This question paper contains 6 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 6501 **F**

Unique Paper Code : 32341101

Name of the Paper : Programming Fundamentals using C++

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

Semester : I

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Question **1** is compulsory in **Section A**.
3. Attempt any **four** questions from **Section B**.
4. Parts of a question should be attempted together.

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Section–A

(a) What is polymorphism in OOP? (2)

(b) Why don't the constructors have return type? (2)

(c) How do you overload '++' as post-increment operator? Give an example to illustrate overloading of '++' as post-increment operator. (4)

P.T.O.

(d) Find errors in the following code segments:

i.
```
int func(int x,y)
{
int z;
cout << z;
}
```

ii.
```
class du
{
private:
…;
public:
void ~du(void);
}
```

(e) How do the properties of the following two derive classes A and P differ?

i. `class A: private B{//…..};`
ii. `class P: public B{//…...};`

(f) What is 'this' pointer? Explain with an example.

(g) Give output of the following code segments :

i.
```
x=12;
   while(x>7){
        cout <<x<<endl;
   x-=2;}
```

ii.
```
for (int x = 20;x>=1; x--)
{
   for (int y = x; y>=1, y--)
   cout << "  ";
   cout << x;
}
```

(h) When do we make a virtual function "pure"? What ar the implications of making a function a pure virtu function?

(i) How is a **structure** different from a **class** in C++? (2)

(j) What are inline functions? When will you make a function inline? (3)

(k) Which one of the following is a valid function declaration? Justify your answer. (2)

```
 i.   int f1(int i=1,int j=2,int k);
ii.   int f1(int i=1,int j,int k=2);
iii.  int f1(int i ,int j=2,int k=3);
```

(l) Explain the following string functions with suitable example : (3)

(i) compare()

(ii) find()

(iii) replace()

Section–B

(a) Write a C++ program to convert a two-dimensional array A[4][4], into a one-dimensional array B[16] that will have all the elements of A if they are stored hi row-major form. For example, if array A[4][4] is :

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

ThenB[16] is {1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16} (5)

P.T.O.

(b) Assume a class D derived from a base class B. Cl
B is a friend of class A. Can class D access priv
data of class A? Justify your answer.

3. (a) Identify error(s) in the following code :

```
class Fun
{
    private:      int x;
    protected:    int y;
    public:       int z;
};
class Funny: public Fun
{
    private:      int u;
    protected:    int v;
    public:       int w;
};

int main()
{

    Fun fun;
    Funny funny;
    fun.x = 1;
    fun.y = 2;
    fun.z=3;
    funny.x=11;
    funny.y = 12;
    funny.z=13;
    funny.u=14;
    funny.v=15;
    funny.w=16;
}
```

(b) What is a copy constructor? Give an example of a copy constructor. (4)

(c) Give the output of the following program : (3)

```
int x=2, y;
int main()
   {
    cout<<"x="<<x;
    cout<<"y="<<y;
    func();
    cout<<"x="<<x;
    cout<<"y="<<y;
    return 0;
}

void func()
{
  int  x=7;
  y=11;
  cout<<"x="<<x;
  cout<<"y="<<y;
}
```

(a) What is function overloading? Explain with the help of suitable example. (6)

(b) What is the sequence of constructors and destructors being called in the following multilevel inheritance : (4)

```
class A
{…};
class B:public A
{…};
class C:public B
{…};
class D:public C
{…};
```

5. (a) Write a C++ program that reads a text file and crea another file that is identical to the first except that ev sequence of consecutive blank spaces is replaced b single space.

(b) Write a recursive function to compute sum of first natural numbers.

6. (a) Create a class TwoDim which contains x and coordinates as int. Define the following :

(i) default constructor to initialize data members zero

(ii) parameterized constructor to initialize d members to values passed

(iii) function print() to print the coordinates of class.

(b) Explain the purpose of using the key word 'const' w data and function members of a class.

7. (a) What are static variables and static functions? How a static variables initialized? What is the purpose of sta variables and static functions?

(b) Write a program to swap two numbers using pointe