MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

EMM 201: PROGRAMMING I

DATE: 26/3/2021 **TIME: 8.30-10.30 AM**

INSTRUCTIONS

Answer **question ONE and any other TWO questions.**

QUESTION ONE (30 MARKS)

a) Explain why C is a Structured programming language (2 marks)

b) Explain the following as used in c programming Language (8 marks)

i. Linker:

ii. #include directive:

iii. Main() function:

iv. Comments:

c) i. Write a C function that can calculate the area of a triangle and return the calculated result. The program should accept two arguments height and base. Hint Area= ½ B * H (3 marks)

ii. Write a C program that calls the C function you just wrote to calculate area then print out the return a using user inputs and print result from the function on the screen. (6 marks)

d) i) Briefly explain the importance of making proper choice of data types (2 marks)

ii) With exemplification Explain the use of the size of operator (2 marks)

e) Write a c program to calculate the powers of two for all numbers between 0 and 9 using the math.h library functions (4 marks)

QUESTION TWO (20 MARKS)

Jacob has been instructed to create a computer program that can be used to calculate the surface area of a closed cylinder:

a) Design a pseudo code that he is likely to use in representing the program. (6 marks)

b) Draw a well labeled flow chart for the pseudo code in 4 (ii) above. (6 marks)

c) Write a C program that implements 4 (i) and (ii) above (8 marks)

QUESTION THREE (20 MARKS)

a) With exemplification explain the following data structured used in c (4 marks)

i. Arrays:

ii. Structures:

b) Write code snippets in c to declare and initialize (4 marks)

i). Character array

ii). Pointer to a function

c) Write a simple program that accepts a radius from the keyboard calculates and then displays the area and circumference of a circle. Use a constant called PI (3.14). (6 marks)

d) Briefly explain the use of the following functions using examples (6 marks)

i). Strcat( )

ii). Strcpy( )

QUESTION FOUR (20 MARKS)

a) Given the declarations:

```
float x;
int k, i = 5, j = 2;
```

To what would the variables x and k be set as a result of the assignments

i) k = i/j;

ii) x = i/j;

iii) k = i%j;

iv) x = 5.0/j;

v) k = j++ (10 marks)

b) Explain the stages that a programmer would follow in developing a typical computer program. (10 marks)

QUESTION FIVE

a) Explain each of the following terms as used in C programming

i. Formal parameter

ii. Value parameter (4 marks)

b) Distinguish between call by value and call by reference as used in programming (4 marks)

c) Describe three statements used in iteration in C a program (6 marks)

d) Discuss three data structures used in C language (6 marks)