

[This question paper contains 16 printed pages.]

Sr. No. of Question Paper : 1197 F

Unique Paper Code : 2342011201

**Name of the Paper : Object-Oriented Programming
with C++ (DSC04)**

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

Semester : II

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. **Section A** is compulsory (Question 1).
3. Attempt **any 4** questions from **Section B** (Questions 2 to 6).

Section A

(Compulsory Question)

1. (a) What are inline functions? Rewrite the following code using the inline function. (3)

P.T.O.

```
#include<iostream>

using namespace std;

float mul (int x, int y)

{

    return (x*y);

}

int main()

{

    int a = 2, b = 5;

    cout << mul(a, b) << "\n";

    return 0;

}
```

(b) What will be the output of the following program :

(i) #include<iostream> (3)

```
using namespace std;

class construct

{

    int p, q;
```

```
public:  
    construct(int x, int y)  
    {  
        p = x;  
        q = y;  
    }  
  
    void Display()  
    {  
        cout<<p<<"\n"<<q<<"\n";  
    }  
};  
  
int main()  
{  
    construct item1(10, 20), item2 =  
    construct(30, 40);  
  
    item1.Display();  
  
    item2.Display();  
  
    return 0;  
}
```

(ii) #include<iostream> (3)

```
using namespace std;
```

```
void square(int* snum)
```

```
{
```

```
cout<<"Square of 10 is ";
```

```
*snum *= *snum;
```

```
}
```

```
int main()
```

```
{
```

```
int num = 10;
```

```
square (&num);
```

```
cout << num << endl;
```

```
}
```

(iii) #include<iostream> (3)

```
using namespace std;
```

```
void Myclass()
```

```
{
```

```
try
```

```
{
```

```
throw "y";
```

```
    }

    catch (const char*)

    {

        cout<<"Exception inside Myclass\n";

        throw;

    }

}

int main()

{

    cout<<"Now main starts\n";

    try

    {

        Myclass();

    }

    catch (const char*)

    {

        cout<<"Exception inside main\n" ;

    }

    cout<<"Now main ends\n";

    return 0;

}
```

(c) Write a program that takes a character from the keyboard and displays its corresponding ASCII value on the screen. (3)

(d) How do the properties of the following two derived classes A and B differ?

(i) class A: private C{...};

(ii) class B: public C{...}; (3)

(e) Write a function to swap two numbers using pointer datatype parameters. (3)

(f) Identify the error(s) in the following program :

(i) #include<iostream> (3)

using namespace std;

class four_seater

{

public:

void Property()

{

```
cout<<"It has space for four  
persons"<<endl;  
}  
};  
  
class four_wheeler  
{  
public:  
    void Property()  
    {  
        cout<<"It runs on four tyres"<<endl;  
    }  
};  
  
class Car: public four_seater, public four_wheeler  
{ };  
  
int main ()  
{  
    Car C1;  
    C1.four_seater;  
    C2.four_wheeler;  
    return 0;  
}
```

(ii) #include<iostream> (3)

```
using namespace std;
Template<class T1, class T2>
class Person
{
    T1 m_t1;
    T2 m_t2;
public:
    Person (T1 t1, T2 t2)
    {
        m_t1=t1;
        m_t2=t2;
        cout<<m_t1<<" "<<m_t2<<endl;
    }
    Person (T3 t2, T4 t1)
    {
        m_t2=t2;
        m_t1=t1;
        cout<<m_t1<<" "<<m_t2<<endl;
    }
};
```

```
void main()
{
    Person <int, float> obj1(1, 2.34);
    Person <float, char> obj2(2.13, 'r');
}
```

(iii) # include <iostream> (3)

```
#include <fstream>
using namespace std;
int main()
{
    const int size = 100;
    char buffer[size];
    ifstream in ("p1.cpp");
    ofstream out("p2.cpp");
    while(in.get(buffer))
    {
        in.get();
        cout<<buffer<<endl;
        cout<<buffer<<endl;
    }
    in.close();
    out.close();
}
```

SECTION B

2. (a) Write a program that reads a text file and creates an output file, named "out. dat". The output file is identical to the text file except that every sequence of consecutive blank spaces is replaced by a single space. (5)
- (b) What is the sequence of constructors and destructors being called in the following multilevel inheritance : (5)

class X

{...};

class Y: public X;

{...};

class Z: public Y;

{...};

- (c) Write the output of the following code. Also, mention the call by value and call by reference parameters in the following code. (5)

```
#include<iostream>

using namespace std;

int func(int a, int* b, int& c)

{

    int temp = a + *b + c;

    a += 10;

    *b += 20;

    c += 30;

    return temp;

}

int main()

{

    int x = 1, y = 2, z = 3;

    cout << x << ", " << y << ", " << z << "\n";

    cout << func(x, &y, z);

    cout << "\n" << x << ", " << y << ", " << z;

    return 0;

}
```

3. (a) Create a class ThreeDim which contains x, y and z coordinates as integers. Define the following for the class :

- (i) default constructor to initialize data members to zero
- (ii) parametrized constructor to initialize data members to values passed
- (iii) function out() to display the coordinates of the class. (9)

(b) What will be the change in the output if a virtual keyword is removed from the print () function of the class basel? Write the output for the following code with the virtual keyword and without it.

(6)

```
#include<iostream.h>
using namespace std;
class basel
{
    public:
        virtual void print()
    {
```

```
cout<<"print version of base class"<<endl;  
}  
  
void show()  
{  
    cout<<"Show version of base class"<<endl;  
}  
};  
  
class der: public basel  
{  
public:  
    void print()  
    {  
        cout << "print version of derived class " <<  
        endl;  
    }  
  
    void show()  
    {  
        cout << "Show version of derived class" <<  
        endl;  
    }  
}
```

```
};

int main()

{

    basel *ptr;

    der x;

    ptr = &x;

    ptr->print();

    ptr->show();

}
```

- A. (a) Write a program to print the following output :
(6)

1
12
123
1234
12345
.....

- (b) Write a program to print the area of a square and circle using function overloading. (9)

5. (a) Write a program to define a class, Complex, with the following features : (10)

- (i) data members hidden from outside the class
- (ii) a default and parametrised constructor
- (iii) a member function to add another complex number to it main() function to show the implementation of the class

(b) Write a function that compares the two given arrays arr1 and arr2 of the same size (passed as parameters) for equality, and returns true or false. (5)

6. (a) What is a pure virtual function? Define an abstract class Polygon, with a data member area that stores the area of the Polygon, and a pure virtual function that calculates the area of the Polygon. Inherit a Rectangle class from the Polygon. Complete the program to show the use of the abstract class and polymorphism. (10)

- (c) Write a function `UpperTriangle()` that accepts a square matrix A and its order n as input arguments. The function should convert matrix A to an upper triangular matrix by assigning 0 to all elements below the diagonal (diagonal left to right from top). (5)

(1000)