



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

EMM 308: PROGRAMMING II

DATE: 24/7/2019

TIME: 8.30-10.30 AM

INSTRUCTIONS

This paper consists of FIVE questions

*Answer **question one** and other **two questions** in this paper*

QUESTION ONE (30 MARKS)

- a)
 - i) Explain three advantages of using modules in program development (3 marks)
 - ii) Explain what is Preprocessor, hence define two Preprocessors in C++? (3 marks)
- b) Describe the following types of program testing (4 marks)
 - i) Functional/black box testing
 - ii) Structural testing/white box
- c)
 - i) Differentiate between actual and formal parameters as used in high level programming. (4 marks)
 - ii) Write a C++ program to store and display the details (including Name, Rollno, marks) of n students using structure. (7 marks)
- d) Write a C++ program to find maximum of three numbers input by the user. Use the if -else statements. (4 marks)
- e)
 - i) Briefly describe three data types used in C++ programming (3 marks)
 - ii) Define the term 'keyword' as used C++ and give an example of such? (2 marks)

QUESTION TWO (20 MARKS)

- a) Classes in OOP are made of private and public members. Briefly describe these class members. (4 marks)
- b) Explain the role of the following in C++ (2 marks)
- #include < iostream >
 - Name space
- c) Using the *for loop* write a program that displays the square pattern as shown below: (5 marks)

```
#####  
#####  
#####  
#####  
#####  
#####  
#####  
#####
```

- d) Consider the following user-defined data type:
- ```
TYPE LibraryBookRecord
 DECLARE ISBN : INTEGER
 DECLARE Title : STRING
ENDTYPE
```
- Write a pseudocode statement to declare a variable, Book, of type LibraryBookRecord. (1 mark)
  - Write a pseudocode statement that assigns 'Dune' to the Title of Book. (1 mark)
  - The user-defined data type LibraryBookRecord needs to be modified by adding the following fields:
    - a field called Genre which can take two values, fiction or non-fiction
    - a field called NumberOfLoans which can be an integer value in the range 1 to 99Write the updated version of LibraryBookRecord. (3 marks)
- e) Explain break and continue statements as used in C++. (4 marks)

### QUESTION THREE (20 MARKS)

a) Outline any three rules that should be considered when naming identifiers in a program (3 marks)

b) The figure below shows the Floyd's triangle. Write a C++ program that will print the triangle shown above: (5 marks)

```
*
* *
* * *
* * * *
* * * * *
```

i. Write a program that uses switch statement to accomplish the following: It asks for a number between 1 and 3, inclusive. It then displays a proverb linked to that number. Any other number causes an error message to be displayed. (5 marks)

| Option           | Proverb                                           |
|------------------|---------------------------------------------------|
| 1                | A fool and his money are soon parted.             |
| 2                | A bird in hand is worth two in the bush           |
| 3                | A rolling stone gathers no moss                   |
| Any other number | The number you entered is out of range. Try again |

ii. Explain the meaning of the following terms as used in OOP: (4 marks)

i) Static class member

ii) Exception

c) Explain the difference between function definition and function declaration. (3 marks)

### QUESTION FOUR (20 MARKS)

a) Different programming languages have been developed for different purposes. Explain the following types of programming languages, giving an example in each case: (3 marks)

i. Machine languages

ii. Assembly languages

iii. High-level languages

b) Describe the meaning of the term multiple inheritance? Write a program to implement multiple inheritance. (6 marks)

c) Using the *for loop*, write a program to display all the letters of the alphabet. (4 marks)

d) i Explain what is meant by interactive programming (2 marks)

ii Give two applications of interactive programming (2 marks)

e) Explain the importance of any three stream classes as in C++ programming (3 marks)

**QUESTION FIVE (20 MARKS)**

- a) Explain the difference between the following terms as used in C++: (4 marks)
- i. Type checking
  - ii. Typecasting:
- b) Describe the two main categories of data types, giving an example in each category. (4 marks)
- c) Write a C++ program that multiplies two matrices. (10 marks)
- d) Give two areas where high level languages can be used to solve scientific problems for a mechanical engineer. (2 marks)