[This question paper contains 8 printed pages.]

1930 *Your Roll No. .....*

B.Sc. (Prog.) / II **E**

CS-201 – PROGRAMMING AND DATA STRUCTURE

(New Course : Admissions of 2005 and onwards)

Time : 3 Hours *Maximum Marks : 75*

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

Answer **All** *Questions.*
Parts of a Question must be answered together.

1. What will be the output of the following code ? (10)

(a)
```
int i = 0, j = 1, k = 2, l = 3, t;
t =i++&&j++&&k++||l++;
cout<<i<<j<<k<<l<<t<<endl;
```

(b)
```
int main( )
{
  int i;
  i = 9+6/3<<2–2+9%3;
  cout<<i<<endl;
  return 0;
}
```

P.T.O.

(c) int main( )

```
{
  int xc;
  xc = 100, 200, 300;
  int xm = xc*xc*xc;
  cout<<"xc is"<<xc;
  xm = xm%100, 1, –1;
  cout<<"xm is"<<xm;
  return 0;
}
```

(d)
```
x = 2;
y = 3;
z = ((x > y) ? 1 : (x%2 == 0)? 20 : 30);
cout<<z;
```

(e)
```
for (int i = 0; i <= 5 ; i++)
{
  for (int j = 0; j <= 5 ; j++)
  {
    If ((j+i) == 5)
```

```
            cout<<" * " ;
        else
            cout<<i + j<<" " ;
        }
        cout<<"\n" ;
    }
```

2. (a) Declare a class for Complex numbers with appropriate data members. (2)

(b) Write C++ statements to open a file "file1.dat" and read a character from it and display it on screen. (2)

(c) What is the printed upon executing the following code ? Explain your answer. (5)

```
class One
{
  public:
    char* name1 ( )
    {
      return "One";
    }
    virtual char* name2 ( )
    {
```

```
        return "One";
    }
};
class Two: public One
{
  public:
    char* name1 ( )
    {
      return "Two";
    }
    char* name2 ( )
    {
      return "Two";
    }
};
int main( )
{
  One *op;
  Two tw;
  op = &tw;
  cout<<op->name1 ( ) <<" "<< op->name2 ( );
  return 0;
}
```

(d) How many objects of AA exist during execution of main( ) in the following ? What is printed upon execution ? (2)

```
class AA
{
  public :
    int a;
    void show( )
    {
      cout<<a;
    }
};
class BB: public AA
{
  private :
    int b;
    AA aa;
  public:
    BB( )
    {
      b = 5;
```

```
        aa.a = 7;
    }
    void show( )
    {
      cout<<a<<"\t"<<b;
    }
};
int main( )
{
  BB bb;
  bb.show( );
  return 0;
}
```

(e) What is the use of header files in C++ ? (1)

3. Write a C++ function for the following : (10)

(a) Bubble sort on a list of *n* integers, stored in an array *aa*.

(b) Multiplication of two single-digit integers given at the command-line.

4. Explain giving suitable example(s)

   (a) Achieving polymorphism using operator overloading in a class. (4)

   (b) If a function needs to return a structured object, (say, an array), how can this be accomplished ? (3)

   (c) Use of reference variables in C++. (3)

5. (a) Write a recursive function in C++ for reversing a character string. (6)

   (b) Write a function that takes a positive integer as parameter and returns *true* if the number is prime and *false* otherwise. (4)

6. Distinguish between the following :

   (a) Compile-time and run-time polymorphism (3)

   (b) Local and global scope of a variable (2)

   (c) Call-by-value and Call-by-reference (3)

7. Write a short note on the following, giving a suitable example.

(a) Reversing the contents of a stack using a queue.

(b) Inheritance as a mechanism for building abstraction.

(c) Default exception handlers in C++. (15)