



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

**FIRST YEAR FIRST SEMESTER EXAMINATIONS
FOR THE DEGREE
OF**

BACHELOR OF SCIENCE (SMT, SME, SPA)

COURSE CODE: BIT 112

COURSE TITLE: INTRODUCTION TO PROGRAMMING

DATE: 13/12/2022 **TIME:** 08:00-10:00AM

INSTRUCTIONS TO CANDIDATES

Question ONE (1) is compulsory
Answer TWO (2) questions

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

QUESTION ONE

- (a) Explain what a programming language is. (2 marks)
- (b) Identify and briefly explain the various categories of programming languages with examples in each case. (6 marks)
- (c) Programmers do not sit down and start writing code right away when trying to make a computer program. Instead they follow an organized plan or methodology that breaks the process into a series of tasks. State and explain the basic steps in trying to solve a problem on the computer. (10 marks)
- (d) If the variable x has the value 10, what are the values of x after each of the following statements is executed separately? (2 marks)
- (i) $a = x++;$
 - (ii) $a = ++x;$
- (e) Explain the following terminologies
- (i) A compound statement
 - (ii) A comment (2 marks)
- (f) Write down the value that the following expressions evaluate to. (1 marks)
- (i) $5 + 8 + 5 / (2 + 2)$
 - (ii) $23 \% 3 + 7 / 3$
- (g) Why is the main () function special in the C language? (1 marks)
- (h) State the rules that one must follow in creating valid identifiers. (2 marks)
- (i) The area of a circle is the product of a constant PI (value is 3.14) and the square of the radius of the circle. Write a program that reads the radius of a circle from the keyboard computes the area of the circle and displays the area of the circle. (4 marks)

QUESTION TWO

- (a) What is a loop: (2 marks)
- (b) Using an example, describe clearly how the 'while' statement differs from that of the 'do' statement in operation. (2 marks)
- (c) Write a code excerpt/fragment using a loop construct of your choice that will give the output below;
- ```
1
2 2
3 3 3
4 4 4
5 5 5 5
```
- (5 marks)

(d) Given the code below;

```
#include <stdio.h>
int main()
{
 int i;
 i=0;
 While (i<5)
 {
 Printf("Junior");
 i=i+1;
 }
 return 0;
}
```

Explain how the computer will execute the above program (6 marks)

(e) What is the output of the following code excerpt/fragment? (5 marks)

```
int x;
for (x = 0; x < 14; x++)
{
 if (x % 3)
 Printf ("%d=", x);
 else
 printf ("\Nno!\n");
}
```

### QUESTION THREE

- (a) What is a recursive function (2 marks)
- (b) State the four requirements that a recursive function must satisfy to avoid infinite recursion (4 marks)
- (c) Write a function divide (s,t) which returns the result of dividing s by t. (4 marks)  
HINT: Division by zero is illegal.
- (d) When passing arguments to a function, what's the difference between passing by value and passing by reference / pointer (4 marks)
- (f) Explain the following terms as used in C language; (6 marks)
  - (i) Block
  - (ii) #include directive
  - (iii) Expression

#### QUESTION FOUR

- (a) What is an array? (2 marks)
- (b) An array is declared with the following statement;  
Float abc[3][4][2]; (4 marks)
- (j) How many elements does the array have?
- (ii) What would be the name of the first element?
- (iii) What would be the name of the last element?
- (iv) What would be the name of the tenth element?
- (c) Declare a structure that would store marks for nine subjects, Name and Admission number of a student. (5 marks)
- (d) Write the function evens (r,n) which returns the number of even numbers stored in the array r whose size is n. (6 marks)
- (e) (i) What is a data type (1 mark)
- (iii) What is a file (2 marks)

#### QUESTION FIVE

- (a) What is a pointer? (2 marks)
- (b) Explain the phrase “an array is a pointer and a pointer is an array” (4 marks)
- (c) Write a program that declares and fills a one-dimensional array of 20 elements with the values 50, 49, 48,.....,22, 21 using array subscripting. (4 marks)
- (d) Redo the exercise in c using pointer arithmetic rather than array subscripting. (4 marks)
- (e) Discuss the three general methods of file access. (6 marks)