



# MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

SMA 390: SCIENTIFIC PROGRAMMING

DATE: 23/3/2021

TIME: 2.00-4.00 PM

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**INSTRUCTION: Answer Question ONE and any other TWO Question**

**QUESTION ONE (30 MARKS)**

- a) i Explain the difference between relational and assignment operators as used in C++ (4 marks)
- ii State if the following variables names can be used in C++ with reasons: (8 marks)
- `7num`, `const`, `switch`, `my_val`, `int`, `&_num1`, `num_2`, `num.num`;
- b) i Write a C++ program that will prompt a user to key in three numbers then the program finds the largest of three numbers. (8 marks)
- ii By use of examples explain the difference between an escape sequence and a format specifier. (6 marks)
- iii What is function overloading? Use an example. (4 marks)

**QUESTION TWO (20 MARKS)**

- a) Define the term recursive function as used in C++ programming. (2 marks)
- b) Explain the difference between a modifier and storage class specifiers as used in C++ programming. Use two examples for each. (6 marks)

- c) Write a program in C ++ to accept a grade and declare the equivalent description. Use if.....else statement. (12 marks)

| Grade | Description |
|-------|-------------|
| E,e   | Excellent   |
| V,v   | Very good   |
| G,g   | Good        |
| A, a  | Average     |
| F,f   | Fail        |

### QUESTION THREE (20 MARKS)

- a) State three types of data types in C++. (2 marks)
- b) Explain the use of the sizeof operator giving an example (2 marks)
- c) Write a C++ program that will prompt a user to input a number and checks. (8 marks)  
Use switch statement.

| Number           | Day       |
|------------------|-----------|
| 1                | Monday    |
| 2                | Tuesday   |
| 3                | Wednesday |
| 4                | Thursday  |
| 5                | Friday    |
| 6                | Saturday  |
| 7                | Sunday    |
| Any other number | INVALID   |

- d) Write a program to find the factorial value of any number entered through the keyboard. Use while loop. (8 marks)

### QUESTION FOUR (20 MARKS)

- a) Explain the difference between pass by value and pass by reference as used in C++ (4 marks)
- b) Explain each of the following statements as used in C programming language. (8 marks)
- i) switch;
  - ii) default;
  - iii) continue;
  - iv) break.
- c) Write a C++ program that will calculate the area of a circle ( $\pi r^2$ ) and volume of a sphere ( $V = \frac{4}{3} \pi r^3$ ). Use function prototype. (8 marks)

### QUESTION FIVE (20 MARKS)

- a)     i       Differentiate between a structure and a union as used as used in C++.       (4 marks)
- ii       Write a structure declaration for a structure called admission that has the following members:       (6 marks)
- Name.
  - Age.
  - Course.
  - Admission number.
  - Marks for English and Kiswahili.
- iii       Use the structure above to write a statement that creates a structure variable called student.       (2 marks)
- b)       Write a C program that will accept user input (x,y,z), the program should calculate average of the numbers and output results.       (4 marks)