



TECHNICAL UNIVERISTY OF MOMBASA

Faculty of Engineering & Technology

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING
(BSME)

ICS 2276: PROGRAMMING II

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 **THREE** printed pages

Question One (Compulsory)

- a) Define the term object oriented programming, giving ONE example of an OOP Language:
- b) Distinguish between the following terms:
- (i) Object and classes
 - (ii) Super class and Sub class
 - (iii) Data members and function members
 - (iv) Private and public members
- (10 marks)**
- c) Outline TWO characteristics of each of the following
- i. Constructor function. **(2 marks)**
 - ii. Friend function. **(2 marks)**
- d) Using a simple diagram, where applicable, discuss the following forms of inheritance:**(4 marks)**
- i. Single inheritance
 - ii. Mutiple inheritance

- e) Outline FOUR benefits of object oriented programming languages. (4 marks)
- f) Write a function prototype for a function named test that accepts two parameters an int and char and returns a float. (4 marks)
- g) Declare a class called rectangle which has two private data members length and width and two public member functions called input () and output (). (4 marks)

Question Two

- a) Define the term function. (1 mark)
- b) Using an example briefly define the following terms as used in C++ (3 marks)
- (i) Function call
 - (ii) Function prototype
 - (iii) Function definition
- c) Explain any FOUR advantages of using a function. (4 marks)
- d) Ken Tank Company Ltd manufactures water containers of different shapes. The most common containers include spherical, rectangular and cylindrical tanks. Required:
Write an overloaded function volume () to compute the different volumetric capacities of the three containers.

Hint:

$$\text{Volume of a cylinder} = \pi r^2 h$$

$$\text{Volume of a rectangle} = l * w * h$$

$$\text{Volume of a sphere} = \frac{4\pi r^3}{3}$$
(12 marks)

Question Three

You have been asked to develop a program for printing out a simple telephone bill. The program will input the following details:

- Name of customer
- Address
- Telephone number
- Previous meter reading
- Current meter reading

The program will calculate the number of units used and compute the bill charged using the following rates.

No of Units	Cost per Unit (kshs)
> 0 and <= 100	2.50
> 100 and <= 200	2.25
> 200 and <= 350	1.90
> 350	1.65

The program will then print out the bill as follows:

- Name of customer
- Address
- Telephone number
- Previous meter reading
- Current meter reading
- Consumption (units consumed)
- Bill to pay

(20 marks)

Question Four

Professional University Library maintains an inventory of books. The list includes details like Author, price, title, publisher, acc no, and number of copies of each book. Whenever new books are purchased the Librarian adds details into the database. The chief Librarian occasionally requests for a list of all books in the database.

Required:

Assuming the database to be an array of 10(ten) books, construct a class called book with suitable data members and member functions to:

- (i) Insert a new book into the database
- (ii) Display a list of all books in the database
- (iii) Write a main function to test the program.

(20 marks)

Question Five

- a) Write a C++ program that prompts the user for length and width and prints the area. **(10 marks)**
- b) Create a C++ program that determines positive and negative numbers, when a number is entered by the user. **(10 marks)**