



MACHAKOS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY
SECOND SEMESTER, 2019/2020 ACADEMIC YEAR
THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE IN INFORMATION TECHNOLOGY
SIT 301: FUNDAMENTALS OF PROGRAMMING LANGUAGES

DATE: _____

TIME: 2 HRS

EXAMINATION SESSION: APRIL

YEAR 2020



INSTRUCTIONS

- i) Answer question ONE and other TWO questions**
- ii) Write on both sides of the answer sheet**

QUESTION ONE (30 marks, Compulsory)

- a) Distinguish between the following pairs
 - i) Identifier and variable **(2 marks)**
 - ii) Postfix and prefix expression **(2 marks)**
 - iii) Struct and class **(2 marks)**
 - iv) Setter and getter methods **(2 marks)**
- b) Suggest data types to represent the following entities **(4 marks)**
 - i. Age of a person.
 - ii. Income of an employee.
 - iii. Registration Number of a student
 - iv. Number of words in a dictionary.

- c) Declare the following in a program
 - i) A collection to hold days of the week (2 mark)
 - ii) A type to manipulate memory location of a variable (2 mark)
 - iii) A collection of floating point numbers (2 mark)
- d) Analyze the structure of a Program written in COBOL language (6 marks)
- e) Why is modular programming important in program design (6 marks)

Question TWO (20 marks)

- a) Given the following code:

```
float p = 1.0;
int n = 11;
int x=2;
for (int i=1; i<=n; i++) {
    if (n%2 == 1) p = p * x;
    cout << p << endl;
}
```

- i) What is the output of the program? (4 marks)
 - ii) Express the output in terms of x (3 marks)
 - iii) Draw a flow diagram to represent the structure shown above (6 marks)
- b) Use an example to analyse the phases of the LOOP control structure (7 marks)

Question THREE (20 marks)

- a) Create a programming function and analyze its structure (6 marks)
- b) Analyze the structure of a program written in any programming language by considering the following constructs
- c) Call-by-value (4 marks)
- d) Call-by-reference (4 marks)
- e) Draw a flow-chart for a program to compute the factorial of a number (6 marks)

Question FOUR (20 marks)

Consider methods associated with a computerized banking system and answer the following questions

- a) Create a Constructor (5 marks)
- b) Design an overloaded method (5 marks)
- c) Create a structure for overriding (5 marks)
- d) Construct an Inheritance structure (5 marks)

Question FIVE (20 marks)

- a) Analyse the architecture of a C Program (6 marks)
- b) Write down an algorithm in a natural language that can be used to find out the maximum number from a given set of numbers ($L_1, L_2, L_3, L_4, \dots, L_n$ where $n > 0$) (6 marks)
- c) Programming has experienced a number of paradigm shifts since the times of Blaise Pascal in 1776. Describe the historical trend in computer programming till today (8 marks)
