



MACHAKOS UNIVERSITY

University Examinations for 2021/2022

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR SECOND SEMESTER EXAMINATIONS FOR

BACHELOR OF SCIENCE (ELECTRICAL AND ELECTRONICS ENGINEERING)

BACHELOR OF SCIENCE (ACTUARIAL SCIENCE)

SST202/EEE202: OBJECT ORIENTED PROGRAMMING /COMPUTER PROGRAMMING II

DATE: 17/12/2021

TIME: 2:00 – 4:00 PM

INSTRUCTIONS:

This paper consists of FIVE questions

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

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Explain what is meant by the following OOP concepts (6 marks)
 - i) Encapsulation
 - ii) Inheritance
 - iii) Polymorphism
- b) Explain **TWO** types of errors that could be encountered in programming. (4 marks)
- c) Explain **FOUR** advantages of object-oriented programming paradigm. (4 marks)
- d) Write a C++ code snippet that declares a function friend. (3 marks)
- e) In C++ programming, the type of inheritance is specified by the access specifiers. Explain **FOUR** rules of the access specifiers that should be applied while using different types of inheritance. (4 marks)
- f) Outline **THREE** class access modifiers found in C++. (3 marks)
- g) Write a program that prompts the user for the length, width and height of a solid cuboid, computes and outputs both the volume and total surface area of the cuboid. [use the formula; $Vol = l \times w \times h$ and $SA = 2(lh + lw + wh)$] (6 marks)

QUESTION TWO (20 MARKS)

- a) With the aid of simple examples, distinguish between the following sets of terms (4 marks)
 - i) Class and object
 - ii) Pass-by-value and pass-by-reference.
- b) With aid of an example, explain the syntax of a multiple inheritance. (4 marks)

- c) Write an inline function called Max of integer type with two arguments x and y. It should return the maximum of the two values of x and y. (8 marks)
- d) Highlight FOUR characteristics of a destructor. (4 marks)

QUESTION THREE (20 MARKS)

- a) Highlight FOUR differences between Object-oriented programming and Procedural-oriented programming. (4 marks)
- b) (i) Define data abstraction (2 marks)
 ii) Using the cout object in C++ programming, write a program that demonstrate data abstraction (6 marks)
- c) Distinguish between virtual member function and non-virtual member function. (4 marks)
- d) Explain the difference between source code and object code as used in high level programming (4 marks)

QUESTION FOUR (20 MARKS)

- a) Differentiate between the following (6 marks)
 - i. Base class and derived class
 - ii. Dot (.) and double colon (::) operator.
 - iii) Constructor and destructor
- b) Write a program to overload function Area() to calculate area of a circle and area of a rectangle, respectively. (8 marks)
- c) Explain the use of this pointer in C++ codes. (2 marks)
- d) Using the *for* loop, write a C++ program that prints the numbers 1 through 100 on the screen. (4 marks)

QUESTION FIVE (20 MARKS)

- a) Write a C++ program code that when compiled and executed will display the address of Val1 variable and the address of Val2 variable (6 marks)
- b) A music producer would like to associate noise loudness measured in decibels with the effect of the noise. The following table shows the relationship between the noise level and human perception of the noise.

Loudness in Decibel	Perception
50 or below	Quiet
51 – 70	Intrusive
71 -90	Annoying
Above 100	Uncomfortable

Write a C++ program using if ..else statements that will prompt for the user to input noise in decibels and display loudness and the noise perception, respectively (8 marks)

- c) Write a program that implements parameterized constructor, using the following information. Class name: Shape; private members length and width. (6 marks)