



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)