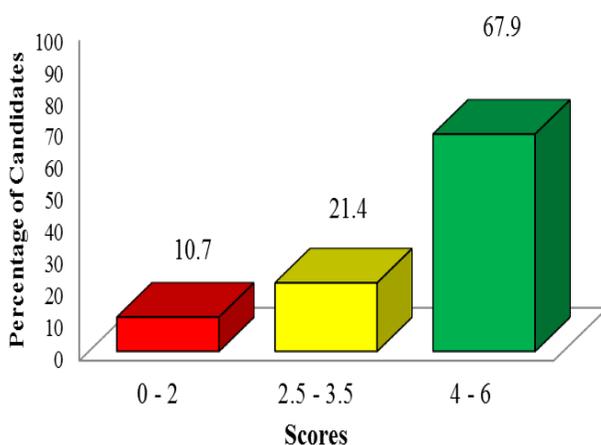


Figure 8: *The candidates' performance in question 9.*

The candidates who scored from 4 to 6 marks (equivalent to 67.9%) explained the representation of a hexadecimal number system and its range in part (a). Further analysis shows that some of the candidates converted $A90F_{16}$ into a binary and decimal equivalent in part (b). Others converted it correctly but failed to indicate the bases in the final answer. For example, one of the candidates wrote $1010\ 1001\ 0000\ 1111$ as the final binary number system instead of $1010\ 1001\ 0000\ 1111_2$ or 43279 as the final decimal number system instead of 43279_{10} . Also some of the candidates wrote the right conversions with the right bases

but did not score full marks because they did not write all the necessary steps. Extract 9.1 is an example of a correct response.

Extract 9.1

9 a.	Hexadecimal number system is a sixteen base number system which comprises digits from 0 to 9 and letters from A to F.									
	Hexadecimal Numbers are.									
	0	1	2	3	4	5	6	7	8	9
	A	B	C	D	E	F				
	(10)	(11)	(12)	(13)	(14)	(15)	← Equivalent decimal digits.			
b.i.	solution.									
	A (10)	9	0	F (15)	Hexadecimal					
	1010	1001	0000	1111	Binary form.					
	$\therefore A90F_{16} \equiv 1010100100001111_2$									
ii.	solution.									
	Place value	16^3	16^2	16^1	16^0					
	Digit	A (10)	9	0	F (15)					
	Decimal equivalent									
	$= (10 \times 16^3) + (9 \times 16^2) + (0 \times 16^1) + (15 \times 16^0)$									
	$= 43279_{10}$									

Extract 9.1 shows a sample of a candidate who explained correctly hexadecimal number system and converted $A90F_{16}$ into its binary and decimal equivalent as targeted.

However, 21.4 percent of the candidates who scored from 2.5 to 3.5 marks explained correctly the representation of the hexadecimal number system and gave its range in part (a). The analysis of the candidates' responses shows that some of the candidates gave correct explanations with an incorrect range of digits and letters. For example, one of the candidates wrote 0 – 16 as the range of the Hexadecimal

number system instead of 0 – 9; and he/she provided A – G as the letters used to represent hexadecimal number system instead of A – F. In part (b), some of the candidates converted the hexadecimal number to a binary number system but failed to convert it to its decimal equivalent. On the other hand, some of the candidates who scored low marks (0 to 2) marks (equivalent to 10.7%) wrote the right range of the letters of the Hexadecimal number with wrong digits. Furthermore, some of these candidates wrote the range of 0 – 15, which is a combination of digits (0 – 9) and letters (A – F). These candidates knew that A – F means 10 – 15 but did not follow the instructions given. However, others had knowledge of the binary numbers that are represented by 0 and 1 but did not know how to convert the given hexadecimal numbers to binary numbers, which led them to guess the answers. For example, one of the candidates wrote $100\ 101\ 0\ 111$ as the binary number system for $A90F_{16}$ instead of $1010\ 1001\ 0000\ 1111_2$.

2.1.10 Question 10: System Development

This question had three parts, (a), (b) and (c). The candidates were required to:

- (a) Explain the meaning of the term Information system.
- (b) Elaborate two roles of information system analyst.
- (c) Describe three main purposes of information system in an organization.

All the candidates (100%) attempted this question. 32.1 percent scored from 0 to 2 marks, 39.3 percent from 2.5 to 3.5 and 28.6 percent from 4 to 5 marks. Figure 9 is a summary of the candidates' performance in this question.

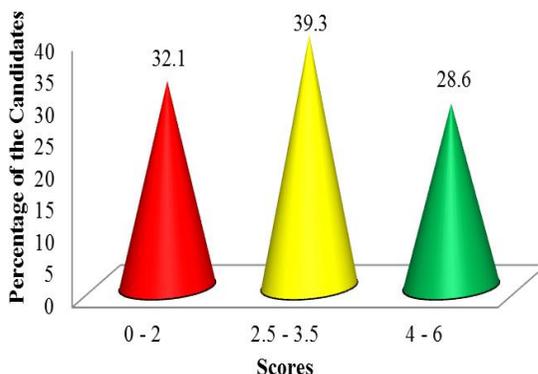


Figure 9: The candidates' performance in question 10.

The candidates' general performance in this question was good, as 67.9 percent of the candidates scored more than 2 marks. In spite of this good performance, 39.3 percent of the candidates scored from 2.5 to 3.5 marks. Some of these candidates explained the term information system in part (a) but others failed to do so because they did not know the components of an information system. For example, one of the candidates wrote: *Information system is the group of element functioning together as a whole in specific boundary to allow data sending and receiving process*, instead of defining it as an arrangement of people, hardware, software and information that works together to support and improve day-to-day operations in a business and in a decision making process.

However, some of the candidates explained correctly one role of an information system analyst in part (b). This shows that the candidates had insufficient knowledge of an information system. In part (c), most of the candidates described only two purposes of an information system in an organization. Others gave partial explanations, which made them lose some marks.

On the other hand, the candidates who scored from 0 to 2 marks (equivalent to 32.1%) failed to describe an information system. Some of them described it as a communication system. For example, one of the candidates wrote: *Information system refers to the whole process which involves the transferring of information from one point to another* instead of an arrangement of people, data processes and information that works together to support and improve the day to day operations in a business and the decision making process.

Further analysis shows that some of the candidates mentioned the roles of an information system analyst without explaining them and that others mentioned the roles of software development instead of the roles of a system analyst. Some of the candidates described correctly only one purpose of an information system in part (c). The majority of the candidates described how an information system helps in decision making. This shows that the candidates had general knowledge of an information system. Extract 10.1 is an example of an incorrect response.

Extract 10.1

10	Information system refers to the whole process which involve the transferring of information from one point to another
⑥	(i) Help to provide a reliable and available information
	(ii) Help to provide a realistic information.
⑥	Purpose of information system of organization
	- To provide accurate information or data
	- To create aware awareness to the users
	- To determine costs for transferring information.

Extract 10.1 shows a sample of a response from a candidate who described the purposes of information system based on information only.

Furthermore, some of the candidates who scored from 4 to 5 marks (equivalent to 28.6%) correctly explained an information system in part (a). Others repeated the role of reviewing/checking an existing system, which made them not score all the marks. However, some of these candidates described the main purposes of an information system in part (c). Others described only two purposes correctly. Extract 10.2 is an example of a correct response.

Extract 10.2

10a	Information system is the arrangement of people, information, process in order to support and improve the day to day operations in decision making and in business.
b	<p>Roles of Information system analyst are.</p> <ul style="list-style-type: none"> - To analyse the system, if there is defect present. - System analyst organized with programmer to solve a particular task.
c	<ul style="list-style-type: none"> - Information sharing: In information system information can be shared with different people. - Information system support decision making by collecting the data, arrangement of data. - Information system used in business: Example. the transaction of money in every day.

Extract 10.2 shows a response of a candidate who defined the information system, also elaborated the roles of information system analyst but the last purpose of information system was not correct.

2.1.11 Question 11: Data Representation

This was an essay question and the candidates were required to describe the decimal, binary, octal and hexadecimal number systems and give an example for each type.

A total of 27 candidates (equivalent to 96.4%) attempted this question. The analysis shows that 11.1 percent scored from 0 to 6.5 marks, 25.9 percent from 7 to 11.5 marks and 70.4 percent from 12 to 18.5 out of 20 marks. However, no candidate scored more than 18.5 and less than 5 marks. Figure 10 presents the candidates' performance in this question.

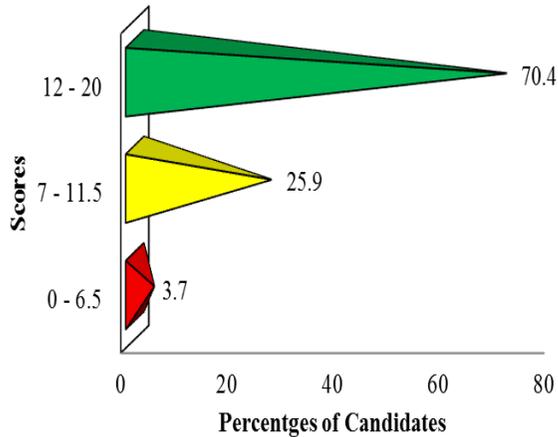


Figure 10: *The candidates' performance in question 11.*

Generally, the candidates' performance was good, as 96.3 percent scored more than 6.5 marks. The majority of the candidates (70.4%) who scored from 12.5 to 18.5 marks correctly described the base, range and examples of decimal, binary, octal and hexadecimal number systems. However, some of the candidates did not score full marks because they wrote unsatisfactory introductions and conclusions. For example, one of the candidates wrote: *Number system refers to the system of representing numbers in different forms. The basic four number systems known are decimal, binary, octal and hexadecimal number systems.* This shows that the candidates did not know how to write introductions and conclusions. Others did not include ranges, bases or examples in their explanations. Extract 11.1 is an example of a good response.

Extract 11.1

11	<p>Number system is the set of symbols used to represent the different quantities. There are many number systems used today but main of them are decimal, binary, octal and hexadecimal.</p> <p><u>Decimal number system</u>: Decimal number system is the number system which contains ten symbols which is lies between zero and nine i.e 0 to 9. On representing the decimal number system are given the base 10 to represent decimal i.e $()_{10}$.</p> <p>Examples of decimal number system are $(10)_{10}$, $(9)_{10}$ e.t.c.</p> <p><u>Binary number system</u>: The binary number system use only two values, which are called the binary digit i.e 0 and 1.</p> <p>The two binary digit and base of two $()_2$ are used to represent the binary number system. The binary number system are now used in the world of electronics to represent the two discrete values i.e 0 and 1.</p> <p>Example of binary number system is $(1011101)_2$.</p> <p><u>Octal number system</u>: This number system use the values between zero and seven i.e 0 to 7 to represent octal number and are given the base 8 i.e $()_8$.</p> <p>Example of octal number system are $(77)_8$.</p>
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	Hexadecimal number system:
	This number system employ an
	alphanumeric character to be represented i.e
	Hexadecimal use A to F and 0 to 9.
	Also by writing the base 16 i.e () ₁₆ we
	indicate now we deals with hexade-
	cimal number system.
	Example of hexadecimal number system
	are (AF86) ₁₆ .
	Conclusively, all of the quantity
	are now represented by number system
	i.e most of them are represented by
	decimal number system.
	Although, we can convert the one
	number system to another by following
	the rules for each conversion.

In Extract 11.1, the candidate described number system but failed to write the conclusion.

25.9 percent of the candidates who scored from 8 to 11.5 marks gave explanations with wrong ranges, bases or examples of the particular number system. For instance, one of the candidates wrote hexadecimal F78 instead of $F78_{16}$. Others gave the right examples but failed to write correct ranges and bases. Further analysis shows that some of the candidates wrote wrong introductions and conclusions. For example, one candidate wrote the conclusion as *Therefore, each number system is used with purpose of figures in which it hold, e.g. Hexadecimal number used for large figure number system while binary for small figure number.* A few candidates failed to distinguish between the decimal number system and decimal points.

2.1.12 Question 12: Information System

This was an essay question. The candidates were required to describe four problems caused by storing data redundantly in a database and to explain how the first three levels of normalization can be used to avoid data redundancy.

This question was not attempted by many candidates. Only 39.3 percent of the candidates attempted it. Out of these candidates, 27.3 percent scored from 0 to 6.5 marks, 27.2 percent from 7 to 11.5 marks and 45.5 percent from 12 to 17.5 marks. This question had 20 marks. The results show that no candidate got 0. Figure 11 illustrates the candidates' performance in this question.

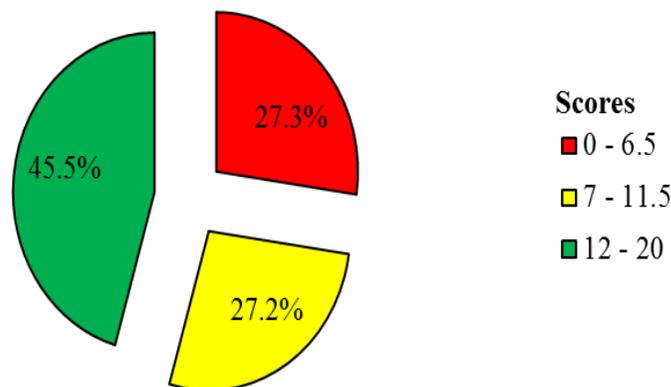


Figure 11: *The candidates' performance in question 12.*

This question is one of the questions that most of the candidates did very well. 72.7 percent of the candidates who attempted it scored more than 6.5 marks. The candidates who scored high marks described the problems caused by storing data redundantly in a database and the levels of normalization, and explained clear steps in each level of normalization. However, some of the candidates did not give any examples, while others wrote unsatisfactory introductions and conclusions. For example, one of the candidates wrote: *Database refers to the collection of related files. Data redundancy refers to presence of dependencies in attributes* in the introductions. Extract 12.1 is an example of a correct response.

Extract 12.1

12	<p>Normalization is the process of decomposing the table in order to remove data redundancy and modification anomalies. Earlier data was stored redundantly and suffer for a certain problem e.g insertion anomalies, deletion anomalies and updation anomalies:</p> <p><u>Insertion anomalies</u>: One of the problem caused by storing data redundantly is that the inability to insert a new data in the table.</p> <p><u>Updation anomalies</u>: For a table/system that their data are stored redundantly will prevent the updation process to take place. We can't update the redundantly data because it will increase the redundancy.</p> <p><u>Deletion anomalies</u>: We can't delete the data in a redundant data tables. It implies the hardness to delete even a small data because all table would be nothing to understand.</p> <p><u>Improper searching and access data</u>: If we store a data redundantly in a database we can't search and access the data exactly we want. Example Suppose you want to search a name but in our database have the exactly the same name three times, you couldn't find accurate data. However, to eliminate that problem caused by storing a data redundantly in data base it should us be use the concept of normalization which can eliminate by:</p>
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	<p><u>First normal form</u>: In first normal form we remove the repeating group, we ensure only atomic value and all and column contain only a single data. The first normal sometimes eliminate all problem caused by store data redundantly but if its insufficient we proceed on second normal form.</p> <p><u>Second normal form</u>: In this level we take first a first normal form and then we apply a fully functional dependency in which all other prime attribute depend on primary key.</p> <p>In second normal form we have ability to search any data without any unexpected output because we use primary key.</p> <p><u>Third normal form</u>: If the third second normal form is insufficient to solve the problem associated with redundant data store the third normal form took a second normal form and remove all transitive dependencies. The redundant table are almost have no the problem.</p> <p><u>Conclusively</u>: the process of normalization have the important role to ensure high efficiency and accurate data are obtained. However a large organisation should normalize their data and update to improve and secure their data.</p>
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Extract 12.1 shows a sample of response of the candidate who explained the problems of storing data redundantly but failed to explain the update anomalies and insertion anomalies.

The candidates who scored from 7 to 11.5 marks had an idea of what database design is, but failed to describe it clearly. Others mentioned

the effects of data redundancy instead of the problems caused by storing data redundantly in a database. For example, one of the candidates wrote: *Misallocation of data and time consuming during management of data* instead of writing update anomalies, deletion and insertion anomalies. This indicates that the candidates did not understand the question.

On the other hand, 27.3 percent of the candidates who scored low marks could not explain the problems caused by storing data redundantly in a database and the levels of normalization. Some of the candidates mentioned the levels of normalization but did not explain them. Others did not use the scientific term such as deletion and updating anomalies to explain the problems caused by storing data redundantly in a database. For example, one of the candidates wrote *Disappearing of some data*, instead of writing deletion anomalies. This shows that the candidates lacked adequate knowledge of a Relational database. Extract 12.2 presents an example of an incorrect response.

Extract 12.2

12.	Database is the collection of various items linked together for easy access of data. A database comprises of several related data that can be related to bring a collective meaning. If data is stored redundantly, there are various problems that may arise. The following are the problems caused by data redundancy in the database;
	Security issues. The issue of security has been a great challenge in database management. Everyday such issue becomes complicated due to the improved science and technology, while programmers and database administrators are working to solve different cases again people discover new way of accessing data unauthorized. Hence it is a challenge to database administrators.
	Backup. A backup data can be obtained from a backup location. Storing data on one location can cause risk of losing data completely. And this has been one of the challenge in database management system.

In Extract 12.2, the candidate who explained the data security instead of data redundancy.

2.1.13

Question 13: Problem Solving and C++ Programming

The question required the candidates to draw a flowchart, write pseudocodes and use the *while...loop* to construct a C++ program that could:

- (i) Read a positive integer N.
- (ii) Calculate and print N! Where $N! = N(N-1)(N-2)\dots(2)(1)$.

This question was attempted by 18 candidates (64.3%). The statistics show that 38.9 percent scored from 0 to 6.5 marks, 55.5 percent from 7 to 11.5 marks and 5.6 percent scored 16 out of 20 marks. Figure 12 is a summary of the candidates' performance.

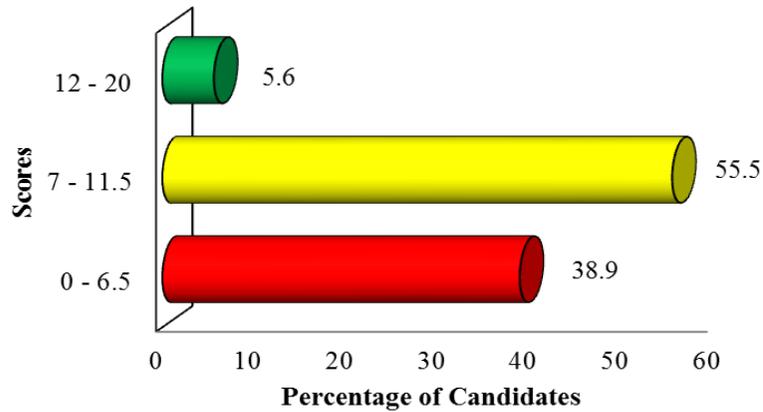


Figure 11: *The candidates' performance in question 13.*

Generally, the performance was good, since only 38.9% of the candidates who attempted the question got less than 7 marks, as Figure 11 shows. Further analysis shows that the majority of the candidates who scored average marks drew a flowchart and some of them provided a correct pseudocode but failed to declare the right variables required in initiating the while...loop condition in the C++ program. For example, one of the candidates wrote:

```
while(N>=1)
{
factorial=factorial*N;
N=N-1;
}
```

Some of the candidates declared the right variables in the while...loop condition but failed to give the right formula for calculating the factorial of the number to display the factorial of the number entered. This shows that the candidates did not know the concept of factorial as applied in mathematics. Others could calculate the factorial of a number but failed to use the while...loop condition to write the C++ program.

However, 38.9 percent of the candidates scored from 0 to 6.5 marks. Some of these candidates drew flowcharts, wrote a pseudocode and constructed a C++ program with incorrect steps in calculating the factorial of a number. Some of the candidates failed to construct a C++ program and others did not understand the question. These

13	The pseudocode of positive integer N .
	i/ Enter the value of N .
	ii/ Check if N is greater than or equal to one.
	iii/ If it is greater the Stage ii/ is true then continue.
	iv/ If Stage ii/ is false print is not positive.
	v/ Print N is positive.
	The Use while --- loop to Read a positive integer N .
	<pre> #include <iostream> using namespace std; main() { int N; cout << "Enter the value of N" << endl; cin >> N; do; { if $N > 1$. cout << "The N is positive" >> endl; } while: { $N > 1$. System("pause"); Return main(); } </pre>

In Extract 13.1, the candidate drew flowchart, wrote pseudocode and created a C++ program for testing whether the entered number is positive or negative instead of calculating the factorial of a number.

3.0 ANALYSIS OF CANDIDATES' PERFORMANCE IN EACH QUESTION IN PAPER 2

3.1 PAPER 2: PRACTICAL

3.1.1 Question 1: C++ Programming

This was a compulsory question, which carried a total of 25 marks. The candidates were required to:

- (a) Use a function named "Functionlarger" to create a C++ program that determines the largest number from a set of 10 numbers entered by the user.
- (b) By using "Switch...Case" statement in C++ program, construct a menu-driven choice to calculate the area of triangle, rectangle or circle. The program should read the user's choice and execute accordingly.

The analysis shows that all 28 candidates (100%) attempted this question. 7.1 percent scored from 4 to 8.5 marks, 14.3 percent from 9 to 14.5 marks and 78.6 percent from 15 to 25 marks. A summary of the candidates' performance in this question is shown in Table 1.

Table 1: The candidates' performance in question 1

Scores	Percentage of Candidates
4 - 8.5	7.1
9 - 14.5	14.3
15 - 25	78.6

Table 1 shows that 92.9 percent of the candidates scored more than 8.5 marks. This is good performance. The candidates who scored high marks (15 - 25) in part (a) wrote the correct function and declared the variables, and got the right output. In part (b), some of the candidates used the right switch-case statement and the right formula to calculate the area of a triangle, of a rectangle or of a circle. However, some of the candidates used the *if...else* statements to create a program, instead of using the functions and the loop to initiate the set of numbers. Others managed to use function but did not define the parameters which enable a program to compare numbers. For example, some of the candidates

wrote the function `FunctionLarger()` instead of `FunctionLarger(double x, double y)`. A few candidates wrote an array as a parameter of a function which led to an incorrect output. Extract 3.1.1 is an example of a correct response.

Extract 3.1.1

```
#include<iostream>
using namespace std;
int main()
{
    double base,height,length,width,radius,area;
    char choice;
    cout<<"Please enter 't' for area of triangle, 'r' for area of rectangle and 'c' for area of a circle"<<endl;
    cin>>choice;
    switch(choice)
    {
        case 't':
            {
                cout<<"Enter the base and height of the triangle respectively\n";
                cin>>base>>height;
                area=(base*height)/2;
                cout<<"The area of the triangle is: "<<area<<endl;
            }
            break;
        case 'r':
            {
                cout<<"Enter the width and length of the rectangle respectively\n";
                cin>>width>>length;
                area=(width*length);
                cout<<"The area of the rectangle is: "<<area<<endl;
            }
            break;
        case 'c':
            {
                cout<<"Enter the radius of the circle\n";
                cin>>radius;
                area=(3.14*radius*radius);
                cout<<"The area of the circle is: "<<area<<endl;
            }
            break;
        default:cout<<"The choice entered is not specified"<<endl;
            break;
    }
    system("pause");
    return 0;
}
```

```

#include<iostream>
using namespace std;
void Functionlarger()
{
    int num[9], lnum=0, i, bnum=0;
    for(i=0; i<10; i++)
        cin>>num[i];
    for(i=0; i<10; i++)
    {
        if(num[i]>num[i+1])
            bnum=num[i];
        if(bnum>lnum)
            lnum=bnum;
    }
    //cout<<bnum<<" "<<lnum;
    cout<<"The largest number among the 10 is: "<<lnum<<endl;
}
int main()
{
    cout<<"Please enter 10 numbers"<<endl;
    Functionlarger();
    system("pause");
    return 0;
}

```

Extract 3.1.1 presents a sample of the candidate who declared variables also used correct loops and function for the program to execute the intended output.

Some of the candidates who scored from 9 to 14.5 marks wrote the right syntax of the function but failed to write the right declaration within a function. Others did not declare the parameters within a function prototype. A few candidates declared the parameters within a function but failed to use them to read the parameters. However, the few candidates who scored low marks wrote `#include<iostream>`, `using namespace std`, `int main()`, declarations, input and output statements correctly but failed to write the right codes for finding the largest number in part (a). Others used the *if...else* condition to write a program instead of a function, which caused them to create a complex loop which could not produce the target output. The analysis shows that some of the candidates did not write the right syntax of switch-case statements and formulae. As a result, the input was incorrect.

3.1.2 Question 2. Computer Basics

This was an optional question with parts (a) and (b). It carried a total of 25 marks. The candidates were required to:

- (a) (i) Use Microsoft Excel program to create a workbook and save as “Students Results”. Which includes different data such as Name, Physics, Computer, Advanced mathematics, GS, Average, Remarks and Rank.
- (ii) Use Built in function to fill the column G, H and I for each student. The average should be automatically rounded off to the nearest whole numbers.

	A	B	C	D	E	F	G	H	I
1	S/N	Name	Physics	Computer	Advanced Mathematics	G.S	Average	Remarks	Rank
2	1	Lee John	45	78	51	60			
3	2	Craig Martinez	80	53	60	47			
4	3	Gerome Steering	15	31	44	51			
5	4	Karim Close	89	80	67	98			
6	5	Jahid Ally	90	43	79	80			

Hint: The remark follows the following trends:

Average	Remarks
80-100	Excellent
70-79	Very Good
60-69	Good
50-59	Average
40-49	Satisfactory
0-39	Fail

- (b) Open Microsoft word program and create the mailing documents given in the next page. The text in the form “text” represents the names of the merged fields. Use the worksheet created in part (a) above as the data source for mailing list. Save your work as Academic Report and Print a report for Lee John as well as Jihad Ally.

MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
MISIGISIGI SECONDARY SCHOOL

P.O Box 20 Changarawe, Morogoro. Tel: 022-000-000; Website: www.misigisigi.ac.tz

ACADEMIC REPORT FOR THE SECOND TERM-2017

Class: Form 6.P.CoM

Student's Name: «Name»

General Performance:

Subject Name	Marks (%)
Physics	«Physics»
Computer	«Computer»
Advanced Mathematics	«Advanced _Mathematics»
GS	«GS»

Summary:

Average: «Average»%.

Rank: «Rank»out of 5.

General Remarks: «Remarks».

Class Teacher Remarks: Work hard you can do better than this.

Headmaster' Remarks: Put more efforts on your studies and involve yourself in group discussions.

The question was attempted by only 6 candidates (21.4%). All the candidates scored high marks. They scored from 16 to 24, out of 25 marks.

The candidates' performance was good, as all the candidates scored more than 15 marks. In part (a), the candidates entered data in the worksheet, used built-in functions to calculate average marks, gave some remarks and ranked each student. Some of them formatted the Microsoft Excel sheets but did not insert borders on the worksheet. In part (b), some of the candidates connected the Microsoft Word document to a data source which had been created on the Microsoft Excel sheet. Others connected the data in the cells correctly to the fields

in Microsoft Word document and generated reports with data from the Microsoft Excel sheet. Furthermore, some of the candidates correctly added up all the data with the right functions of calculating average marks and assigning remarks but failed to write the function which could rank each student. Others failed to connect the data on the Microsoft Excel sheet to the corresponding fields in the Microsoft Word document. Extract 3.1.2 is an example of a correct response.

Extract 3.1.2

H2										
=IF(G2>80,"Excellent",IF(G2>69,"Very Good",IF(G2>59,"Good",IF(G2>49,"Average",IF(G2>39,"Satisfactory",IF(G2>0,"Fail"))))))										
	B	C	D	E	F	G	H	I	J	K
1	Name	Physics	Computer	Advanced Mathematics	G.S	Average	Remarks	Rank		
2	Lee John	45	78		51	60	59 Average	4		
3	Craig Martinez	80	53		60	47	60 Good	3		
4	Gerome Steering	15	31		44	51	35 Fail	5		
5	Karim Close	89	80		67	98	84 Excellent	1		
6	Jahid Ally	90	43		79	80	73 Very Good	2		
7										
8										
9										
10										

MINISTRY OF EDUCATION AND VOCATIONAL TRAINING

MISIGISIGI SECONDARY SCHOOL

P.O.Box 20 Changarawe, Morogoro, Tel:022-000-000; Website:www.misigisigi.ac.tz

ACADEMIC REPORT FOR THE SECOND TERM-2017

Class:Form 6 PcoM

Student's Name:Jahid Ally

General Performance:

Subject name	Marks(%)
Physics	90
Computer	43
Advanced Mathematics	79
G.S	80

Summary:

Average:73%

Rank:2Out of 5

General Remarks:Very Good

Class Teacher Remarks:Work hard you can do better than this.

Headmaster's Remarks:Put more efforts on your studies and involve yourself in group discussions

In Extract 3.1.2, the candidate created a table with the correct data and functions also used data from Microsoft excel sheet to create mailing merge in Microsoft word document.

3.1.3 Question 3: Web Development

This was an optional question. The question consisted of two parts: (a) and (b). The candidates were asked to:

- (a) Use HTML and JavaScript codes to create the following interface which will enable a user to type texts on text area and change its format after clicking radio button.

Change Text Format

Red
 Orange
 Blue
 Bold
 Normal
 Underline
 Italic
 Size

Interface descriptions:

- Rows and columns of text area are 10 and 70 respectively.
- Font size of the heading “Change Text Format” is h1.
- Use prompt box to input text size.

(b) (i) Use basic HTML codes to create the following form:

Enter your Details

Name:

Email:

Password:

Gender: Male Female

(ii) Use JavaScript codes to validate form inputs when the Submit button is clicked.

A total of 22 candidates (78.6%) attempted the question. 18.2 percent scored from 3.5 to 8.5 marks, 27.3 percent from 9 to 14.5 and 54.5 percent from 15 to 24 marks. No candidate scored less than 3.5 marks.

Table 2 shows a summary of the candidates' performance in this question.

Table 2: The candidates' performance in question 3

Scores	Percentage of Candidates
3.5 - 8.5	18.2
9 - 14.5	27.3
15 - 24	54.5

Table 2 shows that 81.8 percent of the candidates scored more than 8.5 marks; thus, the performance was good. The candidates (54.5%) who scored high marks typed the right codes for the heading, radio buttons and textarea in part (a). They also typed the right JavaScript codes, which changed the texts which had been entered into the textarea. However, some of the candidates had knowledge of JavaScript codes but failed to call the function by "id", which caused the radio buttons to fail to change the format of the text typed. For example, some of the candidates typed `document.getElementById("name")` instead of `document.getElementById("id")`.

Further analysis shows that others failed to type the right codes to resize the text which had been entered into the interface by the user. In part (b), the candidates created a form with the right codes for textboxes, radio buttons and the submit button, but some of them failed to type the right JavaScript codes to validate the form inputs. A few candidates has some knowledge of JavaScript codes but failed to understand the question. For instance, one of the candidates typed the codes which test whether the entered password is correct. The codes were as follows:

```
<script language="javascript">
function valid()
{
var x, y;
x=1234;
y=document.validate.pswrd.value;
if(y!=x)
{
alert("wrong password");
}
```

```
}  
else  
{  
  alert("correct password");  
}  
}  
</script>
```

Extract 3.1.3.1 is a sample of correct codes provided by one of the candidates.

Extract 3.1.3.1

```
15 }
16 function Orange()
17 {
18     var x=document.getElementById("text")
19     x.style.color="orange"
20 }
21 function Blue()
22 {
23     var x=document.getElementById("text")
24     x.style.color="blue"
25 }
26 function Bold()
27 {
28     var x=document.getElementById("text")
29     x.style.fontWeight="bold"
30 }
31 function Normal()
32 {
33     var x=document.getElementById("text")
34     x.style.fontStyle="normal"
35 }
36 function Italic()
37 {
38     var x=document.getElementById("text")
39     x.style.fontStyle="italic"
40 }
41 function Underline()
42 {
43     var x=document.getElementById("text")
44     x.style.textDecoration="underline"
45 }
46 </script>
47 </head>
48 <body>
49 <h1>Change Text Format</h1>
50 <form>
```


4.0 CANDIDATES' PERFORMANCE IN EACH TOPIC

The analysis done in relation to each topic shows that most of the candidates did well. The majority of the candidates scored high marks in the questions based on the following topics: C++ Programming, Data Communication and Networking, Website Development, Data Presentation, Problem Solving, System Development and Information Systems. 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 Computer Security and Computer Basics. This is because they had inadequate knowledge of the basic computer-related concepts. Their performance was poor in the question based on Visual Programming. This is because the candidates lacked the practical skills pertaining to Visual Basic programming language. The *Appendix* shows, the performance of the candidates in each topic.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

Generally, the candidates' performance in the 2018 Computer Science Examination was good. This shows that the majority of the candidates answered many questions correctly.

The analysis of the candidates in each question indicates that the majority of the candidates (96.3%) had difficulty answering question number 1, which was based on the Computer Basics topic in paper 1. These candidates did not understand the question. However, question number 2 in paper 2, which was based on the same topic, was attempted by only 6 candidates. This indicates that most of the candidates lacked knowledge of the basic computer-related concepts.

5.2 RECOMMENDATIONS

In order to improve the candidates' performance in future Computer Science examinations, the following should be done:

- (a) Teachers should advise their students to read questions carefully so that they understand them well.
- (b) They should teach all the topics set out in the Computer Science syllabus so that their students master each topic.

(c) They should provide more exercises, tests and examinations to enhance their students' mastery of theoretical concepts and improve their practical skills.

(d) Other education stakeholders, such as the government, parents and school managers, should ensure that schools have ICT laboratories. Such laboratories will improve teaching and learning.

(e) The government should officially introduce combinations that include Computer Science so as to increase the number of people who are computer-literate.

(f) Students should be encouraged to learn the English Language. If they are good at the language, they will give satisfactory explanations, especially when they are answering essay questions.

APPENDIX

Analysis of Candidates' Performance in each Topic

S/N	Topic	ACSEE 2018		
		No. of Question(s)	Percentage of Candidates who Scored average of 35% or more	Remarks
1	C++ programming	1	92.9	Good
2	Data Communication and Networking	1	85.7	Good
3	Website Development	2	79.9	Good
4	Data Presentation	3	78.7	Good
5	Information Systems	1	72.7	Good
6	System Development	2	71.5	Good
7	Problem Solving	2	68.1	Good
8	Computer Security	1	53.6	Average
9	Computer Basics	2	51.9	Average
10	Visual Programming	1	33.3	Poor

