JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-I (EXAMINATION - SEPT 2023)

B.Tech. - III Semester (CSE & IT)

COURSE CODE (CREDITS): 18B11CI311 (3) MAX. MARKS: 15

COURSE NAME: Object-Oriented Systems and Programming

COURSE INSTRUCTORS: A. Sharma, A. Kumar, D. Gupta, H.S. Rawat & M. Singh MAX. TIME: 1 Hr.

Note: 1) All questions are compulsory. Marks and COs are indicated against each question. 2) ***Attempt questions in the given sequence.*** *3) Be precise in your answers. 4) Write neatly.*

Q 1. Explain how the structured programming approach can be applied to develop a simple ATM (Automated Teller Machine) system. Compare this approach with an object-oriented programming approach in terms of code organization, data hiding, and code reusability. [1.5] [1.5] CO1

Q 2. Briefly discuss the key limitations (*at least two each*) of the following concepts in C++: [1*3 = 3] CO1 CO2

a) Reference
b) Inline function
c) Including header files using #include directive

Q 3. How does a friend function (a) violate data hiding and (b) act as an interface between two different classes? Support your answer with a suitable coding example for each. [1.5] [1.5] CO2

Q 4. Create a C++ class named Circle with the following specifications: [3] CO1 CO2

a) Declare a data member radius to store the radius of a circle.
b) Declare and initialize a variable named pi to a constant value 3.14 using in-class initialization.
c) Define an inline member function named calculateArea () that calculates the area of the circle.
d) Define a member function named countObjects () that counts total number of objects in the program.

Create two objects of Circle class having a radius of 5 & 3.5 units respectively making calls to calculateArea (). Thereafter, invoke countObjects () method without using an object.

Q 5. Mention the outputs of the following programs and give brief explanation (*2-3 sentences*) in support of your answer. Assume that following statements are already there:

#include <iostream>

using namespace std;

[1*3 = 3] CO1 CO2

a)

```
struct STest {
   int iCount;
   STest ()
   {
      iCount = 1;
   }
   void DisplayInfo ()
   {
      cout << "Hardwork beats talent!";
   }
   ~STest ()
   {
      cout << endl << "Give your best!";
   }
};

int main ()
{
   STest objSTest;
   cout << objSTest.iCount << endl;
   objSTest.DisplayInfo();
   return 0;
}
```

b)

```
class CTest {
   private:
      int iCount;
   public:
      CTest()
      {
         iCount = 0;
         cout << "Constructor" << endl;
      }
      void DisplayInfo ()
      {
         cout << iCount;
      }
      ~CTest()
      {
         cout << "Destructor" << endl;
      }
};

int main ()
{
   int iCount = 10;
   CTest *objCTest = new CTest;
   objCTest -> DisplayInfo ();
   return 0;
}
```

c)

```
class CTest
{
   static int iCount;
   public:
   CTest()
   {
      iCount++;
   }
   static void Change (float fValue)
   {
      iCount = fValue;
   }
   ~CTest()
   {
      cout << iCount-- << endl;
   }
};

int CTest::iCount = 1.0;

int main ()
{
   CTest::Change (2);
   CTest objCTest [3];
   return 0;
}
```