Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2024/2025 ACADEMIC YEAR
FIRST YEAR, SECOND SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY
KIT 2104 STRUCTURED PROGRAMMING

Date: 8TH AUGUST 2024
Time: 11:30AM – 1:30PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) C programming language is a robust language with an impressive set of built-in functions. State and give the function of any four functions found in C library. **(4 Marks)**

b) State any four main characteristics of C programming language. **(4 Marks)**

c) Comments are very important in structuring a program code. Explain why we use comments in programs. Show how we write comments in C. **(4 Marks)**

d) Write a C program to compute the area and circumference of a circle. Your program should have two user defined functions; area () and circumference (). The user should input the radius of the circle in the main function. **(6 Marks)**

e) Using an example, demonstrate how to use pre-processor directive **#define** to declare constant variables. **(4 Marks)**

f) Given the following segment of a program, write the output of the program after successful execution. **(2 Marks)**

```
char fname[ ] = "Alice";
char lname[ ] = "Joseph";
strcpy(fname, lname);
printf("%s", fname);
```

g) Given three numbers a, b and c, write an algorithm and then draw a flowchart to compute the average of the three numbers. **(6 Marks)**

QUESTION TWO (20 MARKS)

a) Explain the following operators in C programming.

i) Logical operators **(2 Marks)**
ii) Relational operators **(2 Marks)**
iii) Assignment operators **(2 Marks)**
iv) Conditional operator **(2 Marks)**

b) The following program demonstrates how conditional operator works, explain the program and show the output obtained after executing the program. **(4 Marks)**

```
#include <stdio.h>
int main()
{
  int a=5,b;
  b=((a==5)?(3):(2));
  printf("The value of 'b' variable is : %d",b);
  return 0;
}
```

c) The formula to calculate the compounded interest, given the principal amount, time and the interest rate is given below;
Compound interest = Amount – principal
Where amount = Principal(1+rate/100)^{time}
Write a C program where the user enters the principal amount, time and rate and the program compute the compound interest. Show your output. **(8 Marks)**

QUESTIONS THREE (20 MARKS)

a) Given a five-digit integer number (ex. 57362), using arrays data structures and for loop, write a program that displays the number as follows. **(10 Marks)**

57362
7362
362
62
2

b) The following piece of code shows demonstrates the use of unary operator. What is output when the program is executed. **(6 Marks)**

```
int a = 15, b=3,c;
c= a-b;
printf("%d\n",c);
printf("%d\n",++c);
printf("%d\n",c++);
printf("%d\n",c--);
printf("%d\n",b--);
printf("%d\n",--a);
```

c) Explain the difference between the following data types used in C programming.

i) Char and String **(2 Marks)**
ii) Float and double **(2 Marks)**

QUESTION FOUR (20 MARKS)

a) State and explain four features of C programming language. **(8 Marks)**
b) Explain the difference between compiler and interpreter. **(2 Marks)**
c) Given the program code below, analyze it and give its output. **(4 Marks)**

```c
int main()
{
    int m[] = {1, 2, 3, 4, 5};
    int x, y = 0;
    for (x=0;x<5;x++)
    {
        y = y + m[x];
        printf("%d", y);
    }
}
```

d) Write a C program to prompt a user to enter two integer values that are not equal. The program then subtracts the smaller value from the larger and displays the larger integer and their differences. **(6 Marks)**

QUESTION FIVE (20 MARKS)

a) A user is prompted to enter an integer n, the program checks if the integer is positive or negative, if it is negative, it prompts the user to enter another integer, else if the integer is positive, the program calculates the square root of the number and displays the number and the square root as output.

i) Draw a flowchart to demonstrate the flow of the above problem. **(6 Marks)**

ii) Write an algorithm to show how the above program works. **(4 Marks)**

b) You are given three positive integer numbers; a, b and c. Write a program to find the largest of the three numbers using;

i) Conditional operator. **(4 Marks)**

ii) Nested if else statements. **(6 Marks)**