

FORM 3 EXAMINATION 2023

Kenya certificate of Secondary Education

451/1

COMPUTER STUDIES

PAPER 1

MARKING SCHEMES

SECTION A

1. a) Optical scanner capture using light technology while magnetic capture data written using magnetic ink or coded into magnetic strip (award 2 marks)
 b) Hardware portability refers to the ability of the computer to be carried from one place to another with ease. Software portability refers to the ability to install a program in two or more computers (award 2 marks)
2. a) Cache
 Buffer
 Registers (award 2 marks)
 b) Accumulator holds the results of the last processing step of the Alu temporarily while address temporarily holds next piece of data waiting to be processed (award 2 marks)
3. Formatting refers to applying various styles to enhance the documents appearance
 Editing refers to making necessary changes to a document (award 2 marks)
4. a) Pasteboard is a large area where you place text and graphical objects before arranging them on a printable area. Printable area is the area surrounded by the margins.
 b) Margin guide determines printable area while column guide divide a page into columns
5. a) Normalization is the process of trying to eliminate duplication values in a database.
 b) -To relate different tables in database
 -To ease the retrieval of data from a relation database
 -Breaking up multi theme tables to smaller workable tables.
6. - Password protection
 - Data encryption
 - User - level security
 - User and group permissions
7. a) Crop- trim graphics
 b) Embedded objects – separate file not created in the program in use but in another and placed in the program in use.
 c) Master page - A page used to design general layout that needs to be applied in other pages.
 d) Tool box – a set of buttons that contain tools used to create and manipulate publication
8. Website – A group of related web pages
 Web portals - It offers specialized service such as searching, email, sports.
9. a) Protocol is a communication rules that govern sending and receiving of messages by computer network.
 b) TCPL/IP – Transmission Control Protocol/Internet Protocol
 HTML – Hypertext Markup Language
 HTTP – Hypertext Transmission Protocol
 FTP – File Transfer Protocol
10. Fraud – Stealing by false pretence
 Eaves dropping – Tapping into Communication Channel
 Information Security – Ensuring of safety of data and information against threats
11. Control structure determine how statements are to be executed
12. Data collection
 Data input
 Processing

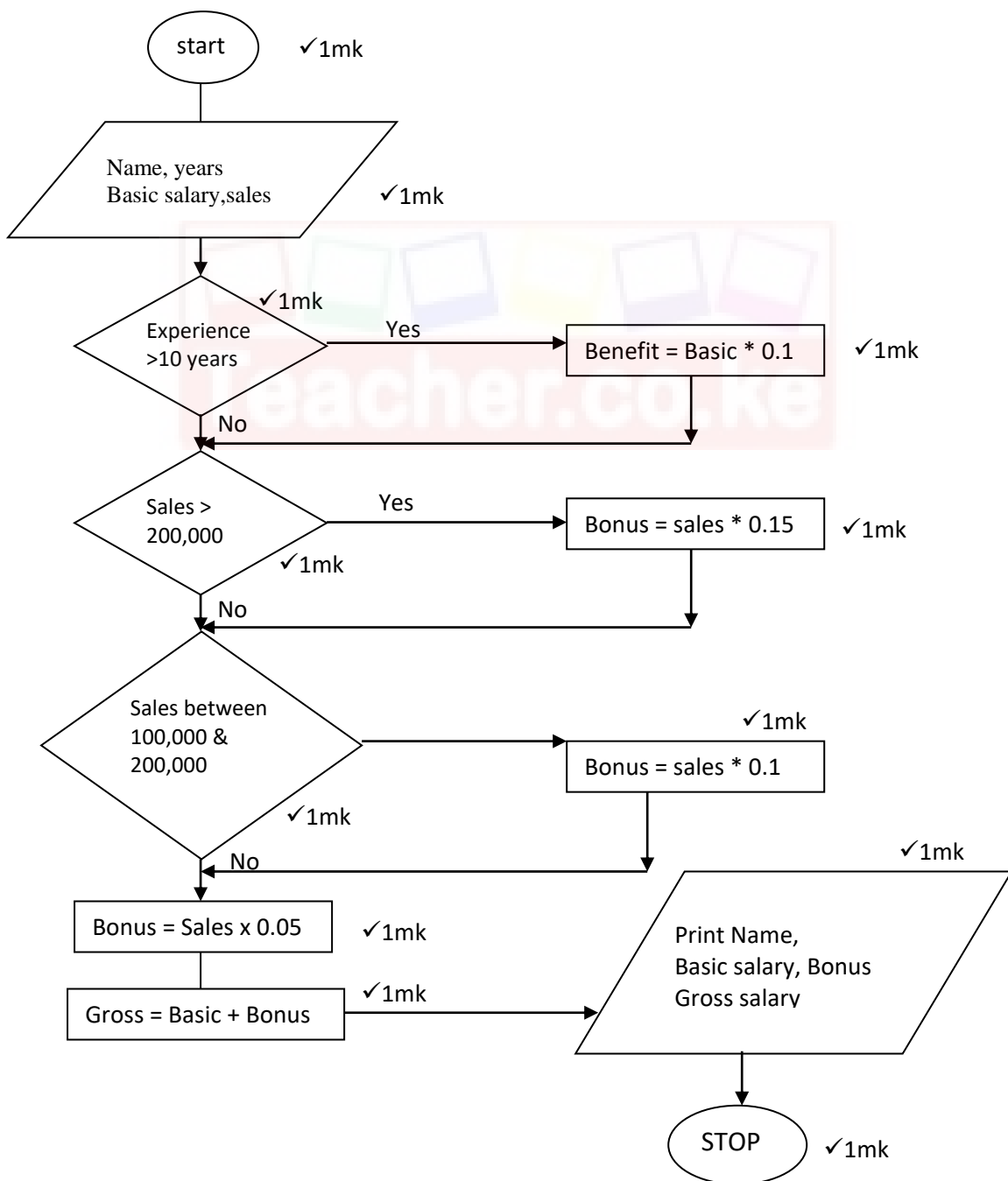
Output

- 13. Cables and sockets well insulated
Provide stable power supply
Cables laid out away from pathways
- 14. a) Is a type of input where data is entered in form of spoken words
b) - Homophones
- Limited to few vocabularies
- Response is slow
- Problem of accents and tones
- 15. - Flash disk
- Memory stick

SECTION B

- 16. a) Dry running
Use of translators
Debugging utilities *(award 3 marks well explained)*

17.



- i. EBCDIC
→ Extended Binary Coded Decimal Interchange Code
- ii. COBOL
→ Common Business Oriented Language
- iii. ASCII
→ American Standard Coded for Information Interchange

b) Why computers use binary numbers

- Electrical pulses are either high or low
 - Storage system is either magnetic or not
 - Computer understands only ones 1s and 0's
 - The logic that computer uses is based on the states ON and OFF
- (Answer 1 mark each total 2 x 1 = 2 marks)

- c) i) 20.2_{16} to decimal

16^1	16^0	.	16^{-1}
2	0	.	2

1mk

$$= [2 \times 16^1] + [0 \times 16^0] + [2 \times (1/16)]$$

$$= 32. [0.125] \text{ (1mk)}$$

$$= 32.125_{10}$$

- ii) 7.125_{10} to binary

2	7	Rem
2	3	1
2	1	1
	1	1

1mk

$$= 111_2$$

$$0.125 \times 2 = 0.25 \longrightarrow 0$$

$$0.25 \times 2 = 0.5 \longrightarrow 0$$

$$0.5 \times 2 = 1.0 \longrightarrow 1$$

$$= 0.001_2$$

1 mark

Combine the two

$$\therefore = 111.001_2$$

- d) i) $11100111_2 + 00101110_2$
- $$\begin{array}{r} 11100111 \\ 00101110 \\ \hline 100010101 \end{array} = 100010101_2 \quad (1 \text{ mark})$$

- ii) $10101_2 - 110$

$$\begin{array}{r} 10101 \\ \underline{110} \\ 11112 \end{array} \quad (1 \text{ mark})$$

- e) Use Two's complement to subtract 101 from 1000:

Step 1: Change the values to 8 binary digits

$$00001000_2 - 00000101_2 \quad (1 \text{ mark})$$

Step 2: Add the binary equivalent of the first value to the Two's complement of the second value

That is: 00001000

$$\begin{array}{r} 11111011 + \\ \underline{(1)00000011} \end{array}$$

$$= 100000011_2 \text{ (1mk)}$$

f) Convert 57.4_{10} to its octal equivalent

Insegral part

8	57	Rem
8	7	1
	0	7

↑ 71_8

Fractional part 0.4_{10}

$$\begin{array}{l} 0.4 \times 8 = 3.2 \rightarrow 3 \\ .2 \times 8 = 1.6 \rightarrow 1 \\ .6 \times 8 = 4.8 \rightarrow 4 \\ .8 \times 8 = 6.4 \rightarrow \end{array} \quad \begin{array}{l} \downarrow \\ \text{to 2 decimal} \\ \downarrow \end{array}$$

$.3146$

Therefore combine intergal and fractional part

$$\underline{71.31_8}$$

18.

(i) Online processing – data is processed immediately as internet banking, online payment system using credit card (2mks)

(ii) Batch processing – data is accumulated as a group as grading system in a school (2mks)

(iii) Real time – computer processes the incoming data as soon as it occurs, update the transaction file and give an immediate response as making reservation for airlines seats. (2mks)

b) i) Logical file and physical file

- Viewed in terms of what item it contains & details of what processing operations may be performed on the data items.

Physical files are one that is viewed in terms of how data is stored on a storage media (2mks)

ii) Master file and back - up file

Master file is the main file that contains relatively permanent records. Back up files used to hold copies of data or information from fixed storage (hard disk) (2mks)

iii) Random and indexed sequential file organization methods

Random – Also direct file organization records are stored randomly but accessed directly on a storage medium. Indexed sequential records are stored and accessed individual records on storage media. (well explained) (2mks)

c) - Back up data

- Control access of data by enforcing security measures

- Design user interface that minimize unauthorized access.

- Use error detection and correction softwares

- Use device that directly capture data from source document i.e. digital camera, optical CR

(Any three each 1mk).

19.

a) - The scheduler decides which of the jobs is to be allocated to the CPU for processing

- Allocating CPU time to jobs

- Sequencing of jobs in a queues

(well explained) (2mks)

b) - Tapping

- Hacking

- Sabotage

- Alteration of data

- Damage of software (and any other each 1mk)

- ii) - Careful recruitment of staff
 - Set up a clear and firm management policy on crimes and fraud
 - Access restriction to computer rooms or terminal
 - Use transaction files and file logs to monitor access of the system
 - Use backups (any 2 each 1mk)
- c) - Its user friendly
 - Faster to work with as its work relies on the user clicking icons by the use of pointing device
 - Easy to use (each 1mk)
- d) Truncated – Results from having real number that have along fractional part being cut e.g. 73.73487 can be 73.734
 Transposition – Result from incorrect reading of source document e.g. 69371 can be 63971
 Transcription – Occurs during data entry e.g. misreading and transportation. (each 2 mks)
- e) Its small/ tiny clip put into a silicon clip (1mk)
20. (a) List and explain two functions of computer bus
- Data bus – Carries data to and from the CPU i.e. pathway of actual data
 - Address bus – Used to locate the storage position in memory where the next instruction or data to be processed is held
 - Control bus – it is the pathway for all timing and controlling functions sent by the control unit to other parts of the system
- b) = &B7 + D&4
- c) The technology of producing smaller devices is expensive
 Convenient because they are portable
 Have advanced power management capabilities (consume less power)
- d) Document used to explain and describe how a particular program function in a system
- e) • Parallel running is where both the old and the new systems are run in parallel to each other at the same time
 • Direct changeover is a complete replacement of the old system with the new system in one bold move. (Old system is stopped and abandoned and the new system starts operating immediately).
- f) Primary key – Unique field that identifies a record in a database
 Foreign key – a primary key in another table once the tables are linked.