



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 103/SIT 203: OBJECT ORIENTED PROGRAMMING I

DATE: 18/1/2021

TIME: 2:00 – 4:00 AM

INSTRUCTION: Answer Question ONE and any other TWO Question

QUESTION ONE (30 MARKS)

- a) Distinguish between the following terms as used in *Object Oriented programming*
 - i) Encapsulation and abstraction.
 - ii) Polymorphism and Inheritance
 - iii) Object and Class. (6 marks)
- b) Outline any **four** characteristics of constructors (4 marks)
- c) Explain the different access modifiers in a Class definition. (6 marks)
- d) Describe **three** C++ classes used to perform output and input of characters to and from files. (6 marks)
- e) Peter went through a C++ program and met two different signs, :: and : as an expert, explain to him the meaning of the signs and their application with examples. (4 marks)
- f) Give the function header for each of the following functions. (3 marks)
 - i) Function hypotenuse that takes two double-precision floating-point arguments, side1 and side2, and returns a double-precision floating-point result.
 - ii) Function smallest that takes three integers, x, y, z, and returns an integer.
 - iii) Function instructions that does not receive any arguments and does not return a value.
- g) Define Exception as used in C++ programming. (1 mark)

QUESTION TWO (20 MARKS)

- a) Write an object oriented program in C++ that defines a class Circle with the data members radius, area and circumference and the member functions getArea and getCircumference which calculates and outputs the Area and the circumference respectively of an object CircleA, the program should make use of a constructor. (8 marks)
- b) Discuss the role of comments in C++; State and discuss the **two** kinds of comments. (2 marks)
- c) Discuss any **four** major benefits associated with the use of an object oriented programming language like C++ as opposed to procedural languages. (4 marks)
- d) In C++ programming, the type of inheritance is specified by the access specifier. Explain the rules that should be applied while using different type of inheritance. (6 marks)

QUESTION THREE (20 MARKS)

- a)
 - i) Define a Destructor. (1 mark)
 - ii) Write a C++ code to demonstrate a Destructor using Class **XYZ**. (3 marks)
- b) Outline how a member function can be made a friend function with an aid of an example. (4 marks)
- c) In relation to C++language constructs, declare a class called **person**. And declare the following data variables **name**, **age**, **weight**, and **height** and functions **getdata**, and **display**. Clearly show how two objects **Alex** and **Chris** are created and used in reference to data members and functions declared in the class. (10 marks)
- d) With aid of example, outline the opening of a file using a constructor function. (2 marks)

QUESTION FOUR (20 MARKS)

- a) Using an example C program code, explain function overloading. (7 marks)
- b)
 - i) Create a class called **Employee** that includes three pieces of information as data members — a **first name** (type string), a **last name** (type string) and a **monthly salary** (type int). Your class should have a constructor that initializes the **three** data members. Provide a **set** and a **get** function for each data member. (7 marks)
 - ii) Write a test program that demonstrates class Employee's capabilities. Create **two** Employee objects and display each object's Details. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Write a C++ program that defines a pointer **ip** of **integer** type and assign the pointer the address of a variable **var**, and let the pointer access the value at the address available in the pointer variable which is **20**. (5 marks)
- b) Illustrate the concept of inheritance with the help of an example. (5 marks)
- c) Write a C++ Program to Define a Class Student with the following specification and accessing member function using its object. (10 marks)

Private members of class student

admno integer

sname 20 character

eng, math, science float

total float

ctotal() a function to calculate eng + math + science with float return type.

Public member function of class student

Takedata() Function to accept values for admno, sname, eng, science and

invoke ctotal() to calculate total.

Showdata() Function to display all the data members on the screen.