# COMPUTER STUDIES
# FORM THREE

# OPENER EXAMINATION: TERM 2 2024

## MARKING SCHEME

1. Define the following terms as used in Computer studies.

   (i) Nibble
   ✓ **This is half a bite or a collection of 4 bits.**

   **(Award 1 mark max 1)**

   (ii) Word
   ✓ **Two or more bytes**

   ✓ **(Award 1 mark max 1)**

2. State the difference between Batch and real time processing then give an example in each case.
   ✓ **In batch processing data items are collected over a long period of time then processed together all at once as a batch i.e., on month. It is used in billing. Real time processing on the other hand involves processing incoming data immediately it is received, transaction file updated, and an output is given to determine the next course of action. It is used in Airline and hotel reservation.**
   ✓ **(Award 1 mark max 2 for the difference then 1 mark each for the example)**

3. Mr. Muigai games teacher at Anestar High School wants to invite several schools for the hockey tournament. He was advised to use mail merging technique to create invitation letters for the respective schools identified. State three benefits of this technique
   ✓ **It is time saving since only one letter is referenced to many recipients.**
   ✓ **There is uniformity in the content of the letter.**
   ✓ **Enables one to send letters to many letters to many people at once.**
   ✓ **In case of an error changes are only made to the main document**

   **(Award 1 mark max 3)**

4. The final activity in data processing cycle is producing the desired output. Mention three ways of disseminating the desired output.
   ✓ **By use of electronic bulleting in boards**
   ✓ **Use of internet coupled with internet services.**
   ✓ **By use of mobile phones**
   ✓ **Through distribution of hard copies**
   ✓ **Through electronic devices such as radios and TV sets**

   ✓ **(Award 1 mark max 3)**

5. Convert AAFH to Octal number system.

   **A=1010**                  **=$5257_8$**

   **F=111**

   **AAF=101/010/101/111**

   **Grouping binary numbers award 1 mark**

   **Correct answer award 1 mark**

6. A company has decided to computerize their operations. They have decided to purchase packages standard software instead of developing their own programs. Give three advantages of standard software.
   - ✓ **Have minimal or no errors since they are thoroughly tested.**
   - ✓ **They are easy to install and run.**
   - ✓ **They are cheaper.**
   - ✓ **They are readily available.**
   - ✓ **They can be modified to meet user needs.**

   **(Award 1 mark max 3)**

7. A computer student from Bondo Technical defined multitasking as a concept where computer process more than one tasks at the same time. Agree or disagree with this student and support your answer (**2marks**)
   - ✓ **I disagree. This is because multitasking is a process where a computer performs more than one task apparently at the same time. Each task presented for processing is given a fraction of the processor time or time slice and the processor switch between the tasks so fast the ordinary user will view as if all these tasks are being processed at the same time**
   
   **(Award 1 mark max 1 for not supporting the definition and 1 mark for supporting your answer)**

8. $0110_2 + x_2 = 1010_2$ Find the value of x in base 10 and 16

   - ✓ **$X = 1010_2 - 0110_2$     $4_{10} = 0100$**

     **$= 0100$     $0100 = 4H$**

     **$(2^2 \times 1) = 4_{10}$**

   | |
   |---|
   | **$X = 1010 - 0110$ award 1mark** |
   | **$X_2 = 0100$ award 1 mark** |
   | **Convert $X_2$ to Decimal award 1 mark.** |
   | **Convert $X_2$ to Hexadecimal award 1** |

9. State the functions of the following disk management operation.

   (i) Partitioning

   - ✓ **Create space to allow installation of two or more operating systems.**
   - ✓ **Back up**

   ✓ **(Award 1 mark max 1)**

   (ii) Disk defragmentation(**1mark**)

   - ✓ **Allows ease of access of data items on the disk.**

   **(Award 1 mark max 1)**

10. List two limitation of low-level programming languages
    - ✓ **They are machine dependent.**
    - ✓ **Debugging is difficult.**
    - ✓ **Difficult to learn and user.**
    - ✓ **Require highly trained experts.**

    ✓ **(Award 1 mark max 3)**

11. Demonstrate three ways in which $-21_{10}$ can be represented in a binary form.

    1. Prefixing an extra sign bit   2. One's complement  3.two's complement.

    | 2 | 21 | $10101_2$ | $10101_2$ |
    |---|---|---|---|
    | | | | |

| 2 | 10 rem 1 | $01010_2$-1C | 01010 |
| 2 | 5 rem 0 | | +1 |
| 2 | 2 rem 1 | $01011_2$-----2C | |
| 2 | 1 rem 0 | $=01011_2$ | |
| | 0 rem 1 | $=110101_2$ | |
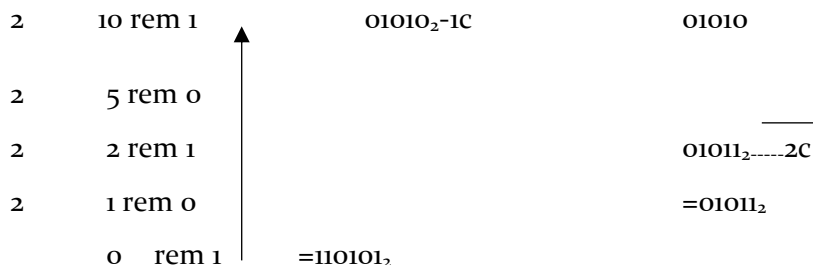
**(Award 1 mark max 1)**

12. Describe the concept of binary search method as used in sequential file organization.
   ✓ **Is a technique used to access data in sequential file organization where set of records in the file are divided into two halves and the search continues in the half that contains the required record.**

**(Award 1 mark max 2)**

13 Mention three advantages of electronic data processing.
   ✓ **Data processing is fast.**
   ✓ **Provide wide space for data storage.**
   ✓ **Information generated is of high quality.**
   ✓ **Can work for long periods of time provided there is power.**
   ✓ **Support information sharing and collaboration.**
   ✓ **Availability of data and information digitally**
   ✓ **Distance between entities that prepare data are made non-significant.**

**(Award 1 mark max 3)**

14 Bena has a new laser printer to print letters for his business. Bena connects his printer to his computer using the USB port. Give two benefits of using the USB port to connect the printer to the computer.
   ✓ **High quality transmission.**
   ✓ **Transmission of data is fast.**
   ✓ **Support plug and play where connected devices are automatically detected.**
   ✓ **Support multiple connection.**

   ✓ **(Award 1 mark max 3)**

15 State two ways of resolving windows related problem like missing operating system.

   ✓ **Re-installation of operating system.**
   ✓ **Start the computer using rescue disk/start up disk.**
   ✓ **Repair the operating system.**

   ✓ **(Award 1 mark max 2)**

# SECTION B: (60 MARKS)

**(ANSWER QUESTION 16 AND ANY OTHER THREE QUESTIONS FROM THIS SECTION)**

16

(a) With the aid of a diagram differentiate between analog and digital data.        6mks

**Digital computers process data that is in discrete (binary) form while analog computers process data that is continuous (analog) in nature.**

(Diagram)

(b) Define the following terms

    i.    Amplitude        3mks

**This is the maximum displacement that the waveform of an electrical signal can attain.**

    ii.    Frequency        3mks

**This is the number of cycles ($360^0$) made by the signal in one second. It is measured in units called Hertz(Hz)**

    iii.    Periodic time        3mks

**This is the time taken by a signal to complete one cycle.**

(c) Distinguish between

    i.    Byte and nibble        2mks

**Byte is a group of bits (often 8) used to represent a character. While a nibble refers to half of a byte usually a series of 4 bits.**

    ii.    Word and word length        2mks

**A word is two or more bytes while word length is used to measure number of bits in each word.**

(d) Explain the role of modem in communication.        3mks

- Converting digital data from a computer or other digital device into analog signal for transmission over analog communication lines.
- Enables the transfer of digital information over analog communication channel.

(e) State the reasons for use of binary data in digital technology  **(3marks)**

It is easier to design and fabricate digital systems that take a proportion of natural language instructions.

17

(a) The binary pattern 110100010101 can be interpreted in more than one way.

    (i) State the hexadecimal equivalent:

        **1101/0001/0101**

        **D   1   5**

        **=D15H**

    (ii) State the denary equivalent if it represents two's complement of a binary number **(2marks)**

        110100010101-2C

              -1

        ――――――――

        110100010100-1C        $=(2^9 \times 1) +(2^7 \times 1)+(2^6 \times 1)+(2^5 \times 1)+(2^3 \times 1)+(2^1 \times 1)+(2^0 \times 1)$

        001011101011     $=512+128+64+32+8+2+1=747_{10}$

(b) Convert $214.625_{10}$ to binary **(3mks)**

| 2 | 214 | $0.625 \times 2 = 1.25$ |
|---|-----|------|
| 2 | 107 rem 0 | $0.25 \times 2 = 0.5$ |
| 2 | 53 rem 1 | $0.5 \times 2 = 1.0$ |
| 2 | 26 rem 1 | $= 0.101_2$ |
| 2 | 13 rem 0 | |
| 2 | 6 rem 1 | |
| 2 | 3 rem 0 | $= 11010110.101_2$ |
| 2 | 1 rem 1 | |
| | 0 rem 1 | $= 11010110_2$ |

(c) Use twos compliment to subtract $20_{10}$ from $10_{10}$ and write your answer in decimal notation **(4mks)**

$10_2 + (-20_{10})10100$        $10110$

$10_{10} = 1010_2$      $01011 - 1C$    $- 1$ _____

$20_{10} = 10100_2$      $+ 1$ _____    $10101$ -back to 1c

       $01100 - 2C$      $01010$ -negated

       $+$    $1010$ _____      $= -10_{10}$

       $10110_2$

(d) Evaluate $1010011_2 + 10010_2 - 01010_2$ **(2marks)**

   1010011

$+$ 10010 _____

   1100101

   $-01010$ _____

   $1001011_2$     $= 1001011_2$

(e) State two difference between Ones and Twos complements

✓ **In ones complement there are two ways of representing a zero while in twos complement there is only one way of representing a zero**

- ✓ **Ones complement is obtained by negating the binary number while twos complement is obtained by negating the binary number then adding one.**
- ✓ **In one complement the overflow is added while Twos complement the overflow is ignored**

✓ **(Award 1 mark max 2)**

18  A database was used to keep results for a class of students. Part of the database is shown below in Table called MARKS.

| Name | School Num. | Math | English | Science | History | Geography |
|------|------|------|------|------|------|------|
| Paul | 017 | 70 | 55 | 65 | 62 | 59 |
| Ravi | 0009 | 29 | 34 | 38 | 41 | 44 |
| Chin | 0010 | 43 | 47 | 50 | 45 | 52 |
| John | 0013 | 37 | 67 | 21 | 28 | 35 |
| Diana | 001 | 92 | 88 | 95 | 89 | 78 |
| Rosanna | 0016 | 21 | 13 | 11 | 27 | 15 |

(a) Mention the most appropriate data type for field Class ID.
- ✓ **Text**            **(award 2marks each max 2)**

(b) State the number of records in the table above.
- ✓ **6**            **(award 2marks each max 2)**

(c) Identify the key field to be used in the table.
- ✓ **SchoolNum**            **(award 2marks each max 2)**

(d) Give a reason for choosing the field in C above
- ✓ **It is unique and therefore cannot be shared**

**(award 2marks each max 2)**

(e) Suggest how you can set an input mask for the name field such that data entered in the field is automatically changed to title case.
- ✓ **Set the input mask >L<?????????**

**(award 2marks each max 2)**

(f) Show how the dynaset will appear if the following parameters are set as shown in the query extract below.

| Field Name | Name | History | Geography | Science | Math |
|------|------|------|------|------|------|
| Table | MARKS | MARKS | MARKS | MARKS | MARKS |
| Sort | | | | | |
| Show | √ | √ | √ | | |
| Criteria | | >60 | | | |
| Or | | | >60 | | |

| NAME | HISTORY | GEOGRAPHY |
|------|------|------|
| DIANA ABUR | 89 | 78 |

**(award 1marks each max 3 for correct data per field)**

(g) Write an expression that when typed at the builder will compute total marks per subject for the students.
- ✓ **Total:[History]+[Geography]+[Science]+[Math]**

**(award 2marks each max 2)**

(a) Study the worksheet below then answer the questions that follows.

|  | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 1 | Item code | Type | Quantity | Price | Total |  |  |
| 2 | 001 | Sugar | 3 | 100 | 300 |  |  |
| 3 | 002 | Tea Leaves | 5 | 50 | 250 |  |  |
| 4 | 003 | Salt | 4 | 20 | 80 |  |  |
| 5 | 004 | Rice | 2 | 80 | 160 |  |  |
| 6 | 005 | Book | 10 | 20 | 200 |  |  |
| 7 |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |  |
| 10 |  |  |  | 10% |  |  |  |
| 11 |  |  |  |  |  |  |  |

(i) Write a formula at cell E2 to calculate Total amount for sugar.
- ✓ **=C2 X D2 or =Product(c2:d2)**

**(award 1mark each max 1)**

(ii) The formula =Countif (c2:c6 >=5) was placed at cell C7, what will be the result
- ✓ **2**

**(award 1 marks each max 1)**

(iii) Prices for all items are to be increased by 10%, write a function at cell F2 to show the new price increase per item to be copied to F3, F4, F5 and F6
- ✓ **=(D2*$D$10)+D2**

**(award 2marks each max 2)**

(iv) Identify the data types in cell E3, C6 and A1
- ✓ **E3    -Formular**
- ✓ **C6    -Value**
- ✓ **A1    -Label**

**(award 1mark each max 3)**

(b) List four hardware or software requirement that enable a computer to have multimedia capability.
- ✓ **Speaker**
- ✓ **Multimedia software**
- ✓ **Reasonable processor speed**
- ✓ **Minimum graphic adapter should be SVGA.**
- ✓ **Sound card**

**(award ½ mark each max 4)**

(c) Mentioned two methods of checking genuineness, validity and legitimacy of a computer software.
- ✓ **Checking for product key**
- ✓ **Checking for certificate of authenticity**

**(award 1mark each max 2)**

(d) State four factors to consider when upgrading the computer memory modules.
- ✓ **Compatibility with the existing hardware and software**
- ✓ **Availability of expansion slots**
- ✓ **Capacity of the module**
- ✓ **Cost (Initial and running)**
- ✓ **Type of the RAM module**

20

(a) Describe how the operating system handle the following in a computer system.
   (i) Data and program protection
      ✓ **It implements security policies such as passwords to prevent unauthorized access.**

      **(award 1mark each max 1)**
   (ii) Interrupt
      ✓ **It determines the cause of the interrupt and transfer the control to the appropriate programme.**

      **(award 1marks each max 1)**

   (iii) Deadlock
      ✓ **Gives each recourse a unique identification number to enable processor to determine which task is assigned a particular resource.**

      **(award 1marks each max 1)**

(b) King James saved a document in his computer during the lesson. At the end of the lesson the teacher instructed him to delete the document, King James looked for the document and was not able to locate the document. Describe three parameters that would help him located the document.
      ✓ **File extension e.g. .doc specifies the type of file that he is looking for.**
      ✓ **File name-specifies the exact document he is looking for.**
      ✓ **Date modified-gives most recently accessed file.**

      **(award 1marks each max 3)**

(c) Give a reason to justify why operating systems are the first software to be installed in a computer.
      ✓ **It is the main program that manages the hardware and software resources of a computer.**

      **(award 2marks each max 2)**

(d) Describe three parameters used to measure data integrity.
      ✓ **Timelessness –should be availed when needed.**
      ✓ **Relevance-should be pertinent to the processing needs at hand and must meet the requirements of the processing cycles.**
      ✓ **Accuracy –it should be precise to the actual value.**

      **(award 1marks each max 3)**

(e) Masala Complex is a small financial institution based in a rural in Kisumu County. The institution carries out transactions with both international and local financial organization. State four measures that the institution need to adopt to minimize threats to its data integrity.

      ✓ **Use methods that capture data directly from source e.g., scanners, cameras,**
      ✓ **Design user interfaces that minimize chances of invalid data entry**
      ✓ **Use error detection and correction software when transmitting data**
      ✓ **Making regular backups**
      ✓ **Controlled access to data by enforcing security measures e.g., passwords and username.**