MACHAKOS UNIVERSITY

University Examinations for 2020/2021 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (TELECOMMUNICATION AND INFORMATION TECHNOLOGY)

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF SCIENCE (APPLIED PHYSICS AND TECHNOLOGY)

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY)

BACHELOR OF SCIENCE (ANALYTICAL CHEMISTRY)

BACHELOR OF SCIENCE (ACTUARIAL SCIENCE)

BACHELOR OF SCIENCE (MATHEMATICS)

SMA 191: INTRODUCTION TO PROGRAMMING

SIT 122: STRUCTURED PROGRAMMING

DATE: 18/6/2021 **TIME: 2.00-4.00 PM**

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

a) i. Outline **two** challenges of using machine language in program development. (2 marks)

ii. Distinguish between a *compiler* and an *interpreter* as used in programming. (4 marks)

b) Explain **two** reasons that would make a programmer prefer using modular design. (4 marks)

c) i. Explain **two** rules for naming identifiers in programming. (4 marks)

ii. Describe **three** components of the structure of a C language program. (6 marks)

d) Assuming C programming language, evaluate the expression;

$Y = a + b^2 * c \% 2 - d$

Given that a = 8, b = 3, c = 7 and d = 5. (4 marks)

e) Write a program in C language that accepts distance between two towns in kilometers. The program then uses a function to convert the distance to meters and displays the results. (6 marks)

QUESTION TWO (20 MARKS)

a) i. Outline **four** non-numeric data types used in a structured program. (4 marks)

ii. Distinguish between *actual* and *formal* parameters as used in programming. (4 marks)

b) Describe **three** functions used for error handling in C programming language. (6 marks)

c) A programmer would like to design a program that accepts the mark scored by a student and display the grade based on the following criteria:

Mark	**Grade**
Greater than 70	A
Greater than 60	B
Greater than 50	C
Greater than 40	D
Greater than 0	E

Draw a flowchart to represent this program logic. (6 marks)

QUESTION THREE (20 MARKS)

a) Outline **two** circumstances that necessitate program translation. (2 marks)

b) Explain **three** approaches used to break down a program into its subprograms. (6 marks)

c) The following program has errors. Rewrite the program correctly. (4 marks)

```
#include<stdio.h>
#include<stdlib.h>
 main()
{
 Int radius, pi= 3.14, area;

        Printf(Enter the radius:);
        scantf(radius);
        area = = pir2
printf(The area is:,area);
 }
```

d) i. State the function of each of the following specifiers in C programming language.

I. \t

II. \n (2 marks)

ii. Write a program in C language that would prompt a user to enter the length and height of a wall in meters. The program then computes the number of tins required to paint the wall given that one tin can paint 0.5 M^2. (6 marks)

QUESTION FOUR (20 MARKS)

a) i. Outline **two** methods used to pass parameters in a program. (2 marks)

ii. Explain each of the following types of program testing:

I. stress testing;

II. unit testing;

III. integration testing. (6 marks)

b) Write a pseudocode for a program that could be used to determine the square root of a positive integer. (4 marks)

c) Describe **two** types of documentation created during program development. (4 marks)

d) Write a program in C language that could be used to generate the following output.

```
4   4   4   4
3   3   3
2   2
1
```

(4 marks)

QUESTION FIVE (20 MARKS)

a) Explain **two** ways through which a programmer could improve the efficiency of a program. (4 marks)

b) i. John, a programmer at Mashini company created a file using C programming language. Outline **four** file operation functions he could have used. (4 marks)

ii. Outline **two** uses of comments in a program. (2 marks)

c) Write a program in C language that would accept four integers in an array. The program then outputs the integers in reverse order of entry. (4 marks)

d) The following table shows the criteria used by a University to admit students for various courses. Use it to answer the question that follows.

Mean Grade	**Course**
A	Science
B	Business
C	Humanities
Other	Social Science

Table 1

Write a program in C language that would prompt a user to enter the mean grade of a student. The program then outputs the respective course. Use switch statement. (6 marks)