



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY (BSIT 12S)

ICS 2104: OBJECT ORIENTED PROGRAMMING I

END OF SEMESTER EXAMINATION

SERIES: APRIL 2014

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Attempt question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (Compulsory)

a) “A good system consists of encapsulated modules” Briefly describe with examples where appropriate the following OOP concepts:

- (i) Objects
- (ii) Data Abstraction
- (iii) Inheritance
- (iv) Dynamic binding
- (v) Classes
- (vi) Data encapsulation
- (vii) Polymorphism
- (viii) Message passing

(16 marks)

b) The following details are available from a shop: Item code, Quantity and item cost. Write a C++ program to include a class called cash purchases, to store the details the class definition should have:

- (i) Private member variables: Item code Quantity
Item cost and Total cost **(4 marks)**
- (ii) Private member function: Total to compute and return total cost of each stem. **(4 marks)**

(iii) Public member function: set () and display () for inputting and displaying the details respectively. **(4 marks)**

(iv) Create an array of objects for the class to record details of at least 5 objects. (Hint: Total cost = item cost *Quality) **(2 marks)**

Question Two

a) Briefly explain the term: “Information hiding”. **(4 marks)**

b) Distinguish between a structure and a class as used in C++ **(4 marks)**

c) With the help of an example, explain the concept of function-overloading. **(4 marks)**

d) Write a C++ program that displays all multiples of 8 (between 1 – 100), their squares and cubes, using user-defined functions: SQUARE() and CUBE () respectively. **(8 marks)**

Question Three

a) (i) State THREE properties that characterize all objects.

(ii) Briefly explain how message-passing influences the three properties stated in (i) above. **(8 marks)**

b) using C++, define a class STRING, a user-defined string type. Include constructors that create an initialized string:

STRING S1: || string with length O:

STRING S2: (“well DONE!); || initialized string constant include a function that adds the two strings to make a third string the statement S1 – S2; || copies are string to another.

Write a complete C++ program to test the STRING class for the following tasks.

(i) Create un-initialized string

(ii) Create objects with string constants

(iii) Concatenate the two string

(iv) Display desired string objects **(12 marks)**

Question Four

a) C++ supports both Procedure Oriented Programming (POP) and Object Oriented Programming (OOP) paradigms. Distinguish these two approaches. **(10 marks)**

b) Write a C++ program using user defined function called power () to raise number m to a power n. The function takes only +ve integer values. Use default n = 2, to make the function calculate the square when this argument is omitted. The value of m and n are read from the user in the main () method/function to test the program. **(10 marks)**

Question Five

a) Using relevant examples, explain the importance of arrays to programmers. **(4 marks)**

b) Distinguish between the following OOP concepts and give their roles in C++ programming.

(i) Dot (.) operator and scope resolution (::) operator

(ii) Constructor and destructor **(8 marks)**

- c) Write a C++ program using recursive function to calculate the factorial of a number entered by a user:
(Hint: Factorial of a +ve number, n , is given by: $n! = n * (n - 1) * (n - 2) * (n - 3) \dots * 1$;
If $n \leq 1$, then $n! = 1$) **(8 marks)**