Aga Khan University Examination Board

Notes from E-Marking Centre on SSC-I Computer Science Examination April/ May 2019

Introduction

This document has been produced for the teachers and candidates of Secondary School Certificate (SSC-I) Computer Science. It contains comments on candidates' responses to the 2019 SSC-I Examination, indicating the quality of the responses and highlighting their relative strengths and weaknesses.

E-Marking Notes

This document includes overall comments on candidates' performance on every question and *some* specific examples of candidates' responses which support the mentioned comments. Please note that the descriptive comments represent an overall perception of the better and weaker responses as gathered from the e-marking session. However, the candidates' responses shared in this document represent some specific example(s) of the mentioned comments.

Teachers and candidates should be aware that examiners may ask questions that address the Student Learning Outcomes (SLOs) in a manner that requires candidates to respond by integrating knowledge, understanding and application skills they have developed during the course of study. Candidates are advised to read and comprehend each question carefully before writing the response to fulfill the demand of the question.

Candidates need to be aware that the marks allocated to the questions are related to the answer space provided on the examination paper as a guide to the length of the required response. A longer response will not in itself lead to higher marks. Candidates need to be familiar with the command words in the SLOs which contain terms commonly used in examination questions. However, candidates should also be aware that not all questions will start with or contain one of the command words. Words such as 'how', 'why' or 'what' may also be used.

General Comments

In general, questions related to the types of programming translators, types of programming languages, input and output devices, number system, generations of computers, computer architecture and MS Word were well attempted. However, questions based on memory units, Windows Installation, MS PowerPoint, DOS, differentiation between Windows and DOS were generally not well attempted.

Detailed Comments:

Constructed Response Questions (CRQs)

Question 1a:

The given table shows the characteristics of TWO translators, i.e. compiler and interpreter.

Categorise each of these characteristics as that of a compiler or an interpreter.

Characteristic of Translator	Compiler/ Interpreter
It produces an executable file of machine code.	
It is used at testing/ development stage of a program.	
It converts source code into machine code line by line.	
It produces file that does not need any type of translator to run it.	

(**Note:** Most of the candidates performed well in this question.)

Better responses showed that the candidates had a good understanding of both compiler and interpreter and were categorised correctly as shown in the given example.

Example:

Characteristic of Translator	Compiler/ Interpreter
It produces an executable file of machine code.	Compiler
It is used at testing/ development stage of a program.	Interpreter.
It converts source code into machine code line by line.	Interpreter.
It produces file that does not need any type of translator to run it.	Compiler.

Weaker responses depicted that candidates were confused among the characteristics of compiler and interpreter. Most of them categorised the characteristics in reverse order, e.g. first and fourth characteristics are identified as that of an interpreter rather than a compiler and second and third characteristics are identified as that of a compiler rather than an interpreter.

Example:

Characteristic of Translator	Compiler/ Interpreter
It produces an executable file of machine code.	Interpreter
It is used at testing/ development stage of a program.	Compiler
It converts source code into machine code line by line.	Compiler
It produces file that does not need any type of translator to run it.	Interpreter

Question 1b:

Define the following THREE types of programming languages.

Machine Language	Assembly Language	High-Level Language

Better responses showed that the candidates had a good knowledge of the types of programming languages and defined them correctly. The definitions written by them included: machine language consists of 1s and 0s/ machine language is machine-oriented language/ machine language is easy for computers to understand; assembly language consists of mnemonics/ assembly language is keywords based language; high level language is easy for human to understand/ high level language is difficult for computers to understand/ high level language consists of English statements.

Example:

Machine Language	Assembly Language	High-Level Language
The language following binary codes with two distinct values '0' and '1'. It is the only language understandable by machines and varies from machine to machine. Programs written in this language do not require any translator. They also depend upon the machine's internal structure.	The language based on mnemonic codes, words with predefined binary code running at the back-end. It is also a low-level language but requires translator assembler to act upon it. It also varies from machine to machine. In the early generations of computers, it helped programmers in writing programs. It is machine dependent	The language based on english words so that it is more understandable by humans. This language works similarly for all kinds of machines and requires translators i.e. compiler or interpreter to convert it into machine code. It does not require the knowledge of machine's internal structure. Modern programs are written in this language. Therefore it is machine independent.

Weaker responses revealed that the candidates managed to define either machine language or high level language but failed to define assembly language properly due to which they lost their marks.

Example:

Machine Language	Assembly Language	High-Level Language
Machine language is language consisting of 0's & 1's. which can be understood by computer.	Assembly language is a type of language which could be under-stood by humans.	High-level language is a source code language

Question 2a:

There is a set of video files in which the size of each file is 64 megabytes (MBs). How many of these video files can be stored in a flash drive with the storage capacity of 1 gigabyte (GB)? Show your working.

Better responses depicted that candidates were able to perform the conversion of gigabyte into megabytes correctly. They also applied correct arithmetic operation, i.e. division or multiplication, to get the required answer.

Example:

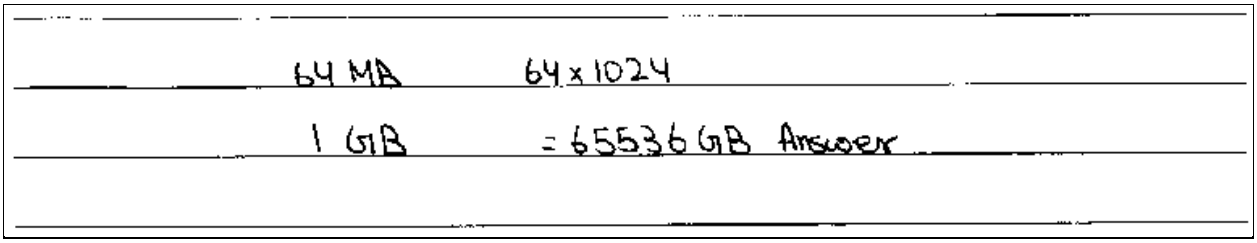
1 GB = 1024 MB

$\frac{1024}{64}$ = 16 files

16 files of 64 MB each can stored in 1 GB.

Weaker responses demonstrated that candidates had poor conceptual knowledge about the conversion of gigabyte into megabytes. They calculated the number of files without making the memory unit of given values same.

Example:

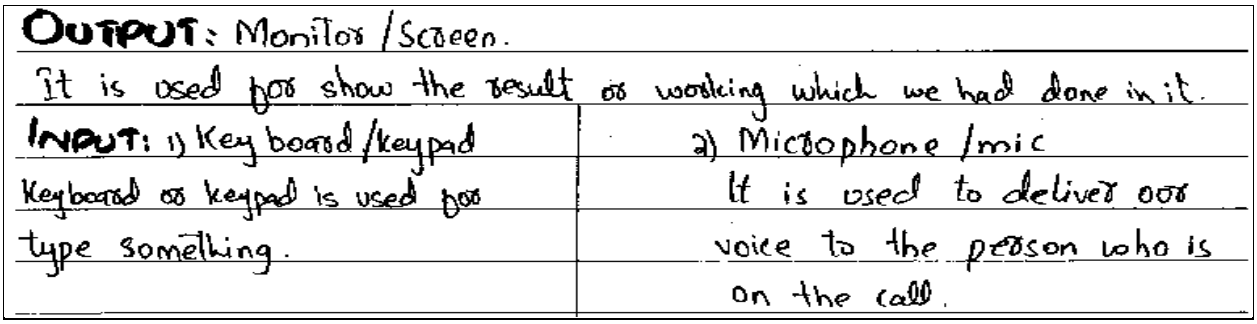


Question 2b:

Identify and describe the purpose of TWO input and any ONE output components that are present in the mobile phone shown in the given picture.

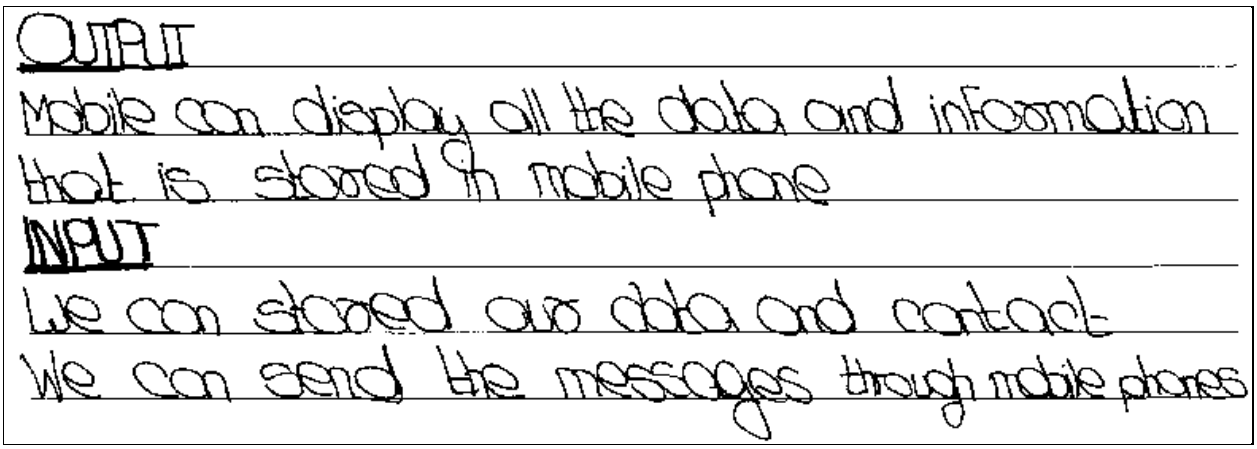
Better responses showed that candidates had a good understanding of the concepts of input and output devices. They mostly identified and described microphone and keypad as input devices and mobile screen and speaker as output devices of mobile phone.

Example:



Weaker responses revealed that candidates wrote only names of devices and did not describe them. Some of these wrote features of mobile phone such as making phone calls, sending and receiving messages. These responses included camera as an output device which is incorrect for the given image, as there is no camera visible in the picture of phone. Moreover, input devices described by them included: sensors which is incorrect for the given picture of phone; mobile charger; hands-free; SIM card; memory card; mouse. Some of these responses managed to identify and describe either speaker as output device or keypad as input device.

Example:



Question 3:

A computer controlled car is programmed in such a way that it moves in different directions on receiving specific binary codes (numbers).

The binary codes with corresponding directions are given below.

Binary Code	Direction
1010	Forward
0101	Backward
1101	Left
1011	Right

In order to move the car, the operator uses the given hexadecimal digits.

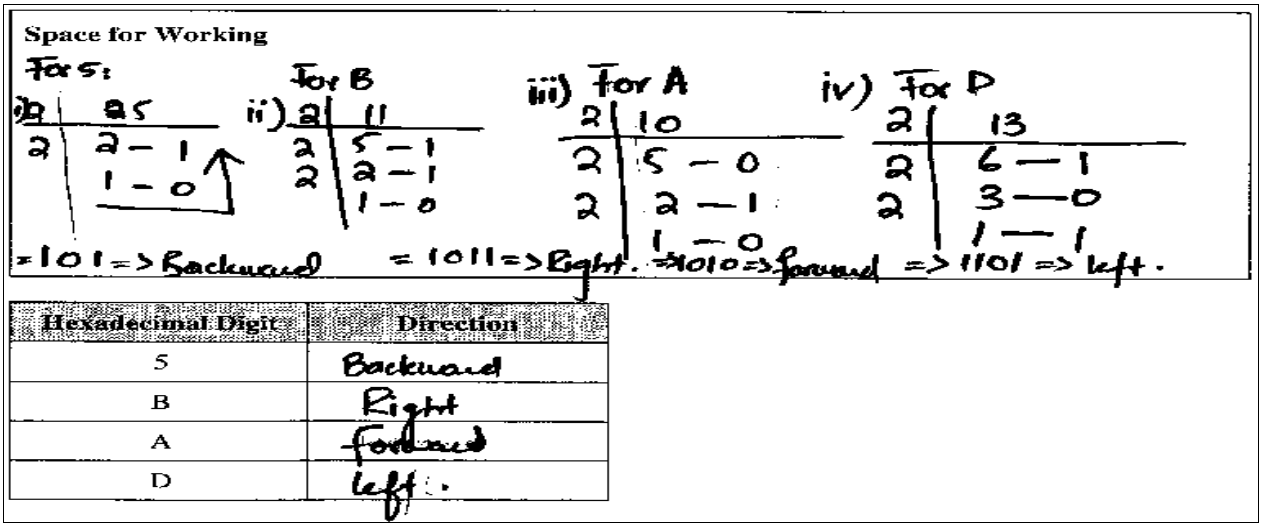
5 B A D

Determine the direction in which the car will move for each hexadecimal digit.

(**Note:** Show your working.)

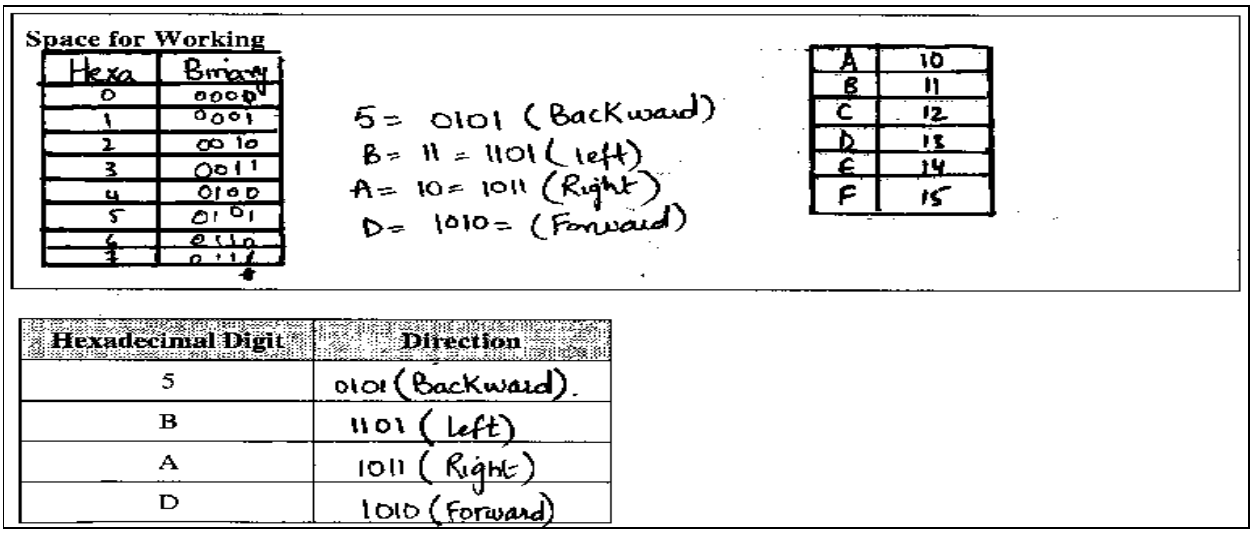
Better responses demonstrated that candidates applied the concepts of the number system on the given scenario correctly to find the directions for each hexadecimal digit. These responses converted the hexadecimal numbers into binary numbers and then mapped each binary number against the directions given in the table.

Example:



Weaker responses proved that candidates had a poor understanding of different number systems and were unable to apply the concepts in the given scenario. Some of these responses managed to determine the direction for digit 5. However, they failed to convert the alphabetical digits of hexadecimal number system, i.e. A, B and D. Some of them wrote directions and did not show working.

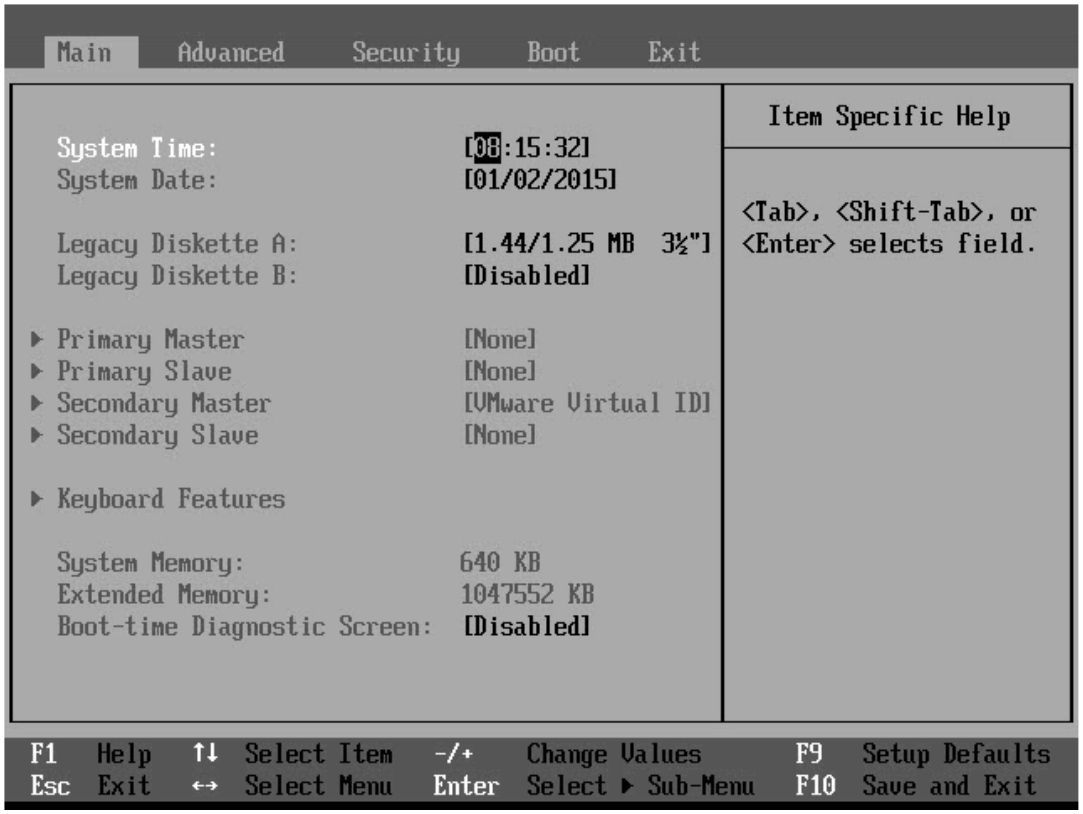
Example:



Hexadecimal Digit	Direction
5	0101 (Backward)
B	1101 (Left)
A	1011 (Right)
D	1010 (Forward)

Question 4a:

During installation of Windows operating system, Sheeraz opened the following screen.



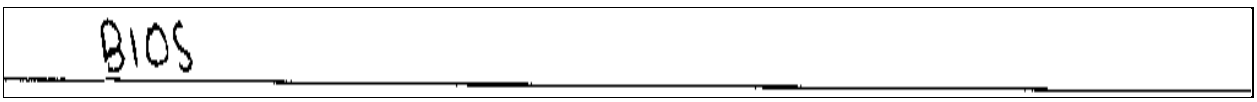
i. Name the screen shown in the given image.

ii. Give the reason for which he must open the screen shown in part (i).

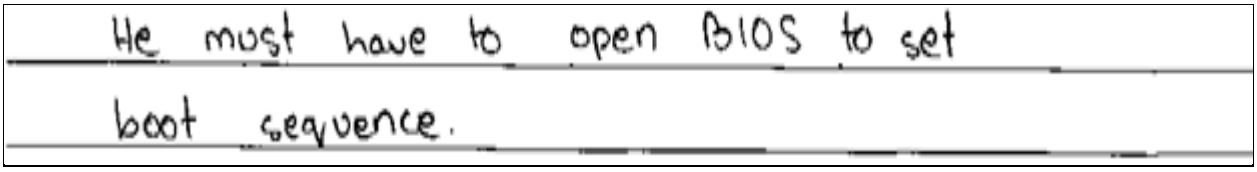
(**Note**: Most of the students did not perform well in this part of the question.)

Better responses showed that candidates had a good conceptual knowledge of Windows installation and wrote the name of the screen correctly, i.e. BIOS screen. Other relevant names that are written by them included: setup screen; system setting; boot menu; boot setup; boot options. Likewise, they mentioned the correct reason for using this screen during Windows installation. These included: it is used to change booting device priority; set booting device priority; set boot options; set preferences; set sequence of booting.

Example (i):



Example (ii):

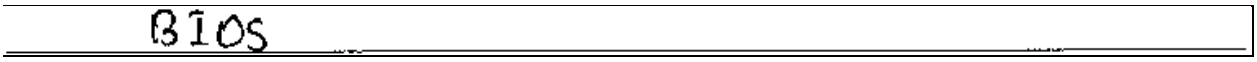


Weaker responses depicted that the candidates were unable to name the screen shown in the picture. The names written by them included: Windows installation screen; main screen; setting screen; control panel; DOS screen.

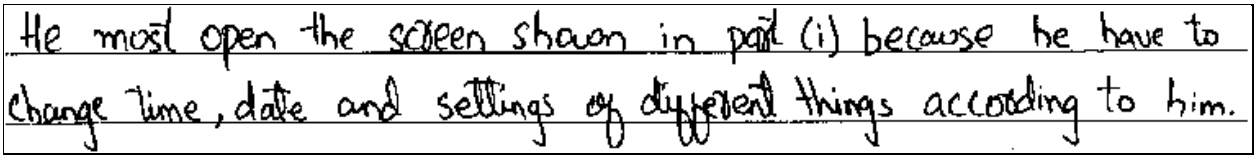
Similarly, they did not mention reason according to the requirement of question, i.e. why this screen is used during the installation of Windows? The reason mentioned by them included: to install Windows; to set time and date; to see the options of "appearances and themes" and "printers and other hardware"; to set keyboard features; to set working of computer.

Some of them managed to write the name of the screen but failed to write the reason for using this screen during Windows installation.

Example (i):



Example (ii):

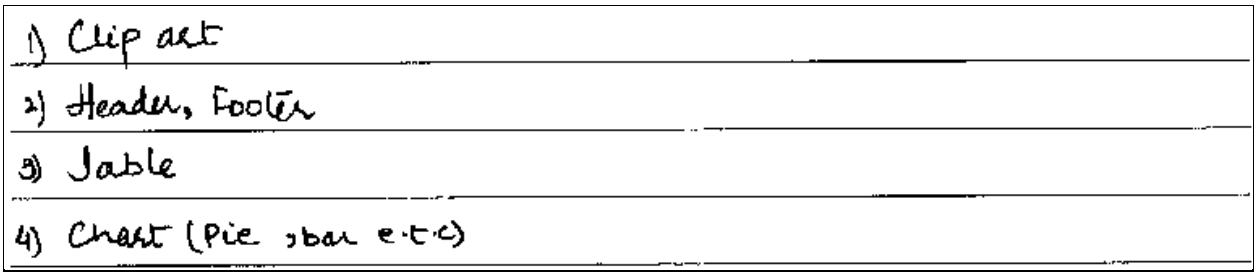


Question 4b:

List the names of any FOUR options that are available in the Insert menu of MS Word.

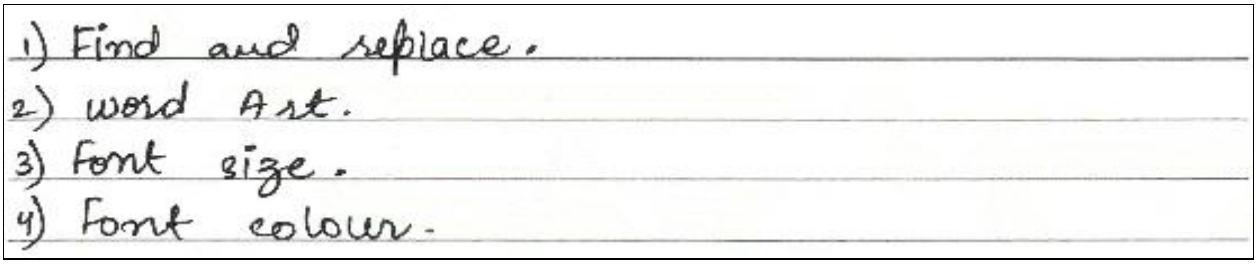
Better responses depicted that candidates had a good knowledge of the options available in MS Word Insert menu. The names listed by these responses included: Page; Graph; Textbox; Picture; Table; Cover Page; Blank Page; Page Break; Clip Art; Shapes; Smart Art; Chart; Screenshot; Hyperlink; Bookmark; Cross-reference; Header; Footer; Page Number; Word Art; Date and Time; Equation; Symbol.

Example:



Weaker responses showed that candidates had lack of knowledge of the options available in MS Word Insert menu and were confused among the options available in Home menu and Insert menu. Most of them wrote the names of the formatting options available in Home menu, i.e. Font Style, Font Size, Underline and Bold.

Other random names listed by them included: Find and Replace; New Slide; Heading; Line Spacing; Outline; Page Orientation; Page Background.



Question 4c:

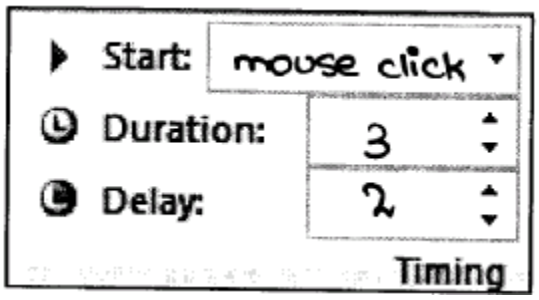
Shumaila is preparing an MS PowerPoint presentation and she has inserted animation on the text of one of the slides.

She wants the animation to appear 2 seconds after the click of the mouse and to stay on screen for 3 seconds. Complete the given picture with the THREE timing options of animation that would fulfil this requirement.

(**Note**: This question proved to be a difficult question for the candidates.)

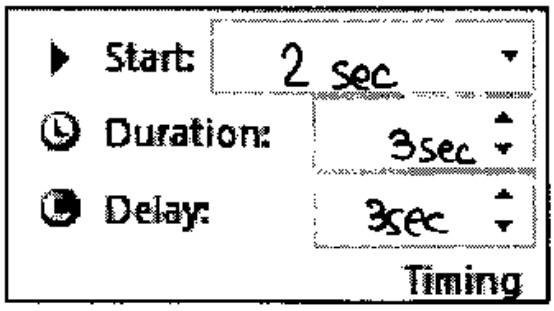
Better responses demonstrated that candidates had a good understanding of using MS PowerPoint animation. However, they were unable to write the exact term to start animation, i.e. On Click. Due to this reason, other relevant terms written by candidates are considered correct. These terms included: After Mouse Click; Click; Mouse Click. Likewise, they had clear understanding of duration and delay and wrote 3 for duration and 2 for delay respectively. However, those responses in which candidates mentioned 3.00 for duration and 2.00 for delay, 3 seconds for duration and 2 seconds for delay and 3 sec for duration and 2 sec for delay were also considered correct.

Example:



Weaker responses proved that candidates had a poor understanding of MS PowerPoint animation. They mentioned numeric values rather than writing correct or relevant term to start the animation, i.e. On Click. The responses written by these candidates included: 2 or 3 for Start option; 3 for duration and 3 for delay; 2 for duration and 3 for delay; 2 for duration and 1 for delay; 3 for duration and 5 Delay.

Example:



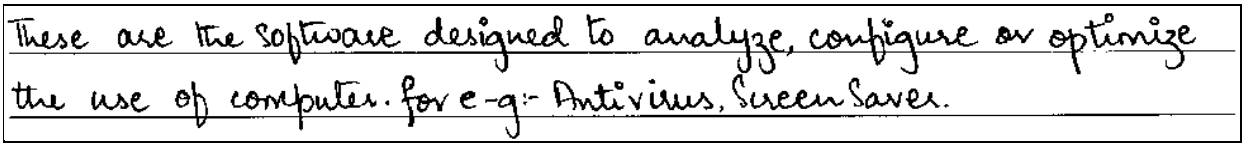
Question 5a:

Describe the purpose of each of the following:

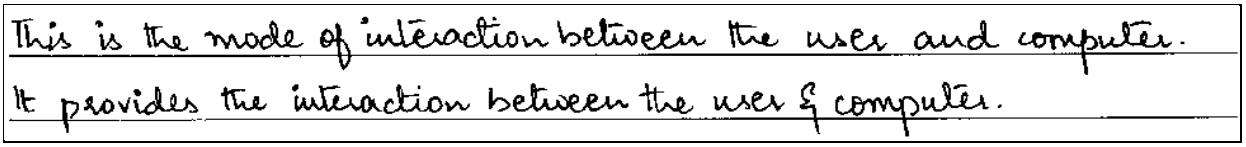
i. Utility Software
ii. User Interface

Better responses showed that canididates described the purpose of utility software and user interface correctly. These responses included: utility software optimises and analyses the performance of the operating system; utility software configures, analyses and optimises the computer system; utility software analyses, maintains and protects the system; user interface allows a user to interact with the computer system; user interface is a set of commands through which a user communicates with computer system; user interface communication between user and devices.

Example (i):



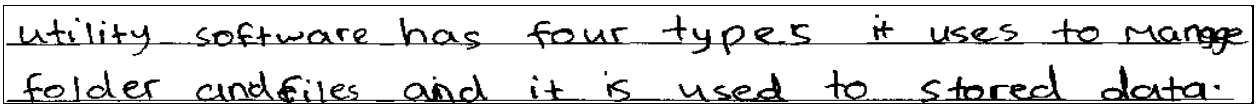
Example (ii):



Weaker responses revealed that candidates failed to describe the purpose of utility software and user interface. The descriptions written by them included: examples of utility software and user interface; general features of software, such as, utility software is a type of software/ it is user friendly/ it turns source code into object code/ antivirus software/ used for specific files/ it performs multiple tasks.

Likewise, the purpose of user interface written by them included: it is software; it is user interface; it runs on commands given by the user; it provides interface to work with.

Example (i):



Example (ii):

User Interface is the type of Interface used in a compuiter. For example: Graphical user interface.

Question 5b:

In disk operating system (DOS), users have to perform each task by using commands.

Write appropriate DOS commands to perform the given tasks.

i. Change present working directory from **C:\DOS to C:\GAMES\PACEM**
ii. Display the DOS version number on the screen of the monitor.
iii. Delete a file named **CAT.TMP** from the **TEST** directory on drive **C**.

(**Note**: Few candidates performed well in this question.)

Better responses revealed that candidates had good application skills of DOS. These responses included:

(i) CD C:\Games\PACEM

(ii) VER

(iii) DEL C:\TEST\CAT.TMP

Example (i):

C:\> CD C:\GAMES\PACEM
and then press enter

Example (ii):

C:\> VER
and then press enter the exsicting version will be displayed.

Example (iii):

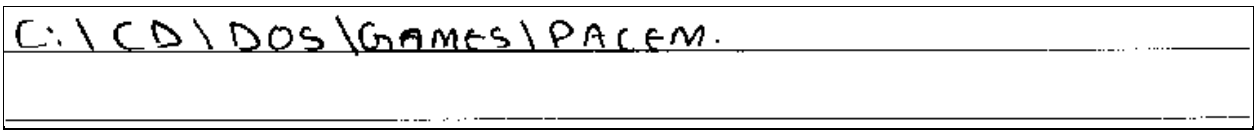
C:\> DEL C:\TEST\CAT.TMP
and press enter to delete

Weaker responses depicted that most of the candidates managed to write the command for part (ii) of this question, i.e. command to display the DOS version number on the screen. In part (i) and part (iii), candidates had an idea of the general syntax of commands but were unable to write the correct command for the given tasks and committed errors such as used forward slash (/) instead of backward slash (\), used commas and colons. These responses included:

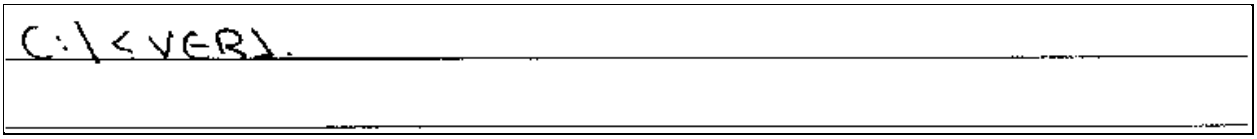
(i) CHDIR; C://C:\DOS://C: GAMES PACEM; C:\del\MD Test/Sd CAT.TMP

(iii) DEL; DELTREE; DEL://CAT.TMP://Test://Drive C

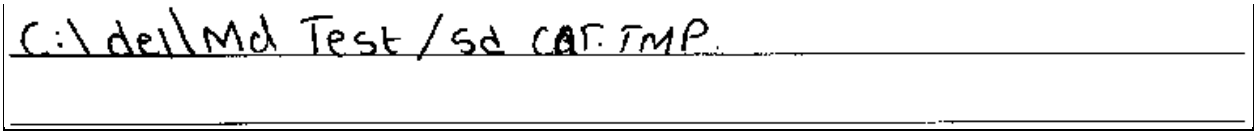
Example (i):



Example (ii):



Example (iii):



Extended Response Questions (ERQs)

The following questions offered a choice between part **a** and **b**.

Question 6a:

i. Following are the codes to perform the addition of numbers.

I. ADD 105, 100
II. 105 + 100
III. 0001 0001 0000 0101

Identify whether each of the given code lines is a machine code, an assembly language code or a high level language code.

ii. Which of the codes, I, II and III, given in part (i) does not require any kind of translator?

iii. Differentiate between the first generation computers and fourth generation computers on the basis of the given factors.

Factor	First Generation Computers	Fourth Generation Computers
Programming Language Used		
Cost		
Technology Used		
Speed		

(**Note**: As compared to part (a), a slightly higher number of candidates preferred to attempt part (b) and they did well.)

Better responses showed that candidates had good understanding of programming languages and the first and the fourth generation of computers. They wrote assembly language, high level language and machine code for part I, II and III respectively.

Similarly, they correctly identified the code that does not require any kind of translator, i.e. Code III or machine code.

Likewise, they differentiated between the first generation computers and the fourth generation computers correctly on the basis of the given factors.

Example (i):

I. Assembly language code.
II. High level language code.
III. Machine code

Example (ii):

Code III does not requir any kind of translator.

Example (iii):

Factor	First Generation Computers	Fourth Generation Computers
Programming Language Used	low-level languages.	High level languages
Cost	cheap	expensive.
Technology Used	vacuum tubes	microprocessors.
Speed	low speed	high speed.

Weaker responses revealed that candidates identified machine code correctly but were confused in the identification of the high level language code and assembly language code.

Likewise, most of them identified the high level language as a programming language that does not require any translator.

Similarly, most of them differentiated between the first and the fourth generation computers on the basis of either cost or technology used correctly, but failed to differentiate on the basis of programming language used and speed.

Example (i):

I. high level code
II. Assembly language code.
III. Low level machine language code.

Example (ii):

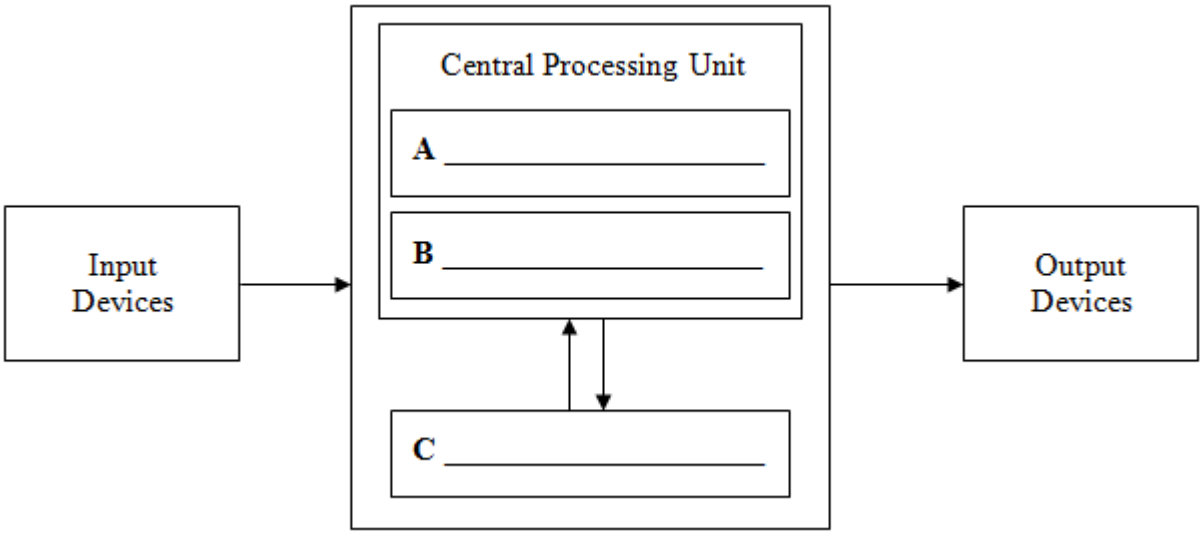
I (high level) doesn't requires any translator.

Example (iii):

Factor	First Generation Computers	Fourth Generation Computers
Programming Language Used	Binary language.	Data base Oracle.
Cost	have highest Cost.	Very high
Technology Used	Artificial Intelligence	Microprocessor VLIC's. Large Integrated Circuits
Speed	Super fast speed	Very fast

Question 6b:

i. Complete the given diagram of the computer architecture by writing the names of components in boxes **A**, **B** and **C**.



ii. Describe the function of each component named in part (i).

iii. Write any ONE difference between data bus and address bus.

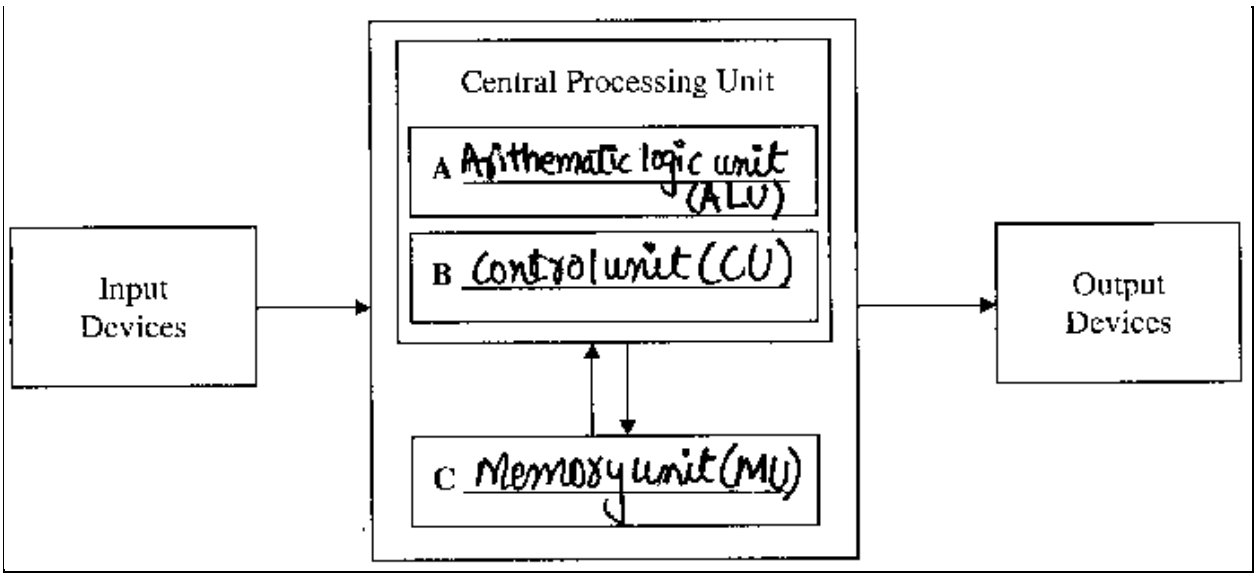
Data Bus	Address Bus

Better responses revealed that candidates had a good understanding of computer components and they differentiated data bus from address bus correctly. They completed the diagram of computer architecture by writing names of components in boxes A, B and C, i.e. A = Arithmetic Logic Unit, B = Control Unit and C = Memory unit/ primary storage/ primary memory.

Likewise, they correctly described the function of each component identified in part (i). These responses included: ALU performs arithmetic logic operations; Control unit controls the operations of all other components of computer; control unit tells other units that how to respond to program instructions; Memory unit stores data coming from hard disk temporarily.

Similarly, they wrote that data bus carries data from CPU to memory and input/ output components and vice versa while address bus carries memory addresses from CPU to memory.

Example (i)



Example (ii)

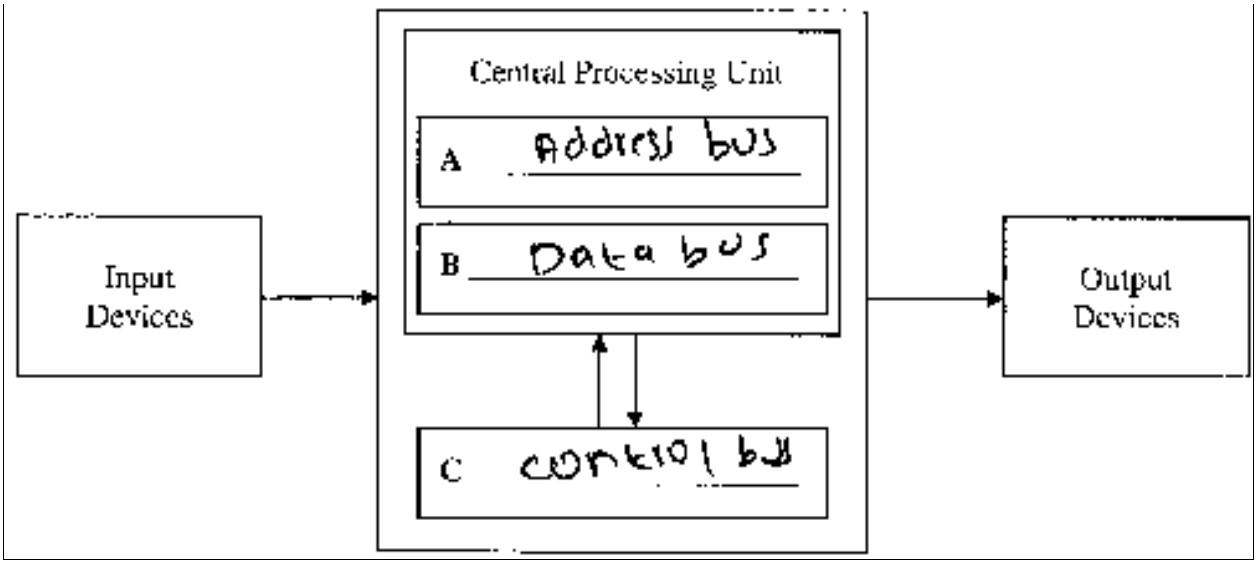
A) ALU: It is responsible for all the arithematic (+, −, ×, ÷ etc) and logical operations being carried out.
B) CU: It is responsible for all the operations of CPU. It controls flow of information and generates control signals.
C) MU: It is used for storing all the data and programs that are currently being used. It is directly accessed by CPU

Example (iii)

Data Bus	Address Bus
Data bus carries data, and connects CPU, memory and I/O devices	Address bus carries address information to/from CPU, memory and I/O devices.

Weaker responses depicted that candidates were unable to write the names of the components A, B and C correctly. They also failed to write the description of the components of A, B and C identified in part (i). However, most of these candidates managed to differentiate between data bus and address bus.

Example (i):



Example (ii):

A) Address bus carries address information it is set of wires similar to data bus connecting central processing unit (cpu). It reason for importance of address bus is that the number of lines in address is determined by maximum number of memory location. B) Data bus carries data information it is electrical path connecting central processing unit. C) control bus is direct transfer of data from CPU for executing.

Example (iii)

Data Bus	Address Bus
An data bus carries data information it is electrical path connecting central processing unit (CPU)	An address bus carries address information it is set of wires data bus connecting central processing unit (CPU)

Question 7a:

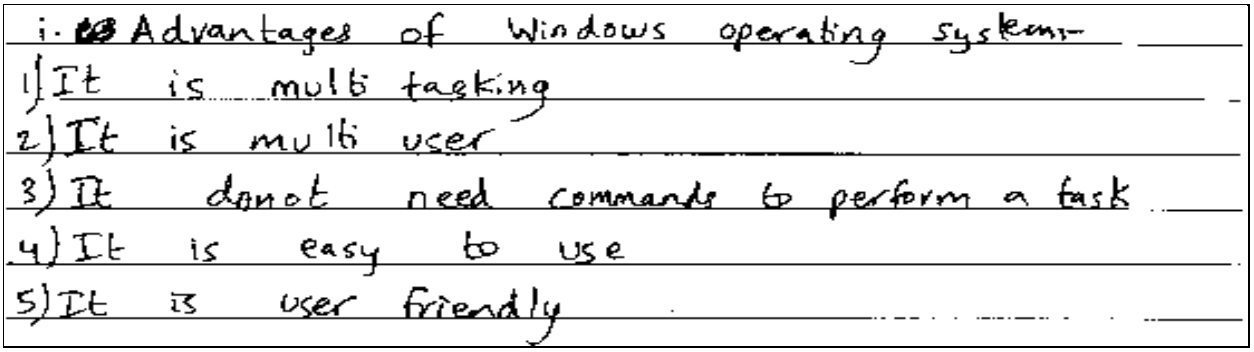
i. Describe any FOUR advantages of using Windows operating system as compared to DOS.
ii. Describe any FOUR disadvantages of using Windows operating system as compared to DOS.

(**Note:** As compared to part (b), a slightly higher number of candidates attempted part (a). However, they performed almost equally in both parts.)

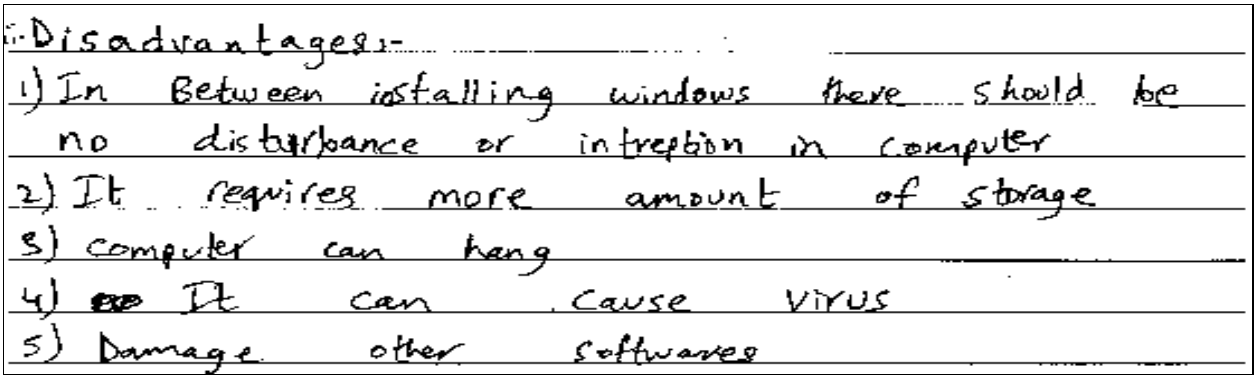
Better responses proved that candidates were able to describe the advantages and the disadvantages of Windows operating system over Disk Operating System (DOS). The advantages described by them included: it is multitasking; it does not need commands to operate; it is easy to use; it is user friendly; files and folders can be accessed quickly with a single click of mouse; file, folders and menus are accessed by using mouse and keyboard both but in DOS only keyboard is used; most of the hardware is connected automatically (plug and play).

Likewise, disadvantages described by them included: Windows needs more space on disk than DOS; Windows is expensive than DOS; Windows gets affected from viruses easily; Windows has a lengthy installation process.

Example (i):


i. Advantages of Windows operating system:-
1) It is multi tasking
2) It is multi user
3) It donot need commands to perform a task
4) It is easy to use
5) It is user friendly

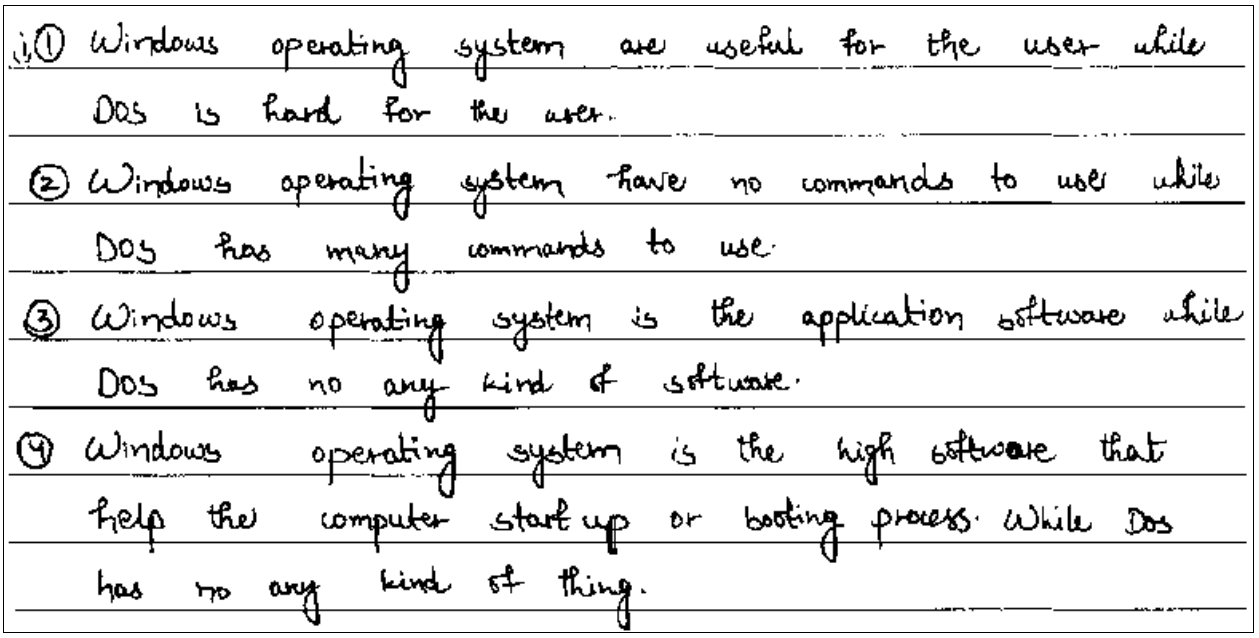
Example (ii):


i. Disadvantages:-
1) In Between isfalling windows there should be no disturbance or intreption in computer
2) It requires more amount of storage
3) computer can hang
4) It can cause virus
5) Damage other softwares

Weaker responses showed that candidates failed to describe the advantages and the disadvantages of Windows over DOS. The advantages written by them included: Windows is useful and DOS is not useful; Windows is application software while DOS has no kind of software; Windows help the startup of the computer system while DOS does not; files are saved in My Computer in Windows; Windows graphical user interface is used for learning.

Likewise, disadvantages described by these responses included: Windows does not allow creating shortcuts while DOS allows it; Windows does not allow taking back up; Windows does not allow seeing the version and directories in Windows; DOS processes data according to the requirement but Windows does not; DOS gives result in the form of a program output, but Windows does not; DOS performs memory management but Windows does not; DOS accepts instructions from input device but Windows does not.

Example (i):

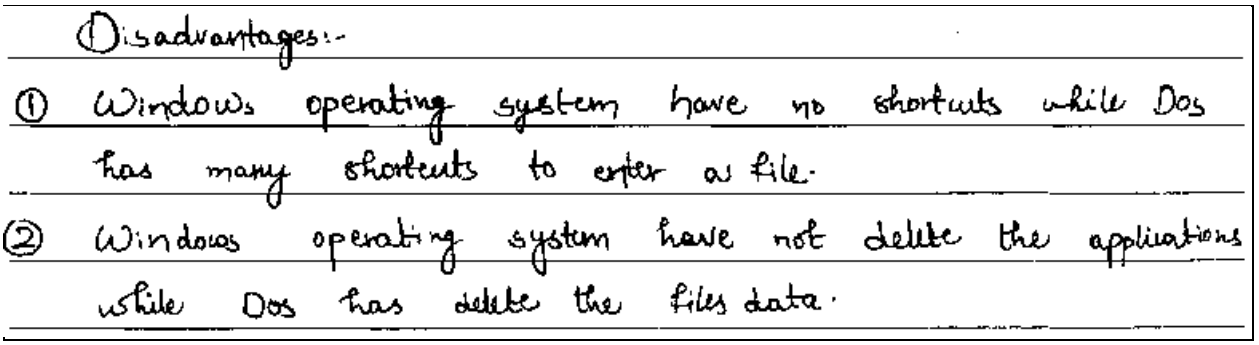

i① Windows operating system are useful for the user while DOS is hard for the user.

② Windows operating system have no commands to user while DOS has many commands to use.

③ Windows operating system is the application software while Dos has no any kind of software.

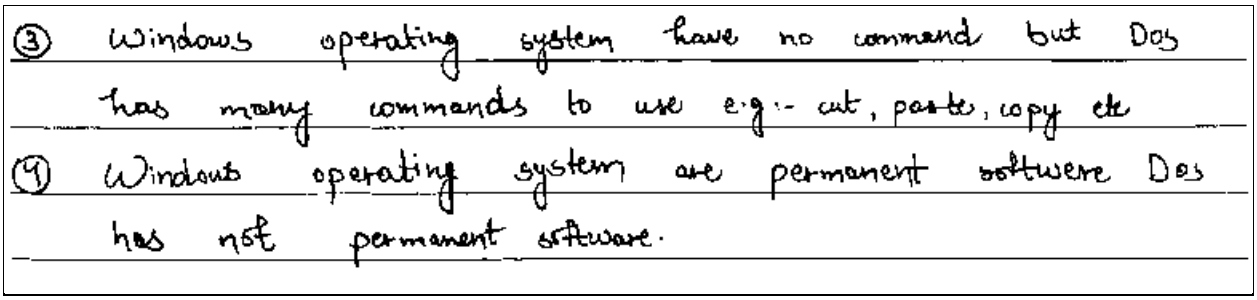
④ Windows operating system is the high software that help the computer start up or booting process. While Dos has no any kind of thing.

Example (ii):


Disadvantages:-

① Windows operating system have no shortcuts while Dos has many shortcuts to enter a file.

② Windows operating system have not delete the applications while Dos has delete the files data.



Question 7b:

i. In the given table, name the DOS command which fulfils each purpose. Identify each command as external or internal.

Purpose of Command	DOS Command	Type of Command
This command copies the contents of one floppy from the source drive to a formatted or un-formatted floppy disk in the destination drive.		
This command is used to check a disk and display a status report with properties of disk like serial number, volume label, memory and other properties along with errors on the disk if any.		
This command is used to remove a directory along with its contents.		

ii. In the given table, write the purpose of each given DOS command. Identify each command as external or internal.

DOS Command	Purpose of Command	Type of Command
MD		
VER		
CLS		

Better responses revealed that candidates had good theoretical concepts of DOS internal and external commands. The commands written by these responses included: DISKCOPY for the first purpose given in the table; CHKDSK for the second purpose in the table; DELTREE for the third purpose in the table. Likewise, these responses identified type of command in the given table as external.

Similarly, purpose written by these responses in the second table included: MD is used to make new directory and identified it as internal command; VER displays DOS version and identified it as internal; CLS clears the screen and identified it as internal.

Example (i):

Purpose of Command	DOS Command	Type of Command
This command copies the contents of one floppy from the source drive to a formatted or un-formatted floppy disk in the destination drive.	DISK COPY	External
This command is used to check a disk and display a status report with properties of disk like serial number, volume label, memory and other properties along with errors on the disk if any.	CHK DSK	External
This command is used to remove a directory along with its contents.	DELTREE	External

Example (ii):

DOS Command	Purpose of Command	Type of Command
MD	Make a new Directory	Internal
VER	Display version of DOS	Internal
CLS	Clears the screen	Internal

Weaker responses unveiled that candidates failed to identify DOS commands and their type on the basis of their purpose. They wrote incorrect spelling or different commands such as: COPY/ COPY FILE/ CD for the first purpose given in the table; CHECKDSK/ CHKDISK/ VER/ DELTREE/ DOS CHECK SYSTEM/ SYS/ DIR for the second purpose in the table; RD/ DEL.COM/ DEL*_*/ DEL for the third purpose in the table. Moreover, they identified the type of commands on the basis of their purpose randomly and incorrectly.

Likewise, most of them managed to write the purpose of VER and CLS command but failed to write purpose of MD and identify the type of command correctly. The purpose written by them for the first command included: it is used to find the file in the memory; to check the directory; to move data from one directory to other directory; to move from any directory to any other directory; to check media files in a directory. Similarly, the purpose written by them for the second command included: it is used to check the volume label; to check how many files DOS can store; to display status report; to check version updates of DOS; to cut a file from anywhere and place it in any directory; to check subdirectories and files present in a computer. Likewise, the purpose written by them for the third command included: It is used to start work in DOS/ to clear DOS system.

Example (i):

Purpose of Command	DOS Command	Type of Command
This command copies the contents of one floppy from the source drive to a formatted or un-formatted floppy disk in the destination drive.	CORY	internal
This command is used to check a disk and display a status report with properties of disk like serial number, volume label, memory and other properties along with errors on the disk if any.	SYS	external
This command is used to remove a directory along with its contents.	DEL	internal

Example (ii):

DOS Command	Purpose of Command	Type of Command
MD	To find the file in memory.	internal
VER	To display the DOS version number.	external
CLS	To clear the display screen only from display.	external