



FOCUS A365

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COMPUTER STUDIES - FORM 3 TERM 2

SECTION A (40 Marks)

(Answer all questions in this section)

1. Distinguish between an integrated computer and an embedded computer (2 Marks)

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2. The fifth generation computers are used in different applications. Describe the fifth generation computer applications listed below. (4 marks)

a. Robotics

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b. Biometric systems

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3. Bonso is a computer technician at Monroe high school. Due to constrain of resources he wants to convert a classroom into a computer laboratory. List four factors Bosno would consider when setting up the lab (2 Marks)

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4. The keyboard is said to be the main computer input device. State the function of the keyboard sections listed below (2 Marks)

a. Function keys

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b. Special purpose keys

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5. a. Today the memory technology is rapidly shifting from memory modules and chips to flash memories. Other than cost state any other two characteristics of the flash memory (2 Marks)

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b. State any two functions of RAM (2 Marks)

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c. The control unit is said to be a very critical resource for data processing, give two reasons why the control unit is critical in data processing (2 Marks)

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6. At times it is necessary to present the output of the computer in audio form of a particular form. Distinguish between a voice response system and a voice recognition system (2 Marks)

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7. Distinguish between a storage media and storage device (2 Marks)

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8. What is a smart card? (1 Mark)

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9. State any two advantages of using a smart card for data storage (2 Marks)

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10. Define the term word processing (1 Mark)

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11. State the importance of footnotes in a document (2 Marks)

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12. Define a table as used in word processing (1 Mark)

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13. State any two benefits of integrating a table in a document (2 Marks)

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14. State any four features of a desktop publisher (4 Marks)

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15. Spreadsheets are very important tool for the accountants.

a. Distinguish between a workbook and worksheet (2 Marks)

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b. The spreadsheet below was extracted from Mji bora high school evaluation department. Use it to answer the questions that follow

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	SNO	NAME	ADM No.	CLS	GENDER	MATHS	ENGLISH	KISWA	CHEM	PHY	COMP	TOTAL	AVERAGE	GRADE
2	1	JOHN	1322	3M	M	65	89	87	78	87	68			
3	2	MICHAEL	1326	3M	M	70	77	67	58	66	78			
4	3	JOSHUA	1331	3M	M	82	97	86	67	57	67			
5	4	ABIGAEL	1344	3M	F	89	90	78	65	56	89			
6	5	RICHARD	1351	3M	M	77	76	68	86	34	68			
7	6	BENTA	1387	3M	F	56	97	97	75	65	79			
8	7	MILLICENT	1380	3M	F	57	66	99	86	36	72			
9	8	KEVIN	1389	3M	M	88	97	86	96	46	57			
10	9	PATRICK	1364	3M	M	86	87	76	86	47	79			
11	10	HELLEN	1392	3M	F	97	58	97	67	20	62			
12														

Write a formula that would be used to calculate;

- i. The boys average scores for mathematics in cell C15 (3 Marks)

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The grade for Michael in cell N3 then copied to the other cells given that; (2 Marks)

AVERAGE MARKS	GRADE
80 – 100	A
60 – 79	B
40– 59	C
20– 39	D
0-19	E

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SECTION B

(Answer all questions in this section)

- 16 a. Distinguish between a compiler and an interpreter (2 Marks)

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- b. Describe the object oriented programming concepts listed below (2 Marks)

- i. Polymorphism

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- ii. Inheritance

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17 a. Describe how the operating system manages the resources listed below (4 Marks)

i. Processor

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ii. Communication devices and ports

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b. Distinguish between the terms listed below with reference to the operating system (4 Marks)

i. Error handling and interrupt handling

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ii. Job scheduling and resource allocation

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c. The operating system organizes its data into files and folders for ease of accessibility.

i. Distinguish between a file and a folder

(2 Marks)

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ii. Distinguish between disk compression and file compression

(2 Marks)

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iii. State any two benefits of file compression

(2 Marks)

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iv. What is an archive file? (1 Mark)

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18 a. Define the term data security as used in computing (1 Mark)

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b. Using relevant examples for each, distinguish between physical data security and software based data security (2 Marks)

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c. Distinguish between private data and confidential data (2 Marks)

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d. Lenzy is a company clerk, he managed to access the manager's computer remotely where he downloaded an appraisal letter for a colleague and shared it with the others in the office. His act was against the rules and protocols of the organization.

i. Identify any two data security issues Lenzy breached (2 Marks)

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ii. For each data security threat mentioned in (i) above, state two measures taken to protect data (4 Marks)

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e. For computers to communicate, they have to be interconnected using different components, Define the connectivity devices listed below (2 Marks)

i. Internet service provider (ISP)

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ii. Transmission media

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ii. $X_2 + 11101_2 = 100_{10}$

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d. State **three** ways of representing signed numbers in a computer (3 Marks)

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MARKING SCHEME

SECTION A (40 Marks)

(Answer all questions in this section)

1. Distinguish between an integrated computer and an embedded computer

An embedded computer is a special purpose computer used inside another device and is usually dedicated to specific functions. It is housed on a single microprocessor board with the programs stored in its ROM chip while integrated computer systems are independent computer systems that are connected /linked to machines so as to monitor and control their operations hence operating as a single unit by supporting each other to process data.

Difference @ 2 Marks

2. The fifth generation computers are used in different applications. Describe the fifth generation computer applications listed below.

- a. Robotics

This is the science of Programming computers to see and hear and react to other sensory stimulus well as making it perform physical tasks performed by experts such as in production industries with minimum human intervention.

- b. Biometric systems

This is the science of using unique body parts for data entry and enforcing security on a system

Description @ 2 Marks

Total = 2 X 2 Marks

= 4 Marks

3. Bonso is a computer technician at Monroe high school. Due to constrain of resources he wants to convert a classroom into a computer laboratory. List four factors Bosno would consider when setting up the lab
(2 Marks)

- i. Security of computers programs and other resources
- ii. Reliability of the source of power
- iii. The number of computers to be installed and the available floor space
- iv. The maximum number of users that the laboratory can accommodate

Factor @ ½ Mark

Total = 4 X ½ Mark

= 2 Marks

4. The keyboard is said to be the main computer input device. State the function of the keyboard sections listed below

a. Function keys

They are used to issue commands. Each of these keys has a special function to perform depending with the program the user is working with; hence their function differs from one program to another.

b. Special purpose keys

These keys are used in conjunction with other keys to give commands to the computer or perform certain tasks for the computer.

Function @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

5. a. Today the memory technology is rapidly shifting from memory modules and chips to flash memories. Other than cost state any other two characteristics of the flash memory

i. it is volatile therefore it retains its information even when the computer is turned off,

ii. it stores information electronically

or any other correct response

characteristic @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

b. State any two functions of RAM

i. INPUT STORAGE

ii. PROGRAM STORAGE

iii. WORKING STORAGE

iv. OUTPUT Storage

Or any other correct response

Function @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

c. The control unit is said to be a very critical resource for data processing, give two reasons why the control unit is critical in data processing

i. The control unit monitors and controls all the activities of the computer

ii. It decodes / finds the meaning (translation) of instructions before they are executed

Or any other correct response

Reason @ 1 Mark

Total = 2 X 1 Mark
= 2 Marks

6. At times it is necessary to present the output of the computer in audio form of a particular form. Distinguish between a voice response system and a voice recognition system

The voice response system selects from a set of digitized pre-recorded words, phrases, alarms or other sounds stored in a disc. The system combines these pre-recorded words into responses based on selections made by the user while voice recognition system has the ability to distinguish between different voices for input and commands.

Difference @ 2 Marks

7. Distinguish between a storage media and storage device

STORAGE DEVICE is the computer hardware that facilitates writing and reading of information in the storage media in a format that the computer is able to understand and manage while STORAGE MEDIA is the actual surface where data is stored.

Difference @ 2 Marks

8. What is a smart card?

Smart cards are the latest means of storing data on cards which have very thin gold coloured memory chips sealed into them. It can store a large amount of information which can be updated on the embedded memory chip.

Definition @ 1 Mark

9. State any two advantages of using a smart card for data storage

i. The chip can store a large amount of information, including personal information, helping to confirm that the user of the card is also the owner of the card

ii. The smart card is flexible in that it can be used for many different applications such as credit cards, ATM Cards. E.t.c

Or any other correct response

Advantage @ 1 Mark

Total = 2 X 1 Mark
= 2 Marks

10. Define the term word processing

Word processing is the CREATION, EDITING, STORAGE and PRINTING of text by use of electronic means using computer hardware and software.

Definition @ 1 Mark

11. State the importance of footnotes in a document

Footnotes help the reader of the document understand the vocabularies, phrases and other confusing words in accordance to the context of the document.

Importance @ 2 Marks

12. Define a table as used in word processing

A table is a collection of rows and columns

Definition @ 1 Mark

13. State any two benefits of integrating a table in a document

- i. It is used to summarize data in document
- ii. It is used to organize statistical and numeric oriented data

Or any other correct response

Benefit @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

14. State any four features of a desktop publisher (4 Marks)

- a. Text can be entered directly into a DTP publication. Alternatively, the text can be entered into a Word processor and then copied into the DTP document.
- b. Graphics can be created in a separate program, then incorporated into a Desktop publishing program.
- c. A Scanner can also be used to copy images, such as photographs and drawings, into a Desktop publishing document. A Scanner is a device that reads text and images into a document.
- d. A DTP program gives you more control over the graphics in a publication. You can:
- e. Has a wide range of Fonts & print sizes that can be merged with useful symbols, such as arrows and stars.
- f. Has Columns of various widths, in which the text is fitted automatically using sensible hyphenation. The columns can also be reorganization automatically.
- g. Enables Scaling and cropping of publications so as to fit the available space.
- h. Page numbers can be inserted.
- i. Enables production of multiple page documents.

15. Spreadsheets are very important tool for the accountants.

a. Distinguish between a workbook and worksheet

A workbook is a collection of related worksheets viewed as a single file in spreadsheets while worksheet is the actual working area (a page) in a workbook organized in rows and columns.

Difference @ 2 Marks

b. The spreadsheet below was extracted from Mji bora high school evaluation department. Use it to answer the questions that follow

Write a formula that would be used to calculate;

i. The boys average scores for mathematics in cell C15

=SUMIF(E2:E11,"M",F2:F11)

Formula @ 3 Marks

The grade for Michael in cell N3 then copied to the other cells given that;

AVERAGE MARKS GRADE

80 – 100 A

60 – 79 B

40– 59 C

20– 39 D

0-19 E

=IF(M3>=100,"A",IF(M3>=60,"B",IF(M3>=40,"C",IF(M3>=20,"D","E"))))

OR

=IF(M3<=20,"E",IF(M3<=40,"D",IF(M3<=60,"C",IF(M3<=80,"B",IF(M3<=100,"A","INVALID MARKS")))))

OR

=IF(M3<=20,"E",IF(M3<=40,"D",IF(M3<=60,"C",IF(M3<=80,"B","A"))))

Formula @ 2 Marks

SECTION B

(Answer all questions in this section)

16 a. Distinguish between a compiler and an interpreter

A compiler translates the entire program (source code) to machine code, before the code is executed and The translated codes are saved as a file on disk with an EXE file name extension while An interpreter translates and executes one instruction at a time as it is encountered. The machine codes are not saved after execution

Difference @ 2 Marks

b. Describe the object oriented programming concepts listed below (2 Marks)

i. Polymorphism

Polymorphism means the ability to take more than one form. An operation may exhibit different behaviors in different instances. The behavior depends on the data types used in the operation. Polymorphism is extensively used in implementing Inheritance.

ii. Inheritance

Inheritance is the process by which objects can acquire the properties of objects of other classes. In OOP, inheritance provides reusability, like, adding additional features to an existing class without modifying it. This is achieved by deriving a new class from the existing one. The new class will have combined features of both the classes.

Difference @ 2 Marks

Total = 2 X 2 Marks

= 4 Marks

c. In a tournament, there are 40 participants. To win the tournament, the participant must go through 4 stages and attain the acceptable points for each stage. At each stage 10 participants with the least points are eliminated. At each stage the points are awarded according to their positions i.e. the winner in stage 1 will have 40 Points. The points for each stage are then consolidated at the end of all the stages to get the overall winner.

Draw a flowchart and pseudocode for the above system that would prompt for the participants name, age and position then calculate the points and display the points and whether the participant has qualified to the next stage or not.

Pseudocode (5 Marks)

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The operating system controls all the input and output devices, including the ports which act as the interfaces between the Operating system and the input/output devices; the Operating system handles all the instructions that pass between them and the processor. The operating system is also controls how your application software interfaces with your computer hardware

Description @ 2 Marks

Total = 2 X 2 Marks

= 4 Marks

b. Distinguish between the terms listed below with reference to the operating system (4 Marks)

i. Error handling and interrupt handling

The Operating system identifies errors that come about in the use of the computer system by the user, and in the execution of instructions. The operating system has different ways of alerting the user of such errors by stating the error and possible causes, as well as a suggestion of a possible course of action to rectify the error. The operating system does this by monitoring the status of the system and performing error checks on both hardware and software.

Interrupt handling

In computing, an interrupt is a signal indicating the need for attention or an event in software indicating the need for a change in execution. It is a break from the normal sequential processing of instructions in a program.

An act of interrupting is referred to as an interrupt request (IRQ). Any device or program communicates to the processor using a special number called the interrupt request number.

When an interrupt is received, the computer's hardware automatically suspends whatever program is currently running, saves its status, and runs computer code previously associated with the interrupt; this is similar to placing a bookmark in a book in response to a phone call. In modern operating systems, interrupts are handled by the operating system's kernel. Interrupts may come from either the computer's hardware or from the running program.

A hardware interrupt causes the processor to save its state of execution and begin execution of an interrupt handler. When a hardware device triggers an interrupt, the operating system's kernel decides how to deal with this event, generally by running some processing code. The amount of code being run depends on the priority of the interrupt. The processing of hardware interrupts is a task that is usually delegated to software called device driver, which may be either part of the operating system's kernel, or part of another program, or both. Device drivers may then relay information to a running program by various means.

Software interrupts are usually implemented as instructions in the instruction set, which cause a context switch to an interrupt handler similar to a hardware interrupt. If a program wishes to access hardware for example, it may interrupt the operating system's kernel, which causes control to be passed back to the kernel. The kernel will then process the request. If a program wishes additional resources (or wishes to shed resources) such as memory, it will trigger an interrupt to get the kernel's attention.

ii. Job scheduling and resource allocation

Job scheduling

The allocation of system resources to various tasks, known as job scheduling, is a major assignment of the operating system. The operating system must determine which tasks the CPU should do first. The system maintains prioritized queues of jobs waiting for CPU time and must decide which job to take from which queue and how much time to allocate to it, so that all jobs are completed in a fair and timely manner.

Scheduling is a key concept in computer multitasking, multiprocessing operating system and real-time operating system designs. Scheduling refers to the way processes are assigned to run on the available CPUs, since there are typically many more processes running than there are available CPUs.

Resource allocation

Each resource in a computer is given a unique identification number called an Interrupt Request (IRQ). The OS uses the IRQ number to identify the resources being requested. Poor resource allocation would result to an undesirable condition called a deadlock. Deadlock is a situation where a particular job holds a requested resource and fails to release it, yet it is requesting for a resource held by another job.

c. The operating system organizes its data into files and folders for ease of accessibility.

i. Distinguish between a file and a folder

A computer file is the basic unit of data or information in digitized form stored on a computer storage device under a particular file name. Each file stores a collection of related data or information. Each file is given a name for identification purposes while a folder is a named storage location where related files are stored in an organized way

Difference @ 2 Marks

ii. Distinguish between disk compression and file compression (2 Marks)

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iii. State any two benefits of file compression

1. It causes the file to occupy less space on the storage device hence saving on storage space
2. It enables easy transfer of large files over the network without breaking them down

Or any other correct response

Benefit @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

iv. What is an archive file?

This is a fully processed file kept in the computer for future reference or as evidence of a transaction

Definition @ 1 Mark

18 a. Define the term data security as used in computing

Data security refers to the measures and precautions undertaken to ensure protection of data and data resources in an organization

Difference @ 1 Mark

b. Using relevant examples for each, distinguish between physical data security and software based data security

physical data security refers to the Physical safeguards used to protect the hardware and software from accidental or malicious damage, destruction or theft while software based data security refers to Software safeguards that involves all the activities undertaken to ensure protection of data in the computer

Difference @ 2 Marks

c. Distinguish between private data and confidential data

Private data is data that can only be accessed and used by the owner only. No one else has a write the right to access the information without the owner's permission while confidential data refers to information given by the owner to an organization for official use only. This information can be accessed and used by several authorized persons without the owner's permission.

Difference @ 2 Marks

d. Lenzy is a company clerk; he managed to access the manager's computer remotely where he downloaded an appraisal letter for a colleague and shared it with the others in the office. His act was against the rules and protocols of the organization.

i. Identify any two data security issues Lenzy breached

1. Unauthorized access
2. Data theft

Security issue @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

ii. For each data security threat mentioned in (i) above, state two measures taken to protect data

Control measures against unauthorized access

To safeguard data and information against unauthorized access, the most appropriate measures to take are the Software – Based Data Security which include;

1. Passwords for the system
2. Password for individual files or folders
3. Audit trails or access logs
4. Encryption
5. Firewall,
6. Security monitors
7. Biometric security
8. Access control

Control measures

- locked doors
- Bars on windows
- Alarms
- Good security measures (don't let the public or untrusted people near a computer)
- Video surveillance
- Security cables or cradles to bolt down or tie computers to furniture
- Locks on computer cases so they can't be opened and hard disks removed
- Don't store important/secret data on local hard disks - save them to the file server

Or any other correct response

Definition @ 1 Mark

Total = 4 X 1 Mark

= 4 Marks

e. For computers to communicate, they have to be interconnected using different components, Define the connectivity devices listed below

- i. Internet service provider (ISP)

These are companies that own large powerful computers (gateways) that offer internet services to the end users at a fee.

- ii. Transmission media

These are the physical or wireless pathways used to transmit data and information from one point to another.

Definition @ 1 Mark

Total = 2 X 1 Mark

= 2 Marks

f. With the increase in use of electronic communication, many different forms of communication has been introduced. Distinguish between webcasts and webinars

Webcasts refers to the delivery of live or delayed sound or video broadcasts over the World Wide Web. The captured sound and video is digitized and streamed on a web server while Webinars refers to conducting a seminar or lecture via the World Wide Web using graphics, text, and live voice where the audience is able to interact with the presenter by asking questions by sending instant messages. This interactive element allows the presenter and the audience to give, receive and discuss information.

Difference @ 2 Marks

19 a. Convert the following numbers into their binary equivalent (4 Marks)

i. 67.562510

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ii. 90.312510

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b. Using eight-bit twos complement, perform the following arithmetic (4 Marks)

i. 1012 - 1112

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ii. 10002 - 1012

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c. Determine the value of x in the equations: (4 Marks)

i. $10011012 - x2 = 110102$

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ii. $X2+ 111012 = 10010$

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d. State three ways of representing signed numbers in a computer (3 Marks)

- i. Signed magnitude numbers
- ii. Ones complement numbers
- iii. Twos complement numbers

Correct response @ 1 Mark
Total = 3 X 1 Mark
= 3 Marks