451/1

COMPUTER STUDIES

PAPER 1

(Theory)

SEPTEMBER 2021

2 1/2 HOURS

**BURAMU JOINT EVALUATION EXAMINATION**

**Kenya Certificate of Secondary Education 2021**

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**MARKING SCHEME**

**SECTION A: (40 marks)**

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| **NO** | **ANSWER** | **MARKS** |
| 1. | * Computers in this generation use Large Scale Integrated (LSI) and Very Large Scale Integrated (VLSI) circuits. * Memories in use include magnetic and optical disks.   (1 x 1, first two only) | 1 |
| 2. | * Touch screen * Smart board/interactive whiteboard   (1 x 2, first 2 only) | 2 |
| 3. | **Advantages to customers**   * It offers 24-7-365 service for customers. * Provides fast access to cash. * Customers do not have to queue for a long time.   **Advantages to the bank**   * The employees are free to perform other duties since they do not have to spend all the time doing repetitive transactions. * It is cost-effective since less staff is needed. * Queuing in the bank is reduced hence reducing congestion in the banking hall.   (2 x 1 = 2, first two only) | 2 |
| 4. | * Prevents remote or an authorized persons from logging in your computer. * It limits or stops spam. * Filters content that is downloaded that is downloaded from the internet. * Provide protection against computer viruses.   (2 x 1 =2, first two only) | 2 |
| 5 | 1. [A note or annotation that an author or reviewer adds to a document.](javascript:AppendPopup(this,'wodefAnnotation_1'))   (1 x 1) | 1 |
|  | 1. Used to restrict the types of changes that reviewers can make to your document.   (1 x 1) | 1 |
|  | 1. Allows a user to generate personalized documents by combining a main document and a data source.   (1 x 1) | 1 |

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| 6. | * **Brownout**: this is partial blackout. It is a condition whereby there is low voltage flowing to the system. * **Blackout**: this is a situation where there is no current flowing to the system. * **Power surge/transients**: This is a condition where there is high voltage flowing to the system. * **Power sag**: this is a sudden drop of voltage which lasts less than a second. * **Short-circuits**: resulting from cables that are not of correct power rating or cables that are not insulated.   (2 x 2 = 4, first two only) | 4 |
| 7. | 1. Prompt a user for a number √ ½ mk 2. Get the number √ ½ mk 3. Calculate square by multiply the number by number √ 1mk 4. Display square. √ 1mk | 3 |
| 8. | * They do not get damaged by magnetic fields. This is because they use optical technology to write data. * They are virus-free. Chances of them getting infected with a virus are impossible. * Relatively durable when handled with care. * Accessibility to information stored in optical disks is relatively fast.   (2 x 1 = 2, first two only) | 2 |
| 9. | Convert the number -1110 into 9-bit ones complement. (3 marks)   |  |  |  | | --- | --- | --- | | 2 | 11 | Rem | | 2 | 5 | 1 | | 2 | 2 | 1 | | 2 | 1 | 0 | |  | 0 | 1 |   10112 **√1mk**  0000010112 **√1mk**  1111101002 **√1mk** | 3 |

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| 10. | * It co-ordinates all the processing activities in the CPU as well as input, storage and output operations. * It determines which operation or instruction is to be executed next. * Fetches, decodes and executes the next instruction from the main memory.   (2 x 1 =2, first two only) | 2 |
| 11 | *Insert mode* is where the text is inserted between words or characters pushes the existing text to the right as you type while *overtype mode* is where the text typed between existing words or characters automatically replaces the characters on the right of the insertion pointer as you type.  (Award 2 or 0) | 2 |
| 12. | * Computers are used to keep patients’ records in databases in order to provide easy access to a patient’s treatment and diagnosis history. * MRI and other technologies are used to get a cross section view of a patient’s body and this enables the physicians to get proper diagnosis of the affected body parts. * Through the internet and expert systems, physicians gain access to otherwise inaccessible or prohibitively expensive foreign expertise or labour making it possible for them to use consultants or even surgeons in another country and hence reducing travelling costs for patients. * Simulations can be used to easily predict the spread of a disease. * Robots can be used to collect specimens from hazardous environment and hence protecting human life.   (2 x 2=4, first two only) | 4 |
| 13. | (a) *System software* is primarily designed to manage the hardware resources as well as make computer resources available to the users while *application software* is a program designed to enable the user accomplish specific tasks. | 2 or 0 |
|  | (b) - They are expensive to acquire.   * Their market is limited. * They take time to be developed. * They are designed to solve problems of specific users and may not be of any use to a general user.   (2 x 1 = 2, first two only) | 2 |
| 14. | The formula will generate the output as 25.  (Award 2 marks) | 2 or 0 |
| 15 | 1. System analyst  * Reviewing the current manual or redundant information system and making recommendations on how to replace it with a more efficient one. * Working with programmers to construct and test the system. * Co-ordinating training for users of the new system.   (2 x 1=2, first two only)   1. Computer programmer  * Write in-house application programs or system programs. * Customize commercial application packages to suite the organization needs. * Test, debug, install and maintain programs developed or customized for the organization.   Or  Software engineer   * Developing system and application software. * Developing user and technical documentations for the new software. * Maintaining and updating the software to meet day-to-day requirement while overcoming challenges.   (2 x 1=2, first two only) | 4 |
|  | **SECTION B (60 MARKS)** |  |
| 16 | (a) - It leads to a program that is flexible, easier to read and modify.   * Re-use modules that contain standard procedures throughout the program, saving developmental time. * It is easy to trace mistakes since individual modules can be tested separately. * Amendments can be made to a single module without affecting the rest of the program. * Modules can be named in a such a way that they are easy to find in documentation. * Makes it possible to create libraries of often-used routines which are reliable and can go into other programs. * It encourages team programming where each member can work on a different module separately.   (2 x 1=2, first two only) | 2 |
|  | (b) (i) Program implementation  (1 or 0) | 1 |
|  | (ii) Program design  (1 or 0) | 1 |
|  | (iii) Problem definition  (1 or 0) | 1 |
|  | (iv) Program maintenance  (1 or 0) | 1 |
|  | (c) START/BEGIN**√ ½ mk**  READ car number, rental period**√1mk**  IF rental period >7 THEN**√1mk**  Amount = rental period \* 25000**√1mk**  Discount = 25/100 \* Amount**√1mk**  Total amount = Amount – Discount**√1mk**  ELSE  Total amount = rental period \* 25000**√1mk**  ENDIF  PRINT Total amount**√1mk**  STOP/END **√ ½ mk**  Logic **√1 mk** | 9 |
| 17. | (a) 111001002 = 22810  228 – 13 = 21510  21510 = 11010111  A = 11010111 | 4 |
|  | (b) (i) - Binary Coded Decimal (BCD)   * Extended Binary Coded Decimal Interchange Code (EBCDIC) * American Standard Code for Information Interchange   (3 x 1=3, first 3 only) | 3 |

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|  | (ii)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 26 | 25 | 24 | 23 | 22 | 21 | 20 | | 1 | 1 | 0 | 1 | 1 | 0 | 1 | | 64 | 32 | 0 | 8 | 4 | 0 | 1 |   (I) 01101101    Conversion to decimal **√ ½ mk**  64+32+0+8+4+0+1 = 109 **√ ½ mk**  +1092 **√ 1 mk** | 2 |
|  | (II)   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 26 | 25 | 24 | 23 | 22 | 21 | 20 | | 1 | 1 | 0 | 1 | 0 | 0 | 0 | | 64 | 32 | 0 | 8 | 4 | 0 | 1 |       Conversion to decimal **√ ½ mk**  64+32+0+8+0+0+0 = 104 **√ ½ mk**  -1042 **√ 1 mk** | 2 |
|  | (c)   |  |  |  | | --- | --- | --- | | 2 | 19 | Rem | | 2 | 9 | 1 | | 2 | 4 | 1 | | 2 | 2 | 0 | | 2 | 1 | 0 | |  | 0 | 1 |   √ **1mk**  0.03125 × 2 = 0.0625  0.0625 × 2 = 0.125 √ 1**mk**  0.125 × 2 = 0.25  0.25 × 2 = 0.5  0.5 × 2 = 1.0  1910=100112 √ **½ mk**  0.03125 10 = 0.000012 √ **½ mk**  19.0312510 = 10011.000012 √ **1mk** | 4 |

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| 18 | (a)   1. Resource control – this involves assigning and controlling the use of computer resources by other system software and application programs being executed. The operating system therefore determines which system or application program will use which resource at what given time.   (2 marks or 0) | 2 |
|  | 1. Error handling – the operating system monitors the status of a computer system and deals with errors produced during program execution and keeps the computer running when errors do occur.   (2 marks or 0) | 2 |
|  | (b) A computer system is able to operate on two or more packages at the same time through the use of multiprogramming/multitasking OS which allows one or more programs to reside in the computer memory and be processed or executed concurrently.  (2 marks or 0) | 2 |
|  | (c) - Retrieving certain files will be faster and easier.   * Classification of related files will be easier e.g file of one program can be stored separately from each other. * It allows each user to keep his\her files separately even if they are both using the same computer.   (1 x 3=3, first three only) | 3 |
|  | (d) (i)   * Processing of report cards * Processing of students’ termly attendance * Processing of teachers’ lesson attendance in a week or a term.   (1 x 1= 1, first **one** only) | 1 |
|  | (ii)   * Printing of fee payment receipts.   (1 x 1= 1, first **one** only) | 1 |
|  | (e)   1. The process of checking that data has been correctly transcribed.   (2 marks or 0) | 2 |

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|  | 1. The process of subjecting data entered into the computer to validity checks built in a computer program at the point of input before being processed to reduce errors at the input.   (2 marks or 0) | 2 |
| 19. | (a) (i) Star (1 mk or 0) | 1 |
|  | (ii) Switch/hub (1 mk or 0) | 1 |
|  | (iii)   1. Modem/router/gateway   (1 mk or 0) | 1 |
|  | (II)   * Network operating system * Protocols   ( ½ x 2= 1, first two only) | 1 |
|  | (iv)  **- Resource sharing:** Users whose computers are connected to a network can, for example, share their files, exchange mails, send faxes, schedule meetings, and print documents from any point on the network. This centralized access to data & information leads to less waste of time, and hence greater productivity.  - **Remote communication:** refers to the transmission of data signals between two communication devices located at different geographical locations.  E.g., using remote communication, one can work from home just as if he/she is in the office.  **- Distributed processing facilities:** refers to the act of running the same programs or databases on different computers, which are on the same network but placed in separate locations. Each computer has its own local peripherals, e.g., disks, printers, terminals, etc.  - **Cost effectiveness:** The initial cost of purchasing and laying down of networks components may be expensive. However, the savings experienced and the value added to service delivery make networks cost effective.  **- Reliability:** A computer network is reliable especially when communicating or accessing information: Data can be transferred with minimum errors from source to destination. Incase one computer breaks down; the user can still access data & information from the other computers using another computer on the network. | 4 |

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|  | (v) - It is immune to electromagnetic interference, and eavesdropping.   * It is fast and supports high bandwidth. * It has low attenuation; hence, a long distance can be covered. * It does not generate electrical signals; hence can be used in dangerous (highly flammable) places. * It is smaller & lighter than copper cables; hence, suitable for situations where space is limited.   (1 x 4=4, first four only) | 4 |
|  | (b) =RANK(B2,$B$2:$B$50,0)  Or  =RANK(B2,B$2:B$50,0)  Or  =RANK(B2,$B$2:$B$50)   * RANK function **√1mk** * Arguments i.e. bracket to bracket **√2 mks** | 3 |
| 20. | (a) - Studying the available documentation   * Interview * Questionnaires * Observation * Automated methods   (1x4=4, first four only) | 4 |
|  | (b) - Inadequate user involvement: A system project may fail if major functions were not anticipated in the design because users did not make their needs known.   * Continuation of a project that should have been cancelled: Often it’s tempting to not cancel a project because of the investment already made. The Analyst should re-evaluate the project at various phases to determine it remains feasible. * The failure of two or more portions of the new system to fit together properly (systems integration): This often results when major portions of the systems are worked on by different groups of technical specialists who do not communicate well.   (2 marks or 0, first three only) | 6 or 4 or 2 or 0 |
|  | (c) Give **two** characteristics of a system. (2 marks)   * Holistic thinking * Subsystems * Boundary * Control * System entropy * Process * Purpose * Inputs/outputs * Open and closed system   (1 x 2=2, first two only) | 2 |
|  | (d) - Some workers may lose their jobs as some of the work will be handled y computers.   * The workers may be required to retrain on how to use computers. * The workers may fear the side effects of using computers like glaring screen interfering with eye sight. * The workers may fear the difficult in grasping the skills of handling a computer.   (1 x 3= 3 marks, first three only) | 3 |