(16)

[This question paper contains 12 printed pages.]

Your Roll No.....

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Unique Paper Code	:	2342571101	
Name of the Paper	:	Programming Fundamentals Using C++	
Name of the Course	:	**B. A. (Prog) & BSc (Non-Major)**	
Semester	:	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. Attempt any four questions from Section B. Parts of a question must be answered together.

Section A

1. (a) For the following statements state true or false: (3)

   (i) Return type of an overloaded function does not play any role in overload resolution.

   (ii) Constructors can be declared as private members of a class.

   (iii) The eof() function returns 0 if end-of-file condition is reached.

   (b) Write a program to declare an array of integers using dynamic declaration. Take input values from the user and store them in the array. Display the contents of the array. (3)

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(c) What would be the output produced on the execution of the following code segment: (3)

```
#include<iostream>
using namespace std;
int main()
{
    int x = 0;
    x = 400*400/400 ;
    cout<<"Value of x = "<<x<<endl;

    int atry[5] = {1,2,3,4,5};
    cout<<*(atry)<<"\t\t"<<*(atry + 1)<<endl;
    return 0;
}
```

(d) Identify the errors in the following C++ statements: (3)

```
i)   int mul(int a,b);
ii)  float code = "7.7";
iii) int b = 6;
      int  *p = b;
```

(e) What would be the output produced on the execution of the following code segments: (3)

```
i)   int i = 1;
     do
     {
        i++;
       cout<< "Value of  i = "<<i;
     }while(i>5);
```

ii)
```
for(int n=0 ; n<10 ; n++)
{
    if(n==4)
        continue;

    cout<<n<<endl;
}
```

iii)
```
int x = 12;
int y = 5;
cout<<(x>y);
```

(f) What is a destructor function? Can destructors be overloaded? (3)

(g) Write a function swap() to swap two numbers using reference variable (without using third variable). (3)

(h) Rewrite the following code using ternary operator. Additional variables can be declared if necessary. (3)

```
int main()
{
    int number ;
    cout<<"Enter an integer: " ;
    cin >> number ;
    if (number >= 40)
    {
        cout<<"Passed "<<endl;
     }
    else
    {
        cout<< "Failed: "<<endl;
    }
   return 0;
}
```

(i) Identify the errors in the following code. Correct the code and give output produced upon the execution of the corrected code. (3)

i)
```
#include<iostream.h>
int main()
{
    int x = 80;
    int y& = x;
    x++;
    cout<<x;
   return 0;
}
```

ii)
```
cin>>x ;>>y;
```

(j) What would be the output produced on the execution of the following (3)

```
#include<iostream>
int main()
{
    int a[] = {1, 2, 3, 4, 5, 6} ;
    cout<<(1+3)[a]<<endl;
    cout<<a[0]<<endl;
    cout<<(a+1)[2]<<endl ;
    return 0 ;
}
```


Section - B

2. (a) Write a program in C++ to define a function `calc_volume ()` that returns the volume of a cylinder. Take `radius` and `height` of the cylinder as input from the user and send them as parameters to `calc volume ()` function. (Volume of cylinder= `3.14*radius* radius *height`) (5)

(b) State whether the following statements are true or false. (5)

(i) A function can return a value by reference.

(ii) Class members are `public` by default.

(iii) A class should have at least one constructor.

(iv) 'this' pointer points to the object that is currently used to invoke a function.

(v) `private` data members of parent class are not accessible to object of child class.

(c) What would be the output produced on the execution of the following code segment: (5)

```
#include<iostream>
using namespace std;

class inventory
{
      static int number;
      float cost;

    public:
      void getnumber()
        {
           cout<<"Number ="<<number<<endl;
        }

       void getdata(int a)
         {
             cost = a;
             number++;
         }
};

int inventory::number;

int main()
{
        inventory a, b;
        a.getnumber ();
        a.getdata(100);
        b.getdata(200);
        a.getnumber ();
        b.getnumber ();

        return 0;
}
```

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

```
include<iostream>
using namespace std;

class Base1
{
    public:
        Base1()
        {
            cout<<"I am in Base1 class\n";
        }
};

class Base2
{
    public:
        Base2()
        {
            cout<<"I am in Base2 class\n";
        }
};

class Derived: public Base1,public Base2
{
    public:
        Derived()
        {
            cout<<"I am in Derived class\n" ;
        }
};


int main()
{
    Derived d;
    return 0;
}
```

(b) Consider the following class: (5)

```
class Bank
{
   float balance;
   int account_number;

};
```

Add the following member functions to the class with their definitions:

(i) Add default constructor.

(ii) Add a parameterized constructor to initialize private data members of the class.

(iii) Add a function to deposit some amount in the bank account.

(iv) Define function `get_info()` to display `balance` and `account_number`.

Create an object of Bank class and call the above defined functions in the main() function.

(c) What are the different ways of declaring a string in C++? List any three built-in string functions available in C++ and the input and output parameters of each function. (5)

4. (a) Identify the errors (if any) in the following code. Correct the errors and give the output:

i)
```
int n = -1;
if(n + 1)
   cout<<"if clause";
else
   cout <<"else clause";
```

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ii)
```
class abc
{
  ~abc()
   {
    cout << "I love coding"<<endl;
   }
public:
    abc()
    {
     cout << "My idea of fun"<<endl;
    }
};

int main()
{
   abc obj;
}
```

(b) Write a program that accepts `name` and `marks` from the user and writes them to a text file `File1`. For example, if the name is 'Amit' and marks are 90, then the contents of the file should be: `Amit has scored 90 marks` (5)

(c) (i) Can constructors be declared in the `private` section of a `class`? Give reasons to support your answer. (5)

(ii) What would be the output produced on the execution of the following code segment:

```
#include <iostream>
using namespace std;
int main()
```

```
{
    int i, x[5], y, z[5];
    for(i = 0; i < 5; i++)
    {
        x[i] = i;
        z[i] = i + 3;
        y = z[i];
        x[i] = y++;
    }
    for(i = 0; i < 5; i++)
        cout << x[i] << "  ";
}
```

5. (a) Consider the following class definitions: (5)

```
class A
{
    int i;
    public:
        int j;
    protected:
        int c;
};
class B: protected A
{
    char d;
    public:
        B();
};
```

List the public, private and protected data members of class B.

(b) Write a program to take a string and a character value from the user. The program should check whether the character is present in the string or not and display appropriate messages. (5)

(c) What would be the output produced on the execution of the following code segment: (5)

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```
#include <iostream>
using namespace std;

double division(int a, int b)
{
    if (b == 0)
    {
        throw "Division by zero exception!";
    }
    return (a / b);
}

int main()
{
    int x
    try
    {
        x = division(50, 5);
        cout<<x<<endl;
        x = division(50, 0);
     }
    catch(const char* msg)
    {
        cout<<msg<<endl;
    }

    return 0;
}
```


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

```
#include<iostream>
template<class T>
T max(T x, T y)
{
   return(x>y ? x : y);
}

int main()
{
    int i = 5, j = 7, k;
    long l = 10, m = 25, n;
    k = max<int>(i,j);
    n = max<int>(l,m);
    cout<<"value of k ="<<k;
    cout<<"value of n="<<n;
    return 0;
}
```

(b) (i) Which header file is required to be included in a program for performing file input/output? (5)

(ii) Identify the error in the following program. Write the changes needed to correct the error.

```
#include <iostream>
using namespace std;
int main()
{
   try
   {
      throw 10;
    }
   catch (...)
   {
      cout<<"default exception \n";
   }
   catch (int param)
   {
      cout<<"integer exception \n";
   }

  return 0;
}
```

(c) What is polymorphism? Distinguish between early binding and late binding in the context of polymorphism. (5)

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

```
#include<iostream>
using namespace std;
int main(){

    int x[5] = { 1, 2, 3, 4, 5 };
    int *p  =  x;
    int i;
    for (i = 0; i < 2; i++)
    {
        int temp = *(p+i);
        *(p) = *(p+4-i);
        *(p) = temp;
    }
    for (i = 0; i < 5; i++)
        cout<<x[i]<<" ";
    return 0;
}
```

(b) Create a class teacher having name and qualification as data members. (5)

Define member functions - getdata() and put data (). The function getdata () assigns values to data members and putdata () displays the same.

Create an array of 10 objects of teacher type in function main(). Call member functions to display the data for all teachers.

(c) Write a program to compute the sum of terms of Fibonacci series up to n terms, taking n as input from the user. (5)

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