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 (COMPUTER SCIENCE)

SCO200: OBJECT ORIENTED PROGRAMMING II

DATE: **TIME:**

Instructions
This paper consists of FIVE questions
*Answer **question one** and **two** other **questions**.*

QUESTION ONE (COMPULSORY (30 MARKS)

a) Explain briefly, giving language examples, the following programming paradigms. (4 marks)

(i) Structured programming
(ii) Object-oriented programming

b) Discuss re-usability and data abstraction as used in object-oriented programming (4 marks)

c) Citing appropriate examples, differentiate between the following terms as used in object-oriented programming (6 marks)

i. Constructor and Destructor

ii. Class and Object

iii. Local and Global variable

d) Using the *for loop,* write a C++ program that prints the numbers 1 through 100 on the screen. The program should not have user input. (6 marks)

e) Distinguish between polymorphism and inheritance as applied in object-oriented programming (4 marks)

f) Give THREE advantages of using objects in program development. (3 marks)

g) Briefly explain the following terms in as used in Object Oriented Programming (3 marks)

i. Overriding
ii. Overloading
iii. Access modifier

QUESTION TWO (20 MARKS)

a) Discuss, citing examples the following concepts as used in object-oriented programming (6 marks)

i) Function Overloading
ii) Function Overriding
iii) Inheritance

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b) Write a C++ program that would instantiate a class named *Numbers* with the following properties:

- A data member named *myMembe*r;
- A member function named *input* for setting the value of a to 10;
- A member function named *display* for outputting the value of a

(8 marks)

c) Write a program that reads a number through the keyboard input and determines if it is an odd or even number and prints the message "ODD Number" or "Even Number" as appropriate (6 marks)

QUESTION THREE (20 MARKS)

a) Give a brief outline of THREE inbuilt functions available in C++ Programming. (6 marks)

b) Explain what a *friend* function is, hence write a C++ code snippet that declares a function friend. (6 marks)

c) Write an object-oriented program in C++ that allows a user to key in the quantity and the cost of each item a customer has bought, and then displays the unit cost, the quantity and the total cost for each item bought.

- The program should have two functions; one for input and another for display.
- It should create a class called *items* and two objects namely: *bread* and *milk*.

(8 marks)

QUESTION FOUR (20 MARKS)

a) Describe the following terms as used in OOP (6 marks)

i. Data abstraction
ii. Nesting of classes
iii. Scope resolution

b) With aid of an example, explain the concept and syntax of a multiple inheritance. (6 marks)

c) Using the cout object in C++ programming, write a program that demonstrates data abstraction (8 marks)

QUESTION FIVE (20 MARKS)

a) State and explain **FOUR** typical problems of object orientated programming. (8 marks)

b) Write a C++ program for the following:

i. Create class named *student* with student name, course and department properties. (4 marks)
ii. Create another class called *exam* that inherits properties of *student* class created above, and has additional Electrical Principles, Mathematics, and Programming marks properties and two functions to calculate total and average marks, respectively. (4 marks)
iii. Write a program that uses exam instance to calculate student marks and display the result. (4 marks)