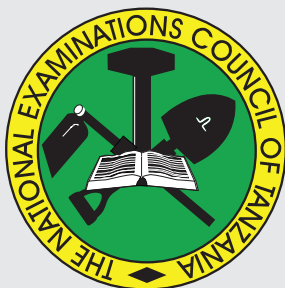


THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



**STUDENTS' ITEM RESPONSE ANALYSIS REPORT
FOR THE FORM TWO NATIONAL
ASSESSMENT (FTNA) 2019**

036 INFORMATION AND COMPUTER STUDIES

THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA



STUDENTS' ITEM RESPONSE ANALYSIS REPORT FOR THE FORM TWO NATIONAL ASSESSMENT (FTNA) 2019

036 INFORMATION AND COMPUTER STUDIES

Published by

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

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List of Abbreviations

SIRA	–	Students’ Item Response Analysis
FTNA	–	Form Two National Assessment
LAN	–	Local Area Network
WAN	–	Wide Area Network
MAN	–	Metropolitan Area Network
GUI	-	Graphical User Interface
OS	-	Operating System
ICT	-	Information and Communication Technology
CPU	–	Central Processing Unit

FOREWORD

The National Examinations Council of Tanzania is pleased to issue the Students' Item Response Analysis (SIRA) report in Information and Computer Studies for the Form Two National Assessment (FTNA) 2019. The analysis provides feedback to the students', teachers, parents, policy makers and other education stakeholders on how the students' responded to the items.

The Form Two National Assessment marks the end of the two years of secondary education. The report highlights the factors that made the students to provide the correct or incorrect responses in each item. Essentially, the students' responses are strong indicator of what the education system has been able or unable to offer to the students in their two years of ordinary level of secondary education.

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

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

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 Students' Item Response Analysis in Form Two National Assessment in Information and Computer Studies subject for the year 2019. The assessment evaluated the knowledge and competences acquired by the students. The paper was set according to the 2005 Information and Computer Studies syllabus for Ordinary Level of Secondary Education at form two level and 2017 format.

The assessment comprised a theory paper which consisted of three (3) sections, A, B and C. Section A consisted of three (3) objective questions. One question consisted of multiple-choice with ten items, while the other questions were matching items and true/false items with five items each. This section carried a total of 20 marks. Section B consisted of six (6) short answer questions which carried a total of 60 marks. Lastly, section C involved an essay question weighed 20 marks. All questions in all sections were compulsory.

A total of 13,952 students sat for the Information and Computer Studies assessment in November, 2019. Out of these students, 6,558 (47.2%) passed the assessment and 7,334 (52.8%) failed. In 2018, a total of 17,945 students sat for assessment. Of these students, 8,433 (47.1%) passed the assessment and 9,484 (52.9%) failed. The performance in 2019 has increased by 0.1 percent when compared to the 2018 performance.

This report provides feedback to our stakeholders on students' performance; showing both students' strengths and weaknesses. The students' performance in each question/topic has been categorized using the ranges of 0 to 29 (poor performance), 30 to 64 (average performance) and 65 to 100 (good performance). These intervals stand for the percentage of the students who scored from 30 percent or more of the marks allocated to the question. In this report, the students' performance is presented in different charts in which the red colour stands for poor performance, the yellow for an average performance and the green for good performance.

2.0 ANALYSIS OF THE STUDENTS' PERFORMANCE IN EACH QUESTION

2.1 Question 1: Multiple-choice Items

The question consisted of ten (10) multiple-choice items which were composed from eight topics of the syllabus. The topics were: *Information, The Computer, Computer Handling, Spreadsheet, Computer Software, Word Processing, Internet and Computer Networks and Communication*. The students were required to choose the correct answer from the given alternatives (A – D).

A total of 13,952 (100%) students attempted this question, of which, 2,351 (16.9%) students scored from 0 to 2 marks. The students who scored from 3 to 6 were 9,261 (66.4%), whereas 2,340 (16.7%) scored from 7 to 10 marks. The performance of the students' in this question is summarized in Figure 1.

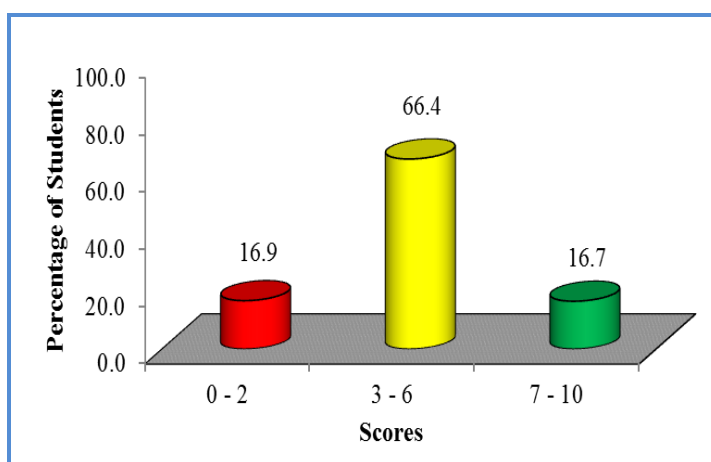


Figure 1: *The students' performance in question 1.*

Students' general performance in this question was good because only 16.9 percent of the students scored below 3 marks, as shown in Figure 1. The majority of the students 11,601 (83.1%) scored from 3 to 10 marks. This indicates that most of the students managed to choose the correct answer in many items. However, 2,351 (16.9%) students performed poorly. The analysis showed that some students failed to choose the correct answer especially for the item (i), (ii), (iv), (vii), (viii) and (x).

Item (i) was as follows: *Why modern ways of disseminating information are more preferred than traditional ways?*

- | | |
|-----------------------------|--------------------------|
| <i>A They are expensive</i> | <i>B They need skill</i> |
| <i>C They are slow</i> | <i>D They are fast</i> |

This item tested students' knowledge on the advantage of modern ways of disseminating information compared to traditional ones. The correct answer was D "They are fast". Other options were not correct because A "They are expensive", B "They need skill" and C "They are slow" discourage a user to use modern ways of disseminating information.

Item (ii) stated that: *How would you classify a touch screen among the computer hardware parts?*

- | | |
|--|---------------------------------------|
| <i>A An input device</i> | <i>B An output device</i> |
| <i>C Both processing and output device</i> | <i>D Both input and output device</i> |

The correct answer was D "Both input and output device". Other alternatives were not correct because A "An input device" is used to enter data in the electronic device and B "An output device" displays information. The analysis indicates that some students opted for C "Both processing and output device" which was also not correct because data are processed in a processor (CPU) and not in the touch screen.

Item (iv) stated that: *Which of the following presents number of sheets by default in Excel workbook?*

- | | |
|------------|------------|
| <i>A 4</i> | <i>B 2</i> |
| <i>C 3</i> | <i>D 5</i> |

This item tested students' knowledge on the workbook. The correct answer was C "3". Students who scored zero chose alternatives A "4", B "2", or D "5". These options were wrong because a workbook contains only three worksheets by default that means sheet1, sheet2 and sheet3. A user can reduce or increase the number of sheets according to the need.

Item (vii) stated that: *The following are features of the Microsoft word except*

- | | |
|-----------------------------|--|
| <i>A Synonyms.</i> | <i>B Page intersection facilities.</i> |
| <i>C Footer and header.</i> | <i>D Statistical function.</i> |

The correct answer was D “Statistical function”. This alternative is among of the features found in spreadsheet. The students who scored a zero mark in this item chose alternative A “Synonyms”, B “Page intersection facilities” and C “Footer and header”. These alternatives were not correct because are features of Microsoft word. This indicates that the students mixed up features that are found in Microsoft word and Microsoft excel.

Item (viii) stated that: *Computer software required to access the internet services such as the World Wide Web is called*

- | | |
|-------------------|-------------------------|
| <i>A Browser.</i> | <i>B Web link.</i> |
| <i>C Website.</i> | <i>D Search engine.</i> |

The correct answer was A ‘Browser’. However, most of the students chose D “Search engine”. These students were distracted by such an alternative because search engine such as google is commonly used to find information from the internet. Students who chose alternative C “Website” and B “Web link” were also wrong because website is a collection of webpages, while web link connects a user from one page to another.

Item (x) was as follows: *When CTRL key and Home key are pressed together in a spreadsheet the cursor goes to the:*

- | | |
|-------------------------------------|-------------------------------------|
| <i>A Beginning of the workbook.</i> | <i>B First cell in a worksheet.</i> |
| <i>C End of a row.</i> | <i>D End of a worksheet.</i> |

The item tested students’ skills on the use of special key in the worksheet document. The correct answer was B “First cell in a worksheet”. Students who scored a zero mark chose incorrect answer. Alternative A “Beginning of the workbook” was not correct because in Microsoft excel, data are entered in a work area made up of row and column known as worksheet. These students failed to differentiate a worksheet from workbook. Alternative C “End of a row” and D “End of a worksheet” were not correct because pressing the Control key and Home key returns the cursor to the first cell and not at the end of the row or worksheet.

2.2 Question 2: Spreadsheet

The question was intended to measure the students’ knowledge on spreadsheet. In this question, the students were required to match excel window elements in **List A** with their corresponding names in **List B** by

writing the letter of the correct response below the corresponding item number in the table provided. The question was as follows:

List A	List B
(i) A work area made of rows and columns.	A Worksheet
(ii) An area which displays data or formula in an active cell.	B Name box
(iii) The intersection of a row and a column.	C Active cell
(iv) A vertical arrangement of cells labeled A, B, C etc.	D Formula bar
(v) A horizontal arrangement of cells labeled 1, 2, 3 etc.	E Cell
	F Workbook
	G Column header
	H Row header
	I Status bar

The analysis showed that all 13,950 (100%) students attempted this question. Of which, 4,201 (30.1%) students' scored from 0 to 1 mark and 4,533 (32.5%) from 2 to 3 marks. Data analysis shows that 5,216 (37.4%) students scored from 4 to 5 marks. Figure 2 presents the students' performance in this question.

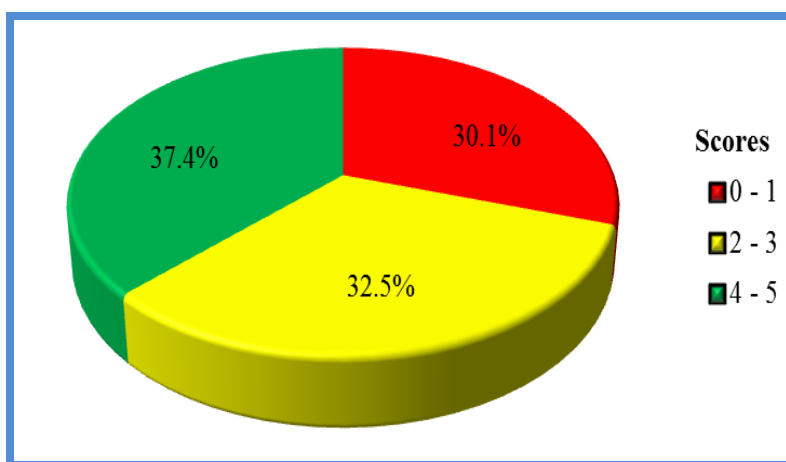


Figure 2: *The students' performance in question 2.*

Figure 2 shows that the general performance in this question was good because 69.9 percent of the students scored above 2 marks. The analysis showed that majority of the students who performed poorly answered correctly in item (iii). This item tested the students' knowledge on the name

of the intersection of row and column. The correct answer was A “Worksheet”. These students got the correct answer in this item because worksheet comprises of many cells which led them to keep remembering. However, most of them faced difficulty in answering item (i), (ii) and (iv).

Item (i) required the students to identify the name of a work area made up of rows and columns. The correct answer was A “Worksheet”. Majority of the students wrote F “Workbook”, while others wrote E “Cell”. The students’ responses were not correct because a workbook contains several worksheets and a cell is an intersection of row and column. These students were supposed to understand that worksheet is made up of many cells. This indicates that the students lacked practical skills in Microsoft excel.

Item (ii) demanded the students to identify the name of an area which displays data or formula in an active cell. The correct answer was D “Formula bar”. However, some of the students answered I “Status bar”. These students had an idea that a bar display data or formula entered in an active cell, but failed to know the specific name of the bar. The students were supposed to understand that status bar is found in Microsoft word and it acts as a communication link between a user and program. Others wrote C “Active cell”. The students who wrote active cell had no idea that formula which is entered in an active cell must be displayed in a formula bar not in active cell.

Item (iv) required the students to identify the name of a vertical arrangement of cells labeled A, B, C etc. The correct answer was G “Column header”. Some of the students answered H “Row header” which was the answer for an item (v). This item required the students to identify the name of a horizontal arrangement of cells labeled 1, 2, 3 etc. The analysis showed that majority of the students failed to differentiate vertical arrangement from horizontal arrangement of cells.

2.3 Question 3: True/False Items

The question consisted of five (5) True/False items derived from four topics of the syllabus. The students were required to write (True) for the correct statement and (False) if the statement is not correct. The question was set from the following topics: *The Computer*, *Computer Evolution*, *Word Processing* and *Computer Handling*.

The following items were given:-

- (i) A computer can respond to its user through the user interface controlled by the hardware known as ALU.
- (ii) An abacus was an American first counting instrument.
- (iii) Microsoft office is one of the most popular computer software used in personal computers.
- (iv) Hardware and software are intangible parts of the micro-computer.
- (v) A voltage increase above 110% in a very short period of time is called surge.

A total of 13,952 (100%) students attempted this question. Of which, 1,464 (10.5%) students scored from 0 to 1 marks. The students who scored from 2 to 3 marks were 7,292 (52.3%), whereas 5,196 (37.2%) scored from 4 to 5 marks. Figure 3 shows the performance of the students in this question.

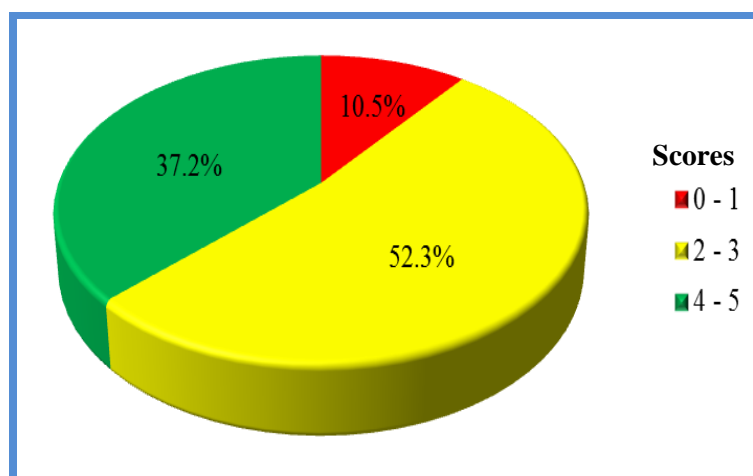


Figure 3: *The students' performance in question 3.*

Figure 3 shows that the general performance in this question was good because 89.5 percent of the students scored from 2 to 5 marks, as Figure 3 illustrates. Majority of the students answered correctly in most of the items. However, some of them failed to score high marks because they provided incorrect answers in item (i), (ii), (iii) and (iv).

Item (i) tested the students' knowledge on the function of operating system. The correct answer was "False". However, some students' wrote "True". This response was not correct because the user interface is controlled by the

operating systems and not ALU. These students did not understand that ALU is a part of CPU which performs Arithmetic and Logical operations.

Item (ii) intended to test the students' knowledge on historical development of the computer. The correct response was "False" but some students wrote "True". The students' response was not correct because an Abacus was a Chinese instrument and not an American one.

Item (iii) tested the students' knowledge on the Microsoft word program. The correct answer was "True" because Microsoft word is commonly used in personal computer for typing letters and other rich text documents such as books. Students who wrote "False" lacked knowledge on the application of software that can be installed in personal computers.

Item (iv) tested the students' knowledge on the characteristics of computer hardware and software. The correct answer was "False" because hardware are tangible, while software are intangible part of the computer. These students failed to understand the meaning of the term "intangible" which was used in the stem.

2.4 Question 4: The Computer

In this question, students were required differentiate delete key from backspace key according to their uses in part (a) and briefly explain four categories of the key available on the QWERTY keyboard in part (b).

The statistics showed that 13,948 (100%) students attempted this question, of which 10,234 (73.4%) students scored from 0 to 2.5 marks. The students who scored from 3 to 6.5 marks were 2,576 (18.5%). In addition, 1,138 (8.1%) students scored from 7 to 10 marks. Figure 4 summarizes the students' performance in this question.

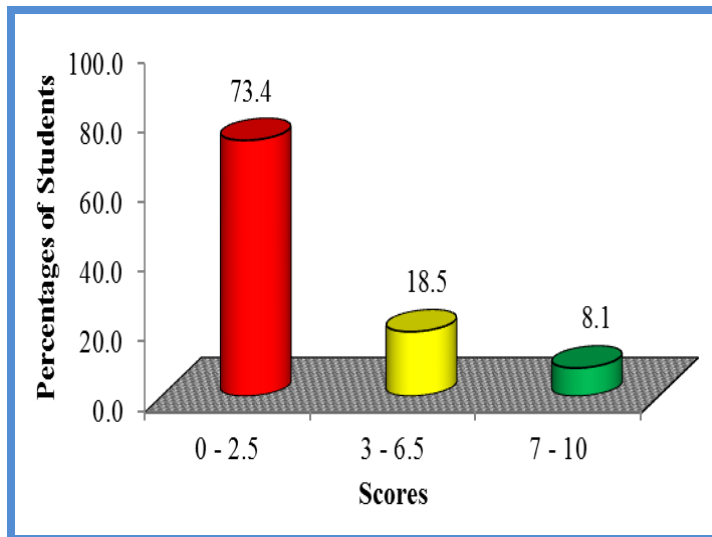


Figure 4: *The students' performance in question 4.*

The general performance of the students in this question was poor as Figure 4 illustrates. Majority of the students 10,234 (73.4%) who scored low marks (0 to 2.5) had an idea that delete key and backspace key erase the characters. However, did not know their difference which led them to interchange the explanations. For example, some students wrote that *Delete key deletes text from right to left* while *backspace key deletes characters from left to right*. In part (b), some of the students explained correctly few categories of keys available on the QWERTY keyboard. The analysis showed that most of the students gave only one correct key (alphanumeric key) without giving explanations. Others wrote the names of the keys which are found in the keyboard such as *caps lock*, *shift* and *enter*. This shows that the students lacked knowledge and skills on using computer keyboard keys. Extract 4.1 shows a sample of incorrect responses provided by one of the students.

4. (a) Differentiate delete key from backspace key according to their uses.
- Delete key you can delete without using any space. While Backspace you can use many way to delete that sentences or file.
- (b) Briefly explain four categories of keys available on the QWERTY keyboard.
- Number key - This it represent their key by number.
 - Word key - This it represent their key by word.
 - Italic key - It represent the key by italic language or key.

Extract 4.1: A sample of incorrect answer in question 4.

The responses of a student provided in Extract 4.1 shows that the student did not understand the question because a student explained “delete backspace” instead of differentiating delete key from backspace key. The student also had a concept of a key which contain numbers but failed to understand clearly its name. Other keys provided by the students were wrong and they do not exist.

Further analysis showed that, 2,576 (18.5%) of the students scored average marks (3 to 6). Some of them failed to differentiate delete key from backspace key although they had an idea of these keys. For example, one of the students wrote that *delete key is used to delete the whole sentence while the backspace key deletes the word*. Others did not know the function of these keys but interpreted the meaning of delete and backspace which used in the question. For example, some of the students wrote that *delete key is used to delete programs while backspace enable a user to give space between the words*. The students were supposed to understand that delete key deletes or erases characters at the cursor position from left to right while backspace key deletes or erases characters from right to left on the same line.

However, some of the students explained correctly few categories of keys available on the QWERTY keyboard in part (b). It was observed that some of them explained alphanumeric and numeric keys. This might be attributed to the fact that many students practice on typing texts and numbers which led them to be familiar with this type of keys. Further analysis showed that others listed only the types of keys without giving explanations.

On the other hand, 2,576 (18.5%) students who scored high marks (6.5 to 10) gave the correct difference between delete key and back space key according to their uses in part (a). In part (b), some of them explained correctly categories of the keys available on the QWERTY keyboard. However, some of them failed to score high marks because they gave unclear explanations and also thought that alphanumeric key includes numeric keys. For example, one of the students wrote that *alphanumeric keys are labelled with alphabetic letters A to Z and numbers*. The students were supposed to understand that alphanumeric key are labelled with alphabetic letters A to Z while numeric keys consist of set of numbers 0 to 9 and the arithmetic signs like + (addition), - (minus), *(multiplication) and /(division). Extract 4.2 shows a sample of correct response from one of the students.

4. (a) Differentiate delete key from backspace key according to their uses.
- A delete key is a key which is used to delete or erase a type word or character while a backspace key is a key which is used to delete a typed word or character starting from the left or provide space between words in typing.
- (b) Briefly explain four categories of keys available on the QWERTY keyboard.
- Alphanumeric keys are the keys which are labelled with letters (A, B, C, D, ...), numbers (1, 2, 3, 4, ...) and other symbols like @, #, \$ and they are also called typing keys.
 - Function keys, these are the keys which are used to perform functions. They are labelled from F1, F2, F3, F4 to F12.
 - Special keys, there are keys which are used in combination with other keys to execute some operations. They include shift, CTRL and Caps Lock keys.
 - Number keys these are keys which include numbers labelled from 0 to 9.

Extract 4.2: A sample of correct answer in question 4.

The student's response presented in Extract 4.2 demonstrates the correct answers on the difference between delete key and backspace key and the types of keys available in a QWERTY keyboard.

2.5 Question 5: Computer handling

The question consisted of two parts (a) and (b). The students were required to:

- (a) Outline three measures used to protect computer user in a laboratory.
- (b)
 - (i) Give a name of a device used to protect a computer from being damaged due of power instability.
 - (ii) List three measured used to protect computers in laboratory.

This question was attempted by 13,951(100%) students, out of which 8,330 (59.7%) scored from 0 to 2.5 marks. Data analysis indicates that 4,233 (30.3%) students scored from 2.5 to 6.5 marks, while 1,388 (10%) scored from 7 to 10 marks. Figure 5 illustrates the students' performance in this question.

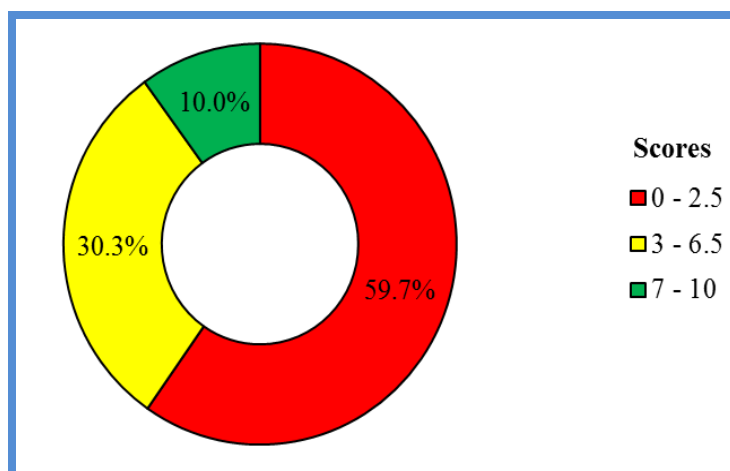


Figure 5: *The students' performance in question 5.*

The students' performance in this question was average because 40.3 percent of the students scored above 2.5 marks as illustrated in Figure 5. According to the analysis done, the majority of the students 8,330 (59.7%) who scored low marks (0 to 2.5) wrote measures that protect computers instead of computer user in part (a). Some of these students mixed up measures that protect computer and computer user in a computer laboratory. For example, some students wrote *fitting grills on doors and windows, cover computers to prevent dust* instead of writing room should

be properly ventilated to avoid dizziness caused by lack of enough oxygen. Some of the students outlined correctly few measures that protects computer in laboratory.

In part (b) (i), some of the students wrote *antivirus* as a device used to protect computers from being damaged due to power instability instead of Uninterruptible Power Supply (UPS). Further analysis carried on the scripts of the students' showed that, some of the students listed correctly only one or two measures used to protect computers in laboratory in part (b) (ii). Responses such as *installing fire prevention and Burglar proofing the room* were given by the students. Others failed to understand the requirement of the question as they wrote *the uses of computer* instead of measures to protect computers in a laboratory. Extract 5.1 shows a sample of incorrect responses which were provided by one of the students.

5.	(a)	Outline three measures used to protect a computer user in a laboratory.
		<ul style="list-style-type: none">• <i>not to keep on the place & absence of dust</i>• <i>to keep on the at cool place</i>• <i>to keep on the good electricity supply</i>
	(b)	(i) Give a name of a device used to protect a computer from being damaged due to power instability.
		<i>Direct current (DC)</i>
		(ii) List three measures used to protect computers in a laboratory.
		<ul style="list-style-type: none">• <i>dust</i>• <i>water</i>• <i>electricity supply</i>

Extract 5.1: A sample of student's incorrect answer in question 5.

In Extract 5.1, a student wrote the factors that protects a computer instead of computer user in part (a). The student also wrote things that affect computer in part (b) instead of measures that protect computers in a laboratory.

Likewise, most of the students 4,233 (30.3%) who scored average marks (3 to 6) overlooked the term “user” in part (a) which led them to outline measures used to protect a computer instead of computer user. For example, some of the students wrote *the user should not eat or drink in a computer laboratory* as a factor for protecting computer user in a laboratory instead of *providing antiglares screens (light filters) and adjustable screens*. However, in part (b), (i) and (ii) some of them gave the correct measures to protect computer and the name of a device used to protect a computer from being damaged due to power instability. Devices provided by students were “Uninterrupted Power Supply (UPS) and surge protector.

Lastly, 1,388 (10%) students who scored high marks (6.5 to 10) wrote correct measures to protect computers in laboratory in part (a). They also listed correctly the measures used to protect computers in part (b) (ii). However, some students missed the name of a device used to protect computers in part (b) (i). Others listed few measures used to protect computers in a laboratory. Extract 5.2 represents a sample of a correct response which was provided by one of the students.

5.	(a)	Outline three measures used to protect a computer user in a laboratory.
		<ul style="list-style-type: none"> • Cables should be laid in trunks. This is purposely to avoid stepping on them and sometimes falling. • The room should be well ventilated and arranged. This is to ensure proper ventilation in the laboratory and easily movements from one place to another. • Good and suitable furniture (Tables and desks). The desks should support upright posture and the tables should be of relative height to maintain posture.
	(b)	(i) Give a name of a device used to protect a computer from being damaged due to power instability. Uninterruptable Power Supply (U.P.S.)
		(ii) List three measures used to protect computers in a laboratory.
		<ul style="list-style-type: none"> • Securing the room with a portable fire extinguisher. This is to ensure overcoming fire accidents in the lab. • Windows and doors should have grills and the room should be kept with defence man for more security. • Wide based tables for avoiding knocking down of computers and eventually cause damages.

Extract 5.2: A sample of student’s correct answer in question 5.

The student’s answer presented in Extract 5.2 shows the correct measures used to protect computers and computer user in a laboratory. The student

also gave the correct device used to protect computers from being damaged due to power instability.

2.6 Question 6: Computer Networks and Communication

This question had two parts (a) and (b). The students were required to:

- (a) (i) Define computer network.
- (ii) Give two disadvantages of computer network.
- (b) (i) List three types of network cables.
- (ii) Apart from the network cables in part (b) (i) list the other four network accessories.

This question was attempted by 13,952 (56.7%) students out of which 3,955 (28.1%) scored from 0 to 2.5 marks. The analysis indicates that 2,086 (15%) students scored from 3 to 6.5 marks, while 92 (3.5%) scored from 7 to 10 marks. Figure 6 illustrates the students' performance in this question.

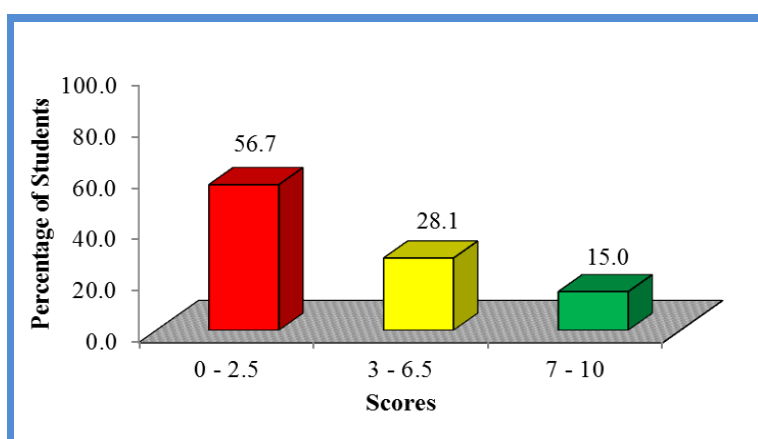


Figure 6: The students' performance in question 6.

Generally, the performance of the students in this question was average because 43.1 percent scored more than 2.5 marks as illustrated in Figure 6. It was noted that 56.7 percent of the students who scored low marks (0 to 2.5) could not give a clear meaning of computer network in part (a) (i). The analysis done on the scripts of the students showed that some students defined internet instead of computer network. For example, some of the students wrote that *Computer network is the connection of computers in the internet* instead of collection of two or more computer systems connected together by medium so that they can communicate and share resources. However, some of these students gave the correct disadvantages of

computer network in part (a) (ii). Others wrote the advantages of computer network instead of its disadvantages. For example, some students wrote *sharing of resources such as printer*.

Furthermore, the majority of the students had problem in attempting part (b) as they failed to score any mark. In part (b) (i), some students wrote types of network topology instead of network cables. For example, some of the students listed types of physical topologies such as *star topology*, *bus topology* and *mesh topology* instead of twisted pair cables (UTP, STP), coaxial cables, fibre optic cables. Others wrote Wi-Fi and wireless cable. Further analysis showed that some of the students wrote network devices such as *router*, *switch* and *hub*.

It was also observed that some students listed types of computer network in part (b) (ii). Some of the incorrect responses provided by the students were Local Area Network (LAN), Wide Area Network (WAN) and Metropolitan Area Network (MAN). Others wrote examples of web browser such as *google chrome*, *opera mini*, *mozilla firefox* and *internet explorer* instead of hub, switch, router and bridge. This indicates that students lacked clear understanding of the computer network which led them to guess the answers. Extract 6.1 signifies a sample of such incorrect response.

6.	(a)	(i)	Define the term computer network.	computer network is the connection of two or more computer to contribute communication
		(ii)	Give two disadvantages of computer network.	<ul style="list-style-type: none"> It is accountability It can not save time
	(b)	(i)	List three types of network cables.	<ul style="list-style-type: none"> LAN MAN WAN
		(ii)	Apart from the network cables in part (b)(i), list the other four network accessories.	<ul style="list-style-type: none"> Flash disk hard disk information management cable

Extract 6.1: A sample of incorrect answer in question 6.

The student answer presented in Extract 6.1 shows the correct definition of computer networking in part (a). The student also wrote types of computer network and computer storage in part (b) which were not correct.

Despite of these weakness 2,086 (15%) students scored average marks (3 to 6). Some of them gave the correct definition and disadvantages of computer networking in part (a). Sampled answers provided by students were *computer network is the group of computers connected together in order to share resources*. Disadvantages which were provided by some students are *spread of computer virus and security threats (hackers)*. The students answered correctly in this part because many schools nowadays use computer network in the computer laboratory.

It was also noted that, a few students answered correctly in part (b) (i) by listing twisted pair and coaxial cable as the type of network cables. Furthermore, some of the students listed unshielded and shielded cable as two types of computer cables. These students did not understand that unshielded and shielded cables are type of twisted pair cables. Others listed only twisted pair cable but failed the rest. This is attributed to the fact that twisted pair cables are commonly used in Local Area Network which is installed in schools compared to coaxial cable and fibre optic cables which are used in Wide Area Network. It was observed that some of the students faced difficulties in answering part (b) (ii) due to lack of practical skills. These students did not know the network accessories, which led them to guess the answers. Others did not attempt this part at all.

Conversely, a few students 92 (3.5%) who scored high marks gave the correct meaning of computer network, disadvantage of computer network, types of network cables and network accessories. However, some of them failed to score full marks because they failed to list all network accessories. Extract 6.2 shows a sample of a correct response from one of the students.

6. (a) (i) Define the term computer network.
 Computer network is a collection of computers that are physically or logically connected together.

(ii) Give two disadvantages of computer network:
 • Reduce privacy since computers share information.
 • Expensive to configure and running costs for the network.

(b) (i) List three types of network cables.
 • Fiber Optic Cable.
 • Coaxial Cable.
 • Twisted Pair Cable (UTP and STP).

(ii) Apart from the network cables in part (b)(i), list the other four network accessories.
 • Network Interface Card (NIC)
 • Router
 • Repeater
 • Bridge.

Extract 6.2: A students who were able to give correct answers in all parts.

In Extract 6.2, the student gave correct answers on the meaning of computer network, disadvantage of computer network, types of network cables and network accessories.

2.7 Question 7: Word Processing

The question had four parts (a), (b), (c) and (d) and students were required to:-

- (a) Give the meaning of term thesaurus.
- (b) Describe the function of the following keys as used in Microsoft words.
 - (i) Enter key.
 - (ii) Shift key.
 - (iii) Caps lock key.
- (c) Differentiate line spacing from paragraph spacing.
- (d) Give four reasons to justify a statement “Word processor is better and more efficient than a type writer.

The question was attempted by 13,952 (100%) students, out of which 8,117 (58.2%) scored from 0 to 2.5 marks. The analysis showed that 4,645 (33.3%) scored from 3 to 6 marks, while 1,190 (8.5%) scored from 6.5 to 10 marks. The students' performance in this question is represented in Figure 7.

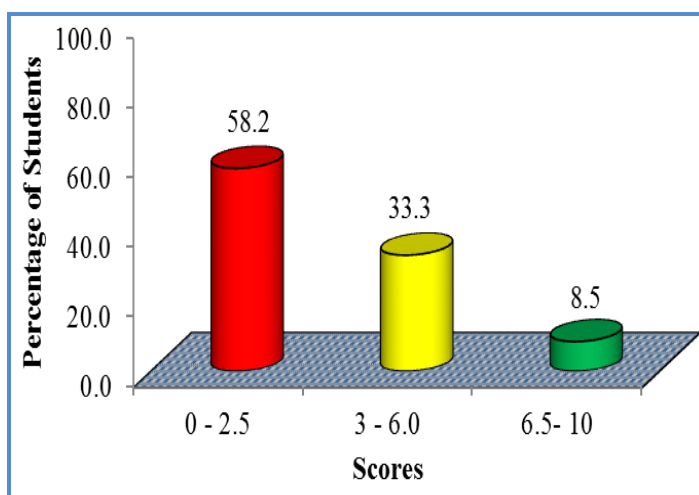


Figure 7: The students' performance in question 7.

The students' general performance in this question was average because 41.8 percent of the students scored more than 2.5 marks as shown in Figure 7. The analysis done on the scripts of the students revealed that many students did not understand the meaning of the term thesaurus in part (a), thus skipped the question. Some of the students wrote answers which were contrary to the question requirements. For example, one of the students wrote that *thesaurus is a device that is connected to the computer to perform a certain task*. Others wrote *thesaurus is a program used in the computers*. There were some of them who wrote *thesaurus is a program used to measure amount of internet*. This indicates that the students lacked knowledge on the features of Microsoft word.

Furthermore, majority of them failed to describe the function of enter key, shift key and caps lock key in part (b). The analysis showed that these students interpreted the name of the keys asked. For example, some students wrote that *enter key is used to enter data and information in the computer*, *shift key is used to shift the word from one line to another*. Others wrote *caps lock key is used to lock the document*. However, some of the students gave the correct descriptions of the caps lock key that, it enables or disable all the letters from being typed in capital letters.

In part (c), some of the students failed to differentiate line spacing from paragraph spacing. The analysis showed that the students failed to distinguish the term "line" from "paragraph" which led to wrong

descriptions. For instance, some students differentiated as *line spacing is the space between one word and another* while *paragraph spacing is the space of the paragraph away from the margin*. These students had an idea but they were not aware that line spacing refers to the space between lines and paragraph spacing refers to the space between paragraphs. They were also supposed to understand that the space of the paragraph away from the margin is known as indenting paragraphs and not paragraph spacing.

In part (d), some students gave a few reasons to justify a statement “Word processor is better and more efficient than a typewriter” but did not score full marks because they did not compare with the typewriter. For example, some students wrote *it is possible to re-use the existing documents as templates in the feature* instead of the typewriter document cannot be used as a template for future. Extract 7.1 shows a sample of a wrong response provided by one of the students.

7.	(a)	What is meant by thesaurus? This is the device that used in commands in a microsoft word.
	(b)	Describe the function of the following keys as used in Microsoft Word: (i) Enter key. Used to allow the user to go in another key. (ii) Shift key. This used to move from one program to another. (iii) Caps lock key. Used to close a document.
	(c)	Differentiate line spacing from paragraph spacing. These line spacing these this is the space lived in a line WHILE Paragraph spacing this is the space lived when starting a paragraph

Extract 7.1: A sample of student's wrong response in question 7.

In Extract 7.1, the student wrote incorrect answers in all parts. This student wrote irrelevant definition of thesaurus but had a concept of line spacing although failed to organize the idea.

In contrast, 4,681 (33.5%) students scored average marks (3 to 6). Some of these students gave the incorrect meaning of the term thesaurus in part (a). Likewise, in part (b), some of the students gave the correct descriptions of enter key and caps lock key but could not describe the shift key. The analysis showed that these students did not understand the concept of shift key. For example, some students wrote *shift key used to shift the current program to another program*. Others wrote *shift key is used to shift data from one key to another*. This indicates that they lacked knowledge on creating word processing file. However, some students differentiated correctly line spacing from paragraph spacing in part (c). Furthermore, some students gave the correct reasons to justify a statement “Word processor is better and more efficient than a type writer” in part (d). The analysis revealed that many students gave the correct answer only in part (d) which was a theoretical question but failed to score any mark in part (a), (b) and (c) which demanded practical skills.

On the other hand, 1,154 (8.3%) students scored high marks (6.5 to 10). Some of them answered correctly in all parts except part (a) which required them to explain the meaning of thesaurus. The students were supposed to know that thesaurus is the feature in the word processor which is used to find the word with similar meanings (Synonyms). Only 13 students scored all 10 marks in this question. The correct answers provided by the students were as follows:

- (a) *The functions of the enter, shift and caps lock keys.*
 - (i) *Enter key is used to return a cursor to the next line.*
 - (ii) *Shift key allows a user to type a single capital letter (also is used when a user wants to type an alternative character which appear on top of the other)*
 - (iii) *Caps lock key enables or disables all the letters from being typed in upper case (capital letters).*
- (b) *Line spacing determines the amount of vertical space between lines of text in paragraph **while** paragraph spacing determines the amount of space above or below a paragraph.*
- (c) *Reasons for using word processor than typewriter*

- *Easier to use due to automated features such as word wrap, autocorrect and auto format which are not found in typewriter.*
- *It is possible to re-use the existing documents as templates in the feature while typewriter does not have template.*
- *Powerful editing and formatting features but typewriter has no such features.*
- *Easy to produce multiple copies which is difficulty in typewriter.*

2.8 Question 8: Computer Software

The question had two parts (a) and (b), in this question the students were required to:

- (i) Write three ways which are used to classify operating system.
 - (ii) Mention three types of operating systems according to user interfaces.
- (b) Give four factors to be considered when choosing an operating system.

This question was attempted by 13,951 (100%) students. Out of which 10,811 (77.5%) scored from 0 to 2.5 marks and 2,254 (16.2%) from 3 to 6.0 marks. The analysis showed that, 883 (6.3%) students scored from 6.5 to 10.0 marks. Figure 8 is a summary of the students' performance in this question.

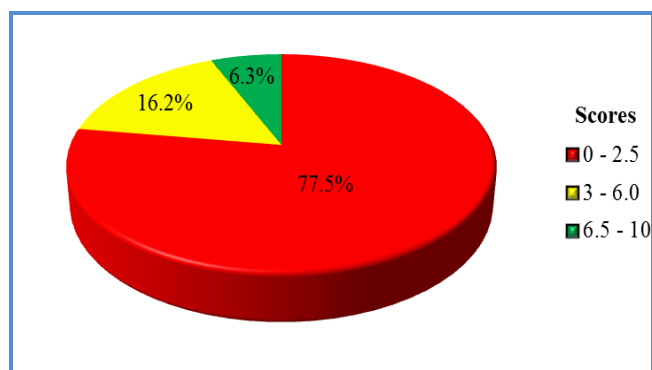


Figure 8: The students' performance in question 8.

Figure 8 shows that 10,811 (77.5%) of the students scored from 0 to 2.5 marks which indicates poor performance. Of which 8,310 (59.6%) students scored a zero mark. The analysis showed that most of the students' who

scored from 0 to 2.5 marks did not understand the requirement of the question. In part (a) (i), some of them wrote types of operating system according to user interface instead of ways which are used to classify operating system. For example, some of the students wrote *command line based, the graphical user interface, menu driver interface*. Others wrote factors to consider when choosing an operating system such as *user friendliness of the operating system, the cost of the operating system and hardware configuration*. Further analysis showed that some of the students wrote the function of operating in part (a) (ii) instead of types of operating system. For instance, some of the students wrote *provides a link between a computer and a user* instead of user interfaces, number of users an operating system can accommodate at a time and number of tasks an operating system can process at a time. In addition, some of the students mentioned correctly few types of operating system according to user interface in part (a) (ii).

Likewise, some of the students wrote *memory, input and output management* which are resources managed by operating system. Moreover, some of them did not attempt part (b) at all. The types mentioned by some of the students were *command-line based operating systems* and *graphical user interface* (GUI). In this part, some of the students mentioned examples of application software such as *Microsoft word, Microsoft power point and Microsoft publisher*.

From the students' responses, it was also observed that in part (b), some of the students gave a few correct factors to be considered when choosing an operating system. The factors which were commonly provided by the students are *cost* and *user friendliness* but failed the rest. This might be due to the fact that the factors mentioned are common factors which must be considered when choosing both hardware and software, so these students transferred knowledge easily. Extract 8.1 shows a sample of incorrect response provided by one of the students.

8.	(a)	(i)	Write three ways which are used to classify operating systems.
			• Input device.
			• out put device.
			• Processor unit.
		(ii)	Mention three types of operating system according to user interfaces.
			• Control unit.
			• Arithmetic logical unity.
			• Register.
	(b)		Give four factors to be considered when choosing an operating system.
			• title of the system.
			• menu bar.
			• close button.

Extract 8.1: A sample of irrelevant answer in question 8.

The answers provided in Extract 8.1 were irrelevant because the student wrote categories of computer hardware in part (a) (i) instead of ways used to classify operating system. A student also wrote components of Central Processing Unit (CPU) in part (a)(ii) instead of types of operating system according to the user interface. The responses provided in part (b) were unrelated answers.

Despite of this poor performance, 2,254 (16.2%) students scored average from 3 to 6 marks. It was noted that students failed to provide ways of classifying operating system in part (a) (i). However, they mentioned correctly types of operating system according to user interfaces in part (a) (ii). Conversely, some of the students failed to score any mark in part (a) but gave the correct factors of choosing an operating system in part (b). This indicates that, the students had no sufficient knowledge on the system software.

Moreover, students who scored high marks (6.5 to 10) provided the correct ways of classify operating systems. Some of them mentioned correctly the types of operating system according to user interface and factors to consider when choosing an operating system. However, some of them failed to score full marks because they mixed up ways which are used to classify operating system and types of operating system according to user

interface. Extract 8.2 shows a sample of a correct response which was provided by one of the students.

8. (a) (i) Write three ways which are used to classify operating systems.

- Number of tasks performed
- Number of users
- User interface

(ii) Mention three types of operating system according to user interfaces.

- Command line
- Menu driven Interface
- Graphic user interface (GUI)

(b) Give four factors to be considered when choosing an operating system.

- The cost of an operating system
- User friendliness
- Number of users that can be accessed by an operating system
- Reliability of & security of computer software

Extract 8.2: A sample of student's correct response in question 8.

In Extract 8.2, the student wrote correctly the ways of classifying operating systems and mentioned types of operating system according to the user interface. The student also gave the correct factors to be considered when choosing an operating system.

2.9 Question 9: Spreadsheet

In this question, the students were required to read carefully the given worksheet snapshot and answer the question that follows: The following worksheet snapshot was given:

	A	B	C	D	E	F
1	Check No.	Date	Account Name	Account Type	Amount	
2	1026	1-Mar	J & Sons	Loan payment	50,000	
3	1022	1-Mar	M. Allen	Salary	100,000	
4	1046	2-Apr	IS Publishers	Saving	50,000	
5	1120	4-Feb	Juma Lambert	Salary	150,000	
6						

The asked questions were:

- What is the font style and size of worksheet?
- Write the reference cell of an active cell.
- What format has been applied to the labels in row 1?
- Write formula required to find the total amount.
- Write the formula required to find the maximum amount.

Out of 13,952 (100%) students who attempted this question, 8,320 (59.6%) scored from 0 to 2.5 marks. Data analysis shows that 2,709 (19.4%) students scored from 3 to 6 marks, while 2,923 (21.0%) scored from 6.5 to 10 marks. The students' performance in this question is summarized in Figure 9.

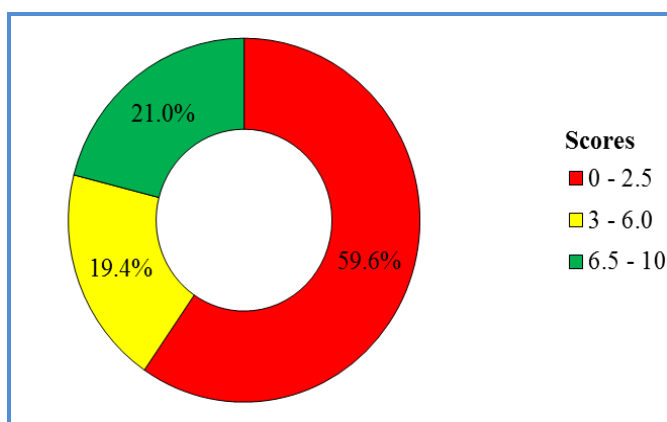


Figure 9: *The students' performance in question 9.*

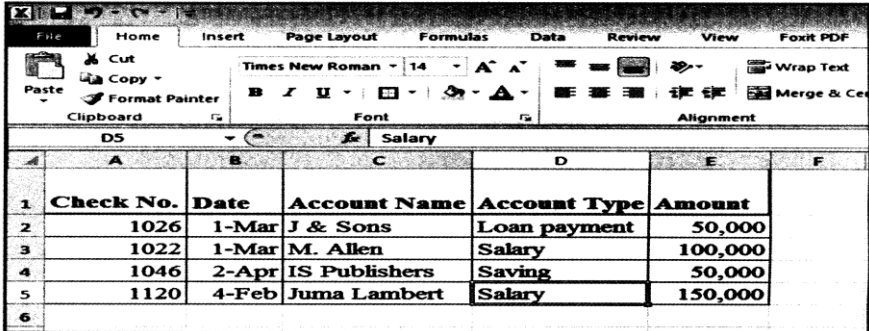
The analysis indicated that students' performance in this question was average because 40.4 percent of the students scored above 2.5 marks as shown in Figure 9. Some students with poor performance (59.6%) wrote the correct answer in part (a) by providing the font style (Times New Roman) and font size (14) of the worksheet. The analysis showed that some of the students failed to understand this part as they wrote the meaning of the font style and size of the worksheet. For example, one of the students wrote that font style *is the style of the worksheet and font size as the size of the worksheet*. This student failed to understand that font style and size implies the style and size of the data typed in a worksheet.

In part (b), majority of the students wrote *Salary* which was the account type of an active cell and was located in cell D5. These students understood the active cell but lacked knowledge on cell referencing. Others wrote 15,000 which was the amount allocated in an active cell. It was also observed that few students had knowledge on cell referencing but did not know that reading cell reference starts with columns which are labelled with letters followed by rows which are labelled by numbers. For example, one of the students wrote *5D* as a cell reference of an active cell instead of D5. Further analysis showed that in part (c), some students failed to identify the format done in row 1 as they wrote *Check No* which was a label data allocated in the first cell. The correct answer was bold. These students demonstrated poor knowledge on formatting tools.

Furthermore, some of the students failed to score any mark in part (d) and (e) because they had no knowledge on cell referencing. Some of the students wrote formula/function with wrong reference cell. For example, some of the students wrote the formula to find total as = A5 + B5 + C5 + D5 + E5 instead of E2 + E3 + E4 + E5. The students' response was not correct because the question demanded the formula which will compute the total amount but cell A5, B5, C5 and D5 contain words/text which cannot be computed. Others wrote the formula which computes the total of check No which was contrary to the question demand.

Likewise, a few students wrote the function to compute total amount but failed to include the arguments. For example, some students wrote =SUM() as the function to compute total amount instead of =SUM(E2:E5). Others wrote the correct arguments but did not include the function name. For example, one of the students wrote =E2:E5. This formula cannot be computed because the function name (sum) is missing. Lastly, majority of them wrote the function that computes the total amount instead of maximum amount in part (e). However, the function provided by the students has wrong syntax and arguments. Extract 9.1 shows a sample of incorrect response provided by one of the students.

9. Read the following worksheet snapshot and answer the question that follow:



(a) What is the font style and size of the worksheet?
Bold, Italic, Underline there are font style and font size

(b) Write the reference cell of an active cell.
= Sum (Account types : check no. 5)

(c) What format has been applied to the labels in row 1?
A, B, C, D, E, F, X, 2?

(d) Write formula required to find the total amount.
= Sum (E5 : E5)

(e) Write the formula required to find the maximum amount.
= (A5 : E5)

Extract 9.1: A sample of incorrect response in question 9.

In Extract 9.1, the student wrote examples of formatting which can be applied in a word document in part (a). The student also wrote a function in part (b) that computes total but had wrong reference cell and the function provided in part (c) was also wrong.

Some of the students 2,709 (19.4%) who scored average marks (3 to 6) identified correctly the font style and size of the worksheet and wrote the correct reference cell of an active cell. Some of them wrote the correct formula required to find the total amount in part (d). However, majority of them failed to write the function required to find the maximum amount as they wrote the function that computes the total amount. This indicates that, the students had knowledge on mathematical functions but lacked understanding on statistical functions.

Additionally, 2,923 (21.0%) students scored high marks from 6.5 to 10. However, only 727 (5.2%) students answered correctly in all parts of the question. These students wrote the correct font style and size which was Times New Roman and 14 respectively. They also wrote D5 as a cell reference of an active cell and bold as a format applied in row 1. Furthermore, they wrote the correct formula that finds the total amount as well as maximum amount in part (d) and (e). The formula and function provided by the students were $= E_2 + E_3 + E_4 + E_5$ and $= \text{Max} ((E_2:E_5))$. Nevertheless, some of the students failed to score high marks because they did not include the equal sign in the formula and others wrote the function without arguments such as $= \text{Max} ()$.

2.10 Question 10: The Internet

This was an essay type question which required the students to explain five services available on the internet.

The analysis showed that 13,944 (99.9%) students attempted this question. Of which, 6,402 (45.9%) students' scored from 0 to 6.5 marks and 4,515 (32.4%) from 7 to 12.5 marks. Data analysis shows that 3,027 (21.7%) students scored from 4 to 5 marks. Figure 10 presents the students' performance in this question.

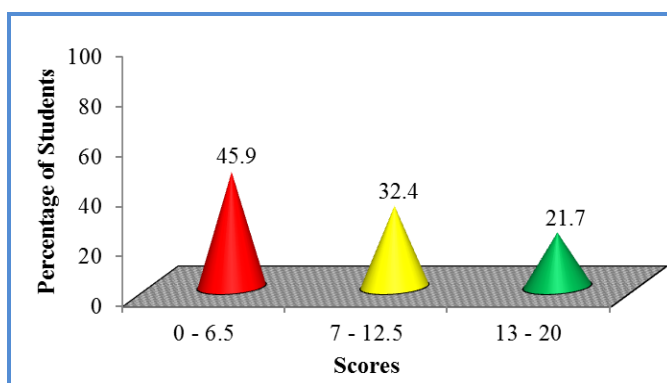


Figure 10: *The students' performance in question 10.*

This question had an average performance because 54.1 percent of the students scored above 6.5 as verified in Figure 10. The majority of the students 6,402 (45.9%) who scored low marks (0 to 6.5) explained the advantages of the internet instead of the services available on the internet. For example, some of students wrote improve *education sector* and *sharing of resourcase*. Others wrote the effects of ICT in the society such as *internet has affected lives by improving timely distribution of information*. However, some of the students wrote the correct introduction but did not explain the services available in the internet. Likewise, some of the students provided only one service but failed to give the rest. The service provided commonly by these students was communication. This might be attributed to the fact that nowadays communication through internet is common in the society. Others explained the social media such as *twitter*, *what sup*, *Facebook* and *Instagram*. Extract 10.1 shows a sample of a incorrect response provided by one of the students.

10. Explain five services that are available on the internet.

Internet is the global system of communication and there are many examples of internet like Google, Mozilla, Opera and Safari and the internet help people many things like communication between other people and development of the globalization. The following are the services that available on the internet.

Computers; through the computers lead the people to develop and to communicate through the internet by using computer and to produce the thing which is producing in the computer so through that lead to the spread of the internet.

Telephones; Through the telephone lead the people to produce and do many thing by using the telephone and the internet the people can use through telephone.

Wireline; through the wire line lead to the spread of the internet and the use of wire so through wire the internet can spread wider through the connection of the internet.

Google; through the google lead the people to get internet which help to the spread of it through searching to the differentate things which concern about.

Generally, all the services is available in computer so through these services lead to the spread and the development of the internet which used for the speed of the information.

Extract 10.1: A sample of students incorrect response in question 10.

Extract 10.1 shows a student who explained the components of the internet instead of the services available on the internet.

It was further noted that most of the students 4,515 (32.4%) who scored average marks (6 to 12.5) explained few services available on the internet. For example, one of the students wrote *internet is the group of computer connected together in order to share data or information* as an introduction. Some of them explained few services available in the internet. Common services explained by some of the students were *online shopping*, *e-learning* and *sharing information*. Others listed the services without giving explanations. It was also observed that, others did not give the correct explanations on the advertisement and updating antivirus services. However, only 8 students scored all 20 marks in this question. These

students explained correctly services that are available on the internet. Extract 10.2 shows a sample of such a correct response.

10. Explain five services that are available on the internet.

10. Internet - Is a global network in a network. The Internet was first invented as ARPANET. This grew up to wide world web (WWW). The Internet is used all over the world. People use internet because it provides different services which are very important like helps to find learning material, helps to conduct business and so on. The following are the services available on the internet.

E-Learning; It is an online service which enables the internet user to find different learning materials which improves the educational sector.

E-Commerce; This is an online business or exchange between the consumer and the suppliers. It facilitates the complete interaction of consumers and the supplier and it helps to save time.

Cloud computing; It is a service offered online so as to store different documents, images and attachments. Cloud storage can be done in a google drive, dropbox and so many other.

E-mail; Over the internet people are able to communicate through e-mail. Email are electronic messages transmitted from one place to another.

Entertainment; In the Internet there are many interesting web sites which are very entertaining. Some can be video clips, sound recordings which are funny or even movies. In general Internet is useful some time but there are some disadvantages which are wastage of time, immorality or culture disturbance, insecurity, inaccuracy of information and lack of privacy.

Extract 10.2: A sample of students' correct answer.

In Extract 10.1, the student explained correctly the services available on the internet. However, the students failed to give a clear conclusion.

3.0 PERFORMANCE OF STUDENTS IN EACH TOPIC

The Information and Computer Studies Assessment had 10 questions that were set from 9 topics. The analysis of the performance showed that multiple choice, True/False questions and the topic of *Spreadsheet* had good performance. The multiple choice question was composed from the topics of *Information*, *The Computer*, *Computer Handling*, *Spreadsheet*, *Computer Software*, *Word Processing*, *The Internet* and *Computer Networks and Communication*. True/False questions were composed from the topics of *The Computer*, *Computer Evolution*, *Word Processing* and *Computer Handling*; while an essay question was set from the topic of *The Internet*. The good performance in the stated topics was attributed to students adequate knowledge and correct interpretation of the requirements of the questions.

The five (5) topics, namely *Computer Handling*, *Computer Network and Communication*, *Word processing*, *Spreadsheet* and *The Internet* that were tested in question 5, 6, 7, 9 and 10 had an average performance. However, the performance was poor in two topics, *The Computer* and *Computer Software*. This poor performance was attributed to insufficient knowledge and skills of the concept taught under the stated topics, wrong interpretation of the requirements of the questions and lack of practical skills. The performance of students in different topics is summarized in the attached *Appendix*.

4.0 CONCLUSION

The analysis of the students' performance has been done on the questions that were assessed in (FTNA) in 2019 in Information and Computer Studies paper. In general, the students' performance was average because 47.2 percent of the students who sat for this assessment passed. However, there are some factors that led to students' failure to score high marks. This is attributed to insufficient knowledge and skills of the concept taught under the stated topics, wrong interpretation of the requirements of the questions, and lack of practical skills.

The analysis on individual items showed that most students experienced difficulties in question number 4 and 8 which involved the topics of *The Computer* and *Computer Software*. Further analysis showed that the students scored high marks in objective questions, 1 and 3.

5.0 RECOMMENDATIONS

In order to improve the performance of Form Two National Assessment in the future, it is recommended that:

- (a) Other education stakeholders, such as the government, parents and school managers, should ensure that schools have ICT laboratories equipped with necessary ICT facilities which will improve teaching and learning process.
- (b) Teachers should advise their students to read questions carefully during assessment time so that they understand them well and adhere to the given instructions.
- (c) Teachers should provide more exercises, tests and examinations to enhance students' mastery of theoretical concepts and practical skills.
- (d) Students need to prepare themselves well for the Assessment so as to be able to attempt all the required questions as expected.

APPENDIX

Summary of Performance of the Students – Topic wise

S/n	Topic	No. of Questions	Percentage of Students who Scored 30% Marks or Above	Remarks
1	The Computer, Computer Evolution, Word Processing and Computer Handling	1	89.5	Good
2	Information, The Computer, Computer Handling, Spreadsheet, Computer Software, Word Processing, Internet and Computer Networks and Communication	1	83.1	Good
3	Spreadsheet	2	55.2	Average
4	Internet	1	54.1	Average
5	Computer Networks and Communication	1	43.1	Average
6	Word Processing	1	41.8	Average
7	Computer Handling	1	40.3	Average
8	The Computer	1	26.6	Poor
9	Computer Software	1	22.5	Poor

