THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

036/1 INFORMATION AND COMPUTER STUDIES 1

(For Both School and Private Candidates)

Time: 3 Hours **ANSWERS** **Year: 2004**

Instructions

1. This paper consists of sections A, B and C with a total of twelve questions

2. Answer all the questions in section A and B and one question in section C.

1. For each of the items (i)–(x), choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) The LET statement functions just like the
A. READ
B. DATA
C. INPUT
D. GOTO
E. ENTER

Answer: C. INPUT
Reason: The LET statement assigns a value to a variable, similar to how the INPUT statement assigns data provided by the user to a variable.

(ii) What is the decimal representation of the hexadecimal number represented by E?
A. 8
B. 5
C. 14
D. 15
E. 12

Answer: D. 15
Reason: In hexadecimal notation, E represents 15 in decimal.

(iii) To skip one line before printing the PRINT statement is used together with a
A. comma
B. semicolon
C. colon
D. TAB statement
E. hyphen

Answer: B. semicolon
Reason: A semicolon in BASIC allows spacing between outputs or skipping lines before printing.

(iv) A variable usually refers to
A. a memory location
B. value of the variable
C. something whose value keeps on changing
D. any computer program
E. a computer virus

Answer: A. a memory location
Reason: A variable is a reserved memory location that stores values used in a program.

(v) Eight characters form a
A. bit
B. byte
C. bite
D. bike
E. book

Answer: B. byte
Reason: A byte is a unit of digital information that consists of 8 bits.

(vi) The conditional sum wizard in Excel is best described as
A. an add-on
B. an add-in
C. a macro
D. a module
E. a disk tool

Answer: C. a macro
Reason: A macro automates repetitive tasks, such as conditional sums in Excel.

(vii) In Excel, a cell address is specified by a
A. box number
B. table
C. row or column
D. column and a row
E. rectangular region

Answer: D. column and a row
Reason: In Excel, cell addresses are identified by combining the column letter and row number (e.g., A1).

(viii) Another name for temporary storage is the
A. secondary storage
B. main memory
C. auxiliary storage
D. magnetic tape
E. floppy diskette

Answer: B. main memory
Reason: Main memory, such as RAM, is used for temporary storage during program execution.

(ix) A bootstrap is
A. a memory device

B. a device to support the computer
C. a small initialization program
D. a startup error
E. an error correction technique

Answer: C. a small initialization program
Reason: A bootstrap program initializes the system during the startup process.

(x) The physical components of a computer are called
A. hardware
B. software
C. input devices
D. output devices
E. storage media

Answer: A. hardware
Reason: Hardware refers to the physical parts of a computer system, such as the CPU, keyboard, and monitor.

2. Match the responses in List B with the words/phrases in List A by writing the letter of the correct response beside the item number.

List A
(i) Cold Boot
(ii) Operating System
(iii) Soft-copy
(iv) Control unit
(v) Compiler
(vi) A group of related fields
(vii) A hardware device for interfacing a telephone line and a computer
(viii) LAN
(ix) A set of organized collection of logically related data
(x) A program written for destructive purposes

List B
A. A program that translates the work program statements before execution
B. Record
C. Trojan
D. Computer network which is confined in a small area
E. Modem
F. Output from the computer which has not been printed
G. Restarting the computer
H. Database

I. Programming languages written for microcomputer
J. Handles the movement of data within the computer
K. Makes use of underlying hardware of the computer and manages resources
L. Permanent storage area in a computer
M. Virus
N. Turning on the computer from the cold
O. Spreadsheets
P. Starting the computer from off mode
Q. Controls only the input devices
R. Computer network which covers a large area
S. Unfinished work in the computer
T. Information
Solutions
(i) Cold Boot - P
(ii) Operating System - K
(iii) Soft-copy - F
(iv) Control unit - J
(v) Compiler - A
(vi) A group of related fields - B
(vii) A hardware device for interfacing a telephone line and a computer - E
(viii) LAN - D
(ix) A set of organized collection of logically related data - H
(x) A program written for destructive purposes - M
3.

(a) What is programming?
Programming is the process of writing, testing, debugging, and maintaining a set of instructions, known as code, that a computer can execute to perform a specific task or solve a problem.

(b) Name two characteristics of structured programming.
1. Modular design: The program is divided into smaller, reusable modules or functions.
2. Sequence, selection, and iteration: Structured programming uses these three constructs to ensure a clear and logical flow of execution.

4.

(a) Draw the basic computer operation diagram.
The basic computer operation diagram consists of the following components:
Input → Processing Unit (CPU) → Output
↘ Storage ↙

(b) Name two devices for each component of the diagram in (a) above.
1. Input: Keyboard, Mouse

2. Processing Unit: Central Processing Unit (CPU), Graphics Processing Unit (GPU)
3. Output: Monitor, Printer
4. Storage: Hard Disk Drive (HDD), Solid State Drive (SSD)

5. State and explain four common word processing features.
1. Spell check: Automatically detects and corrects spelling errors in the document.
2. Formatting: Allows users to style text, such as bold, italicize, or underline.
3. Find and replace: Locates specific text in the document and replaces it with another.
4. Tables: Provides tools to create and manipulate rows and columns for data organization.

6. What is the difference between a program and a process?
A program is a set of instructions written to perform a task, whereas a process is the instance of a program that is being executed by the computer.

7. Correct the errors found in the following BASIC statements:

(a) LET A^B = C
Corrected: LET A = B ^ C

(b) FOR 10 = 1 TO 100
Corrected: FOR I = 1 TO 100

(c) LET D = SUPPLY
Corrected: LET D$ = "SUPPLY"

(d) LET 10B = X + Y
Corrected: LET B10 = X + Y

8.

(a) What is a syntax error?
A syntax error occurs when the code violates the rules or grammar of the programming language, such as missing punctuation or invalid variable names.

(b) What is the function of the END statement in a BASIC program?
The END statement signifies the conclusion of the program, ensuring no further instructions are executed.

9. State four differences between a computer and an electronic calculator.
1. A computer performs complex calculations and tasks, whereas a calculator is limited to basic arithmetic operations.
2. A computer processes, stores, and manipulates data, while a calculator only provides immediate results without storage.
3. Computers support multitasking, whereas calculators perform one operation at a time.

4. Computers execute programmable instructions; calculators operate with predefined logic.

10. What is the output of the following program?

```
LET A = 4
LET B = 3
LET D = A
PRINT A, B
END
```

Output:
4 3

11. Define the following terms:

(a) Analog computer
An analog computer processes continuous data and represents values using physical quantities, such as electrical voltages.

(b) Digital computer
A digital computer processes discrete data, using binary (0s and 1s) to represent and manipulate information.

(c) Pseudocode
Pseudocode is a simplified, language-independent representation of a program's logic, using plain text to outline algorithms.

(d) An array
An array is a collection of elements of the same data type stored in contiguous memory locations and accessed using indices.

12. Differentiate a "soft copy" from a "hard copy."
A soft copy is an electronic version of a document displayed on a screen, while a hard copy is a physical printout of the document.

13.

(a) Draw the DO WHILE and DO UNTIL flowcharts.

DO WHILE:
1. Start.
2. Test condition.
3. If condition is true, execute the body of the loop.
4. Go back to the condition test.

5. End if the condition is false.

DO UNTIL:
1. Start.
2. Execute the body of the loop.
3. Test condition.
4. If condition is true, terminate the loop.
5. Else, continue to the body of the loop.
6. End.

(b) What are the differences between DO WHILE and DO UNTIL loops?
1. DO WHILE executes as long as the condition is true, while DO UNTIL executes as long as the condition is false.
2. In DO WHILE, the condition is checked before executing the loop body, while in DO UNTIL, the condition is checked after executing the loop body.

(c) State four qualities of a good algorithm.
1. Finiteness: The algorithm must terminate after a finite number of steps.
2. Definiteness: Each step must be clearly and precisely defined.
3. Input: The algorithm should accept zero or more inputs.
4. Output: The algorithm must produce at least one output.

14.

(a) Given three numerical constants 2, 3, and 4, write a BASIC program to calculate their average.

```
LET A = 2
LET B = 3
LET C = 4
LET AVG = (A + B + C) / 3
PRINT "The average is "; AVG
END
```

(b) Write short notes on the two numeric constants used in BASIC.
1. Integer constants: Represent whole numbers without decimal points (e.g., 5, -10).
2. Floating-point constants: Represent numbers with decimal points (e.g., 3.14, -0.75).

(c) Write true or false for each of the following variable names:

(i) 3B - False (Variable names cannot start with a digit).
(ii) $X - False (Variable names cannot contain special characters like $).
(iii) Q% - True (The % symbol is valid for integer variables in BASIC).
(iv) T2 - True (Variable names can include alphanumeric characters).

15.

(a) What does each of the statements in the program below do?

```
LET AGE = 23
PRINT "You have lived more than"; AGE * 365; "days"
END
```

1. LET AGE = 23: Assigns the value 23 to the variable AGE.
2. PRINT "You have lived more than"; AGE * 365; "days": Prints the message along with the product of AGE and 365.
3. END: Ends the program.

Output:
You have lived more than 8395 days

(b) If DAYS looks like DIM DAYS(1 TO 7), do you think that the following statement is correct?

```
DAY$(8) = "Memorial Day"
```

No, it is not correct.
Explanation: The array DAYS(1 TO 7) is defined to hold 7 elements (from index 1 to 7). Index 8 is out of range and will result in an error.

16.

(a) Why are subroutines important in BASIC programs?
1. Subroutines allow code reuse, reducing redundancy and simplifying maintenance.
2. They make programs more organized by dividing tasks into smaller, manageable blocks.

(b) How do internal or library functions differ from user-defined functions?
Internal or library functions are built-in functions provided by the programming language, while user-defined functions are created by the programmer for specific tasks.

Examples:
1. Internal function: SQR(X) computes the square root of X.
2. User-defined function: A function to calculate factorial.

17.

(a) State five rules that govern the choice of variable names.
1. Variable names must begin with a letter.
2. They can only contain letters, numbers, and underscores.
3. They cannot contain special characters like $, %, or @.
4. They should not be keywords or reserved words.
5. They should be descriptive and meaningful.

(b) Why is it important to document every step in program development?
Documentation provides a clear understanding of the code's logic, making it easier to debug, maintain, and enhance. It also aids collaboration among developers.

(c) Define sorting as it is used in programming.
Sorting is the process of arranging elements in a particular order, such as ascending or descending, to facilitate data searching and analysis.

18.

(a) System development has two principal phases: systems analysis and systems design. Explain briefly what is done in each phase.

1. Systems Analysis:
- Identifies the needs and requirements of the system by gathering and analyzing information from users and stakeholders.
- Defines the problems that need to be solved and specifies the objectives and functions of the system.

2. Systems Design:
- Develops the blueprint for the system by creating detailed technical specifications.
- Specifies hardware, software, data flow, user interface, and system architecture needed to meet the requirements.

(b) How is a program tested?
1. Unit Testing: Tests individual components or modules of the program for correctness.
2. Integration Testing: Ensures that different modules work together as expected.
3. System Testing: Verifies that the entire program meets the specified requirements.
4. User Acceptance Testing (UAT): Ensures the program meets user expectations and performs as intended in a real-world scenario.

(c) Dry run the following program and write the results:

```
CLS
A = 9
```

```
B = 8
IF A < 12 AND B > 14 THEN PRINT B
LET B = A + B
IF A + B < 17 THEN PRINT A ELSE PRINT B
END
```

Step 1: Initialize values:
A = 9
B = 8

Step 2: Evaluate `IF A < 12 AND B > 14 THEN PRINT B`:
Condition: A < 12 (True) AND B > 14 (False) → Result: False
Action: The statement is skipped.

Step 3: Execute `LET B = A + B`:
B = 9 + 8 = 17

Step 4: Evaluate `IF A + B < 17 THEN PRINT A ELSE PRINT B`:
Condition: A + B < 17 --> 9 + 17 < 17 --> Result: False
Action: ELSE PRINT B ---> Output: 17

Output:
17