



TECHNICAL UNIVERSITY OF MOMBASA

INSTITUTE OF COMPUTING AND INFORMATICS

Select department

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

ICS 2276: COMPUTER PROGRAMMING 2

END OF SEMESTER EXAMINATION

SERIES: APRIL 2016

TIME: 2 HOURS

DATE: Pick Date May 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

- a. The following program illustrates the working of Objects and Class in C++ Programming. Explain the program. [10 marks]

```
#include <iostream>
using namespace std;
class temp
{
private:
    int data1;
    float data2;
public:
    void int_data(int d){
        data1=d;
        cout<<"Number: "<<data1;
    }
    float float_data(){
        cout<<"\nEnter data: ";
        cin>>data2;
    }
};
```

```

        return data2;
    }
};
int main(){
    temp obj1, obj2;
    obj1.int_data (12);
    cout<<"You entered "<<obj2.float_data();
    return 0;
}

```

b. Define the following terms/phrases.

[10 marks]

- i. Class member functions:
- ii. Class access modifiers
- iii. Constructor & destructor
- iv. C++ friend functions
- v. The this pointer in C++

c. Describe four storage classes used in C++ programming

[6 marks]

d. Write a C++ program that calculates the perimeter of a circle of radius 5.0 using defined statements

[4 marks]

Question TWO

a. A Fibonacci Series is a series of number in which each number is the sum of preceding two numbers is known as Fibonacci series e.g:1, 1, 2, 3, 5, 8, 13, 21, and 34. Write a C++ program that prompts the user for a positive integer (Suppose n) and Fibonacci series is displayed up to n th term

[5 marks]

b. Create a structure called student which contains student name, student number and marks as its data members. Write a C++ program that prompts the user for his name, his number and his marks for a course. The marks are then stored in a structure and displayed on the screen.

[10 marks]

c. Write a C++ program that uses a for loop to output the following

[5 marks]

1. value of a: 10
2. value of a: 11
3. value of a: 12
4. value of a: 13

Question THREE

- State four benefits of Object Oriented Programming [4 marks]
- Write a C++ program that uses a class called box with dimensions length, width and height. Show how the class can be implemented to calculate the volume of any box given the dimensions. [8 marks]
- The quadratic formula shown below can be used to get the roots of any quadratic equation in Mathematics. Show how the formula can be implemented using a C++ program. [8 marks]

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Question FOUR

- The for loop has the following syntax; *for (initialization; condition; increase) statement*; Use five steps to explain how the loop works [5 marks]
- Describe using C++ code how the conditional ternary operator (?) works. [5 marks]
- Write a C++ program that calculates the factorial of any positive number [10 marks]

Question FIVE

- Define the term polymorphism in the context of object oriented programming. [2 marks]
- Differentiate using C++ code extracts an interface from an abstract class. [5marks].
- A student creates a class Polygon from which two other classes: Rectangle and Triangle are derived as shown in the figure below. Applying the principle of inheritance, write a C++ program that calculates the area of two objects: rectangle and triangle [13m marks]

