COMPUTER SCIENCE

Time allowed : 3 hours   *Maximum marks: 70*

> *General Instructions:*
>
> *(i)*   ***All*** *questions are compulsory.*
>
> *(ii)*   *Programming Language : C++*

QUESTION PAPER CODE 91

1.   (a) Differentiate between a Logical Error and Syntax Error. Also give suitable
             examples of each in C++.   2

(b) Name the header file(s) that shall be needed for successful compilation of
      the following C++ code :   1

```
void main( )
{
    char Text[40];
    strcpy(Text,"AISSCE");
    puts(Text);
}
```

(c) Rewrite the following program after removing the syntactical error(s),
      if any. Underline each correction.   2

```
#include  <iostream.h>
const int Size 5;
void main()
{
    int Array[Size];
    Array = {50,40,30,20,10};
    for(Ctr=0; Ctr<Size; Ctr++)
        cout>>Array[Ctr];
}
```

(d) Find the output of the following program :   2

```
#include<iostream.h>
void main()
{
    int Numbers[] = {2,4,8,10};
```

```
    int *ptr = Numbers;
    for (int C = 0; C<3; C++)
    {
        cout<< *ptr << "@";
        ptr++;
    }
    cout<<endl;
    for(C = 0; C<4; C++)
    {
        (*ptr)*=2;
        --ptr;
    }
    for(C = 0; C<4; C++)
        cout<< Numbers [C]<< "#";
    cout<<endl;
}
```

(e)   Find the output of the following program :   3

```
#include<iostream.h>
void Indirect(int Temp=20)
{
    for (int 1=10; I<=Temp; I+=5)
        cout<<I<<" , " ;
    cout<<endl;
}
void Direct (int &Num)
{
    Num+=10;
    Indirect(Num);
}
void main()
{
    int Number=20;
    Direct(Number) ;
    Indirect();
    cout<< " Number=" <<Number<<endl ;
}
```

(f) In the following C++ program what is the expected value of Myscore from Options (i) to (iv) given below. Justify your answer. 2

```cpp
#include<stdlib.h>
#include<iostream.h>
void main( )
{
    randomize();
    int Score[] = {25,20,34,56, 72, 63}, Myscore;
    Myscore = Score[2 + random(2)];
    cout<<Myscore<<endl;  }
```

(i)   25

(ii)   34

(iii)   20

(iv)   None of the above

2. (a) Differentiate between Protected and Private members of a class in context of Inheritance using C++. 2

(b) Answer the questions (i) and (ii) after going through the following class: 2

```cpp
class Science
{
    char    Topic[20];
    int    Weightage;
public:
    Science ( )                         //Function   1
    {
        strcpy (Topic, "Optics" );
        Weightage = 30;
        cout<<"Topic  Activated";
    }
    ~Science( )                         //Function   2
    {
        cout'<<"Topic  Deactivated";
    }
```

(i)   Name the specific features of class shown by Function 1 and Function 2 in the above example.

(ii)   How would Function 1 and Function 2 get executed ?

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(c) Define a class Travel in C++ with the description given below : 4

Private Members :

T_Code	of type string
No_of_Adults	of type integer
No_of_Children	of type integer
Distance	of type integer
TotalFare	of type float

Public Members :

- A constructor to assign initial values as follows :

  T_Code with the word "NULL"

  No_of_Adults as 0

  No_of_Children as 0

  Distance as 0

  TotalFare as 0

- A function AssignFare( ) which calculates and assigns the value of the data member TotalFare as follows :

  For **each** Adult

Fare (Rs)	For Distance (Km)
500	>=1000
300	<1000 & >=500
200	<500

For **each** Child the above Fare will be 50% of the Fare mentioned in the above table.

For example :

If Distance is 750, No_of_Adults = 3 and No_of_Children = 2

Then TotalFare should be calculated as

No_of_Adults * 300 + No_of_Children * 150

i.e. 3 * 300 + 2 * 150 = 1200

- A function EnterTraveK) to input the values of the data members T_Code, No_of_Adults, No_of_Children and Distance; and invoke the AssignFare( ) **function.**

- A function ShowTraveK) which displays the content of all the data members for a Travel.

(d) Answer the questions (i) to (iv) based on the following code : 4

```
class Teacher
{
    char TNo[5], TName[20], Deptfl0];
    int Workload;
```

```
protected:
    float  Salary;
    void  AssignSal(float);
public:
    Teacher( )  ;
    void  TEntry( )  ;
    void  TDisplay( );
};
class  Student
{
    char  Admno[10],  SName[20],  Stream[10];
protected:
    int  Attendance,  TotMarks;
public:
    Student( );
    void  SEntry( );
    void  SDisplay( );
};
class  School  :  public  Student,  public   Teacher
};
    char  SCode[10],  SchName[20];
public:
    School  ( )  ;
    void  SchEntry( );
    void  SchDisplay( );
};
```

(i)   Which type of Inheritance is depicted by the above example ?

(ii)   Identify the member functiion(s) that cannot be called directly from the objects of class School from the following :

        TEntry( )
        SDisplay( )
        SchEntry( )

(iii)   Write name of all the member(s) accessible from member functions of class School.

(iv)   If class School was derived privately from class Teacher and privately from class Student, then, name the member function(s) that could be accessed through Objects of class School.

3. (a) Write a function in C++ which accepts an integer array and its size.as arguments and replaces elements having even values with its half and elements having odd values with twice its value. 4

Example : if an array of five elements initially contains the elements as

3, 4, 5, 16, 9

then the function should rearrange the content of the array as

6, 2, 10, 8, 18

(b) An array Arr[15][20] is stored in the memory along the row with each element occupying 4 bytes. Find out the Base Address and address of the element Arr[3][2], if the element Arr[5][2] is stored at the address 1500. 4

(c) Write a function in C++ to delete a node containing customer's information, from a dynamically allocated Queue of Customers implemented with the help of the following structure : 4

```
struct    Customer
{
    int    CNo;
    char  CName[20];
    Customer  *Link;
};
```

(d) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements of middle row and the elements of middle column. 2

[Assuming the 2D Array to be a square matrix with odd dimension

i.e. 3×3, 5×5, 7×7 etc...]

Example, if the array content is

3 5 4

7 6 9

2 1 8

Output through the function should be :

Middle Row : 7 6 9

Middle Column : 5 6 1

(e) Evaluate the following postfix notation of expression : 2

15   3   2   +   /   7   +   2   *

4. (a) Observe the program segment given below carefully, and answer the question that follows : 1

```
class  Labrecord
{
    int Expno;
    char  Experiment[20];
    char  Checked;
```

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```cpp
    int Marks;
public :
            //function to enter Experiment details
    void EnterExp( );
            //function to display Experiment details
    void ShowExp ( ) ;
            //function to return Expno
    char RChecked ( ) {return Checked;}
            //function to assign Marks
    void Assignmarks(int M)
    {     Marks = M;}
};
void   MpdifyMarks()
{  fstream   File;
    File.open("Marks.Dat",ios::binary|ios::in|ios::out);
    Labrecord L;
    int Rec = 0;
    while  (File.read((char*)&L, sizeof(L)))
    {
        if(L.RChecked( )== ' N ' )
            L.Assignmarks(0)
        else
            L.Assignmarks(10)
        _____          //statement 1
        _____          //statement 2
        Rec ++ ;
    }
    File.close ();
}
```

If the funption ModifyMarks() is supposed to modify Marks for the records in the file MARKS.DAT based on their status of the member Checked (containing value either V or 'N'). Write C++ statements for the **statement 1** and **statement 2,** where, **statement 1** is required to position the file write pointer to an appropriate place in the file and **statement** 2 is to perform the write operation with the modified record.

(b)   Write a function in C++ to print the count of the word **the** as an independent word in a textfile STORY.TXT.   2

For example, if the content of the file STORY.TXT is

      There was a monkey in <u>the</u> zoo. <u>The</u>

      monkey was very naughty.

Then the output of the program should be 2.

(c) Given a binary file SPORTS.DAT, containing records of the following structure type :

```
struct    Sports
{
    char    Event[20];
    char    Participant[10][30];
};
```

Write a function in C++ that would read contents from the file SPORTS.DAT and creates a file named ATHLETIC.DAT copying only those records from SPORTS.DAT where the event name is "Athletics".   3

5. (a) What is the importance of a Primary Key in a table ? Explain with a suitable example.   2

(b) Consider the following tables Consignor and Consignee. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).   6

TABLE : CONSIGNOR

| CnorID	CnorName	CnorAddress	City
ND01	R Singhal	24, ABC Enclave	New Delhi
ND02	Amit Kumar	123, Palm Avenue	New Delhi
MU15	R Kohli	5/A, South Street	Mumbai
MU50	S Kaur	27-K, Westend	Mumbai

TABLE : CONSIGNEE

CneeID	CnorID	CneeName	CneeAddress	CneeCity
MU05	ND01	Rahul Kishore	5, Park Avenue	Mumbai
ND08	ND02	P Dhingra	16/J, Moore Enclave	New Delhi
KO19	MU15	A P Roy	2A, Central Avenue	Kolkata
MU32	ND02	S Mittal	P 245, AB Colony	Mumbai
ND48	MU50	B P Jain	13, Block D, A Vihar	New Delhi

(i) To display the names of all Consignors from Mumbai.'

(ii) To display the CneeID, CnorName, CnorAddress, CneeName, CneeAddress for every Consignee.

(iii) To display consignee details in ascending order of CneeName.

(iv) To display number of consignors from each city,

(v) SELECT DISTINCT City FROM CONSIGNEE;

(vi) SELECT A.CnorName, B.CneeName
FROM Consignor A, Consignee B
WHERE A.CnorID = B.CnorlD AND B.CneeCity = 'Mumbai';

(vii) SELECT CneeName, CneeAddress
FROM Consignee
WHERE CneeCity NOT IN ('Mumbai', 'Kolkata');

(viii) SELECT CneelD, CneeName
FROM Consignee
WHERE CnorID='MU15' OR CnorID='ND01';

6. (a) State De Morgan's Theorems and verify the same using truth table. 2

(b) Write the equivalent Canonical Product of Sum Expression for the following
Sum of Product Expression
$$F(X, Y, Z) = \Sigma (0, 2, 4, 5)$$ 2

(c) Write the equivalent Boolean expression for the following Logic Circuit. 2
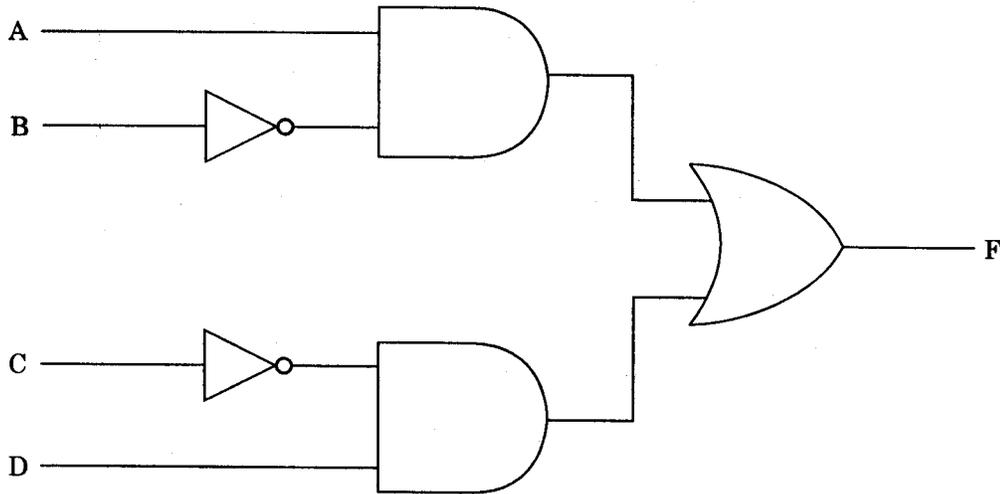
(d) Reduce the following Boolean expression using K-Map : 2
$$F(A, B, C, D) = \pi(5,6,7,8,9,12,13,14,15)$$

7. (a) What is the significance of Cyber Law ? 1

(b) Expand the following terms with respect to Networking : 2
(i) XML
(ii) WWW
(iii) WLL
(iv) TCP/IP

(c) Which of the following units measures the speed with which data can be transmitted from one node to another node of a network ? Also, give the expansion of the suggested unit.   1

   (i)   KMph

   (ii) Mbps

   (iii) MGps

(d) "Hindustan Connecting World Association" is planning to start their offices in four major cities in India to provide regional IT infrastructure support in the field of Education & Culture. The company has planned to set up their head office in New Delhi in three locations and have named their New Delhi offices as "Sales Office", "Head Office" and "Tech Office". The company's regional offices are located at "Coimbatore", "Kolkata" and "Ahmedabad". A rough layout of the same is as follows :
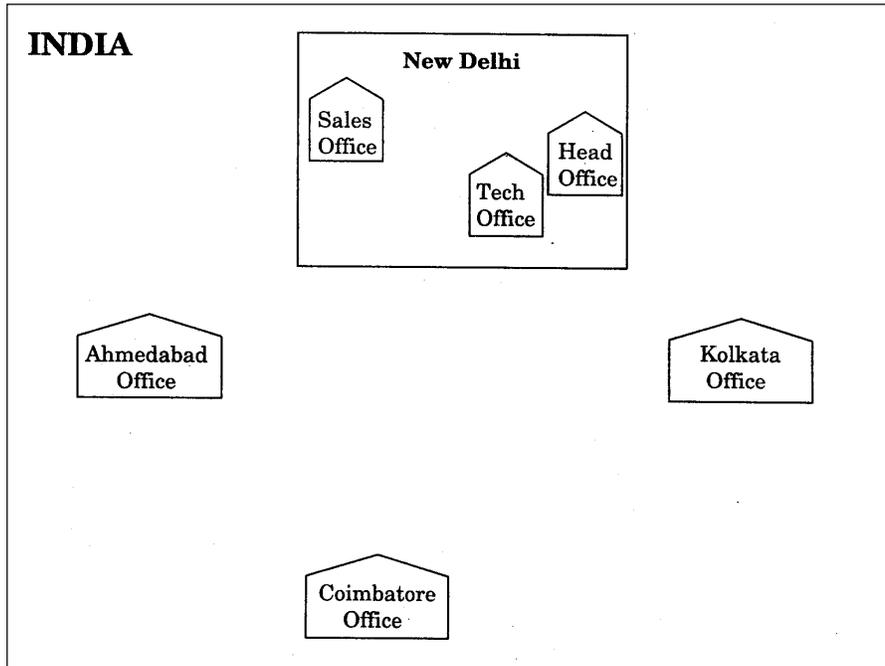
Approximate distances between these offices as per network survey team is as follows :

Place From	Place To	Distance
Head Office	Sales Office	10 KM
Head Office	Tech Office	70 Meter
Head Office	Kolkata Office	1291 KM
Head Office	Ahmedabad Office	790 KM
Head Office	Coimbatore Office	1952 KM

In continuation of the above, the company experts have planned to install the following number of computers in each of their offices :

Head Office	100
Sales Office	20
Tech Office	50
Kolkata Office	50
Ahmedabad Office	50
Coimbatore Office	50

(i) Suggest network type (out of LAN, MAN, WAN) for connecting each of the following set of their offices :
   • Head Office and Tech Office
   • Head Office and Coimbatore Office

(ii) Which device will you suggest to be procured by the company for connecting all the computers within each of, their offices out of the following devices ?
   • Modem
   • Telephone
   • Switch/Hub

(iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local offices in New Delhi for very effective and fast communication ?
   • Ethernet Cable
   • Optical Fiber
   • Telephone Cable

(iv) Suggest a cable/wiring layout for connecting the company's local offices located in New Delhi. Also,, suggest an effective method/technology for connecting the company's regional offices at "Kolkata", "Coimbatore" and "Ahmedabad".   4

QUESTION PAPER CODE 91/1

1. (a) Differentiate between a Run Time Error and Syntax Error. Also give suitable examples of each in C++.   2

(b) Name the header file(s) that shall be needed for successful compilation of the following C++ code   1

```
void main ( )
{
    char String [20];
    gets (String);
    strcat (String, "CBSE");
    puts (String);
}
```

(c) Rewrite the following program after removing the syntactical error(s) if any.
Underline each correction. 2

```
# include <iostream.h>
const int Max 10;
void main ( )
{
    int Numbers [Max];
    Numbers = { 20, 50,10, 30,40 } ;
    for (Loc= Max-1 ; Loc > = 0 ; Loc - -)
        cout>>Numbers [Loc];
}
```

(d) Find the output of the following program : 2

```
# include < iostream.h>
void main ()
{
    intArray[] = {4,6,10,12};
    int *pointer = Array ;
    for (int I=1 ; I<=3 ; I++)
    {
        cout<<*pointer<<#";
        pointer ++;
    }
        cout<<endl;
        for (I=1 ; I<=4 ; I++)
    {
            (*pointer)*=3 ;
            -- pointer;
    }
    for(I=1; I<5; I + + )
        cout << Array [I-1] << "@";
    cout << endl;
}
```

(e) Find the output of the following program : 3

```
# include < iostream.h>
void Withdef (int HisNum = 30)
{
    for (int 1=20 ; I<*= HisNum; I+=5)
        cout<<I<<"";
        cout<<endl;
}
void Control (int &MyNum)
{
```

```
        MyNum+=10;
        Withdef(MyNum);
    }
    void main ()
    {
        int YourNum=20;
        Control (YourNum);
        Withdef();
        cout<<"Number="<<YourNum<<endl;
    }
```

(f)   In the following C++ program what is the expected value of MyMarks from
      Options (i) to (iv) given below. Justify answer.   2

```
#include<stdlib. h >
# include<iostream. h>
void main ()
{
    randomize ();
    int Marks [ ]= {99, 92, 94, 96, 93, 95}, MyMarks;
    MyMarks = Marks [1 + random (2) ];
    cout<<MyMarks<<endl;
}
```

(i)   99   (ii) 94

(iii) 96   (iv) None of the above

2.   (a)   Differentiate between Constructor and Destructor function in context of
               Classes and Objects using **C++**   2

(b)   Answer the questions (i) and (ii) after going through the following class   2

```
class Maths
{
    char Chapter [20];
    int Marks;
public:
    Maths ( )      //Member Function 1
    {
        strcpy (Chapter, "Geometry");
        Marks = 10;
        cout<<"Chapter  Initialised";
    {
    ~Math ()       //Member Function 2
    }
        cout<<"Chapter  Over";
    }
};
```

(i)   Name the specific features of class shown by Member Function 1 and Member Function 2 in the above example.

(ii) How would Member Function 1 and Member Function 2 get executed?

(c) Define a class Tour in C++ with the description given below :   3

Private Members :

TCode	of type string
NoofAdults	of type integer
NoofKids	of type integer
Kilometres	of type integer
TotalFare	of type float

Public Members :

- A constructor to assign initial values as follows :

  TCode with the word "NULL"

  NoofAdults as 0

  NoofKids as 0

  Kilometres as 0

  TotalFare as 0

- A function AssignFare ( ) which calculates and assigns the value of the data member TotalFare as follows

  For **each** Adult

Fare(Rs)	For Kilometres
500	>=1000
300	<1000&>=500
200	<500

  For **each** Kid the above Fare will be 50% of the Fare mentioned in the above table

  For example :

  If Kilometres is 850, NoofAdults = 2 and NoofKids = 3

  Then TotalFare should be calculated as

  NumofAdults * 300 + NoofKids * 150

  i.e. 2*300 + 3*150=1050

- A function EnterTour( ) to input the values of the data members TCode, NoofAdults, NoofKids and Kilometres; and invoke the Assign Fare( ) function.

- A function ShowTour( ) which displays the content of all the data members for a Tour.

(d) Answer the questions (i) to (iv) based on the following code :   4

```
class Trainer
{
    char TNo [5], TName [20], Specialisation [10];
    int Days;
protected :
    float Remuneration;
    void AssignRem (float);
public :
    Trainer ( ) ;
    void TEntry ( );
    void TDisplay ( );
};
class Learner
{
    char Regno [10], LName [20], Program [10];
Protected :
    int Attendance, Grade;
public:
    Learner ( );
    void LEntry ( );
    void LDisplay ( );
};
class Institute : public Learner, public Trainer
{
    char ICode[10], IName [20];    (
public:
    Institute ( );
    void IEntry ( );
    void IDisplay ( );
};
```

(i)   Which type of Inheritance is depicted by the above example?

(ii) Identify the member function(s) that cannot be called directly from the
      objects of class Institute from the following

      TEntry( )

      LDisplay()

      IEntry()

(iii) Write name of all the member(s) accessible from member functions of class Institute.

(iv) If class Institute was derived privately from class Learner and privately from class Trainer, then, name the member function(s) that could be accessed through Objects of class Institute.

3. (a) Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having odd values with thrice its value and elements having even values with twice its value.

Example : if an array of five elements initially contains the elements as

    3, 4, 5, 16, 9

then the function should rearrange the content of the array as

    9, 8, 15, 32, 27   4

(b) An array Array[20][15] is stored in the memory along the column with each element occupying 8 bytes. Find out the Base Address and address of the element Array[2][3] if the element Array [4] [5] is stored at the address 1000.   4

(c) Write a function in C++ to delete a node containing Book's information, from a dynamically allocated Stack of Books implemented with the help of the following structure.   4

```
struct  Book
}
    int  BNo;
    char  BName[20];
    Book  *Next;
};
```

(d) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements which lie on diagonals.   2

[Assuming the 2D Array to be a square matrix with odd dimension

i.e. 3×3, 5×5, 7×7 etc.]

Example, if the array content is

5 4 3

6 7 8

1 2 9

Output through the function should be :

Diagonal One : 5 7 9

Diagonal Two : 3 7 1

(e) Evaluate the following postfix notation of expression :　　　　　　　　2

25　8　3　-　/　6　　*　　10　+

4.　(a) Observe the program segment given below carefully, and answer the question
that follows:　　　　　　　　　　　　　　　　　　　　　　　　　　　1

```
class PracFile
{
    intPracno;
    char  PracName[20];
    int  TimeTaken;
    int  Marks;
public:
            // function to enter PracFile details
    void EnterPrac( );
            // function to display PracFile details
    void ShowPrac( ):
            // function to return TimeTaken
    int RTime() {return TimeTaken;}
            // function to assign Marks
    void Assignmarks (int M)
    {    Marks = M;}
};
void AllocateMarks( )
{      fstreamFile;
    File.open("MARKS.DAT",ios::binary|ios::in|ios::out);
    PracFile P;
    int Record = 0;
    while (File.read(( char*) &P, sizeof(P)))
    {
    if(P.RTime()>50)
        P.Assignmarks(0)
    else
        P.Assignmarks(10)
    _____         //statement 1
    _____         //statement 2
    Record + + ;
    }
    File.close();
}
```

If the function AllocateMarks () is supposed to Allocate Marks for the records
in the file MARKS.DAT based on their value of the member TimeTaken.
Write C++ statements for the **statement 1** and **statement 2,** where,
statement 1 is required to position the file write pointer to an appropriate
place in the file and **statement 2** is to perform the write operation with the
modified record.

(b) Write afunction in C++ to print the count of the word is as an independent word in at text file DIALOGUE.TXT. 2

For example, if the content of the file DIALOGUE. TXT is

This is his book. Is this book good?

Then the output of the program should be 2.

(c) Given a binary file GAME.DAT, containing records of the following structure type 3

```
struct Game
{
    char GameName [20];
    char Participant [10] [30];
};
```

Write a function in C++ that would read contents from the file GAME.DAT and creates a file named BASKET.DAT copying only those records from GAME.DAT where the game name is "Basket Ball"

5. (a) Differentiate between primary key and alternate key. 2

(b) Consider the following tables. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii) 6

TABLE:SENDER

SenderlD	SenderName	SenderAddress	SenderCiry
ND01	R Jain	2, ABC Appts	New Delhi
MU02	H Sinha	12, Newtown	Mumbai
MU15	S Jha	27/A, Park Street	Mumbai
ND50	T Prasad	122-K, SDA	New Delhi

TABLE : RECIPIENT

RecID	SenderlD	RecName	RecAddress	RecCiry
KO05	ND01	R Bajpayee	5, Central Avenue	Kolkata
ND08	MU02	S Mahajan	116, A Vihar	New Delhi
MU19	ND01	H Singh	2A, Andheri East	Mumbai
MU32	MU15	P K Swamy	B5, C S Terminus	Mumbai
ND48	ND50	S Tripathi	13, B1 D, Mayur Vihar	New Delhi

(i) To display the names of all Senders from Mumbai

(ii) To display the RecID), SenderName, SenderAddress, RecName, RecAddress for every Recipient

(iii) To display Recipient details in ascending order of RecName

(iv) To display number of Recipients from each city

(v) SELECT DISTINCT SenderCity FROM Sender;

(vi) SELECT A. SenderName, B.RecName
FROM Sender A, Recipient B
WHERE A. SenderlD = B.SenderlD AND B.RecCity = 'Mumbai';

(vii) SELECT RecName, RecAddress
FROM Recipient
WHERE RecCity NOT IN ('Mumbai', 'Kolkata');

(viii) SELECT RecID, RecName
FROM Recipient
WHERE SenderID='MU02' ORSenderID='ND50';

6. (a) State Distributive law and verify the same using truth table.   2

(b) Write the equivalent Canonical Sum of Product expression for the following Product of Sum Expression   2

$F(X,Y,Z) = \pi (1,3,6,7)$

(c) Write the equivalent Boolean Expression for the following Logic Circuit.   2
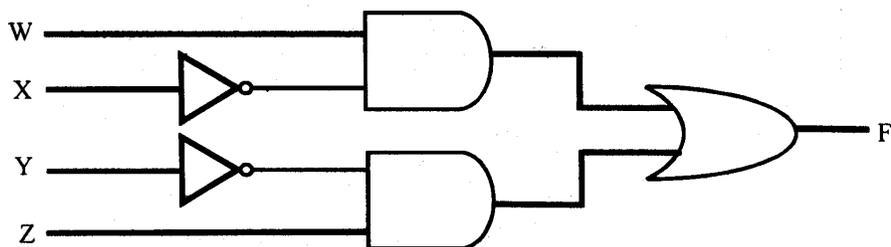
(d) Reduce the following Boolean expression using K-Map   2

$F(U,V,W,Z) = \Sigma (0, 1, 2, 3, 4, 10, 11)$

7. (a) What is the significance of Cyber law ?   1

(b) Expand the following terms with respect to Networking :   2

(i) CDMA   (iii) FTP

(ii) WLL   (iv) HTML

(c) Which of the following unit measures the speed with which data can be transmitted from one node to another node of a network? Also, give the expansion of the suggested unit.   1

    (i)   Mbps

    (ii)   KMph

    (iii) MGps

(d) "Bhartiya Connectivity Association" is planning to spread their offices in four major cities in India to provide regional IT infrastructure support in the field of Education & Culture. The company has planned to setup their head office in New Delhi in three locations and have named their New Delhi offices as "Front Office", "Back Office" and "Work Office". The company has three more regional offices as "South Office", "East Office" and "West Office" located in other three major cities of India. A rough layout of the same is as follows :   4
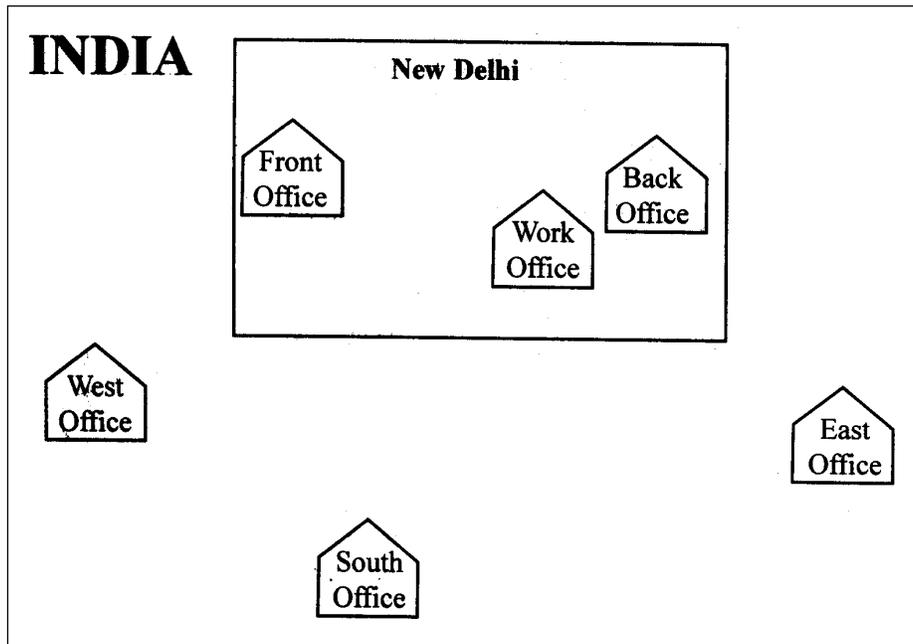
Approximate distances between these offices as per network survey team is as follows:

Place From	Place To	Distance
BackOffice	Front Office	10KM
Back Office	Work Office	70 Meter
Back Office	East Office	1291 KM
BackOffice	West Office	790 KM
Back Office	South Office	1952 KM

In continuation of the above, the company experts have planned to install the following number of computers in each of their offices :

Back Office	100
Front Office	20
Work Office	50
East Office	50
West Office	50
South Office	50

(i)   Suggest network type (out of LAN, MAN, WAN) for connecting each of the following set of their offices :

   •   Back Office and Work Office

   •   Back Office and South Office

(ii) Which device you will suggest to be procured by the company for connecting all the computers with in each of their offices out of the following devices?

   •   Switch/Hub

   •   Modem

   •   Telephone

(iii) Which of the following communication medium, you will suggest to be procured by the company for connecting their local offices in New Delhi for very effective and fast communication?

   •   Telephone Cable

   •   Optical Fiber

   •   Ethernet Cable

(iv) Suggest a cable/wiring layout for connecting the company's local offices located in New Delhi. Also, suggest an effective method/technology for connecting the company's regional offices-"East Office", "West Office" and "South Office" with offices located in New Delhi.

Marking Scheme — Computer Science

QUESTION PAPER CODE 91

EXPECTED ANSWERS/VALUE POINTS

1. (a) **Logical Error:**

   Error occurred due to incorrect logic applied by the programmer.

   Syntax Error:

   Error occurred due to not following the proper grammar/syntax of the language

   OR

   Error occurred due to violating rules of the programming language

   Example:

   ```
   //Program to find area and perimeter of rectangle
   void main()
   {
       int A,B,AR,P;
       A=10;
       B=20;
       AR=2*(A*B);         //Logical Error - Wrong Formula
       P=2*(A+B);
       cout<<A<<P>>endl;  //Syntax Error - Use of >> with cout
   }
   ```

   (½ Mark for each correct explanation of Logical Error and Syntax Error)
   (½ Mark for each correct example of Logical Error and Syntax Error)
   OR
   (Full 2 Marks for correct examples demonstrating the difference between Logical Error and Syntax Error)
   Note: *Only 1 Mark to be awarded if Explanation is given without supporting example.*

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(b)　string.h

　　stdio.h

　　(½ Mark for identifying each correct header file)

　　Note: *Marks are not to be deducted if any additional header file is mentioned*

(c)　`#include<iostream.h>`

　　`const int Size =5;`

　　`void main( )`

　　`{`

　　　　`int Array[Size]={50,40,30,20,10};`

　　　　`for(int Ctr=0;Ctr<Size;Ctr++)`

　　　　　　`cout<<Array[Ctr];`

　　`}`

　　(½ Mark for each correction)

　　OR

　　(1 Mark for identifying at least three errors, without suggesting correction)

(d)　2 @ 4 @ 8 @

　　4 # 8 # 16 # 20 #

　　(1 Mark for each correct line of output)

　　Note:

　　·　　*½ Mark to be deducted for missing symbols in each line of output*

　　·　　*½ Mark to be deducted if endl is not considered in the output*

　　·　　*As Borland C++ Compiler declares <u>for loop variable</u> locally, the program will result in syntax errors. So, any student specifying <u>Variable C not declared</u> OR mentioning that the program will not RUN due to incorrect syntax should be awarded full 2 Marks*

(e)　10, 15, 20, 25, 30,

　　10, 15, 20,

　　Number=30

　　(1 Mark for each correct line of output)

　　Note:

　　·　　*½ Mark to be deducted for missing Commas (,) in each line of output*

　　·　　*½ Mark to be deducted if endl is not considered in the output*

(f) (ii) 34

(1 Mark for the correct answer)
(1 Mark for the correct justification)

2. (a)

Base Class	Access Specifier	Derived Class
Protected	Private	Private
	Protected	Protected
	Public	Protected
Private	Private	Not Accessible
	Protected	Not Accessible
	Public	Not Accessible

(1 mark each for correct explanation of Private and Protected members)

Note: If the contents of the above table is explained correctly in any format (with or without example) full 2 marks are to be awarded.

(b) (i) Function 1: Constructor/ Default Constructor

Function 2: Destructor

(½ Marks for each correct answer)

(ii) Function 1 is executed or invoked automatically when an object of class Science is created.

Function 2 is invoked automatically when the scope of an object of class Science comes to an end.

OR

Example:

```
{
    Science s1;//Constructor is invoked
}   // the destructor is invoked
```

(½ Mark for each correct answer through explanation OR example)

(c)
```
class Travel
{
    char TCode[5];          //OR char *Tcode;
    int No_of_Adults;
    int No_of_Children;
    int Distance;
    float TotalFare;
```

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```cpp
public:
    Travel();
    void AssignFare();
    void EnterTravel();
    void ShowTravel();
};
Travel::Travel()
{
    strcpy(TCode,"NULL");// OR TCode[0]='\0' OR strcpy(TCode,"\0")
            //   OR TCode=NULL if TCode is declared as char pointer
    No_of_Adults = 0;
    No_of_Children = 0;
    Distance = 0;
    TotalFare = 0;
}
void Travel::AssignFare()
{
    if(Distance>=1000)
            TotalFare = 500*No_of_Adults+250*No_of_Children;
    else
    if (Distance >= 500)
            TotalFare = 300*No_of_Adults+150*No_of_Children;
    else
            TotalFare = 200*No_of_Adults+100*No_of_Children;
}
void Travel::EnterTravel()
{
    gets(TCode);        // or cin >> TCode;
    cin>>No_of_Adults>>No_of_Children>>Distance;
    AssignFare();
}
void Travel::ShowTravel()
{
    cout<<TCode<<No_of_Adults<<No_of_Children
            <<Distance<<TotalFare<<endl;
}
```

(½ Mark for correct syntax of class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of constructor)

(1 Mark for checking all three conditions and calculating TotalFare in AssignFare( ))

(½ Mark for correct EnterTravel( ) with proper invocation of AssignFare( ))

(½ Mark for displaying all data Members including TotalFare inside ShowTravel( ))

(d) (i) Multiple Inheritance

(1 Mark for correct answer)

(ii) None

OR

All the functions can be called.

(1 Mark for any of the correct answer)

(iii) Data Members: `SCode, SchName, Attendance, TotMarks, Salary`

Member Functions: `SchDisplay(), SchEntry(), SEntry(), SDisplay( ), TEntry( ), TDisplay( ), AssignSal( )`

(1 Mark for all correct members)

NOTE:

- *Mention of Constructor functions School(), Student() and Teacher() to be ignored.*
- *No marks to be awarded for partially correct answers*

(iv) `SchEntry( ),SchDisplay( ).`

(1 Mark for all correct member functions)

NOTE:

- *Constructor function School() to be ignored.*
- *No marks to be awarded for partially correct answers*

3. (a)
```
void Display(int NUM[],int N)
{
    for(int  i=0;i<N;i=i+1)
    {
        if(NUM[i]%2==0)
            NUM[i]=NUM[i]/2;
        else
            NUM[i]=2*NUM[i];
    }
}
```
OR
```
void Display(int NUM[],int N)
{
    for(int  i=0;i<N;i=i+1)
        NUM[i]=(NUM[i]%2!=0)?2*NUM[i]:NUM[i]/2;
}
```

(1 Mark for correct Function Header with proper Arguments)
(1 Mark for correct loop)
(1 Mark for checking Even / Odd values)
(1 Mark for replacing array elements with proper values)

(b) Assuming LBR=LBC=0

```
S=4 bytes
Number of Rows(N)=15
Number of Columns(M)=20
LOC(Arr[I][J]) = B +((I-LBR)*M+(J-LBC))*S
LOC(Arr[5][2]) = B +((5-0)*20+(2-0))*4
          1500 = B +(100+2)*4
             B = 1500-408
             B = 1092
  LOC(Arr[3][2] = 1092+((3-0)*20+(2-0))*4
               = 1092 + (62*4)
               = 1092+248
               = 1340
```

OR

Assuming LBR=LBC=1

```
S=4 bytes
Number of Rows(N)=15
Number of Columns(M)=20
LOC(Arr[I][J]) = B +((I-LBR)*M+(J-LBC))*S
LOC(Arr[5][2]) = B +((5-1)*20+(2-1))*4
         1500  = B +(80+1)*4
            B  = 1500-324
            B  = 1176
LOC(Arr[3][2]) = 1176+((3-1)*20+(2-1))*4
               = 1176 + (41*4)
               = 1176+164
               = 1340
```

(1 Mark for writing correct formula/correct substituted values, for row major properly, for calculating Base Address)
(1 Mark for calculating correct Base Address)
(1 Mark for writing correct formula/correct substituted values, for row major properly, for calculating Address of Arr[3][2])
(1 Mark for calculating correct Address of Arr[3][2])

(c)
```
class QUEUE
{
    Customer   *Rear,*Front;
public:
    QUEUE( ) { Rear=NULL; Front=NULL;}
    void DELETE( );
    ~QUEUE( );
};
```

```
 //Function definition DELETE()
void QUEUE::DELETE()
{
    if(Front==NULL) // OR if(!Front)
        cout<<"\n Queue Underflow\n";
    else
    {
        Customer  *Temp;
        Temp=Front;
        cout<<Front->Cno<<":"<<Front->Cname
            <<"Deleted"<<endl;//To be ignored
        Front=Front->Link;
        delete Temp;
        if (Front==NULL)
            Rear=NULL;
    }
}
```

OR

```
void DELETE(Customer *&Front,Customer *&Rear)
{
    if(!Front)
        cout<<"\n Queue Underflow\n";
    else
    {
        Customer *Temp;
        Temp=Front;
        cout<<Front->Cno<<":"<<Front->Cname
            <<"Deleted"<<endl;//To be ignored
        Front=Front->Link;
        delete Temp;
        if (Front==NULL)
            Rear=NULL;
    }
}
```

Note: If Front and Rear are declared as Global variables then parameters are not needed in the above function.
(½ Mark for correct function header)
(½ Mark for declaring Front and Rear as members OR passing them as arguments OR declaring them as global variables)
(1 Mark for checking Underflow)
(1 Mark for updating Front)
(1 Mark for deleting node)

(d)
```
//Function  definition
void Display(int A[][100],int N)
{
    cout<<"Middle  Row:"<<endl;
    for(int  i=0;i<N;i=i+1)
        cout<<A[N/2][i]<<"  ";
    cout<<endl;
    cout<<"Middle  Column:"<<endl;
    for(i=0;i<N;i=i+1)
    for(int  i=0;i<N;i=i+1)  –  For Borland C++
        cout<<A[i][N/2]<<"  ";
}
```
OR

Any other correct equivalent function definition

(½ Mark for correct function header)
(½ Mark for correct loop)
(½ Mark for checking/printing middle row elements)
(½ Mark for checking/printing middle column elements)

(e) Evaluation of the given postfix expression is explained below

Operator Scanned	Stack Content
15	15
3	15, 3
2	15, 3, 2
+	15, 5
/	3
7	3, 7
+	10
2	10, 2
*	20

OR

Any other method of evaluating the postfix expression is shown.

(½ Mark for each operation correctly evaluated)
(Only 1 Mark is to be awarded if correct answer is given without steps)

4. (a) <u>**Statement 1:**</u>

```
File.seekg(-1*sizeof(L),ios::cur);
```

OR

```
File.seekg(Rec*sizeof(L));
```

OR

```
File.seekp(-1*sizeof(L),ios::cur);
```

OR

```
File.seekp(Rec*sizeof(L));
```

OR

Any equivalent correct method of calculating size of the record in place of sizeof operator.

<u>**Statement 2:**</u>

```
File.write((char *) &L,sizeof(L));
```

OR

Any equivalent correct method of calculating size of the record in place of sizeof operator.

(½ Mark for each correct statement)

(b)
```
//Function to count the word in STORY.TXT file
void thewordCount()
{
    ifstream Fil("STORY.TXT");
    char String[20];
    int C=0;
    while(!Fil.eof())
    {
        Fil>>String;
        if(strcmpi(String,"the")==0)
            C=C+1;
    }
    cout<<C<<endl;
    Fil.close();
}
```
OR
```
void thewordCount()
{
    ifstream Fil("STORY.TXT");
    char String[20];
    int C=0;
    while(!Fil.eof())
    {
        Fil>>String;
        if(strcmp(String,"the")==0 || strcmp(String,"The")==0)
            C=C+1;
```

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```
        }
        cout<<C<<endl;
        Fil.close();
    }
    OR
    void thewordCount()
    {
        ifstream  F("STORY.TXT");
        char Str[4];
        int C=0;
        while(F.getline(Str,4,' '))
        {
            if(strcmp(Str,"the")==0  ||  strcmp(Str,"The")==0)
                C=C+1;
        }
        cout<<C<<endl;
        F.close();
    }
```

(½ Mark for opening file in the correct mode)
(½ Mark for reading the content from the file and the loop)
(½ Mark for correct comparison)
(½ Mark for initialization and increment of the counter(variable))
Note:
Ignore case sensitivity in the comparison with "the" or "The"

(c)
```
    //Function to copy records from SPORTS.DAT to
    //ATHELETIC.DAT
    void SP2AT()
    {
        fstream IS,OA;
        Sports S;
        IS.open("SPORTS.DAT",ios::binary|ios::in);
        OA.open("ATHLETIC.DAT",ios::binary|ios::out);
        while(IS.read((char*) &S,sizeof(S)))
        {
            if(strcmp(S.Event,"Athletics")==0)
                OA.write((char *)&S,sizeof(S));
        }
        IS.close();
        OA.close();
    }
```

OR
```
void SP2AT()
{
    fstream F1,F2;
    Sports S;
    F1.open("SPORTS.DAT",ios::binary|ios::in);
    F2.open("ATHLETIC.DAT",ios::binary|ios::out);
    while(F1.read((char*) &S,sizeof(S)))
    {
        if(!strcmp(S.Event,"Athletics"))
            F2.write((char *)&S,sizeof(S));
    }
    F1.close();
    F2.close();
}
```
OR
```
void SP2AT()
{
    fstream F1,F2;
    Sports S;
    F1.open("SPORTS.DAT",ios::binary|ios::in);
    F2.open("ATHLETIC.DAT",ios::binary|ios::out);
    while(!F1.eof())
    {
        F1.read((char*) &S,sizeof(S));
        if(!strcmp(S.Event,"Athletics"))
            F2.write((char *)&S,sizeof(S));
    }
    F1.close();
    F2.close();
}
```
(½ Mark for opening each file in the correct mode)
(½ Mark for reading the content from the file)
(½ Mark for the correct loop)
(½ Mark for the correct comparison with "Athletics")
(½ Mark for writing the content to the second file)

5. (a) The Primary Key is an attribute/set of attributes that identifies a tuple/ row/ record uniquely.

Example:
Rollnumber in the table STUDENT
OR

AccessionNumber in the table LIBRARY

OR

EmpNumber in the table EMPLOYEE

OR

PanNumber in the table INCOMETAX

OR

MemberNumber in the table MEMBER

OR

AccNumber in the table BANK

OR

Any other suitable example

(1 Mark for correct definition/explanation of Primary Key)
(1 Mark for suitable example)

(b) (i)
```
SELECT  CnorName  FROM  CONSIGNOR  WHERE
City='Mumbai';
```

(½ Mark for correct use of SELECT and FROM)
(½ Mark for correct use of WHERE clause)

(ii)
```
SELECT  B.CneeID,  A.CnorName,  A.CnorAddress,
B.CneeName , B.CneeAddress
FROM Consignor A, Consignee B
WHERE  A.CnorID=B.CnorID;
```
OR
```
SELECT Consigner.CneeID, CnorName, CnorAddress,
CneeName, neeAddress
FROM Consignor, Consignee
WHERE  Consignor.CnorID=  Consignee.CnorID;
```

(½ Mark for correct use of SELECT and FROM)
(½ Mark for correct use of WHERE clause)

(iii)
```
SELECT * FROM CONSIGNEE ORDER BY CneeName;
```

(½ Mark for correct use of SELECT and FROM)
(½ Mark for correct use of ORDER BY clause)

(iv)
```
SELECT City,Count(CnorID) FROM CONSIGNOR Group
By City;
```
OR
```
SELECT  City,Count(*) FROM CONSIGNOR Group  By
City;
```

(½ Mark for correct use of SELECT and FROM)
(½ Mark for correct use of GROUP BY clause)

(v) `DISTINCT CneeCity`

`Mumbai`

`New Delhi`

`Kolkata`

(½ Mark for correct output)

OR

(½ Mark for mentioning Error as CITY not present in the table CONSIGNEE)

(vi) <u>`A.CnorName`</u>   <u>`B.CneeName`</u>

`R Singhal`   `Rahul Kishore`

`Amit Kumar`   `S Mittal`

(½ Mark for correct output)

OR

(½ Mark for any 2 correct output out of (v),(vii)and (viii) even if part (vi) not attempted)

(vii) <u>`CneeName`</u>   <u>`CneeAddress`</u>

`P Dhingra`   `16/J,Moore Enclave`

`B P Jain`   `13,Block D,A Vihar`

(½ Mark for correct output)

(viii) <u>`CneeID`</u>   <u>`CneeName`</u>

`MU05`   `Rahul Kishore`

`KO19`   `A P Roy`

(½ Mark for correct output)

Note: Column Headings for all Outputs may be ignored

6. (a) If $X,Y \in B$

$(X+Y)'=X'.Y'$

$(X.Y)'=X'+Y'$

X	Y	X'	Y'	X+Y	(X+Y)'	X'.Y'
0	0	1	1	0	1	1
0	1	1	0	1	0	0
1	0	0	1	1	0	0
1	1	0	0	1	0	0

X	Y	X'	Y'	X.Y	(X.Y)'	X'+Y'
0	0	1	1	0	1	1
0	1	1	0	0	1	1
1	0	0	1	0	1	1
1	1	0	0	1	0	0

(½ Mark for each form of DeMorgan's Theorem)

(1 Mark for correct verification of any of the form of DeMorgan's Theorem using Truth Table)

(b) `F(X, Y, Z) = π (1, 3, 6, 7)`

OR

`F=(X+Y+Z')(X+Y'+Z')(X'+Y'+Z)(X'+Y'+Z')`

(½ Mark for each term of POS)

(c) `F=A.B'+C'.D`

(2 Marks for the correct expression)

OR

(½ Mark for each term of the expression)

(d)

	A'.B'	A'.B	A.B	A.B'
C'D'	1 0	1 4	12	8
C'.D	1 1	5	13	9
C.D	1 3	7	15	1 11
C.D'	1 2	6	14	1 10

`F(A,B,C,D)=  A'.B'+B'.C'+A'.C'.D'`

OR

	A + B	A+B'	A'+B'	A'+B
C+D			0 12	0 8
	0	4		
C+D'		0 5	0 13	0 9
	1			
C'+D'		0 7	0 15	1 11
	3			
C'+D		0 6	0 14	1 10
	2			

F(A,B,C,D)=(A'+C).(B'+D').(B'+C')

(½ Mark for representing the terms in K-Map)

(½ Mark for obtaining each reduced term i.e. 1 ½ Marks for reducing to the correct minimal form)

7.   (a)   **Cyber law** encompasses a wide variety of political and legal issues related to the Internet and other communications technology, including intellectual property, privacy, freedom of expression, and jurisdiction.

OR

Restricting unauthorized access to user accounts. Promoting, coordinating and controlling e-business.

(1 Mark for any correct definition/explanation)

(b) (i)   XML   **eXtensible MarkUp Language**

     (ii) WWW   **World Wide Web**

     (iii) WLL   **Wireless in Local Loop**

     (iv) TCP/IP   **Transmission Control Protocol/Internet Protocol**

(½ Mark for each correct expansion)

(c) (ii)   Mbps

         Mega bits per second

(½ Mark for correct identification)

(½ Mark for correct expansion)

(d) (i)   ·   Head Office and Tech Office: **LAN**

        ·   Head Office and Coimbatore Office: **WAN**

     (½ Mark for mention of each - LAN and WAN correctly)

     (ii) ·   Switch/Hub

     (1 Mark for the correct device)

     (iii) ·   Optical fiber

     (1 Mark for the correct device)

(iv)   Optical Fiber/Star Topology

Wireless

OR
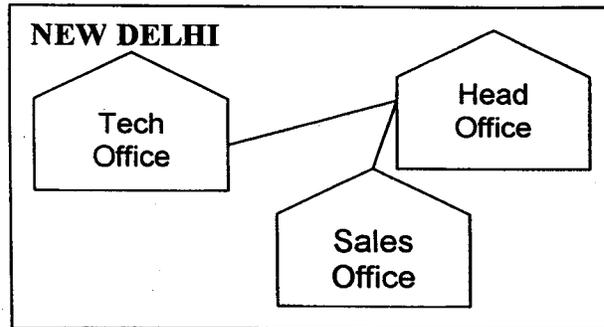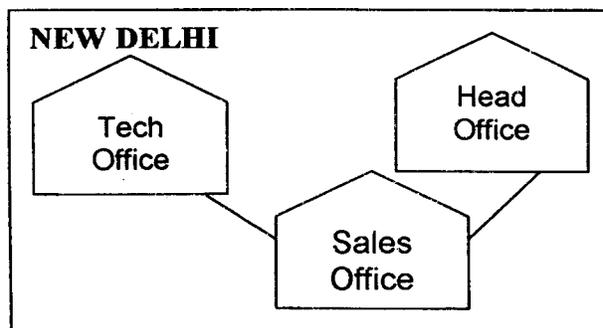
Optical Fiber/Bus Topology

Wireless

(½ Mark for the correct layout)

(½ Mark for the any equivalent correct technology)

QUESTION PAPER CODE 91/1

EXPECTED ANSWERS/VALUE POINTS

1.   (a)   **Run Time Error :** Error occurring in a program during its execution. Program execution halts when such an error is encountered.

Example:

```
int A,B,C;
cin>>A>>B;
C=A/B;//Runtime error if value of B is zero.
```

Syntax Error: Error occurred due to wrong syntax of language detected by the compiler during compilation.

Example:

```
cout>>"A C++ Program";
```

(b) `stdio.h`

   `string.h`

   (½ Marks for identifying each correct header file)

   Note: Ignore any other header files, if mentioned.

(c) `#include<iostream.h>`

   <u>`const int Max = 10;`</u>   `//OR `<u>` const int Max = 5;`</u>

   `void main()`
   `{`
   <u>`int  Numbers[Max]=  {20,50,10,30,40};`</u>
   `    // OR `<u>`int Numbers[]= {20,50,10,30,40};`</u>
   <u>`int Loc;`</u>
   `for(Loc=Max-1;  Loc>=0;  Loc—)`
   `    cout`<u>`<<`</u>`Numbers[Loc];`
   `}`

   (½ Marks for each correction)

   OR

   (1 Mark for identifying at least three errors, without suggesting correction)

(d) 4 # 6 # 10 #

   12 @ 18 @ 30 @ 36 @

   (1 Mark for each correct line of output)

   Note:

   · *½ Mark to be deducted for missing symbols in the output*

   · *½ Mark to be deducted if endl is not considered in the output*

   · *As Borland C++ Compiler declares <u>for loop variable</u> locally, the program will result in syntax errors. So, any student specifying <u>Variable I not declared</u> OR mentioning that the program will not RUN due to incorrect syntax should be awarded full 2 Marks*

(e) `20,25,30,`

   `20,25,30,`

   `Number=30`

   (1 Mark for each correct line of output)

   Note:

   · *½ Mark to be deducted for missing Commas (,) in the output*
   · *½ Mark to be deducted if endl is not considered in the output*

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   (1 Mark for correct answer)

   (1 Mark for correct justification)

2. (a) **Constructors**:

   · Name of the constructor functions is same as the name of the class
   · No return type required for constructor function.
   · Constructor functions are called automatically at the time of creation of the object
   · Constructors can be overloaded
   · Constructor functions are defined in public.

   Destructors:

   · Name of the destructor is same as the name of the class preceded by ~
   · No return type required for destructor function.
   · Destructor functions are called automatically when the scope of the object gets over
   · Destructor can not be overloaded
   · Destructor function is defined in public.

   (1 Mark for correct explanation of Constructor)
   (1 Mark for correct explanation of Destructor)
   OR
   (1 Mark for any valid example of a Constructor)
   (1 Mark for any valid example of a Destructor)

(b) (i) Function 1: Constructor OR Default Constructor

   Function 2: Destructor

   (½ Marks for each correct answer)

   (ii) Function 1 is executed or invoked automatically when an object of class Maths is created.

   Function 2 is invoked automatically when the scope of an object of class Maths comes to an end.

OR

Example:

```
{
Maths s1;                    //Constructor is invoked
}                            //Destructor is invoked
```

(½ Mark for each correct answer through explanation OR example)

NOTE: If the error in declaration of the destructor is specified then marks for the destructor function should be allocated.

(c)
```
class Tour
{
    char TCode[10];   //OR char *Tcode;
    int NoofAdults;
    int NoofKids;
    int Kilometres;
    float TotalFare;
public:
    Tour()
    {
        strcpy(TCode,"NULL"); //OR TCode[0]='\0'OR strcpy(TCode,"\0")
                //OR TCode=NULL if TCode is declared as char pointer
        NoofAdults = 0;
        NoofKids = 0;
        Kilometres = 0;
        TotalFare = 0;
    }
    void AssignFare();
    void EnterTour();
    void ShowTour();
};
void Tour::AssignFare()
{
    if(Kilometres>=1000)
        TotalFare = 500*NoofAdults+250*NoofKids;
    else if (Kilometres >= 500)
        TotalFare = 300*NoofAdults+150*NoofKids;
    else
        TotalFare = 200*NoofAdults+100*NoofKids;
}
void Tour::EnterTour()
{
    gets(TCode);      // or cin >> TCode;
    cin>>NoofAdults>>NoofKids>>Kilometres;
    AssignFare( );
```

```
}
void Tour::ShowTour()
{
    cout<<TCode<<NoofAdults<<NoofKids<<Kilometres<<TotalFare<<endl;
}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of constructor)

(½ Mark for condition checking in AssigFare())

(½ Mark for calculation of correct TotalFare for each condition)

(½ Mark for correct EnterTour() with proper invocation of AssignFare())

(½ Mark for displaying all data Members including TotalFare inside ShowTour())

(d) (i)   Multiple Inheritance

     (1 Mark for correct answer)

  (ii) None

     OR

     All the above functions can be called.

     (1 Mark for correct answer)

  (iii) **Data Members:** `ICode, IName, Attendance, Grade, Remuneration`

     Member Functions: `IEntry( ), IDisplay( ), LEntry(), LDisplay( ),`
`AssignRem( ), TEntry( ), TDisplay( )`

     (1 Mark for correct members)

     Note:

     ·   *Constructor functions Trainer(), Learner() and Institute() to be ignored.*

     ·   *No marks to be awarded for partially correct answers*

  (iv) `IEntry( ), IDisplay( )`

     (1 Mark for correct answer)

     NOTE:

     ·   *Constructor function Institute() to be ignored.*

     ·   *No marks to be awarded for partially correct answers*

3. (a)
```
void Replace( int Arr[], int Size)
{
    for(int i =0;  i<Size;  i++)
        if(Arr[i]%2 != 0 )
            Arr[i] *= 3;
        else
            Arr[i] *= 2;
}
OR
void Replace( int Arr[], int Size)
{
    for(int i =0;  i<Size;  i++)
        Arr[i]%2 ? Arr[i] *= 2 : Arr[i] *= 3;
}
```

(1 Mark for correct Function Header with proper Arguments)
(1 Mark for correct loop)
(1 Mark for checking Even / Odd values)
(1 Mark for replacing with proper values)

(b) Address of Array[i][j] along the column =

Base Address + W [(i – L1) + (j – L2) * M]

where,

W = size of each location in bytes = 8

L1 = Lower Bound of rows = 0

L2 = Lower Bound of columns = 0

M = Number of rows per column = 20

Address of Array[4][5] = Base Address + 8 [(4 – 0) +(5 – 0) * 20]

1000 = Base Address + 8 [104]

Base Address = 1000 – 8 x 104

= 1000 – 832

= 168

Address of Array[2][3] = 168 + 8 [(2 – 0) + (3 – 0) x 20]

= 168 + 8 x 62

= 168 + 496

= 664

OR

Address of Array[i][j] along the column =

    Base Address + W [(i – L1) + (j – L2) * M]

    where,

        W = size of each location in bytes = 8

        L1 = Lower Bound of rows = 1

        L2 = Lower Bound of columns = 1

        M = Number of rows per column = 20

Address of Array[4][5]   = Base Address + 8 [(4 – 1) +(5 –1) * 20]

            1000   = Base Address + 8 [83]

    Base Address   = 1000 – 8 x 83

                     = 1000 – 664

                     = 336

Address of Array[2][3]   = 336 + 8 [(2 – 1) + (3 – 1) x 20]

                     = 168 + 8 x 41

                     = 168 + 328

                     = 496

(1 Mark for writing correct formula/ correct substituted values for calculating Base Address)

(1 Mark for calculating correct Base Address)

(1 Mark for writing correct formula/ correct substituted values for calculating Address of Arr[3][2])

(1 Mark for calculating correct Address of Arr[3][2])

(c)
```
class Stack
{
    Book *Top;
public:
    Book()              //Constructor to initialize Top
    {   Top = NULL; }
    void Push();        //Function to insert a node
    void Pop();         //Function to delete a node
    void Display();     //Function to display nodes of Stack
    ~Book();            //Destructor to delete all nodes
};
void Stack::Pop( )
{
    if (Top != NULL)
    {
        Stack *Temp;
        Temp = Top;
```

```
            //Ignore the following line while evaluation
            cout<<Top->Bno<<Top->Bname<<"deleted"<<endl;
            Top = Top ->Next;
            delete Temp;
        }
        else
            cout<<"Stack Empty";
    }
    OR
    void Pop(Book *&Top)
    {
        if(Top!=NULL)
        {
            Book *Temp = Top;
            Top = Top ->Next;
            delete Temp;
        }
        else
            cout<<"Stack Empty";
    }
```

*(½ Mark for declaring Top as member / passing Top to argument/
declaring it as a global variable)*
(½ Mark for correct function header)
(1 Mark for checking Underflow)
(1 Mark for reassigning Top)
(1 Mark for deleting node)

(d)
```
void Diagonals(int Arr[][100], int Size)
{
    int Row, Col;
    cout<<"Diagonal One: ";
    for (Row = 0; Row < Size; Row++)
        for (Col = 0; Col < Size; Col++)
            if (Row == Col)
                cout<<Arr[Row][Col];
    cout<<"Diagonal Two: ";
    for (Row = 0; Row < Size; Row++)
        for (Col = 0; Col < Size; Col++)
            if (Row + Col == Size - 1)
            cout<<Arr[Row][Col];
}
```

OR

```
void Diagonals(int Arr[][100], int Size)
{
    int Loc;
    cout<<"Diagonal One: ";
    for (Loc = 0; Loc < Size; Loc++)
        cout<<Arr[Loc][Loc];
    cout<<"Diagonal Two: ";
    for (Loc = 0; Loc < Size; Loc++)
        cout<<Arr[Loc][Size-Loc-1];
}
```

OR

Any other correct equivalent function definition

(½ Marks for correct function header)
(½ Marks for correct loop(s))
(½ Marks for checking/printing right diagonal elements)
(½ Marks for checking/printing left diagonal elements)

(e)

Operator Scanned	Stack Content
25	25
8	25, 8
3	25, 8, 3
–	25, 5
/	5
6	5, 6
*	30
10	30, 10
+	40

OR

Any other method of correctly evaluating the postfix expression is shown.

(2 Marks is to be given for correct answer)
OR
(½ Mark for each operation correctly evaluated)

4. (a) Statement 1:

```
File.seekp(Record * sizeof(P));
```
OR
```
File.seekp(Record * sizeof(PracFile));
```
OR
```
File.seekp(-sizeof(P), ios::cur);
```
OR
```
File.seekg(Record * sizeof(P));
```
OR
```
File.seekg(Record * sizeof(PracFile));
```
OR
```
File.seekg(-sizeof(P), ios::cur);
```
OR

Any equivalent correct method of calculating size of the record in place of sizeof operator.

Statement 2:
```
File.write((char*)&P, sizeof(P));
```
OR
```
File.write((char*)&P, sizeof(PracFile));
```
OR

Any equivalent correct method of calculating size of the record in place of sizeof operator.

(½ Mark for each correct statement)

(b)
```
void CountIs()
{
    ifstream Fil;
    Fil.open("DIALOGUE.TXT");
    char Word[10];
    int Count =0;
    while(!Fil.eof())
    {
        Fil>>Word;
        if(strcmpi(Word,"is")==0)
            Count++;
    }
    cout<<Count;
    Fil.close();        //Ignore
}
```

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OR

```
void CountIs()
{
    ifstream Fil;
    Fil.open("DIALOGUE.TXT");
    char Word[10];
    int Count = 0;
    while(Fil.getline(Word,10,' '))
    {
        if(strcmpi(Word,"is")==0)
            Count++;
    }
    cout<<Count;
    Fil.close();          //ignore
}
```

OR

```
void CountIs()
{
    ifstream Fil;
    Fil.open("DIALOGUE.TXT");
    char ch, Word[10];
    int Loc=0, Count = 0;
    while(Fil.get(ch))
    {
        if(ch!=' ')
        {
            Word[Loc] = ch;
            Loc++;
        }
        else
        {
            Word[Loc] = '\0';
            Loc = 0;
            if(strcmpi(Word,"is")==0)
                Count++;
        }
    }
    cout<<Count;
    Fil.close();          //ignore
}
```

OR

Any other correct definition

(½ Marks for opening DIALOGUE.TXT correctly)
(½ Marks for reading each word from the file)
(½ Marks for comparing with "is" / "Is")
(½ Marks for printing the count of "is" / "Is")

(c)
```
void CopyBasket()
{
    Game G;
    ifstream fin;
    fin.open("GAME.DAT", ios::binary);
    ofstream fout;
    fout.open("BASKET.DAT", ios::binary);
    while(fin.read((char*)&G, sizeof(G)))
    {
        if(strcmp(G.GameName, "Basket Ball")==0)
            fout.write((char*)&G,sizeof(G));
    }
    fin.close();        //ignore
    fout.close();       //ignore
}
```

(½ Marks for opening GAME.DAT correctly)
(½ Marks for opening BASKET.DAT correctly)
(½ Marks for reading each record from GAME.DAT)
(½ Marks for correct loop / checking end of file)
(½ Marks for comparing GameName with "Basket Ball")
(½ Marks for writing the record to BASKET.DAT)

5. (a) All candidate keys, which are not the primary key of the table are called the alternate keys.

OR

Primary Key: An attribute/ column used to identify each record in a table

Alternate Key: All such attributes/columns, which can act as a primary key but are not the primary key in a table.

(2 Mark for any valid difference/relation between Primary Key and Alternate Key)
OR
(1 Mark for correct explanation of Primary Key)
(1 Mark for correct explanation of Alternate Key)

(b) (i) `SELECT SenderName from Sender WHERE City = 'Mumbai';`

(ii) `SELECT R.RecID, S.SenderName, S.SenderAddress, R.RecName, R.RecAddress FROM Sender S, Recipient R`
`WHERE S.SenderID = R.SenderID;`

(iii) `SELECT * FROM Recipient ORDER BY RecName;`

(iv) `SELECT COUNT(*) FROM Recipient GROUP BY RecCity`

(v) <u>SenderCity</u>
Mumbai
New Delhi

(vi) <u>A.SenderName</u>   <u>B.RecName</u>
R Jain   H Singh
S Jha   P K Swamy

(vii) <u>RecName</u>   <u>RecAddress</u>
S Mahajan   116, A Vihar
S Tripathi   13, Bl D, Mayur Vihar

(viii) <u>RecID</u>   <u>RecName</u>
ND08   S Mahajan
ND48   S Tripathi

(Part (i) to (iv) - 1 Mark for each correct query)

(Part (v) to (viii) - ½ Marks for each correct output)

Note:

·   *Column headings for the output questions to be ignored.*

·   *Since in part (iv) the fieldname RecCity is not mentioned specifically, so full 1 mark to be given if any part of 5 (b) is answered correctly.*

6.   (a)   If X, Y, Z are Boolean Variables then

$X . (Y + Z) = X . Y + X . Z$

OR

$X + Y . Z = (X + Y) . (X + Z)$

X	Y	Z	Y+Z	X.(Y+Z)	X.Y	X.Z	X.Y+X.Z
0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0
0	1	0	1	0	0	0	0
0	1	1	1	0	0	0	0
1	0	0	0	0	0	0	0
1	0	1	1	1	0	1	1
1	1	0	1	1	1	0	1
1	1	1	1	1	1	1	1

└─────VERIFIED─────┘

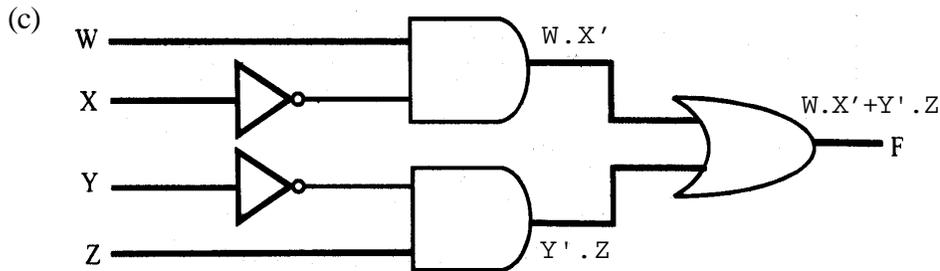*(1 Mark for stating any one of the Distributive Law correctly)*

(1 Mark for verification using Truth Table)

(b) $F(X,Y,Z)$ = $\pi(0,2,4,5)$
$= X'.Y'.Z' + X'.Y.Z' + X.Y'.Z' + X.Y'.Z$

(2 Marks for correct expression)
OR
(1 Mark, if a reduced non-canonical SOP expression is given)

(c)

W.X'
W.X'+Y'.Z
F
Y'.Z

$F = W.X' + Y'.Z$

(2 Marks for correct expression)
OR
(½ Mark each for W.X' and Y'.Z)

(d)

	U'V'	U'V	UV	UV'
W'Z'	1 0	1 4	12	8
W'Z	1 1	5	13	9
WZ	1 3	7	15	1 11
WZ'	1 2	6	14	1 10

$F = U'.V'+W.V'+U'.W'.Z'$

(½ Mark for drawing correct K-Map)
(½ Mark for plotting 1's correctly)
(½ Mark for correct grouping)
(½ Mark for correct Answer)

7. (a) Cyber law encompasses a wide variety of political and legal issues related to the Internet and other communications technology, including intellectual property, privacy, freedom of expression, and jurisdiction.

OR

Cyber law helps prevent Cyber Crime, Hacking, Data theft, Software Piracy and protects rights of Cyber Users.

*(1 Mark for any correct significance / explanation)*

(b) (i)   Code Division Multiple Access

    (ii)   Wireless Local Loop

    (iii)   File Transfer Protocol

    (iv)   Hyper Text Markup Language

    (½ Marks for each correct expansion)

(c) (i)   Mbps (Mega Bits Per Second)

    (½ Marks for correct choice)
    (½ Marks for correct expansion)

(d) (i)   Back Office and Work Office – LAN
    Back Office and South Office – WAN
    (½ Mark for each correct answer)

    (ii)   Switch/Hub
    (1 Mark for correct answer)

    (iii)   Optical Fiber
    (1 Mark for correct answer)

    (iv)

OR
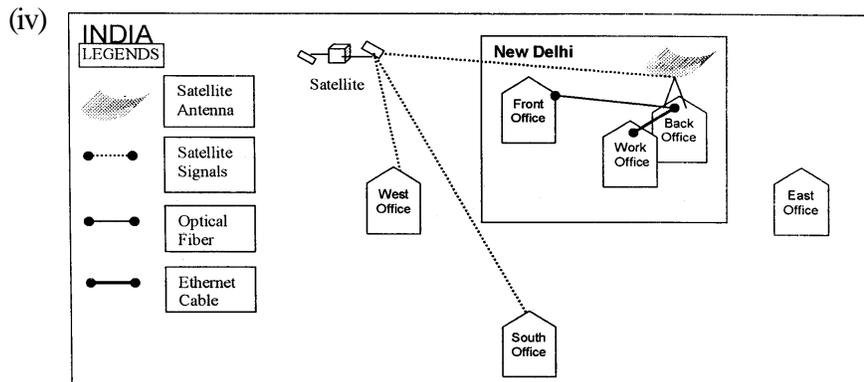
Any other suitable layout / topology drawn or explained.

Optical Fiber/Star Topology

OR

Optical Fiber/Bus Topology

OR

Wireless

(½ Mark for the correct layout)
(½ Mark for the any equivalent correct technology)