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 2

SERIES:APRIL2016

TIME:2HOURS

DATE: Pick Date**May2016**

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

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

Do not write on the question paper.

Question ONE

a. Define the term constructors as used in object oriented C++ programmes. [2 marks]

b. The following Source Code demonstrates the working of constructor in C++ Programming. Explain how the constructer works. [10 marks]

```
#include <iostream>
using namespace std;
class Area
{
   private:
     int length;
     int breadth;

   public:
     Area(): length(5), breadth(2){ }   /* Constructor */
     void GetLength()
     {
        cout<<"Enter length and breadth respectively: ";
        cin>>length>>breadth;
     }
```

```
    int AreaCalculation() {  return (length*breadth);  }
    void DisplayArea(int temp)
    {
       cout<<"Area: "<<temp;
    }
};
int main()
{
   Area A1,A2;
   int temp;
   A1.GetLength();
   temp=A1.AreaCalculation();
   A1.DisplayArea(temp);
   cout<<endl<<"Default Area when value is not taken from user"<<endl;
   temp=A2.AreaCalculation();
   A2.DisplayArea(temp);
   return 0;
}
```

c. Define the following terms/phrases. [8 marks]

i. Class member functions:
ii. Class access modifiers
iii. C++ friend functions
iv. The this pointer in C++

d. Describe four storage classes used in C++ programming [6 marks]

e. Write a C++ program that finds the factorial of a positive integer entered by user. [4 marks]

Question TWO

a. Write a C++ Program to check whether integer entered by user is positive or negative (Considering 0 as positive) **[5 marks]**

b. Create a structure called student which contains name, student number and marks as its data member. Write a C++ program that prompts the user for his name, his student number and his marks for a certain 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

a. Write a C++ Program to Find Largest Number among Three Numbers. [4 marks]

b. Create a class called Rectangle and an object called rect. Show how the program can be used to calculate the area of object rect. [8 marks]

c. A positive integer which is only divisible by 1 and itself is known as prime number. Write a C++ C++ Program to Check Whether a Number is Prime or Not. [8 marks]

QUESTION FOUR

a. The for loop has the following syntax; *for (initialization; condition; increase) statement;*
Use five steps to explain how the loop works [5 marks]

b. Describe using C++ code how the conditional ternary operator (?) works. [5 marks]

c. For a quadratic equation $\mathbf{ax^2+bx+c = 0}$ (where a, b and c are coefficients), its roots is given by following the formula.

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

Write a C++ program that asks user to enter coefficients *a*, *b* and *c* and computes the roots of a quadratic equation. [10 marks]

QUESTION FIVE]

a. Define the term polymorphism in the context of object oriented programming. [2 marks]
b. Differentiate using C++ code extracts an interface from an abstract class. [5marks].
c. 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]