MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SMA 390: SCIENTIFIC PROGRAMMING

DATE: **TIME:**

INSTRUCTIONS: Answer Question ONE and Any Other TWO Questions.

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Define Python as a scientific programming language (2 marks)

b) Outline three the features of python dictionaries (3 marks)

c) Explain the following terms as used in python programming with examples (5 marks)

i. Identifiers,
ii. Keywords,
iii. Statements,
iv. Expressions,
v. Variables.

d) Discuss one type of Exceptions in Python. (3 marks)

e) What is a text file? Give an example for a text file in python programming (3 marks)

f) Describe two methods that are used in Python Lists. (4 marks)

g) Differentiate between break and continue statement as used in python programming (4 marks)

h) Write a Python Program to reverse a number and also find the Sum of digits in the reversed number. Prompt the user for input. (6 marks)

QUESTION TWO (20 MARKS)

a) Describe the following terms as it applies to scientific programming giving examples in each case (6 marks)

i. List,
ii. Tuples
iii. Dictionary

b) Write Python program to count the total number of vowels, consonants and blanks in a String. (4 marks)

c) Explain Python interpreter (2 marks)

d) Explain what is meant by namespaces and scoping in python programming (4 marks)

e) With examples, discuss the two ways of implementing comments in python programming. (4 marks)

QUESTION THREE (20 MARKS)

a) Discuss inheritance in Python programming language with an example (6 marks)

b) Write a program in python programming that accepts a sentence and calculate the number of digits, uppercase and lowercase letters. (6 marks)

c) Explain the meaning of key-value pairs in a dictionary? (4 marks)

d) Discuss any two features of Python that make it a multipurpose programming language (4 marks)

QUESTION FOUR (20 MARKS)

a) Describe the following operators in detail with examples as used in python programming

i. Arithmetic Operators, (3 marks)
ii. Assignment Operators, (3 marks)
iii. Logical Operators (3 marks)

b) Explain two basic data types available in Python with examples. (4 marks)

c) Write Pythonic code to solve the quadratic equation ax**2 + bx + c = 0 by getting input for coefficients from the user. (7 marks)

QUESTION FIVE (20 MARKS)

a) (i) Explain the purpose of loop structure in a programming language (2 marks)

(ii) Describe the syntax and semantics of any two loop structures provided by Python. (6 marks)

b) Explain any three types of literals as used in python programming (6 marks)

c) Write Python Program to Calculate Area and Perimeter of different Shapes using Polymorphism.

(6 marks)