KIRIRI WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
THIRD YEAR, FIRST SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
KCS 303 – PROGRAMMING PARADIGMS

Date: 05TH December 2023
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

i)   Define programming paradigm: (2 Marks)
ii) Give the difference between programming paradigm and a programming language.   (4 Marks)
iii) There are some programming languages that are multi-paradigm giving two examples explain the term 'multi-paradigm'.   (4 Marks)
iv) Define parameter and explain the difference between passing parameter by value and passing parameter by reference.   (6 Marks)
v)   To build a recursive algorithm, you will break the given problem statement into two parts. Explain these two parts of a recursive algorithm   (4 Marks)
vi) Explain the benefits of logic programming paradigms over other programming language paradigms   (6 Marks)
vii) Briefly describe the difference between imperative and declarative programming paradigms   (4 Marks)

QUESTION TWO (20 MARKS)

a)   JavaScript scripting language is one of the major language used in object oriented programming paradigms in creation of dynamic websites.

   i)   State any other four applications which can be created using JavaScript.   (4 Marks)
   ii) Explain three advantages and three disadvantages of JavaScript.   (6 Marks)

b)   Briefly describe a function giving an example.   (4 Marks)
c)   Implement a recursive function using Python Syntax to add two integers and output the sum.
                                                                                 (6 Marks)

QUESTIONS THREE (20 MARKS)

a)   Explain the following features of a functional programming paradigm

   i)   Pure function
   ii) Recursive function
   iii) Referential transparent functions.   (9 Marks)

b)   Study the following piece of code.

```
int add(int a, int b)
 {
 return a + b
 }
 int mult(int a, int b)
 {
 return a * b;
 }
 int x = add(2, mult(3, 4));
```

    i)   State the functions in this code.   (3 Marks)
    ii)   What is the expected output in this piece of code.   (4 Marks)
    iii)   *Mult* method is referentially transparent. Explain.   (4 Marks)

QUESTION FOUR (20 MARKS)

a)   Define Prolog and explain four differences between Logic programming and Functional
       Programming.   (10 Marks)
b)   Prolog is used in various domains and plays a very vital role in automation of systems. Explain any
       five fields in technology where Prolog can be used.   (10 Marks)

QUESTION FIVE (20 MARKS)

a)   Differentiate the following programming paradigms
        i)   Imperative vs Declarative programming paradigm.   (4 Marks)
        ii)   Procedural vs Functional programming paradigm.   (4 Marks)
b)   Explain the three major benefits of Logic programming   (6 Marks)
c)   Explain backtracking as used in recursive functions giving an example of backtracking algorithm
                                                                (6 Marks)