DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER II [CE/EC/IT]
SUBJECT: (ESC201)PROGRAMMING FOR PROBLEM SOLVING II

Examination	**: Second Sessional**	**Seat No.**	**: 31**
Date	**: 26/04/2023**	**Day**	**: Wednesday**
Time	**: 8:30 AM to 09:45 AM**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 (A)Choose the most appropriate alternate(s). **[08]**

CO3 R (a) Which of the following can have return type?
(a) constructor (b) destructor (c) copy constructor (d) none of the above

CO4 R (b) Which of the following forms of inheritance can create multiple copies of the base class in the derived class object?
(a) hybrid inheritance (b) hierarchical inheritance
(c) multiple inheritance (d) multilevel inheritance

CO4 U (c) A derived class can
(a) extend the functionalities of the base class
(b) override the features of the base class
(c) use the attributes of the base class
(d) all of the above

CO4 U (d) What type of members of the base class are accessible by the members of a derived class for the public inheritance of the base class?
(a) private only (b) public only
(c) public and protected (d) protected only

CO4 U (e) Protected members can be
(a) accessed from the *main()*. (b) inherited and accessed by a derived class.
(c) accessed from another class. (d) all of the above.

CO3 U (f) friend functions and classes can access
(a) private, protected and public members of the class
(b) private and protected members of the class
(c) private and public members of the class
(d) protected and public members of the class

CO4 A (g) Which of the following cannot be a correct form of invoking base class constructors?
(a) *D(int a1, int a2, float b1, float b2, int d1): A(a1,a2), B(a1,b1,b2)*
(b) *D(int a1, int a2, float b1, float b2, int d1): A(a1,a2), B(b1,b2,c1)*
(c) *D(int a1, int a2, float b1, float b2, int d1): A(a1,a2), B(a1,a2)*
(d) *D(int a1, int a2, float b1, float b2, int d1): A(a1,a2,b1), B(b1,b2)*

CO4 U (h) What will be order of execution of construction for the following declaration?
class A: public B, virtual public C, virtual D
(a) C( ),D( ),A( ),B( ) (b)A( ),B( ),C( ),D( )
(c) C( ),D( ),B( ),A( ) (d) D( ), C( ), B( ), A( )

Q.1 (B) Do as Directed.

CO3 U (a) **State true/false with reason(s).** **[3]**
(i) The only way an object can be passed to a constructor of the same class is a copy constructor.
(ii) Constructors and destructors for the objects of a program are executed in the same order.

CO3 A (b) Identify and correct the syntax and logical error(s) in class definition only in the following code to get output as 8. **[1]**

```
#include <iostream>
using namespace std;
class Student{
public
intRollNumber;
void PrintDetails()
{cout<<RollNumber<< "\n"; }
};
int main()
{
Student Student1,
Student1 RollNumber = 8;
const Student OtherStudent = Student1;
OtherStudent.PrintDetails();
}
```

Q.2 Attempt *Any TWO* from the following questions. **[12]**

CO3 C (a) Write the code of following methods for the vector class: [6]
Note: Vector size must remain same after performing following tasks.
(i) Define a vector V of type integer with a size of 8.
(ii) Set the first element to 10.
(iii) Set the last element to 18.
(iv) Display the elements of vector.

CO3 C (b) (i)Define an appropriate class and function definitions for following *main( )* and predict the output of the code. [4]

```
#include "iostream"
using namespace std,
int main(){
Area Area1, Area2, Area3,
Area1 SetArea(12), // Assigns value to private
variable Length
Area1 ShowArea(), // Displays value of private
variable Length
Area2 = Area1,
Area2 SqLength(), // Provides square of
private variable Length
Area2 ShowArea(),
Area3 = Sq(Area1), // Provides square of
private variable Length
Area3 ShowArea(),
return 0,}
```

A (ii)Identify and correct the syntax and logical error(s) in following code and write the output after correction(s). [2]

```
#include <iostream>
using namespace std,
class Student {
public
 static int TotalStudents=0, },
int main( )
 { cout << Student :: TotalStudents << "\n",
  return 0,
 }
```

CO4 R (c) What is inheritance? Explain the types of inheritance in brief. [6]

Q.3 Answer the followings Questions.

CO4 N (a) (i)Find the missing declaration or statements and correct the incorrect statements for proper operation of the program given below. [3]

(ii) Also predict the output of the complete program with corrected statements. [3]

(iii)What will happen if *show( )* of the derived class is removed from the class definition? Justify your answer. [2]

(iv)What will be the size of the object of the derived class? How? [2]

```
#include <iostream>
using namespace std;
class base1 {
 int i,
public
base1(){cout<< "Constructing base1 without
argument\n",}
base1(int x) { i = x,
cout<< "Constructing base1 with argument\n", }
~base1() { cout<< "Destructing base1\n", }
void show() { cout<<i<< "\n",}
},
class base2 {
char c ,
public
base2( ) {
cout<< "Constructing base2 without argument\n";
}
~base2() { cout<< "Destructing base2\n"; }
void show() { cout<< c << "\n",}};
class derived: public base1, public base2 {
int j,
public
derived(int x, int y, char p) {
     j=x,
cout<< "Constructing derived with
argument\n"
   }
   ~derived() { cout<< "Destructing
derived\n", }
void show(){
 cout<<i<< " " <<j<< " " << c << "\n",
 }
};
int main() {
   derived ob(3, 4, 'A'),
ob.show(),
   return 0,
}
```

CO3 U (b) List any two situations in which a copy constructor is used? [2]

OR

Q.3 Answer the followings Questions.

CO3 N (a) (i) Predict the output of the following program. [3]

(ii) What is missing in the program for its appropriate behaviour? [1]

(iii) Insert the appropriate feature in the program for the desired behaviour and show the change in the predicted output. [3]

(iv)How many times the destructor of the class array will be executed? Write a suitable destructor for the class array. Why a user defined destructor is desirable for this class? [3]

```
#include <iostream>
using namespace std;
class list {
        int *t,
public
list() {
    t = new int[10],
  for( int i = 0, i< 10; i++)
                t[i] = i,
   }
void put(int i, int j) {
  if( i>= 0 &&i< 10 )
  t[i] = j, }
int get(int i) { return t[i];}};
int main() {
   list beta,
   int i;
for(i =9; i>=0; i--)
 cout<<beta.get(i) << "\n",
 list alpha(beta);
 for(i = 0, i< 10, i++) beta.put(i, i+1),
 for(i=0, i<10, i++)
 cout<<beta.get(i) << " " <<alpha.get(i)
 <<endl,
 return 0,
}
```

CO4 U (b) Briefly explain function overriding with reference to inheritance. [2]