Total number of printed pages: 4 **D/5th/DCSE503**

2022

Object Oriented Programming with C++

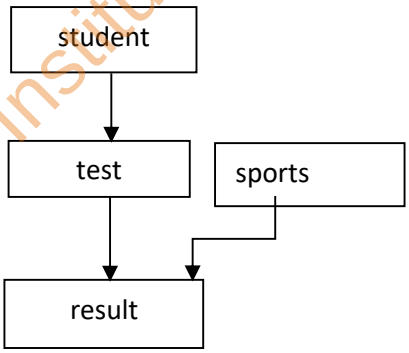
Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Question no.1 *is mandatory and answer* ***any four*** *questions from the rest.*

1.	**a)**	**Fill in the blanks**		5x1=5
		i)	Members of a class are _____ by default.	
		ii)	A _____ function can have access to the private data members of more than one class.	
		iii)	Member function that has the same name as its class is called a _____.	
		iv)	A protected member inherited in public mode becomes _____.	
		v)	A virtual function equated to 0 is known as _____.	
	b)	**State whether the following statements are TRUE or FALSE.**		5x1=5
		i)	Constructors do not return any values.	
		ii)	A reference variable provides an alternative name for a previously defined variable.	
		iii)	A function cannot return a value by reference.	
		iv)	Static member variables must be defined inside the class.	
		v)	A sizeof operator can't be overloaded.	
	c)	**Answer in brief.**		3x3=9
		i)	What is a class? How does it accomplish data hiding?	
		ii)	When will you make a function inline and why?	
		iii)	We know that a private member of a base class is not inheritable. Is it any way possible for the objects of a derived class to access the private members of the base class? If yes, how? **Note:** the base class cannot be modified.	

	d)	What is an abstract class?	1
2.	a)	Define function overloading. Write a program to compute the volume of a cube and a cylinder by overloading the volume() function.	2+8=10
	b)	What is a friend function? Write a program to exchange the values of private data members of two objects of the same class using friend function.	2+8=10
3.	a)	How do we invoke a constructor function? List out some of the properties of a constructor function.	1+5=6
	b)	Explain copy constructor with the help of an example.	6
	c)	What do you mean by inheritance? Discuss any three forms of inheritance with examples.	2+6=8
4.	a)	Differentiate between private and protected visibility mode.	4
	b)	How do the properties of the following two derived classes differ?	4
		i) Class D1:private B{…};	
		ii) Class D2:public B{…};	
	c)	Assume that the test results of a batch of students are stored in three different classes. Class student stores the roll_number, class test stores the marks obtained in two subjects, and class result contains the total marks obtained in the test. Assume one more class named sports which contains the weightage for sports that also needs to be considered before finalizing the result. The inheritance relationship between the classes are shown below.  Write a program to the implement the above scenario and display the various details of two students.	10
	d)	When do we make a class virtual?	2
5.	a)	What is an operator function? Describe the syntax of the same.	2+2=4
	b)	Use operator overloading and write a program to overload binary + operator in order to make it add two complex numbers.	8

	c)	Define a class String and write a program to overload == operator to compare two strings.	8
6.	a)	What is polymorphism? Define compile time and run time polymorphism.	2+4=6
	b)	What does ***this*** pointer point to? Use ***this*** pointer to compare the ages of two persons and return the object corresponding to the elder person.	2+8=10
	c)	Why do we need virtual functions? Discuss in brief.	4
7.	a)	Identify the error in the following programs	3x2=6
		i)	

```
#include<iostream.h>
class Room
{
int width,height;
void setValue(int w,int h)
{
width=w;
height=h;
}};
void main()
{
Room objRoom;
objRoom.width=12;
}
```

ii)

```
#include<iostream.h>
int fun()
{
return 1;
}
float fun()
{
```

			return 10.23;
			}
			void main()
			{
			cout<<(int)fun()<<" ";
			cout<<(float)fun()<<" ";
			}	

	b)	Write the outputs of the following C++ code.		3x2=6

		i)	#include<iostream.h>
			#include<string.h>
			main()
			{
			char s[] = "Hello\0Hi";
			cout<<strlen(s)<<" "<<sizeof(s);}	

		ii)	#include<iostream.h>
			int main()
			{
			int a,b,c;
			a=2;
			b=7;
			c=(a>b)?a:b;
			cout<<c;
			return 0;
			}	

	c)	Write a brief note on exception handling in C++.		8