



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 $\text{Area} = \frac{1}{2} B * H$ (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)