[This question paper contains 12 printed pages.]

Your Roll No. 2200350107

Sr. No. of Question Paper : 1127 **D**

Unique Paper Code : 2342571101

Name of the Paper : Programming Fundamentals Using C++

Name of the Course : **B.Sc. (Multidisciplinary Courses of Study with Three Core Disciplines under UGCF 2022)**

Semester : First (I)

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.
3. Answer any **four** questions from **Section B**.
4. Parts of a question must be answered together.
5. Write program statements in C++ language.

P.T.O.

Section A

1. (a) Which of the following is a valid identifier in C++? Give reason. (3)

(i) protected

(ii) 8years

(iii) _myname

(b) Write an assignment statement using a single conditional expression for the following code segment: (3)

```
if (marks>=80)
    grade= 'A';
else
    grade='B';
```

(c) Give the output of the following code segment: (3)

```
int main()
{
  int n=6;
  if(n=10)
```

```
    cout<< "n is zero"<<endl;
  else
    cout<< "n is not zero"<<endl;
  cout<<"The cube of n is"<<n*n*n<<endl;
}
```

(d) What will be result of the following expressions in C++ : (3)

(i) 56! =90&&56<100

(ii) 20<<2

(iii)
```
a=20;
b=a++ + 5;
cout<<b;
```

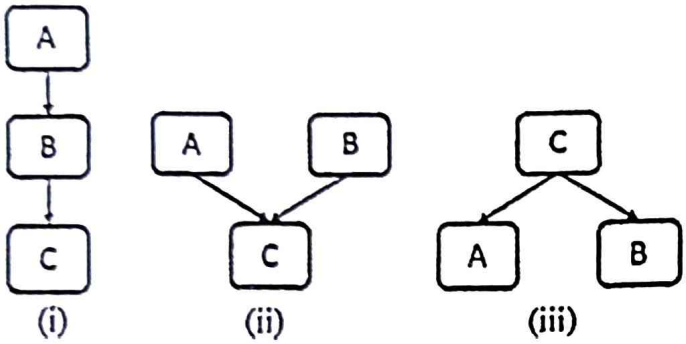
(e) Give the output of the following code segment: (3)

```
int main()
{ int x = 10; //assume the address of x is 1500
  int *y;
  y=&x;
  cout<<*y<<endl ;
  cout<<y<<endl;
  cout<<*(&x);
  return 0;
}
```

(f) Write C++ code to calculate the square of a number using inline function. (3)

(g) List any three properties of destructor function. (3)

(h) Identify the type of inheritance in the following cases : (3)



(i) Identify the error in the following try-catch block and give the correct code. (3)

```
try{
      // try block
}catch( ... ) {
      // catch block 1
}catch( int ) {
      //catch block 2
}catch( char ) {
      //catch block 3
}catch( double ) {
      //catch block 4
}
```

2, 3, 4, 3, 6, 7

(j) State if the following statements are True or False : (3)

(i) Class members are by default public.

(ii) A constructor never has arguments.

(iii) If a file is opened for writing in ios::out mode and the file by that name already exists then the contents of the file are deleted.

Section B

2. (a) Write a C++ function to accept a three digit number as parameter and returns the sum of its digits. For example, if the number is 435 then the function should return 12. (5)

(b) Find the error, if any in the following C++ statements: (5)

(i) cout<<"x=" x;

(ii) int m==10;

(iii) cin>>x;>>y;

(iv) int func(int a=1, int b);

(v) cout<<\n "Name: "<<name;

(c) Write a function average (int count, int marks [where count indicates total number of students i the class and marks [] refers to the marks obtaine by these students. The goal of the function is t return the average marks of the class. (5

3. (a) Write a C++ program to display the following pattern on the output screen. Take the number of rows from the user as an input. For example, if the number of rows entered is 4 then the following output should come. (5)

44444

33333

22222

11111

(b) Consider the following code segment in C++: (5)

```
switch(ch)
{
  case 'A': cout<<"Variable has value A" << "\n";
  case 'B': cout<<" Variable has value B" << "\n";
```

```
case 'C': cout<<" Variable has value C" << "\n";
          break;
default: cout<<"Variable has some other value"<<"\n";
}
```

Find the output of the above code using following values of variable ch :

(i) ch = 'B'

(ii) ch = 'E'

(iii) ch = 'a'

(iv) ch = 'C'

(c) Distinguish between entry-control and exit-control loop with suitable example. (5)

4. (a) Write a program to compute the area of triangle and a circle using the concept of function overloading. (5)

(b) Consider the following function : (5)

```
int Multiple(int a, int b=0,int c=1){
    return (a*b*c);
}
```

What will be the value of result when the following function calls are made:

(i) result=Multiple(2,3,4);

(ii) result=Multiple (2,3);

(iii) result=Multiple (2);

(iv) result=Multiple (1,3.8);

(v) result=Multiple (4.5);

(c) Explain the concept of call by value and call by reference. Write a function to swap two numbers using appropriate calling method. (5)

5. (a) Write a C++ program to copy the contents of one text file to another file. (5)

(b) Add try-catch blocks in the following code at appropriate position : (5)

```
#include<iostream>
using namespace std;
void divide(int x, int y, int z) {
  if(x–y)1=0)
  {
```

```
            int r = z/(x-y);
            cout<<"Result="<<r;
        }
        else
        {
            throw (x–y);
        }
    }
    int main() {
        divide(10, 20, 30);
        divide(10, 10, 30);
        return 0;
    }
```

(c) When do we declare the data member of a class as static? State any two properties of a static member variable of a class. Also state any two properties of a static member function. (5)

6. (a) Write a program to create a class TwoDim which has x and y integer coordinates as data members. Write the following member functions for this class : (5)

   – A parameterized constructor to initialize the data members x and y, with y having default value 5.

- A function print () to print the coordinate values in the form (x, y), i.e. for x=4 and y=5, the output of print should be (4, 5).

In the main (), create an object ptl of the class TwoDim with values 4 and 5, and display this point.

(b) Consider the following C++ program and find the final output. (5)

```
#include <iostream>
using namespace std;
int main ()
{ int a[] = {1, 2, 3, 4, 5, 6, 7, 8};
  int *p;
  p = a;
cout<<" \nValue at p: "<< *p<<endl;
p=p+2;
cout<<" \nValue at p+2 "<< *p<<endl;
++p;
cout<<"\nValue at ++p "<< *p<<endl;
cout<<"\nValue at p-- "<< *(p--) <<endl;
return 0;
}
```

(c) Explain the file opening modes ios: : ate, ios: : app and ios: : out.

Name two file pointers used to move through the files while reading and writing. (5)

7. (a) Convert the following C++ program to incorporate the use of template in Test class. (5)

```
#include<iostream>
using namespace std;
class Test {
        int a;
        int b;
    public:
        Test(int n1, int n2) {
            a = n1;
            b = n2;
        }
        void show( );
};
void Test::show( ){
    cout<<a<<"and"<<b;
}
int main() {
    Test test1(123, 20);
    test1.show( );
    return 0;
}
```

(b) Write the sequence of constructors and destructors being called in the following inheritance: (5)

```
class A{...};
class B: public A{...};
class C: public B{...};
class D{...};
class E: public D, public C{...};
E obj;
```

(c) What are virtual and pure virtual functions? What is a class containing at least one pure virtual function called? Explain the need of virtual functions with the help of an appropriate example. (5)