7/12/19 (M)

(59)

[This question paper contains 16 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **7401** **J**

Unique Paper Code : 32341101 - OC

Name of the Course : **B.Sc.(Hons.) Computer Science**

Name of the Paper : Programming Fundamentals Using C++

Semester : I

Time : 3 Hours ***Maximum Marks : 75***

Instructions for Candidates :

(a) Write your Roll No. on the top immediately on receipt of this question paper.

(b) Question NO.**1** is compulsory in **Section-A**.

(c) Attempt any **four** questions from **Section-B**.

(d) Parts of a question should be attempted together.

P.T.O.

Section-A

1. (a) State error(s) if any, in each of the following code segments: 1×5=5

(i)
```
int main()
{
 const double pl;
 int n;
 pl = 3.141;
 n = 2;
}
```

(ii)
```
class fun
{   private:
    public:
   ~fun (int x );
}
```

(iii)
```
int myfun1(int x, y )
{
  int myfun2(int  x )
  {
     int t = x*2;
     return( t );
  }
 return  y;
}
```

(iv) In the following code segment, assume that `MyClass` is the base class and `YourClass` is the derived class

```
MyClass ob1;
YourClass ob2;
ob2 = ob1;
```

(v)
```
class A{  };
class B{ };
void myfunction()throw ( A )
{
    throw B();
}
```

(b) Give the output that will be produced on execution of each of the following program segments: 2×5=10

(i)
```
{
    string str1 = "Delhi ";
    string str2 = "Delhi1";
    int i = str1.compare
    (0,3,str2,0,3);
    cout <<  i << endl;
}
```

(ii)
```
string str1 = "The c++
                standard";
int  i = str1.find ("c");
int  j = str1.rfind("c");
```

```
cout << i << "  " << j << endl;
```

(iii)
```
int  x = 3 , y = 4 , z = 5;
if ( x < y++) || ( z++ > 0)
  cout << x << "  " << y <<"  " <<z;
```

(iv)
```
int  main()
{
  for ( int i = 0 ; i < 8 ; i++)
{
    if ( i%2 == 0)
        cout << i+1 << endl;
   else if (i%3 == 0) continue;
   else if (i%5 == 0) break;
   cout << " end of loop" << endl;
}
cout << "end of prog" << endl;
}
```

(v) Assuming x1, x2, x3 are integer variables, give the output in each of the following two cases (consider each case independently) and justify your answer.

```
if (x1)
```

```
if (x2)
if (x3)
x2 = 3;
else
x3 = 3;
cout << x1 << "  " << x2 << "
"  << x3;
```

Case 1 : if x1 = 0 , x2 = 1 and x3 = 0

Case 2 : if x1=1 , x2 = 0 and x3 = 1

(c) Give the output on execution of the following program segment: 4

```
int a = 5;
int b = 8;
int c;
int* p1= &b;
int* p2;
int * p3;
p2 = p1;
p3 = &c;
```

```
p1 = &a;

*p2 = 8;

*p3 = *p1;

*p3 = a + *p2 + *(&c);

cout << *p1 << "  " << *p2 << "  "
<< *p3 << *p1 + *p2 << endl;
```

(d) What for do we use key word `const` at the end of a function header? 2

(e) What will be the value of z on execution of the following statement if: 2

`x = 4 , y = 4:`

$z = (x < y ? -2 : (x == y ? 0 : 2));$

(f) Write C++ statements to illustrate how input output stream flags can be used to produce the output that is : 4

(i) left justified

(ii) right justified

(g) If the value of `x = 3` and `y = 5`, what will be the values of x and y on evaluation of each of the following expressions independently? 4

(i) `x++ + y`

(ii) `++x + 4`

(iii) `-x + y++`

(iv) `--x+--y`

(h) if `x = 5, y = 0, and z = -2,` what will be the value of the following expressions: 4

(i) `x && y || z`

(ii) `( x || y ) && z`

Section - B

2. (a) In the following code, point out the statements in which copy constructor will be called. 4

```
class Rational
{
 private :
int num,den;
public :
```

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```
    Rational(){ }
    Rational (int n , int d): num(n),den
    (d)
    {     }
    Rational(const Rational& r):
    num(r.num),
    den(r.den)
    {
      cout    <<    "COPY CONSTRUCTOR
    CALLED\n";
    }
};
    Rational f(Rational r )
    {
     Rational s   =   r;
     return   s;
    }
    void main()
    {
```

```
Rational x(22,7);

Rational y(x);

x = f(y) ;

}
```

(b) What are abstract classes ? Illustrate the use of abstract classes with an example. 6

3. (a) How is function overloading different from function overriding ? Give an example of each. 4

(b) Write a program to read an integer `n`, followed by `n` integers. Compute the average of these numbers. The program should throw an exception for the following : 6

(i) `n` is zero

(ii) `n` is negative

The program should be able to handle any other exception thrown.

4. (a) Write a function `checkSorted` that accepts two parameters 6

(i) Size of an integer array

(ii) An array of integers

The function `checkSorted` should return `true` if input array is sorted in descending order and `false` otherwise.

(b) What will be the output on execution of the following program; 4

```
class Compute
{
   virtual int add(int a , int b )
   {
      return  a + b ;
   }
   int add(int a , int b , int c )
   {
      return a + b + c ;
   }
};
Class Simple: public Compute
{
```

```
    virtual int add (int a, int b)
    {
        return  a + b + 2 ;
    }
};
void main(  )
{
    Compute ob1;
    Compute * p;
    Simple ob3;
    p = &ob3;
    cout  <<  p-> add(4,5 ) ;
    p = & ob1;
    cout << p-> add (6, 7 );
    cout << ob1.add (10,20);
    cout << ob1.add (10, 20, 30);
    return;
}
```

5. (a) Define a class `fraction` having data members `numerator` and `denominator`. Write member functions to do the following: 6

(i) create an object `fr1` for the fraction `5/7`

(ii) increment the fraction using postfix operator ++ (using operator overloading),

`fr++` should update `fr` to `12/7`, by modifying the value of the `numerator`.

(b) Write a C++ program that reads a text file `f1.txt` and creates another file `f2.txt` so that every sequence of consecutive blank spaces in `f1.txt` is replaced by a single character `'@'` in the output file `f2.txt`. 4

6. (a) If `str1` and `str3` are C++ strings, write C++ statements for the following: 4

(i) to obtain the substring `str3` comprising the first four characters of `str1`

(ii) to find the position of the first occurrence of `str3` in the string `str1`

(iii) to find the second occurrence of the string `str3` in `str1`

(b) Write a program to create a class called Person having the following data members: `(i) Aadhar No, Name, birth_year`. Write a following function to: 6

(i) create an object for a person using parameterized constructor.

(ii) `calculate_age` which accepts as input parameter the current year and calculates the person's age in years.

(iii) `display` to print all the details for a given object of the class along with the calculated age.

7. (a)
```
class demo
{
public:
static int objectcount;
```

```
    int a;
    demo(int k)
    {
      a = k;
      cout << ++objectcount << a;
    }
};
int demo :: objectcount = 0;
void main( )
{
  demo ob1( 4 ), ob2( 5 ), ob2( 6 );
   cout << "n_objects created"
  <<demo::objectcount;
}
```

6

(b) Give the output on the execution of the following code : 4

```
class myClass
{
```

```
    int x , y;
    public :
    myClass(int   x1, int   y1)
    {
      x = x1;
      y = y1;
    }
    friend int sum (myClass ob1)
    {
      int   z ;
      z = ob1.x + ob1.y ;
      return   z;
    }
    void increment( )
    {
     x ++;
     y ++;
     cout << x << y;
     }
};
void main()
{
   int   y1 ;
```

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```
    myClass ob1(  4, 5 );
    y1= sum (ob1);
    cout << y1;
    ob1.increment();
}
```