Your Roll No. 15058570

This question paper contains 5 printed pages.

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Sl. No. of Ques. Paper	**: 6535**
Unique Paper Code	**: 32341101**
Name of Paper	**: Programming Fundamentals using C++**
Name of Course	**: B.Sc. (H) Computer Science**
Semester	**: I**
Duration :	**: 3 hours**
Maximum Marks	**: 75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory in Section A. Attempt any four questions from Section B.
Parts of a question should be attempted together.

SECTION A

1. (a) Explain the concept of encapsulation in OOP with the help of a suitable example. 2

   (b) Differentiate between Call by value and Call by reference with the help of suitable examples. 6

   (c) Give output of the following code segments:

   (i) If `x=10, y=0`, and `z=1`, what are the values of x, y and z after executing the following code?

```
if (z<y && x=10)
y=9;
else
z=5;
cout<<endl<<"x="<<x<<"y="<<y<<"z="<<z;
```

   2

   (ii)
```
char str [5] ="ABC";
cout <<endl<<"s="<<str[3];
cout <<endll<<str;
```

   2

   (iii)
```
string s1 ("Computer  Science");
string s2 ("Programming");
s1.erase (3, 7);
s1.replace (3, 7, s2);
s1.insert (0, s3);
cout<<endl<<s1;
```

   3

P. T. O.

(iv)
```
int a=5. int b=8, int c;
int*p1=&b; int*p2; int*p3;
p2=p1;
p3=&c;
p1=&a;
*p2=8;
*p3=*p1;
*p3=a+*p2+*&c;
cout <<*p1<<" "<<*p2<< " " << *p3<<endl;
```

(d) Find error(s), if any, in the following code segments. Explain.

(i)
```
class A
{
    private: int x;
    protected: int y;
    public: int z;
};
class B: public A
{
    private:   int i;
    protected: int j;
    public: int k;
};
int main()
{
    A a;
    B b;
    a.x=10;
    a.y=5;
    a.z=7;
    b.x=10;
    b.y=10;
    b.z=10;
    b.i=20;
    b.k=13;
    b.j=15;
}
```

(ii)
```
int i=10, j=20, k =2;
int A[3]={i, j, k};
cout<<endl<<*A[*A [0]]-8];
```


(iii)
```
enum flag {on=1, off=0, idle=0};
cout <<endl<<on<<endl<<off<<endl<<idle;
```

2

(e) What are inline functions? What are its advantages? Explain with example. 4

(f)
```
int a=2, b=3;
int main()
{
cout<<"a="<<a;
cout<<"b="<<b;
f();
cout<<"a="<<a;
cout<<"b="<<b;
return 0;
}
void f()
{
int a=7;
b=b+1;
cout<<"a="<<a;
cout<<"b="<<b;
}
```

3

3

(g) What is copy constructor? Explain with example.

SECTION B

2. (a) What is a friend function? What are its advantages? Explain with the help of a suitable example. 5

(b) Consider the class A given below. Find the errors, if any. Also correct the errors and give the output. 5

```
class A
{
    int x, y;
    static int z;
    public:
    A() {x=10; y=10;}
    static void print()
      {
      cout<<"x="<<x;
      cout<<"y="<<y;
      cout<<"z="<<z;
```

```
    }
};
int main()
{
    A a;
    a.print();
}
```

3. (a) Design a class figure having two integer data members side1 and side2. Write a function area() to compute the area of a rectangle if two parameters side1 and side2 are passed. Overload this function to compute area of a circle if only one parameter side1 is passed. 6

   (b) What are default arguments in functions? Explain with the help of a suitable example. 4

4. (a) Consider the following class:

```
Class complex
  {
    Double real;
    Double imaginary;
    .....
  }
```

   Write suitable constructors for class complex and overload '*' operator to multiply two complex numbers. 5

   (b) What is an abstract class? Give an example to show how it is used. 5

5. (a) Write a C++ program to count number of characters in a text file. 5

   (b)

```
class A
{
    private: int i;
    projected: int j;
    public: int k;
};
class B: public A
{
...
```



```
};
class C: private A
{
....
};
```

Explain the inheritance of the data members of class A in class B and in class C. 5

6. (a) What are virtual functions? Can a method in base class which is declared as virtual be called using base class pointer which is pointing to derived class object? 5

   (b) Write a recursive function to print a given array of integer. 5

7. (a) Create an array of 10 integers. Write a program to split the given array into two arrays one containing even numbers and the other containing odd numbers of the array. 5

   (b) Explain the purpose of using the key word 'const' with data and function members of a class. Illustrate your answer with an example. 5