[This question paper contains 16 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 8591 **J**

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.

SECTION A

1. (a) Consider the following declaration statements :

```
float  f;
int  *b  =  &f;
```

float

P.T.O.

Identify the error and write the code to correct it. (2)

(b) Assuming that the required header files have been included where required, what will be the output produced on execution of the following code segments :

(i)
```
double z1;
double y = 56.7;
int x = 34;
if(x)
{
    z1 = y++;
    cout<<z1<<"\n"<<y;
}
else
{
    z1 = y+x/2;
    cout<<z1<<y;
}
```
(2)

(ii)
```
int x = 4, y = 3;
for(int i = 1;i<=x; i++)
{
    for(int j = y; j>=1;j--)
      cout<<(i*j);
    cout<<"\n";
}
```
(4)

(iii)
```
int v;
int k = 10;
v = (150%k ? k*5: ++k);
cout<<"v=" <<v <<"k=" <<k;
```
(2)

(iv)
```
int i;
int b[]={101,120,130,-340,-112,
-114};
for (i = 0; b[i]>0; i++)
;
cout <<i;
```
(2)

(v)
```
int i = 890;
double x = 4.678;
cout<<setw(5)<<i<<"\n";
cout<<fixed;
cout<<setprecision(6);
cout<<"x="<<x<<"\n";
cout<<oct<<"Octal="<<i;
```
(4)

(vi)
```
string s("The basic program
of C plus plus");
int j;
int k=0;
int count=0;
j = s.find('u',k);
```

```
while(j!=-1)
{
   count++;
   j  =  s.find('u',j+1);
}

cout<<count;
```

(4)

(vii)
```
class  Base
{
  public:
  Base()
  {
     cout<<"Inside  Base\n";
  }
};
class  Derived1:  public  Base
{
  public:
  Derived1()
  {
     cout<<"Inside  Derived1\n";
  }
};
```



```
class Derived2 : public Derived1
{
  public:
  Derived2()
  {
     cout<<"Inside Derived 2\n";
  }
};
void  main()
{
     Base  o1;
     Derived1  o2;
     Derived2  o3;
}
```

Inside Base
Inside Derived1
Inside Derived2

(3)

(c) Assuming that the required header files have been included where required, Find out the error in the following code fragments

(i)
```
void  f(int  *p)
{
   int  a;
   *p  =  a;
   *a  =  *a+1;
   return  a;
}
```

a is not a pointer

(3)

(ii)
```
void try(int a,int b)
{
  if(a<0) throw("Negative
  number");
}
```
(1)

(d) Write a function to remove duplicate element from one dimensional integer array A of size n. (5)

(e) Rewrite the following while statement as an equivalent for statement :

```
int x = 0;
while(x<10)
{
  cout<<x<<endl;
  x++;
}
```
(3)

SECTION B

2. (a) Write a program to count the number of vowels in a string entered as command line argument. (3)

(b) Consider four integer variables that has been initialized as : y = 5, z = 0 and t = −4. What is the value of each of the following expressions on evaluation (consider each part independent of other)?

(i) t || z <(y+5) && y

(ii) (3*y/4%5)&&y

(iii) !(4+5*y>=z-4)&&(z-2) (3)

(c) Write a C++ function that takes an array of characters to convert all lowercase characters to uppercase (without using *built-in* functions) and return type is void. (4)

3. (a) What will be the output produced on execution of the following code segment :

```
#include<iostream>
using namespace std;
void main()
{
  int i;
  int j = 11;
  int m = 6;
for(int i = 1;i<=m; i++)
```

```
    {
       for(int  t=1; t<=j;  t++)
         cout<<t;
       j  =  j-2;
       cout<<"\n";
    }
}
```

(5)

(b) Write a function UpperTriangular() that accept a matrix A of order n*n as an input argument as well as its order. The function should convert matrix A to uppertriangular matrix by assigning 0 to all elements below principal diagonal(diagonal left to right from top). (5)

4. (a) Consider the following class :

```
class  Rationalnumber
{
    int  p,q;
    ...
};
```

The above class is designed to define a rational number with numerator p and denominator q. For the above class write the definitions of the following member functions :

(i) Parameterized constructor

(ii) Overload + operator to add two rational numbers

(iii) Display function

Write the suitable statements to create three rational numbers r1, r2 & r3 having 5/7, 6/7 and 8/7. Use operator overloading to store the sum of two objects in third object r3. Use the display function to print the content of object r1, r2 and r3. (6)

(b) Write a program that reads a file and print the number of lines in it. (4)

5. (a) What will be the output produced on execution of the following code segment :

```
#include<iostream>
using  namespace  std;
void  main()
{
   int  arr[]={12,34,56,89};
   int  temp;
   int  size  =  4;
   for(int i=0,j=size-1;i<j; i++,j--)
      {
```

P.T.O.

```
        temp = arr[i];
        arr[i] = arr[j];
        arr[j] = temp;
      }
   for(int i = 0;i<size;i++)
      cout<<arr[i]<<"\n";
}
```

(4)

(b) Consider a following class :

```
class X
{
   int i1;
 public:
 X()
 {
   i1 = 15;
 }
 virtual void display()
 {
   cout<<"i1="<<i1<<endl;
 }
 };
class Y :public X
{
 int j1;
```



```
 public:
 Y()
 {
   j1 = 10;
 }
...
};
class Z:public Y
{
 int k1;
 public:
 Z()
 {
   k1 = 20;
 }
 ...
};
```

Replace ellipses ... by appropriate C++ code to override method `display()` in class `Y` and `Z`. Use Runtime polymorphism to display the content of objects of class `X`, `Y` and `Z`. (6)

6. (a) Consider the following declarations:

```
string s1 = "Hello World";
string s2 = "Program in C++";
```

Write code fragments for the following :

(i) To compare the first four characters of s1 with the last two characters of s2

(ii) To extract the last six characters of s2 (5)

(b) Write the output on execution of the following code :

```
#include<iostream>
using namespace std;
 class myexception
   {
     string str;
     public:
     myexception(string p)
     {
       str=p;
     }
     void display()
     {
       cout<<str;
     }
```



```
   };
void main()
{
    int n,m;
 try
 {
   n = 5;
   m = -6;
   if (n<0)
     throw myexception("Negative
     number");
   cout<<n<<endl;
   if (m<0)
     throw myexception("Negative
     number");
   cout<<m;
 }
catch(myexception o1)
{
   o1.display();
}
}
```

(5)

(i) A function that accepts an array of integers, a character variable and returning a pointer to an integer.

(ii) print integer x with field width as 10 and fill character as '*'.