The Management University of Africa

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CERTIFICATE UNIVERSITY EXAMINATIONS

SCHOOL OF SCIENCE AND TECHNOLOGY (SST)

CERTIFICATE IN INFORMATION COMMUNICATION TECHNOLOGY

CIT 103 : BASICS OF C PROGRAMMING

DATE: 29TH JULY 2026

DURATION: 2 HOURS

MAXIMUM MARKS: 70

INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **FOUR** questions.
6. Question **ONE** carries **30 MARKS** and the rest carry **10 MARKS** each.
7. **Write all your answers in the Examination answer booklet provided.**

QUESTION ONE

Read the Case Study below carefully and answer the questions that follow:

Case Study

ABC Electronics Ltd. is developing a simple **embedded temperature monitoring system** using C language to read sensor data, compare it against a threshold (40°C), and display messages such as *"Normal"* or *"Overheated."*

During development, the following challenges were reported:

- Developers used different data types for temperature variables, causing inaccurate readings.
- Missing header files led to multiple compilation errors.
- The program wrongly displayed *"Overheated"* even when temperatures were below 40°C.
- A loop ran indefinitely due to an incorrect condition.
- Updates to macros in the header file did not take effect during deployment.

Required:

a) Analyze why C was an appropriate choice for developing this embedded system.

(6 marks)

b) Explain two likely causes of the inconsistent temperature readings due to data type usage.

(6 marks)

c) Using pseudo code or annotated C code, illustrate how to correctly implement a loop that reads temperatures until a user enters -1.

(6 marks)

d) Evaluate how the team could have avoided the logical error using structured testing or debugging methods.

(6 marks)

e) Explain the purpose of preprocessing in this project and discuss how macros could have affected the system's deployment behavior.

(6 marks)

QUESTION TWO

a) Differentiate between compilation, logical, and runtime errors, giving C examples. **(5 marks)**

b) Evaluate how an IDE helps identify and fix these errors. **(5 marks)**

QUESTION THREE

a) Write and explain a short function to compute and return average of an integer array.

(5 marks)

b) Analyse how modular programming improves debugging and maintenance.

(5 marks)

QUESTION FOUR

a) Analyse the order of evaluation in **result = a + b * c / d - e;**

(5 marks)

b) Evaluate how incorrect precedence affects program results.

(5 marks)

QUESTION FIVE

(a) Construct a switch statement for user menu selection. **(5 marks)**

(b) Analyze why switch improves readability over nested if-else. **(5 marks)**

QUESTION SIX

(a) Write a macro SQUARE(x) and demonstrate its use. **(5 marks)**

(b) Evaluate advantages and pitfalls of macros over functions. **(5 marks)**