



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B. TECH. SEMESTER II [CE, EC, IT]

SUBJECT: (ESC201) PROGRAMMING FOR PROBLEM SOLVING - II

Examination
Date
Time

: Regular
: 21/06/2023
: 10.00 to 1.00 PM

Seat No

: CEC31

Day

: Wednesday

Max. Marks

: 60

INSTRUCTIONS:

1. Answer each section in separate answer book.
2. Figures to the right indicate maximum marks for that question.
3. The symbols used, carry their usual meanings.
4. Assume suitable data, if required & mention them clearly.
5. Draw neat sketches wherever necessary.

SECTION - I

Q.1 Do as directed.

[10]

CO1 A (a) Predict the output of the following program. [2]

```
#include <iostream>
using namespace std;
int main()
{ int Var1;
  int &RVar1 = Var1;
  Var1 = 100; RVar1 = 200;
  int RVar2 = Var1;
  Var1++;
  RVar1++;
  RVar2++;
  cout << RVar1 << " " << RVar2;
```

CO1 U (b) Which of the following is correct for (I) constant pointer and (II) pointer to constant? [2]

- (i) int x=10, y=20, * const ptr= &x; ptr=&y;
- (ii) int x=10, y=20, *const ptr = &x; *ptr=30;
- (iii) int x=10, y=20, const *ptr= &x; ptr=&y;
- (iv) int x=10, y=20, const *ptr = &x; *ptr=30;

CO2 A (c) (I). Write an instruction to de-allocate the memory allocated by the following program? [2]

```
#include <stdio.h>
#include <stdlib.h>
int main()
{ int **p, i, j;
  p = (int **) malloc(3 * sizeof(int*));
  return 0; }
```

(II). If FPtr is a void pointer and SPtr is an integer pointer, which of the following statement(s) is valid in C++?

- (i) FPtr = SPtr, (ii) SPtr = FPtr, (iii) both (i) and (ii), (iv) none of these

CO2 R (d) In C++, default access specifier in union is _____ and in class is _____. [2]

CO3 A (e) Predict the output of the following program. [2]

```
#include <iostream>
using namespace std;
void sub (int One = 210, int Two = 180)
{ cout << One - Two << " ";
```

```
int main()
{ int Int1 = 32, Int2 = 12;
  sub (Int1);
  sub (Int2);
  return 0; }
```

Q.2 Attempt Any TWO from the following questions. [10]

CO3 C (a) Define a class definition for the given main () and predict the output. Define these overloaded member functions volume outside the class. Volume of, (I). Sphere: [5]

$V = \frac{4}{3} \pi r^3$; r = radius, (II). Cylinder: $V = \pi r^2 h$; r = radius, h = height, (III). Rectangular Prism: $V = w * l * h$; w = width, l = length, h = height

```
#include <iostream>
using namespace std;
int main()
{
  Volume sphere, cylinder, cube;
  cout << "VOLUME OF SPHERE => " << sphere.volume(10) << endl;
  cout << "VOLUME OF CYLINDER => " << cylinder.volume(2.5, 8) << endl; //r, h
  cout << "VOLUME OF CUBE => " << cube.volume(100L, 75, 15); //l, w, h
}
```

[5]

CO3 C (b) Define a class definition for the given `main()` and `printdata()`.

```
#include <iostream>
using namespace std;
int main()
{
    Student S1(5); // assigns 5 to private rollnumber
    Result R1(36); // assigns 36 to private variable marks
    printdata(S1,R1); // prints rollnumber and marks
}
```

[5]

CO3 A (c) Predict the output of the following program.

<pre>#include <iostream> using namespace std; class base1 { protected: int i; public: base1(int x) { i=x; cout << "Constructing base1\n"; } ~base1() { cout << "Destructing base1\n"; } };</pre>	<pre>class base2 { protected: int k; public: base2(int x) { k=x; cout << "Constructing base2\n"; } ~base2() { cout << "Destructing base2\n"; } };</pre>
<pre>class derived: public base1, public base2 { int j; public: derived(int x, int y, int z): base1(y), base2(x) { j=x; cout << "Constructing derived\n"; } ~derived() { cout << "Destructing derived\n"; } void show() { cout << i << " " << j << " " << k << "n"; } }; int main() { derived ob(30, 44, 779); ob.show(); return 0; }</pre>	

[10]

Q.3

CO1 A (a) (I). Identify and correct the syntax and logical error(s) and predict the output after correction(s). [3]

```
#include <iostream>
using namespace std;
int main()
{
    int Basic=950, Allowance =95, Total = 1045;
    cout << setw(10) << "Basic" << setw(10) << Basic << endl;
    cout << setw(10) << " Allowance" << setw(10) << Allowance << endl;
    cout << setw(10) << " Total" << setw(10) << Total << endl;
    return 0;
}
```

[2]

(II). Predict the output of the following program.

```
#include <iostream>
using namespace std;
int Variable = 0;
int main()
{
    do
    {
        int Variable=1;
        cout << Variable << '\n';
        cout << ::Variable << "n";
        if (Variable == 0) break;
    } while (Variable);
    cout << Variable;
```

CO2 C (b) Define an appropriate class definition for class called Person for following `main()`. [5]

```
#include "iostream"
using namespace std;
```



```

int main()
{
    Person P1,P2,P3;
    P1.SetDetails("Name1", 54.6, 18); // Private variables Name, Weight, Age
    P2.SetDetails("Name2", 59.8, 21);
    P3=P1.Elder( P2); // Function finds elder person and return appropriate object
    P3.Display( ); //Function displays Name and Age of elder person
    return 0;
}

```

OR

CO1 A (a) (I). Predict the output of given program. [3]

```

#include <iostream>
using namespace std;
static int Next;
int getNext(int NextNumber = Next)
{
    Next++;
    return NextNumber;
}

int main()
{
    cout << getNext() << endl;
    cout << getNext() << endl;
    cout << getNext() << endl;
    return 0;
}

```

(II). Identify and correct the syntax and logical error(s) in class definition only in the following code to get output as 15. Do not change *main()* definition. [2]

```

#include <iostream>
using namespace std;
struct Emp
{
    private:
        int Number;
    public:
        void Display()
        {cout << Number << "\n"; }
};

int main()
{
    Emp Emp1;
    Emp1.Number = 15;
    const Emp Emp2 = Emp1;
    Emp2.Display();
}

```

CO2 C (b) Write an object oriented program for the following methods using vector class and predict the output. [5]

- Define a vector v1 of double data type with a maximum size of 4 and a vector v2 having 5 elements initialized to int value 7.
- Set the last element of v1 to 39.
- Display the contents of v1 and v2.

SECTION - II

Q.4 Do as directed. [10]

CO4 C (a) Define the *main()* definition for the following class definitions to call *display()* of base class followed by derived class. Consider an object of only derived class is present in *main()*. Do not change class definitions. [2]

```

#include <iostream>
using namespace std;
class A
{
    public:
        void display(void)
        {
            cout << "A\n";
        }
};

class B : public A
{
    public:
        void display(void)
        {
            cout << "B\n";
        }
};

```

CO4 A (b) Predict the output of the following program. [2]

```

#include <iostream>
class Base
{
    int i;
};
class Derived : public Base
{
    int j;
};

int main()
{
    Base Obj1;
    Derived Obj2;
    std::cout << sizeof(Obj1) << "\n";
    std::cout << sizeof(Obj2) << "\n";
}

```

CO5 R (c) Briefly explain different types of polymorphism. [2]

CO5 U (d) (I). Uncaught exception leads to _____. [2]

- no effect on the program
 - successful execution of programs
 - termination of program
 - execution of other functions of the program starts
- (II). State true or false with justification(s). "Order of catch block is important in exception handling."

- CO6 R (e) When unary and binary operators are overloaded as member function, _____ argument is passed explicitly for unary operator and _____ argument is passed explicitly for binary operator. [2]

Q.5

Attempt Any TWO from the following questions.

- CO6 C (a) Define an appropriate class definition for class called Time for following main() and predict the output of the program. [5]

```
#include<iostream>
using namespace std;
int main()
{
    Time t1 = 3800; // Converts 3800 sec into hours, minutes, and seconds format
    t1.showTime(); // Displays private integer variables hrs, mins, secs
    Time t2(10, 20, 40); // hours, minutes, seconds
    t2.showTime();
    int s = int(t2); // Converts into seconds
    cout << "Time t2 in seconds:" << s;
}
```

- CO6 R (b) Explain function templates with example. [5]

- CO6 C (c) Overload operator '*' such that multiplication from and to integer work the same way, like, $M * 5$ and $5 * M$, where M is an object. [5]

Q.6

- CO4 R (a) What is inheritance? Explain the types of inheritance in brief. [5]

- CO5 E (b) For the following code, [5]

```
(I) Identify and correct the syntax and logical error(s).
(II) Predict the output after correction(s).

#include <iostream>      class Circle : public Shape  int main()
using namespace std;    { public:                      {
class Shape              ~Circle()                      Shape *PtrShape, Shape1;
{ public:                {                          Circle Ring;
    virtual void draw() = 0;    cout << "Circle dest \n";
    virtual ~Shape()          };
    {                          void draw()
    cout << "Shape dest\n";    {
    };                          cout << "Circle drawn\n";
    void Shape::draw()        };
    {                          PtrShape = new Circle;
    cout << "Shape drawn\n";  delete PtrShape;
    };                          }
}
```

OR

Q.6

- CO4 R (a) Explain how different types of data members are treated under different types of inheritance. [5]

- CO5 E (b) Answer followings with reference to program given below. [5]

```
(I). If the value entered for in is 0? What will be the response of the program?
(II). If the value entered for in is 1? What will be the response of the program?

#include <iostream>
using namespace std;
class A
{
    int Val;
public:
    A(int x) throw (int){
        Val=x;
    }
    try
    {
        if(Val==0) throw Val;
        if(Val==1) throw 2.2;
    }
    catch(int y) {
        cout << "Caught int of class" << endl;
    }
};

int main()
{
    int in;
    cout << "Enter input\n";
    cin >> in;
    try {
        A a(in);
    }
    catch(int i) {
        cout << "Caught int" << endl;
    }
    catch(double d) {
        cout << "Caught double" << endl;
    }
    cout << "end";
    return 0;
}
```

Blooms Taxonomy levels : R-Remembering, U- Understanding, A-Applying, N-Analyzing, E- Evaluating, C-Creating