



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF SCIENCE (MATHEMATICS)

SMA 390: SCIENTIFIC PROGRAMMING

DATE: 16/11/2020

TIME: 8:30 – 10:30 AM

INSTRUCTIONS

Answer question ONE and any other TWO questions.

QUESTION ONE (COMPULSORY – 30 MARKS)

- a) Explain the following as used in Python: (8 marks)
 - i. IDLE;
 - ii. >>>
 - iii. Import;
 - iv. Expressions;
- b) State TWO (2) skills required to be a programmer. (2 marks)
- c) Python is developed as an open source project. Justify this statement. (2 marks)
- d) Explain the difference between Logical Operators and Bitwise Operators. (4 marks)
- e) State TWO (2) factors that should be considered when you declare a variable in Python. (2 marks)
- f) Explain THREE (3) applications areas of python in the field of science and statistics. (6 marks)
- g) Write a Python program that will accept the base and height of a triangle and compute the area. $A = 1/2 * \text{base} * \text{height}$. (6 marks)

QUESTION TWO (20 MARKS)

- a) Explain TWO (2) jump statements. (4 marks)
- b) State TWO (2) comparison operators? (2 marks)
- c) Explain how to handle Exceptions in python. (6 marks)
- d) Write a Program to Prompt for a Score between 1 and 100. If the Score is out of range, print an error. If the score is between 1 and 100, print a grade using the following table. Use Elif statement. (8 marks)

Score	Grade
70 - 100	A
60 – 70	B
50 – 60	C
40 - 50	D
Below 40	F

QUESTION THREE (20 MARKS)

- a) Explain TWO (2) basic data types available in Python. (2 marks)
- b) Write a Python program to create an array of 7 integers and display the array items. (6 marks)
- c) Change the following Python code from a **for** loop to a **while** loop:

for i in range(1,50)

 (4 marks)
- d) Write a python program to generate and print prime numbers between 2 – 50. (8 marks)

QUESTION FOUR (20 MARKS)

- a) Explain TWO techniques that you can use to find bugs or perform static analysis in a python application. (4 marks)
- a) What happens if a semicolon (;) is placed at the end of a Python statement? (2 marks)
- b) Explain THREE (3) different types of function arguments in Python. (6 marks)
- c) Write Python program to find largest of THREE (3) numbers. Use a function. (8 marks)

QUESTION FIVE (20 MARKS)

- a) Explain THREE (3) applications of arrays in scientific programming. (6 marks)
- b) State FOUR (4) advantages of testing a scientific program. (4 marks)
- c) Explain TWO (2) type codes in Python. (4 marks)

- d) Write a python program to accept two numbers, multiply them then print the result.

(6 marks)