Class – XII
Subject – Computer Science

Programming Language: C++

1) a) Write the names of the header files to which the following belong :   **2**
   (i) random( )   (ii) fmod( )   iii)floodfill() iv) gotoxy()
b) Give the output of the following program segment (Assume all
       required header files are included in the program)   **2**

```
void main()
{      char *name;
       int l=0;
       name="Windows98";
       l = strlen(name);
       cout<<endl;
       for (int asc=90;asc>=65;asc--)
       {       for(int i=0;i<l;i++)
       {
   if(name[i]==char(asc)||(name[i]==char(asc+32)))
       cout<<name[i];
       }    }
       cout<<endl;        }
```

c) Find output of the following code :   **2**

```
ii)      #include<iostream.h>
       int a=10;
       void main()
       {
               void demo(int &,int,int*);
               int a=20,b=5;
               demo(::a,a,&b);
                       cout<<::a<<a<<b<<endl;
       }
       void demo(int &x, int y, int *z)
       {
               a+=x;
```

```
            y*=a;
            *z=a+y;
            cout<<x<<y<<*z<<endl;
        }
```

d) What are the first and last values of **i** output by this loop?   **2**

```
        n = 10;
        i = 0;
        while (++i < n)
        { cout<<i<<endl;        }
```

e) Differentiate between Local and Global variable with example.   **2**

2.) a) Consider the following code: **2**

```
    class ci
    {
            int L;
        public:
            ci (int j) { L = j; }              //function 1
            ci (ci & rv ) { L = rv.L; }      //function 2
            void initialize() { L = 0; }
    };
```

Referring to the sample code above answer the questions (i) and (ii)

(i)   How would function1 and function2 get executed? Give example.

(ii)   main()

```
        {
            ci original (1);
            ci X1(original);
            ci X2 = original;
        }
```

Referring to above sample code, what initializes the object X1?

(i) initialize() function   (ii) The default constructor

(iii) The copy constructor   (iv) The default copy constructor

Justify your answer.

b) Define a class BALANCED_MEAL in C++ with following description: **4**

    Private Members:

Access number	Integer
Name of Food	String of 25 characters
Calories	Integer
Food type	String
Cost	Float
AssignAccess( )	Generates random numbers between 0 to 99 and return it.

  Public Members

A function INTAKE( ) to allow the user to enter the values of Name of Food, Calories, Food type cost and call function AssignAccess() to assign Access number.
A function OUTPUT( ) to allow user to view the content of all the data members, if the Food type is fruit.

c) Consider the following declarations and answer the questions given   **4**
below:

```
class Mydata
{    protected:
    int data;
    public:
    void Get_mydata(int);
    void Manip_mydata(int);
    void Show_mydata(int);
    Mydata( );
    ~Mydata( );                    };
class Personal_data
{
    protected:
    int data1;
    public:
    void Get_personaldata(int);
    void Show_personaldata(int);
    Mydata1( );
    ~Mydata1( );                    };
class Person: public Mydata, Personal_data
{
    public:
```

```
void Show_person(void);
person( );
~person( );                    };
```

i) How many bytes will be required by an object belonging to class Person?

ii) Which type of inheritance is depicted in the above example?

iii) List the data members that can be accessed by the member function Show_person( )

iv) What is the order of constructor execution at the time of creating an object of class Person?

3) a) Write a function in c++ which accepts a 2D array of integers, number of rows **3** and number of columns as arguments and assign the elements which are divisible by 3 or 5 into a one dimensional array of integers.

If the 2D array is

$$\begin{bmatrix} 12 & 3 & 9 & 14 \\ 24 & 25 & 16 & 31 \\ 19 & 32 & 45 & 27 \\ 11 & 5 & 28 & 18 \end{bmatrix}$$

The resultant 1D arrays is   12 , 3 , 9 , 24 , 25 , 45 , 9 , 5 , 18

b) An array M[15][35] is stored in the memory along the column with each **2** of its elements occupying 8 bytes. Find out the base address and the address of an element M[2][5], if the element M[5][10] is stored at address 4000.

c) Evaluate the following Postfix expression showing the stack contents.   **2**
        16 , 2 , 6 , + , / , 2 , * , 1 , −

d) Write a C++ function which will insert a node in a dynamically allocated **3** stack defined as:

```
struct stack {
        int u,v;
        stack *next;  };
```

4 a) Write a user defined function in C++ to read the content from a **3** text file "Mybook.txt", count and display the number of word "India" present in the file.

b) Differentiate between ios::app and ios::ate file opening modes. **2**

c) Convert the following infix expression into postfix. show the stack status **2**
after execution of each operation:
TRUE   OR   FALSE   AND   NOT   FALSE   OR   FALSE

d) Given a binary file "COLONY.DAT", containing records of the following **3**
class colony type.

```
class colony
{
        char c_no[10];
        char c_name[40];
        long no_of_ppl;
    public:
        void getdata()
        {
                gets(c_no); gets(c_name); ciin>>no_of_ppl;
        }
        void showdata()
        {
                cout<<"Colony Number : "; puts(c_no);
                cout<<"Colony Name    : "; puts(c_name);
                cout<<" No. of peoples   : "<<no_of_ppl;
        }
        char * returnname()
        {       return c_name;        }
};
```

Write a function in C++ that would read contents of file "COLONY.DAT" and display
the details of those colonies where number of peoples are greater than 1000.

5.) a) What do you understand by the terms Cardinality and Degree of a **2**
relation in relational database?

(b) Given the following **LAB** table, write SQL command for the questions (i) to   **8**
    (vi) and give the output of (iv).

LAB

| No	ItemName	CostPerItem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	60000	9	21/5/96	2	7
2	Printer	15000	3	21/5/97	4	2
3	Scanner	18000	1	29/8/98	3	1
4	Camera	21000	2	13/10/96	1	1
5	Switch	8000	1	31/10/99	2	1
6	UPS	5000	5	21/5/96	1	4
7	Router	25000	2	11/1/2000	2	5

(i) To select the ItemName,which are within the Warranty period till   present date.
(ii) To display all the itemName whose name starts with "C".
(iii)   To list the ItemName in ascending order of the date of purchase   where quantity
     is more than 3.
(iv)Give the output of the following SQL commands:
              (a)   select min(DISTINCT Quantity) from LAB;
              (b)   select max(Warranty) from LAB;
              (c)   select sum(CostPerItem) from Lab;

v)   Update the ItemName to "Web Cam" where ItemName ends with 'a'
vi)   Create a new table MyLab which will have the same structure of
            Lab table. The rows will not be copied.

6) a) Prove   that **XY+YZ+YZ'=Y** algebraically   **2**
    b) State and verify Idempotent Law   **2**
    (c) Write the equivalent Boolean Expression for the following Logic Circuit.   **2**
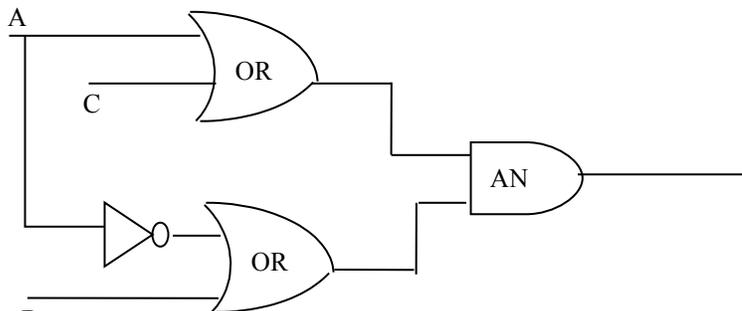
(d) Reduce the following Boolean Expression using K-Map   **3**

    $F(A,B,C,D) = \prod (0 , 1, 2, 3, 4, 5, 10, 11, 15)$

e) Obtain OR Gate from NAND Gate   **1**

7. a) Expand the following : i) SIM   ii) CDMA   **1**
   b) Differentiate between Internet and Intranet.   **2**
   c) Define- Web Browser, URL , GPRS   **3**
   d) A company in Reliance has 4 wings of buildings as shown in the diagram: **4**
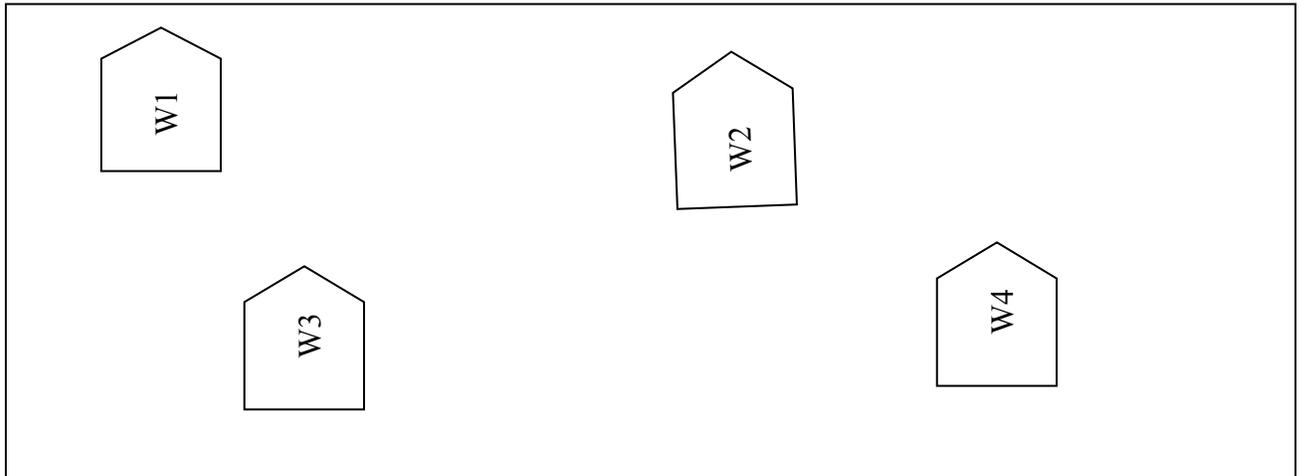
Center to center distances between various Buildings:

W3 to W1	50m
W1 to W2	60m
W2 to W4	25m
W4 to W3	170m
W3 to W2	125m
W1 to w4	90m

Number of computers in each of the wing:

W1	150
W2	15
W3	15
W4	25

Computers in each wing are networked but wings are not networked. The company has now decided to connect the wings also.

i) Suggest a most suitable cable layout & topology of the connection between the wings.

ii) The company wants internet accessibility in all the wings. Suggest an economic technology .

iii) Suggest the placement of the following devices with justification if the company wants minimized network traffic :

        1)Repeater
        2) Hub

3) Switch
4) Bridge

iv) The company is planning to link its head office situated in India with the offices at Reliance. Suggest a way to connect it; the company does not want to compromise with the speed of connectivity. Justify your answer.