

[This question paper contains 6 printed pages.]

Sr. No. of Question Paper : 6065 D Your Roll No.....

Unique Paper Code : 234101/251305

Name of the Course : B.Sc. (Hons.) Computer Science / B.Sc. (Hons.) Electronics

Name of the Paper : Fundamental of Programming

Semester : I / III

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. There are two parts in the Question Paper.
3. Parts of a Question should be attempted together.
4. **Part I** : All its questions are compulsory.
5. **Part II** : Attempt any **four** questions.

PART I

Question No. 1 is compulsory.

Parts of the question should be attempted together.

1. (a) How is $(-5)_{10}$ represented in 2's complement form using 6 bits? (4)
(b) Differentiate between the following : (6)
 - (i) Runtime polymorphism and compile time polymorphism
 - (ii) Call by value and call by reference
 - (iii) Public and private access type.(c) Give output of the following code segments :
 - (i) If $x=0$, $y=0$, and $z=1$, what are the values of x , y , and z after executing the following code? (3)

P.T.O.

```

if(z < x || y >= z && z == 1)
if(z && y)
    y = 1;
else
    x = 1;

```

(ii) string str1 ("DU University"); (4)

```

string str2 ("DU Union");
int result;
result = str1.compare(str2);
cout << result;
result = str1.compare(0, 6, str2);
cout << result;

```

(iii) int a=15;int b=9;int c; (3)

```

int* p = &b; int* q;
int* r;
q=p;
r=&c;
p=&a;
*q=8;
*r=*p;
*r=a+*q+*&c;
cout <<*p<<" " << *q << " " << *r <<endl;

```

(iv) int i; (5)

```

int list[10] = {2, 1, 2, 4, 1, 2, 0, 2, 1, 2};
int res [10];
for(i=0;i<10;i++)
res[i]=list[9-i];
for(i=0;i<10;i++)
cout <<res[i]<<" ";

```

- (d) If four objects of a class are defined, how many copies of class data items are stored in the memory and how many copies of its functions ? (2)
- (e) What are friend functions ? What are their advantages ? (4)
- (f) Find errors in the following code segment : (2)

```
(i) int main()
    {
        int i=5;
        while(i)
        {
            switch(i)
            {
                default:
                case 4:
                case 5:
                    break;
                case 1:
                    continue;
                case 2:
                case 3:
                    break;
            }
            i--;
        }
    }
```

- (ii) #include<iostream> (2)

```
using namespace std;
int main()
{
    int i = 0;
    i = i + 1;
    cout << i << " ";
    /* comment\*/i = i + 1;
    cout << i;
}
```

PART II

Attempt any four questions.

2. (a) We have two arrays A and B, each of 10 integers. Write a function that tests if every element of array A is equal to its corresponding element in arrays B. In other words, the function must check if A[0] is equal to B[0], A[1] is equal to B[1], and so forth. (5)
- (b) What are the static members of a class? What are the restrictions on static function members? (5)
3. (a) If originally $x = 3$ and $y = 5$, what are the values of x and y after evaluation of each of the following expressions?
- (i) $x++ + y$
- (ii) $++x + 2$ (4)
- (b) What do you understand by function overloading? How is it different from function overriding? Give an example of function overloading. (6)
4. (a) Write a C++ program to count occurrences of character 'a' and 'A' in a given string. (5)
- (b) Write a function which returns the number of times an element occurs in an array. The array and the element to be searched are passed as arguments to the functions. (5)
5. (a) Differentiate between binary files and text files in C++. (4)
- (b) What is copy constructor? Explain with example. (4)
- (c) Rewrite the following code fragment using a switch statement: (2)
- ```
if(ch == 'E' || ch == 'e')
 countE++;
```



```
elseif(ch == 'A' || ch == 'a')
 countA++;
elseif(ch == 'I' || ch == 'i')
 countI++;
else
 cout << "Error - Not A, E, or I \n";
```

6. (a) Create a class TwoDim which contains x and y coordinates as int. Define the default constructor, parameterized constructor and void print() to print the co-ordinates. Now reuse this class in ThreeDim adding a new dimension as z of type int. Define the constructors for the derived class and override the method void print() in the subclass. Write main() to show runtime polymorphism. (8)

- (b) Write a C++ statement for the following expression :

$$c = \sqrt{a^2 + b^2 - 2ab} \quad (2)$$

7. (a) Consider the following class definition. What data members and functions are directly accessible by the functions readit(), inform(), and B(). (3)

```
void inform(void);
class X
{
 int a;
 float b;
 void init(void);
public:
 char ch;
 char gett(void);
protected:
 double amt;
 void getamt(void);
 friend void A(void);
};
```

P.T.O.

```
class Y: public X
{
 int x;
 public:
 int j;
 void read(void);
 protected:
 void info(void);
 friend void B(void);
};
```

- (b) Find the error(s) in the following code segment : (2)

```
class x {.....};
class y {.....};
class z {.....};

void alpha() throw(x,y)
{
 throw z();
...
}
```

- (c) What is the sequence of constructors and destructors being called in a multilevel inheritance where class A is parent class of class B, class C is derived class of class B, class D is derived class of class C ? (5)