COMPUTER SCIENCE

Time allowed : 3 hours   *Maximum Marks : 70*

Instructions:

(i) **All** *questions are compulsory.*

(ii) *Programming Language: C++*

QUESTION PAPER CODE 91/1

1   (a)   Difference between the formal parameters and actual parameters. Also, give a
           suitable C++ code to illustrate both.   2

     (b)   Which C++header file(s) are essentially required to be included to run/execute
           the following C++ source code(Note: Do not include any header file, which
           is/are not required) :   1

```
{
char STRING[]="SomeThing";
cout<<"Balance Characters:"<<160-strlen(STRING)<<endl;
}
```

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

```
#include<iostream.h>
class BOOK
{
    long BId,Qty;
Public:
    void Purchase() {cin>>BId>>Qty;}
    void Sale
    {
```

```
            cout<<setw(5)<<BId<<"Old:"<<Qty<<endl;

            cout<<"New: "<<--Qty<<endl;

    }

};

void main ()

{

    BOOK B;

    B.Purchase() ;

    Sale ();

    B. Sale ()

}
```

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

```
# include<iostream.h>

class TRAIN

{

    int Tno, TripNo, PersonCounti

public:

    TRAIN(int Tmno=l) {Tno=Tmno;TripNo=O;PersonCount=O;}

    void Trip(int TC=100) {TripNo++;PersonCount+=TC;}

voidShow(){cout<<Tno<<":"<<TripNo<<":"<<PersonCount<<endl;}

};

void main ( )

{

    TRAIN T(10) ,N;

    N. Trip ();

    T . Show ();
```

```
        T.Trip(70);

        N.Trip(40);

        N. Show ();

        T . Show ();

}
```

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

```
#include<iostream.h>

#include<ctype.h>

typedef char Txt80[80];

void main ( )

{

    Char *PTexti

    Txt80 Txt="Ur2GReAt";

    int N=6;

    PText=Txt;

    while (N>=3)

    {

    Txt[N]=(isupper(Txt[N])?tolower (Txt [N]:toupper(Txt[N]));

    cout<<PText<<endl;

    N--;

    PText++;

    }

}
```

(f) Observe the following program and find out, which output(s) out of (i) to
(iv) will not expected from the program? What will be the minimum and the
maximum value assigned to the variable Chance? 2

```
#include <iostream.h>

#include <stdlib.h>
```

```
void main ( )

{

    randomize ()

    int Game[]={10,16},P;

    int Turn=random(2)+5;

    for(int T=O; T<=2; T++)

    {

    P=random (2) ;

    Cout<<Game[P]+ Turn<<"*";

    }

}
```

(i)   15 # 22 #

(ii)   22 # 16 #

(iii) 16 # 21 #

(iv) 21 # 22 #

2.   (a)   What is the difference between the members in private visibility mode and the
             members in public visibility mode inside a class? Also, give a suitable C++
             code to illustrate both.   2

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

```
class Tour

{

    int LocationCode;char Location[20];float Charges;

public:

    Tour ()                                        //Function 1

    {

        LocationCode=l; strcpy(Location, "PURI"); Charges=1200;
```

```
        }

        void TourPlain(float C)                    //Function 2

        {

                cout<<PlaceCode«": "<<Place<<": "«Charges<<endl;

                Charge+=100;

        }

        Tour(int LC, char L[], float C) {       //Function 3

                LocationCode-LC; strcpy (Location,L); Charges=C;

        }                                         //Function 4

        ~Tour ( )

        {

                cout<<"Tour Plan Cancelled"<<endl;

        }

} ;
```

(i)   In Object Oriented Programming, what are Function 1 and Function 3 combined together referred as?

(ii)   In Object Oriented Programming, which concept is illustrated by Function 4? When is this function called/invoked?

(c)   Define a class SUPPLY in C++ with following description: 4

Private Members

- Code of type int

- Food Name of type string

- Sticker of type string

- Food Type of type string

- A member function Get Type ( ) to assign the following values for

Food Type as per the given Sticker:

Sticker	Food Type
GREEN	Vegetarian
YELLOW	Contains Egg
RED	NON-Vegetarian

Public Members

- A function Foodln ( ) to allow user to enter values for Code, FoodName, Sticker and call function Get Type ( ) to assign respective FoodType.

- A function FoodOut ( ) to allow user to view the content of all the data members.

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

```
class ORGANIZATION
(
    char Address[20];
    double Budge, Income;
protected:
    void Computet();
public:
    ORGANIZATION();
    void Get();
    void Show();
} ;
    class WORKAREA: Public ORGANIZATION
{
    char Address[20];
    int Staff;
```

```
protected:

    double Pay;

    void Calculate();

public:

    WORKAREA () ;

    void Enter() ;

    void Display() ;

} ;

class SHOWROOM: Private ORGANIZATION

{

    char Address [20];

    void Enter() ;

    void Show() ;

} ;
```

(i) Name the type of inheritance illustrated in the above C++ code.

(ii) Write the names of all the data members, which are accessible from member functions of class SHOWROOM

(iii) Write the names of all the member functions, which are accessible from objects belonging to class WORKAREA.

(iv) Write the name of all the members, which are accessible from objects of Class SHOWROOM.

3. (a) Write a function SWAP2CHANGE (int p [ ], int N) in C++ to modify the content of the array in such a way that the elements, which are multiples of 10 swap with the value present in the very next position in the array.   3

For Example:

If the content of array P IS

91, 50, 54, 22, 30, 54

The content of array P should become

91, 54, 50, 22, 54, 30

(b) An array 5[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of 5[5][10], if element 5[2][15] is stored at the location 8200.   3

(c) Write a function in C++ to perform Insert operation on a dynamic Queue containing DVD'S information (represented with the lelp of an array of structure DVD).   4

```
struct DVD
{
long No;          //DVD Nunber
char Title[20];   //DVD Title DVD *Link;
} ;
```

(d) Write a function SKIPEACH (int H[] [3], int C, int R) in C++ to display all alternate elements from two - dimensional array H (starting from H [0] [0]).   2

For example:

If the array is containing:

12	45	67
33	90	76
21	43	59

The output will be

12   67   90   59

(e) Evaluate the following POSTFIX notation. Show status of Stack after every step of evaluation (i.e after each operation.)   2

False, NOT, True, AND, True, False, OR, AND

4   (a) Observe the program segment given below carefully and the questions that follow: 1

```
class Inventory
{
    int Ano, Qty; char Article [20] ;
public:
    void Input() {cin>>Ano; gets (Article) :cin>>Qty:}
```

```cpp
    void Issue(int Q) {Qty+=Q;}

    void procure(int Q) {Qty-=Q;}

    int GetAno() {return Ano;}

};

void ProcureArticle (int TAno, int TQty)

{

    fstream File;

    File. open ("STOCK, DAT", ios::binary|ios::in|ios::out);

    Inventory I;

    int Found =0;

    while (Found ==0 && File.read«char*)&I, sizeof(I)))

    {

        if (TAno == S. GetAno())

        {

            I. Procure (TQty) ;

            _____          // Statement 1

            _____          // Statement 2

            Found ++;

        }

    }

    if (Found == 1)

        cout<<"Procurement Updated"<<endl;

    else

        cout<<"Wrong Article No<<endl.;

    File.close() :

}
```

(i)   Write statement 1 to position the file pointer to the appropriate place, so that the data updation is done for the required Article.

(ii)   Write statement 2 to perform the write operation so that the updation is done in the binary file.

(b)   Write a function in C++ to read the content of a text file "PLACES.TXT" and display all those lines on screen, which are either starting with 'P' or starting with 'S'.   2

(c)   Write a function in C++ to search for the details (Number and Calls) of those Mobile phones, which have more than 1000 calls from a binary file "mobile.dat". Assuming that this binary file contains records/objects of class Mobile, which is defined below: 3

```
class Mobile
{
    char Number [10]; int Calls;
public:
    void Enter() {gets (Number); cin>> Calls;}
    void Billing() {cout<< Number<<"#"<<Calls<<endl;}
    int GetCalls() {return Calls;}
};
```

5.   (a)   Give a suitable example of a table with sample data and illustrate Primary and Candidate Keys in it.   2

Consider the following tables CABHUB and CUSTOMER and answer (b) and (c) parts of this question:

Table: CABHUB

Vcode	VehicleName	Make	Color	Capacity	Charges
100	Innova	Toyota	WHITE	7	15
102	SX4	Suzuki	BLUE	4	14
104	C Class	Mercedes	RED	4	35
105	A-Star	Suzuki	WHITE	3	14
108	Indigo	Tata	SILVER	3	12

Table : CUSTOMER

CCode	CName	Vcode
1	Hemant Sahu	101
2	Raj Lal	108
3	Feroza Shah	105
4	Ketan Dhal	104

(b) Write SQL commands for the following statements: 4

    (i)   To display the names of all the white colored vehicles.

    (ii)   To d splay name of vehicle, make and capacity of vehicles in ascending order of their sittirg capacity.

    (iii)   To display the highest charges at which a vehicle can be hired from CABHUB.

    (iv)   To display the customer name and the corresponding name of the vehicle hired by them.

(c) Give the output of the following SQL queries: 2

    (i)   SELECT COUNT (DISTINCT Make) from CABHUB;

    (ii)   SELECT MAX   (Charges), MIN (Charges) FROM CABHUB;

    (iii)   SELECT count (*), Make FROM CABHUB;

    (iv)   SELECT Vehicle FROM CABHUB WHERE Capacity = 4;

6.   (a) Verify the following using truth table: 2

    (i) $X + 0 = X$

    (ii) $X + X' = 1$

(b) Write the equivalent Boolean Expression for the following Logic Circuit: 2
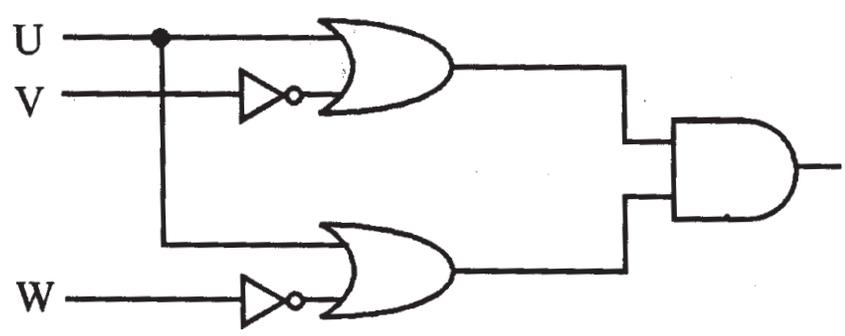
(c) Write the POS form of a Boolean function G, which is represented in a truth table as follows: 1

A	B	C	G
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

(d)   Reduce the following Boolean Expression using K-Map: 3

$F(P, Q, R, S) = \Sigma\ (1, 2, 3, 4, 5, 6, 7, 8, 10)$

7.   (a)   What out of the following, you will use to have an audio-visual chat with an
expert sitting in a faraway place to fix-up a technical issue?   1

   (i)   Email

   (ii)   VolP

   (iii)   FTP

(b)   Name one Client side scripting language and one Serverside scripting language.   1

(c)   Which out of the following does not come under Cyber Crime?   1

   (i)   Stealing a mouse from someone's computer.

   (ii)   Operating someone's Internet Banking account, without his knowledge.

   (iii)   Entering in someone's computer remotely and copying data, without
seeking his permission.

(d)   Write one advantage of Star Topology of network. Also, illustrate how 5
computers can be connected with each other using star topology of network.   1

(e)   Granuda Consultants are setting up a secured network for their office campus
at Faridabad for their day to day office and web based activities. They are
planning to have connectivity between 3 building and the head office situated
in Kolkata. Answer the questions (e1) to (e4) after going through the building
positions in the campus and other details, which are given below.   4

FARIDABAD Campus

Building "RAVI"

Building "JAMUNA"

Building "GANGA"

Head Office "KOLKATA"
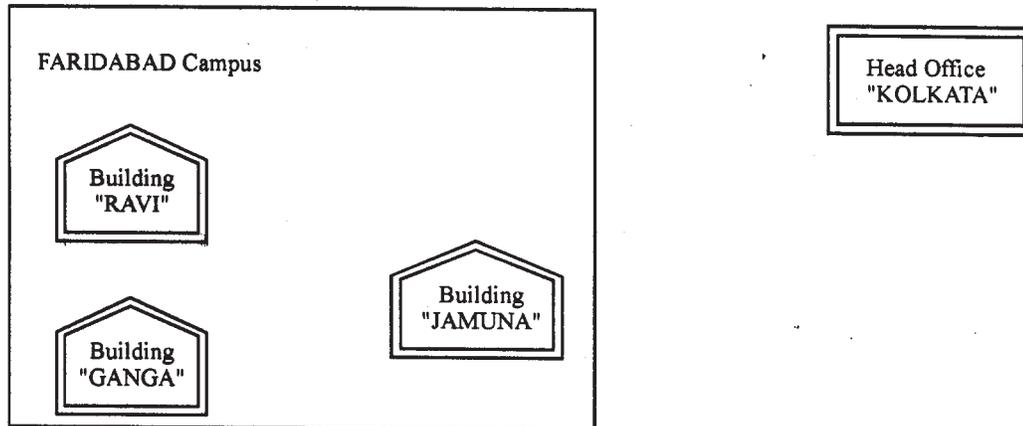
Distances between various buildings :

Building "RAVI" to Building "JAMUNA"	120 m
Building "RAVI" to Building "GANGA"	50 m
Building "GANGA" to Building "JAMUNA"	65 m
Faridabad Campus to Head Office	1460 KM

Number of Computers

Building "RAVI"	25
Building "JAMUNA"	150
Building "GANGA"	51
Head Office	10

(e1)   Suggest the most suitable place (i.e. block) to house the server of this organization. Also give a reason to justify your suggested location.

(e2)   Suggest a cable layout of connections between the building inside the campus.

(e3)   Suggest the placement of the following devices with justification

(i)   Switch

(ii)   Repeater

(e-4) The organization is planning to provide a high speed link with its head office situated in the KOLKATA using a wired connection. Which of the following cable will be most suitable for this job?

(i)   Optical Fibre

(ii)   Co-axial Cable

(iii)   Ethernet Cable

(f)   Give one suitable example of each- URL and Domain Name   1

(g)   Name two Open Source software alongwith its application   1

QUESTION PAPER CODE 91

1   (a)   Give the difference between the type casting and automatic type conversion.
          Also, give a suitable C++ code to illustrate both.   2

    (b)   Which C++ header file(s) are essentially required to be included to run/execute
          the following C++ source code (Note: Do not include any header file, which
          is/are not required) :   1

          void main ( )

          {

              char TEXT [ ] = "Something";

              cout << "Remaining SMS Chars : "<<160-atrlen (TEXT) << endl.;

          }

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

```
#include <iostream.h>

Class 1tem

{
    long IId, Qty;

public :
    void Purchase{cin>>IId>>Qty;}

    void Sale ( )
    {
        cout«setw(5)<<IId<<"Old:"<<Qty<<endl;

        cout<<''New: "<<Qty«end1;
    }
} ;
```

336

```cpp
void main ( )

{

    Item I ;

    Purchase ( ) ;

    I.Sale ( ) ;

    I.Sale ( )

}
```

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

```cpp
#include <iostream.h>

class METRO

{

    int Mno,TripNo,PassengerCount;

public:

    METRO(int Tmno=l) {Mno=Tmno;TripNo=0;PassengerCount=0;}

    void Trip(int PC=20) {TripNo++;PassengerCount+=PC; }

    void status Show ()

    {cout<<Mno<<":"<<TripNO<<":"<<PassengerCount<<endl:}

};

void main ()

{

    METRO M(5), T;

    M. Trip () ;

    M. StatusShow() ;

    T. StatusShow() ;

    M. Status Show () ;

}
```

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

```
#include <iostream.h>

#include <ctype.h>

typedef char str80 [80] ;

void main ( )

{

    char *Notes ;

    str80 str="vR2GooD";

    int L=6;

    Notes=Str;

    while (L>=3)

    {

        Str[L]=(isupper(Str[L])?tolower(Str[L]):
        toupper(Str[L]));

        cout<<Notes<<endl;

        L--;

        Notes++;

    }

}
```

(f) Observe the following program and find out, which output(s} out if (i) to
     (iv) will not be expected from the program? What will be the minimum and the
     maximum value assigned to the variable Chance?   2

```
#include <iostream.h>

#include <stdlib.h>

void main ( )

{

    randomize ( ) ;
```

338

```
    int Arr[]={9,6}, N;

    int Chance=random(2) + 10 ;

    for (int C=0;C<2;C++)

    {

        N=random (2) ;

        cout<<Arr [N] + Chance<<"#";

    }

}
```

(i)   9#6#

(ii)   19#17#

(iii)   19#16#

(iv)   20#16#

2   (a)   What is the difference between the members in private visibility mode and the
           members in protected visibility mode inside a class? Also, give a suitable C++
           code to illustrate both.   2

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

```
class Travel

{

    int PlaceCode; char Place[20] ; float Charges;

public:

    Travel ()                                   //Function 1

    {

    PlaceCode=1;strcpy (Place, "DELHJ:") ; Charges = 1000;

    }

    void TravelPlan (float C)          //Function 2

    {
```

```
        cout<<PlaceCode<<":"<<Place«":"<<Charges<<endl;

    }

    ~Travel ( )                           //Function 3

    {

        Cout<<"Travel Plan Cancelled"<<endl;

    }

    Travel (int PC, char P[], float C)//Function 4

    {

        PlaceCode=PC;strcpy(Place,P); Charges=C;

    }

} ;
```

(i)   In Object Oriented Programming, what are Function 1 and Function 4 combined together referred as?

(ii)   In Object Oriented Programming, which concept is illustrated by

        Function 3? When is this function called/invoked?

(c)   Define a class RESTRA in C++ with following description :   4

Private Members

● FoodCode of type int

● Food of type string

● FType of type string

● Sticker of type string

● A member function GetSticker () to assign the following value for Sticker as per the given FType:

FType	Sticker
Vegetarian	GREEN
Contains Egg	YELLOW
Non-Vegetarian	RED

Public Members

- A function GetFood () to allow user to enter values for FoodCode. Food, FType and call function GetSticker() to assign Sticker.

- A function ShowFood() to allow user to view the content of all the data members.

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

```
class COMPANY
{
    char Location[20] ;
    double Budget, Income ;
protected:
    void Accounts () ;
public:
    COMPANY () ;
    void Register();
    void Show() ;
} ;
class FACTORY:public COMPANY
{
    char Location[20] ;
    int Workers;
protected:
    double Salary ;
    void Computer() ;
public:
    FACTORY () ;
```

```
            void Enter () ;

            void Show() ;

      } ;

      class SHOP:private COMPANY

      {

            char Location[20] ;

            float Area;

            double Sale;

      public:

            SHOP () ;

            void Input( ) ;

            void Output ( ) ;

      } ;
```

(i)   Name the type of inheritance illustrated in the above C++ code.

(ii)   Write the name of data members, which are accessible from member functions of class SHOP.

(iii)   Write the names of all the member functions, which are accessible from objects belonging to class FACTORY.

(iv)   Write the names of all the members, which are accessible from objects of class SHOP

3.   (a)   Write a function SWAP2BEST (int ARR[], int Size) in C++ to modify the content of the array in such a way that the elements, which are multiples of 10 swap with the value present in the very next position in the array.   3

For example:

If the content of array ARR is

90, 56, 45, 20, 34, 54

The content of array ARR should become

56, 90, 45, 34, 20, 54

(b) An array T[20][10] is stored in the memory along the column with each of the elements occupying 2 bytes. Find out the memory location of T[10][5], if the element T[2][9] is stored at the location 7600.   3

(c) Write a function in C++ to perform Insert operation in a static circular Queue containing Book's information (represented with the help of any array of structure BOOK)   4

```
struct BOOK
{
    long Accno;          //Book Accession Number
    char Title [20]      //Book Title
};
```

(d) Write a function ALTERNATE (int A[ ] [3], int N, int M) in C++ to display all alternate elements from two-dimensional array A (staring from A [0] [0]).   1

For example:

If the array is containing:

23   54   76

37   19   28

62   13   19

The output will be

23   76   19   62   19

(e) Evaluate the following POSTFIX notation. Show status of Stack after every step of evaluation (i.e. after each operator):   2

True, False, NOT, AND, False, True, OR, AND

4 (a) Observe the program segment given below carefully and the questions that follow: 1

```
class Stock
{
    int I:no, Qty ; char I:tem [20];
public:
```

```cpp
    void Enter() {cin>>I:no;qets(I:tem) ; cin>>Qty;}

    void issue(int Q){Qty+=O;}

    void Purchase(int Q){Q-=Q;}

    int GetIno () {return Ino;}

};

void PurchaseItem(int Pino,int PQty)

{

fstream File;

File.open("STOCK.DAT", ios::binary|ios: :in|ios: :out);

Stock S;

int Success=O;

while (Success==O && File.read((char*)&S,sizeof(S)))

{

    if (Pino==S. GetIno())

    {

    S.PurchaSe(PQ)     ;

    _____          // Statement 1

    _____          // Statement 2

    Success++;

    }

}

}

if (Success=l)

    Cout<<"Purchase Updated"<<endl;

else

    Cout<<''Wronq I:tem No"<<endl;

File.close() ;

}
```

344

  (i) Write statement 1 to position the file pointer to the appropriate place so that the data ucdation is done for the reauired item.

  (ii) Write statement 2 to perform the write operation so that the updation is done in the binary file.

(b) Write a function in C++ to read the content of a text file "DELHI.TXT" and display all those lines on screen, which are either starting with 'D' or starting with 'M' 2

(c) Write a function in C++ to search for the details (Phone no and Calls) of those Phones, which have more than 800 calls from a binary file "phones.dat" Assuming that this binary file contains records/objects of class Phone, which is defined below. 3

```
class Phone
{
    char Phoneno [10] ; int Calls ;
public:
void Get 0 {gets (Phoneno) ; cin>>ealls;)
void Billing() {cout<<Phoneno<<"#"<<Calls«end1:}
int GetCalls () {return Calls;}
} ;
```

5 (a) Give a suitable example of a table with sample data and illustrate Primary and Alternate Keys in it. 2

  Consider the following tables CARDEN and CUSTOMER and answer (b) and (c) parts of this question:

Table: CARDEN

Ccode	CarName	Make	Color	Capacity	Charges
501	A-Star	Suzuki	RED	3	14
503	Indigo	Tata	SILVER	3	12
502	Innova	Tovota	WHITE	7	15
509	SX4	Suzuki	SILVER	4	14
510	C Class	Mercedes	RED	4	35

Table: CUSTOMER

CCode	Cname	Ccode
1001	Hemant Sahu	501
1002	Raj Lal	509
1003	Feroza Shah	503
1004	Ketan Dhal	502

(b) Write SQL commands for the following statements: 4

    (i) To display the names of all silver colored Cars.

    (ii) To display name of car, make and capacity of cars in descending order of their sitting capacity.

    (iii) To display the highest charges at which a vehicle can be hired from CARDEN.

    (iv) To display the customer name and the corresponding name of the cars hired by them.

(c) Give the output of the following SOL queries: 2

    (i) SELECT COUNT (DISTINCT Make) FROM CARDEN;

    (ii) SELECT MAX (Charges), MIN (Charges) FROM CARDEN;

    (iii) SELECT COUNT (*), Make FROM CARDEN;

    (iv) SELECT CarName FROM CARDEN WHE~ Capacity = 4;

6. (a) Verify the following using truth table: 2

    (i) $X.X' = 0$

    (ii) $X+1=1$

(b) Write the equivalent Boolean expression for the following Logic Circuit: 2
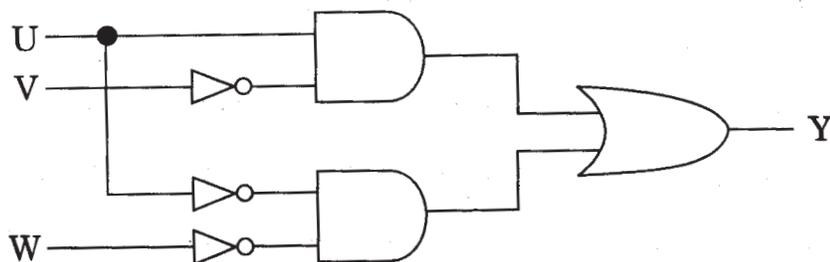
(c) Write the SOP form of a Boolean function F, which is represented in a truth table as follows: 1

X	Y	Z	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map: 3

F(A, B, C, D) =   (2, 3, 4, 5, 6, 7, 8, 10, 11)

7 (a) What out of the following, will you use to have an audio-visual chat with an expert sitting in a far-away place to fix-up a technical issue?   1

(i) VolP

(ii) Email

(iii) FTP

(b) Name one server side scripting language and one client side scripting language.   1

(c) Which out of the following comes under Cyber Crime?   1

(i) Operating someone's Internet banking account, without his knowledge.

(ii) Stealing a keyboard from someone's computer.

(iii) Working on someone's computer with his/her permission.

(d) Write one advantage of Bus Topology of network. Also, illustrate how 4 computers can be connected with each other using star topology of network.   2

(e) Workalot Consultants are setting up a secured network for their office campus at Gurgaon for their day-to-day office and web-based activities. They are planning to have connectivity between 3 buildings and the head office situated

in Mumbai Answer the questions (i) to (iv) after going through the building positions in the campus and other details, which are given below: 3

Distances between various buildings

Building "GREEN" to Building "RED"	110 m
Building "GREEN" to Building "BLUE"	45 m
Building "BLUE" to Building "RED"	65 m
Gurgaon Campus to Head Office	1760 KM

Number of Computers

Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

(i) Suggest the most suitable place (Le. building) to house the server of this organization. Also give a reason to justify your location.

(ii) Suggest a cable layout of connections between the buildings inside the campus.

(iii) Suggest the placement of the following devices with justification:

    (1) Switch

    (2) Repeater

(iv) The organization is planning to provide a high speed link with its head office situated in the MUMBAI using a wired connection. Which of the following cable will be most suitable for this job?

    (i)   Optical Fibre

    (ii)   Co-axial Cable

    (iii)   Ethernet Cable

(f) Give one suitable example of each URL and Domain Name   1

(g) Name two Proprietary softwares along with their application.   1

Marking Scheme — Computer Science

QUESTION PAPER CODE 91/1

EXPECTED ANSWERS

1   (a)   Difference between the formal parameters and actual parameters. Also, give a suitable C++ code to illustrate both.   2

Ans

Formal Parameters	Actual Parameters
The parameters mentioned in the function header are called the formal parameters. In the following example, parameter n is the formal parameter.	Values/Variables which are used while making a call to the function are called actual parameters. In the following example, variable num is an actual parameter.

```
#include <iostrearn.h>

long Fact(long n)
```

Formal Parameter

```
{

    long f=l;

    for(int i=l;i<=n; i++)

        f *= i;

    return f;

}
```
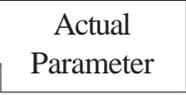
void main () {

    long num;

    cout<<"Enter a number:";

    cin>>num;

    cout<<n<<"!="<<Fact(num),

}

(½ Mark for each correct explanation of Formal Parameter and Actual Parameter)

(½ Mark for each correct example of Formal Parameter and Actual parameter)

OR

(2 Marks for correct example(s) demonstrating the meaning of / difference between Formal and Actual Parameter)

OR

(Only 1 Mark to be awarded if Explanation without supporting examples)

(b)   Which C++ header file(s) are essentially required to be included to run/execute the following C++ source code(Note: Do not include any header file, which is/are not required) :

```
{

char STRING[]="SomeThing";

cout<<"Balance Characters:"<<160-strlen(STRING)<<endl;

}
```

Ans iostream.h/iomanip.h

string.h

(½ Mark for writing each correct header file)

NOTE: Marks should not be deducted for mentioning extra header files in. addition to the ones mentioned above

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

```cpp
#include<iostream.h>

class BOOK

{

    long BId,Qty;

Public:

    void Purchase() {cin>>BId>>Qty;}

    void Sale

    {

        cout<<setw(5)<<BId<<"Old:"<<Qty<<endl;

        cout<<"New: "<<--Qty<<endl;

}

};

void main ()

{

    BOOK B;

    B.Purchase() ;

    Sale ();

    B. Sale ()

}
```

Ans #include<iostream.h>

class BOOK

{

    long BId,Qty;

Public:

public:

    void Purchase() {cin>>BId>>Qty;}

    void Sale Sale()

    {

        cout<<setw(5)<<BID<<"Old:"<<Qty<<end;

        cout<<"New:"<<--Qty<<end;

};

> Either the statement removed or header file included as #include<iomanip_h>

void main ()

{

    BOOK B;

    B. Purchase () ;

> Either the statement removed or replaced with B. Sale ( )

    Sale () ;

    B. Sale () ;

}

(½ Mark for each of any four corrections out of five corrections shown above)

OR

(1 Mark for only identifying any four errors)

NOTE: Marks should not be deducted for mentioning any other error/correction

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

include<iostream.h>

class TRAIN

353

```
{
    int Tno, TripNo, PersonCounti
public:
    TRAIN(int Tmno=l) {Tno=Tmno;TripNo=O;PersonCount=O;}
    void Trip(int TC=100) {TripNo++;PersonCount+=TC;}
voidShow(){cout<<Tno<<":"<<TripNo<<":"<<PersonCount<<endl;}
};
void main ( )
{
    TRAIN T(10) ,N;
    N. Trip ();
    T . Show ();
    T.Trip(70);
    N.Trip(40);
    N. Show ();
    T . Show ();
}
```

Ans	(Full 3 Marks)	(2½ Marks)	(2½ Marks)
	10:0:0	10 0 0	10:0:0 1:2:140 10:1:70
	1:2:140	1 2 140	
	10:1:70	10 1 70	

(1 Mark for each correct line of output)

OR

(½ Mark to be awarded for writing only two of the correct values in each line)

NOTE:

Deduct ½ Mark for not writing any/all: and/or for not considering end / at proper places

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

```
#include<iostream.h>

#include<ctype.h>

typedef char Txt80[80];

void main ( )

{

    Char *PTexti

    Txt80 Txt="Ur2GReAt";

    int N=6;

    PText=Txt;

    while (N>=3)

    {

    Txt[N]=(isupper(Txt[N])?tolower (Txt [N]:toupper(Txt[N]));

    cout<<PText<<endl;

    N--;

    PText++;

    }

}
```

Ans   Option 1:

Full 2 Marks	1½ Marks	(1½ Marks)	(1½ Marks)
Ur2GReat	U	Ur2GReat	Ur2GReAt
r2GREat	r	Ur2GREat	r2GReAt
2GrEat	2	Ur2GrEat	2 GReAt
great	G	Ur2grEat	GReAt

OR

Option 2:

NO OUTPUT

AND/OR

355

Option 3:

INCORRECT SYNTAX FOR char *PText AND/OR

INCORRECT SYNTAX FOR tolower(Txt[N])

(½ Mark for each correct line of Output for Option 1)

OR

(2 Marks for writing either of Option 2/3 Or any equivalent answer conveying same meaning as Option 2/3)

(f) Observe the following program and find out, which output(s) out of (i) to (iv) will not expected from the program? What will be the minimum and the maximum value assigned to the variable Chance?   2

```
#include <iostream.h>

#include <stdlib.h> void main ( )

{

    randomize ()

    int Game[]={10,16},P;

    int Turn=random(2)+5;

    for(int T=0; T<=2; T++)

    {

    P=random (2) ;

    Cout<<Game[P]+ Turn<<"*";

    }

}
```

(i)   15 # 22 #

(ii) 22 # 16 #

(iii) 16 # 21 #

(iv) 21 # 22 #

Ans   Option 1:

None of the outputs are correct

Variable named Chance does not exist in the program, hence no minimum and maximum values for it.

OR

Option 2:

Error in question

OR

Option 3: (Assuming

Cout<<Game[P]+ Turn<<"#"; in place of cout<<Game[P]+ Turn<<"*";)

If random(2) in int Turn=random(2)+5; generates 0 then Turn = 5		If random(2) in int Turn=random(2)+5; generates 1 then Turn = 6	
If P=random (2) ; Generates 0	If P=random(2) ; Generates 1	If P=random(2) ; Generates 0	If P=random (2) ; Generates 1
cout«Game[P]+ Turn«"#" ;. will give the output as 15#	cout«Game[P]+ Turn«"#" ; will give the output as 21#	cout«Game[P]+ Turn«"#" ; will give the output as 16#	cout«Game[P]+ Turn«"#" ; will give the output as 22#
Thus for Turn =5 the output can be 15#15# OR 21#21# OR 15#21# OR 21#15#		Thus for Turn =6 the output can be 16#16# OR 22#22# OR 16#22# OR 22#16#	

Since out of the above possible outputs only option (ii) is correct, hence

The outputs not expected from the program are (i) (iii) and (iv)

(Full 2 Marks for any of the above Options)

NOTE:

No marks for any other answer.

2. (a) What is the difference between the members in private visibility mode and the members in public visibility mode inside a class? Also, give a suitable C++ code to illustrate both.   2

Ans

Private Visibility	Public Visibility
Members in private visibility mode are not accessible to the objects of class (They are only accessible inside the class to the member functions of the class).	Members in public visibility mode of the class are accessible to the objects of the class

```
#include <iostream.h>

#include<stdio.h>

const int Max=20;

class Hospital

{

    int Pno,Wardno;

    char Name [20] ;

public:

    void Register() {cin>>Pno; gets(Neme);cin>>Wardno;}

    void ShowStatus(){ cout<<Pno<<Name<<Wardno<<endl;}

} ;

void main ( )

{
```

Members in Private Visibilty Mode, accessible only to the member functions of same class

358

```
Hospital Pl, P2;

P1.Register() ;  P2.Register();
```
> Public members can be accessed by Objects of the class from outside the class

```
Pl.Showstatus(); P2.Showstatus();

cin>>Pl.Wardno; //NOT ACCESSIBLE as Wardno a a private member

cin>>P2.Pno;  //NOT ACCESSIBLE as Pno is is a private member

}
```

(1 Mark for correct explanation OR example illustrating non accessibility of Private member(s) anywhere except within member function(s) of same class)

(1 Mark for correct explanation OR example illustrating accessibility of Public member(s) to the object(s) of the class and/or inside derived class member function(s))

OR

(2 marks to be awarded if private and public visibility are explained in terms of Inheritance with suitable example)

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

```
class Tour

{

    int LocationCode;char Location[20];float Charges;

public:

    Tour()                                        //Function 1

    {

        LocationCode=l; strcpy(Location, "PURI"); Charges=1200;

    }

    void TourPlain(float C)                  //Function 2

    {

        cout<<PlaceCode«": "<<Place<<": "«Charges<<endl;

        Charge+=100;
```

```
        }

        Tour(int LC, char L[], float C) {        //Function 3

                LocationCode-LC; strcpy (Location,L); Charges=C;

        }

        ~Tour ( )                                 //Function 4

        {

                cout<<"Tour Plan Cancelled"<<endl;

        }

    } ;
```

(i)   In Object Oriented Programming, what are Function 1 and Function 3 combined together referred as?

Ans. (i)   Polymorphism

        OR

Constructor Overloading

        OR

Overloaded Constructor

        OR

Function Overloading

        OR

Overloaded Functions

        OR

Default Constructor and Parameterized Constructor

(1 Mark for writing the feature name correctly)

NOTE: ½ mark for writing only constructor(s)

(ii)   In Object Oriented Programming, which concept is illustrated by Function 4? When is this function called/invoked?

Ans. (ii) Destructor. It is called/invoked, when an object of the class goes out of scope.

(½ Mark for writing the correct concept name)

(½ Mark for writing correct invocation)

NOTE: 1 Mark to be given if only the correct invocation is written

(c) Define a class SUPPLY in C++ with following description: 4

Private Members

- Code of type int

- Food Name of type string

- Sticker of type string

- Food Type of type string

- A member function Get Type ( ) to assign the following values for

Food Type as per the given Sticker:

Sticker	Food Type
GREEN	Vegetarian
YELLOW	Contains Egg
RED	NON-Vegetarian

Public Members

- A function Foodln ( ) to allow user to enter values for Code, FoodName, Sticker and call function Get Type ( ) to assign respective FoodType.

- A function FoodOut ( ) to allow user to view the content of all the data members.

Ans class SUPPLY

{

int Code;

char FoodName [20] ;

char Sticker [10] ;

```cpp
    char FoodType[20];
    void GetType();
public:
    void FoodIn() ;
    void FoodOut() ;
} ;
void SUPPLY::GetType()
{
    if (strcmp (Sticker,"GREEN")==0)
        strcpy(FoodType, "Vegeterian");
    else
    if (strcmp (Sticker, "YELLOW") =0)
        strcpy(FoodType, "Contains Egg") ;
    else
    if (strcmp(Sticker,"RED")==0)
        strcpy(FoodType, "Non-Vegeterian");
}
void SUPPLY::FoodIn()
{
    cin>>Code;
    gets (FoodName) ;
    gets (Sticker) ;
    GetType() ;
}
void SUPPLY:: FoodOut()
{
    cout<<Code<<FoodName<<Sticker<<FoodType<<endl;
}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of GetType())

(1 Mark for correct definition of Food/nO with proper invocation of GetType() function)

(1 Mark for correct definition of FoodOut())

NOTE:

● *½ Mark to be deducted if GetType() is not invoked properly inside Food/n() function*

● *No marks to be deducted if member function definitions are written inside the class*

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

```
class ORGANIZATION

(

    char Address[20];

    double Budge, Income;

protected:

    void Computet();

public:

    ORGANIZATION();

    void Get();

    void Show();

} ;

    class WORKAREA: Public ORGANIZATION

{

    char Address[20];

    int Staff;
```

```
protected:

    double Pay;

    void Calculate();

public:

    WORKAREA () ;

    void Enter() ;

    void Display() ;

} ;

class SHOWROOM: Private ORGANIZATION

{

    char Address [20];

    void Enter() ;

    void Show() ;

} ;
```

(i)   Name the type of inheritance illustrated in the above C++ code.

Ans   Option 1:

Hierarchical Inheritance

OR

Option 2:

Single Level Inheritance

OR

Option 3:

Incorrect access specifier Public and Private used while inheriting

(1 Mark for writing any of the Options or writing any equivalent answer for Option 3 conveying same meaning).

(ii)   Write the names of all the data members, which are accessible from member functions of class SHOWROOM

Ans   Option 1:

Address, Area, Sale

Option 2:

Incorrect access specifier Private used while inheriting

(1 Mark for writing any of the Options or writing any equivalent answer for Option2 conveying same meaning)

OR

(½ Mark for writing any two correct data members for Option 1) ,

(iii)   Write the names of all the member functions, which are accessible from objects belonging to class WORKAREA.

Ans Option 1:

Enter ( ), Display ( ), Get ( ), Show ( )

Option 2:

Incorrect access specifier Public used while inheriting

(1 Mark for writing any of the Options or writing any equivalent answer for Option 2 conveying same meaning)

OR

(½ Mark for writing any two correct member functions for Option 1)

(iv)   Write the name of all the members, which are accessible from objects of Class SHOWROOM.

Ans Option 1:

Enter (), Show ()

Option 2:

Incorrect access specifier Private used while inheriting

(1 Mark for writing any of the Options or writing any equivalent answer for Option 2 conveying same meaning)

OR

(½ Mark for writing anyone correct member function for Option 1)

3. (a) Write a function SWAP2CHANGE (int p [ ], int N) in C++ to modify the content of the array in such a way that the elements, which are multiples of 10 swap with the value present in the very next position in the array.   3

For Example:

If the content of array P IS

91, 50, 54, 22, 30, 54

The content of array P should become

91,54,50,22,54,30

Ans   void SWAP2CHANGE (int p[], int N)

    {

        for (int i = 0; i<N-l; i++)

        {

            if (p[i]%10==0)

            {

                int T = p[i];

                p[i] = p[i+l];

                p[i+l] = T;

                <u>i++;   //Ignore if not written</u>

            }

        }

(½ Mark for correct loop)

(1 Mark for checking array elements which are multiples of 10)

(1½ Mark for swapping the element with value in the next position)

NOTE:

Marks not to be deducted for running the loop till i<N instead of i<N-1

Marks not to be deducted for not incrementing i inside the body of the if construct

(b)   An array 5[10] [30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of 5[5][10], if element 5[2][15] is stored at the location 8200.   3

Ans   Option 1:

    Assuming LBR=LBC=O

    W=2 bytes, Number of Rows(M)=10, Number of Columns(N)=30

```
LOC(S[I] [J]) = B +(I + J*M)*W

LOC (S [2] [15]) = B + (2+15*10) * 2

8200 = B + (152*2)

B = 8200 - 304

B = 7896

LOC (S [5] [10]) = 7896 + (5+10*10) * 2

= 7896 + (105*2)

= 7896 + 210

= 8106
```

Option 2:

Assuming LBR=2,LBC=15 and B = 8200

W=2 bytes, Number of Rows(M)=10, Number of Columns(N)=30

```
LOC (S [I] [J]) = B + ((I-LBR) + (J-LBC) *M) *W

LOC(S[5] [10])= 8200 + ((5-2) + (10-15)*10)*2

= 8200 + (3 + (-5)*10) * 2

= 8200 + (3 +(-50)) * 2

= 8200 + (3 - 50) * 2

= 8200 + (-47) * 2

= 8200 - 94

= 8106
```

Option 3:

Assuming LBR=LBC=l

W=2 bytes, Number of Rows(M)=10, Number of Columns(N)=30

```
LOC(S[I] [J]) = B +((I-LBR) + (J-LBC)*M)*W

LOC (S [2] [15]) = B + ((2-1) + (15-1) *10) * 2

8200 = B + (141*2)
```

```
B = 8200 - 282

B = 7918

LOC (S [5] [10]) = 7914 + ((5-1) + (10-1) *10) * 2

= 7914 + (94*2)

= 7918 + 188

= 8106
```

(1 Mark for writing correct formula (for column major) OR substituting formula with correct values for calculating Address)

(1 Mark for correct calculation)

(1 marks for writing correct address)

NOTE:

- *1 Mark to be awarded for writing only the correct answer (i.e. 8106)*

- *2 Marks to be awarded if the formula and/or substitution is correct and total number of rows is considered as 11*

- *Do not deduct any marks, if the formula/substitution is represented in any other equivalent form*

(c) Write a function in C++ to perform Insert operation on a dynamic Queue containing DVD'S information (represented with the lelp of an array of structure DVD). 4

```
struct DVD

{

long No; //DVD Nunber

char Title[20]; //DVD Title DVD *Link;

} ;
```

Ans:
```
class Queue

{

    DVD *Front, *Rear;
```

368

```cpp
public:

    Queue ( )

    {

        Front = NULL;

        Rear = NULL;

    }

    void Insert() ;

    void Remove() ;

    void Display() ;

    ~Queue() ;

} ;

void Queue::Insert()

{

    DVD *T = new DVD;

    Cin>>T->No;

    gets (T->Title) ; //OR cin.getline(T->Title,20);

    T->Link = NULL;

    if (Rear=NULL)

    {

        Front = T;

        Rear = T;

}

else

{

    Rear->Link = T;

    Rear = T;
```

```
        }
    }
```

OR

Code for array implemented queue will also be acceptable

OR

Code for dynamic array created in heap for a queue will be acceptable

(1 Mark for creating a new DVD dynamically)

(½ Mark for assigning NULL to Link of new DVD)

(½ Mark for checking Rear as NULL.

(½ Mark for assigning Rear and Fro'1t as Temp)

(1 Mark for linking the Rearmost NODE to the new NODE)

(½ Mark for making the new NODE as the Rearmost NODE)

(d) Write a function SKIPEACH (int H[] [3], int C, int R) in C++ to display all alternate elements from two - dimensional array H (starting from H [0] [0]).   2

For example:

If the array is containing:

12	45	67
33	90	76
21	43	59

The output will be

12   67   90   59

Ans
```cpp
void SKIPEACH(int H[] [3], int C, int R)
{
    int N=0;
    for (int I=O;I<R;I++)
        for (int J=0;J<C;J++)
        {
            if (N%2=0)
```

```
                    Cout<<H[I] [J]«" ";

                N++;

            }

    }

    OR

    void SKIPEACH(int H[1 [3], int C, int R)
    {
        int *P=&H [0] [0] ;

        for (int I=0;I<C*R;I+=2)
        {
            Cout<<*P<<" ";

            P+=2;

        }

    }
```

OR

Any other equivalent correct answer acceptable

(1 Mark for writing correct loops starting for location [0][0])

(½ Mark for logic of checking alternate elements)

(½ Mark for displaying the alternate elements)

(e) Evaluate the following POSTFIX notation. Show status of Stack after every step of evaluation (i.e after each operation.)

False, NOT, True, AND, True, False, OR, AND

Ans   Element Scanned   Stack Status

Element Scanned	Stack Status
False	False
NOT	True
True	True, True
AND	True
True	True, True
False	True, True, False
OR	True, True
AND	True

371

Final Answer: True

(½ Mark for evaluating till NOT operator)

(½ Mark for evaluating till the next AND operator)

(½ Mark for evaluating till the next OR operator)

(½ Mark for evaluating till the fast AND Operator and Final Answer)

NOTE:

(1 Mark for only writing the final answer as True without showing the Stack Status)

4   (a)   Observe the program segment given below carefully and the questions that follow: 1

```
class Inventory
{
    int Ano, Qty; char Article [20] ;
public:
    void Input() {cin>>Ano; gets (Article) :cin>>Qty:}
    void Issue(int Q) {Qty+=Q;}
    void procure(int Q) {Qty-=Q;}
    int GetAno() {return Ano;}
} ;
void ProcureArticle (int TAno, int TQty)
{
    fstream File;
    File. open ("STOCK, DAT", ios::binary|ios::in|ios::out);
    Inventory I;
    int Found =0;
    while (Found ==0 && File.read«char*)&I, sizeof(I)))
    {
        if (TAno == S. GetAno())
```

```
        {

            I. Procure (TQty) ;

            _____                    // Statement 1

            _____                    // Statement 2

            Found ++;

        }

    }

    if (Found == 1)

        cout<<"Procurement Updated"<<endl;

    else

        cout<<"Wrong Article No<<endl.;

    File.close() :

}
```

(i)   Write statement 1 to position the file pointer to the appropriate place, so that the data updation is done for the required Article.

Ans Option 1:

```
File.seekp(File.tellg()-.sizeof(Inventory)) ;
```

OR

```
File.seekp(-sizeof(Inventory) ,ios: :cur));
```

OR

```
File.seekp(File.tellg()- sizeof(I));
```

Option 2:

Incorrect use of object S to invoke GetAno ( )

(½ Mark for writing any of the above Options or writing an answer conveying same meaning as Option 2)

NOTE:

seekp( ) and seekg( ) may be used interchangeably for Option 1

tellp( ) and tellg( ) may be used interchangeably for Option 1

(ii)   Write statement 2 to perform the write operation so that the updation is done in the binary file.

Ans   Option 1:

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

OR

```
File.write((char*)&I,sizeof(Inventory));'
```

Option 2:

Incorrect use of object S to invoke GetAno ( )

(½ Mark for writing any of the above Options or writing an answer conveying same meaning as Option 2)   .

(b)   Write a function in C++ to read the content of a text file "PLACES.TXT" and display all those lines on screen, which are either starting with 'P' or starting with 'S'.   2

Ans
```
void DispPorS ( )
{
    ifstream File ("PLACES.TXT");
    char STR[80]; while(File.getline(STR,80))
    {
        if(STR[0]=='P' || STR[0]=='S')
            cout<<STR<<endl;
    }
    File.close(); //Ignore
}
```

OR

Any other correct function definition performing the desired operation

(½ Mark for opening PLACES. TXT correctly)

(½ Mark for reading each Line (Whichever method adopted) from the file)

(½ Mark for checking lines starting with 'P' or 'S')

(½ Mark for displaying the lines)

NOTE:

Ignore case sensitivity check for 'P' or 'S'

(c)   Write a function in C++ to search for the details (Number and Calls) of those Mobile phones, which have more than 1000 calls from a binary file "mobile.dat". Assuming that this binary file contains records/objects of class Mobile, which is defined below: 3

```
class Mobile
{
    char Number [10]; int Calls;
public:
    void Enter() {gets (Number); cin>> Calls;}
    void Billing() {cout<< Number<<"#"<<Calls«end1;}
    int GetCalls() {return Calls;}
} ;
```

Ans
```
void Search ( )
{
    Mobile M;
    fstream fin;
    fin. open ("mobile.dat",1 ios::binaryllios::in);
    While(fin.read((char*)&M, Sizeof(M))
    {
        if(M.getCalls()> 1000)
            M. Billing ( ) ;
    }
    fin.close();//Ignore
}
```

Ignore

OR

Any other correct function definition performing the desired operation

(½ Mark for declaration of object using fstream/ifstream)

(½ Mark for opening mobile.dat correctly)

(½ Mark for reading record(s) from mobile.dat)

(½ Mark for correct formation of loop)

(½ Mark for checking if value returned by getCalls( ) > 1000)

(½ Mark for displaying the matching record)

NOTE:

Marks not to be deducted for the comparison as >= 1000

5. (a) Give a suitable example of a table with sample data and illustrate Primary and Candidate Keys in it.   2

Ans   A table may have more than one such attribute/group of attribute that identifies a row/tuple uniquely, all such attribute(s) are known as Candidate Keys. Out of the Candidate keys, one is selected as Primary Key,

Table: Stock

(1 Mark for writing suitable example /correct definition of a table)

(½ Mark for correct illustration / definition of Candidate Keys)

(½ Mark for correct illustration / definition of Primary Key)

Consider the following tables CABHUB and CUSTOMER and answer
(b) and (c) parts of this question:

Table: CABHUB

Vcode	VehicleName	Make	Color	Capacity	Charges
100	Innova	Toyota	WHITE	7	15
102	SX4	Suzuki	BLUE	4	14
104	C Class	Mercedes	RED	4	35
105	A-Star	Suzuki	WHITE	3	14
108	Indigo	Tata	SILVER	3	12

Table : CUSTOMER

CCode	CName	Vcode
1	Hemant Sahu	101
2	Raj Lal	108
3	Feroza Shah	105
4	Ketan Dhal	104

(b) Write SQL commands for the following statements: 4

(i) To display the names of all the white colored vehicles.

Ans. SELECT VehicleName FROM CABHUB

WHERE Color = 'WHITE';

(1 Mark for correct query)
(½ Mark for partially correct answer)

(ii) To display name of vehicle, make and capacity of vehicles in ascending
order of their sittirg capacity.

Ans. SELECT vehicleName, Make, Capacity FROM CABHUB

ORDER BY Capacity;

(1 Mark for correct query)
(½ Mark for partially correct answer)

(iii) To display the highest charges at which a vehicle can be hired from
CABHUB.

Ans. SELECT MAX(Charges) FROM CABHUB;

(1 Mark for correct query)
(½ Mark for partially correct answer)

(iv)   To display the customer name and the corresponding name of the vehicle hired by them.

Ans.   `SELECT CName, VehicleName FROM CUSTOMER,CABHUB`

`WHERE CUSTOMER.Vcode = CABHUB.Vcode;`

`OR .`

`SELECT CUSTOMER.CName, CABHUB.VehicleName FROM CUSTOMER, CABHUB`

`WHERE CUSTOMER.Vcode = CABHUB.Vcode;`

`OR`

`SELECT :Name, VehicleName FROM CUSTOMER A, CABHUB B`

`WHERE A Vcode = B.Vcode;`

`OR`

`SELECT A.CName, B.VehicleName FROM CUSTOMER A, CABHUB B`

`WHERE A.Vcode = B.Vcode;`

(1 Mark for correct query)

(½ Mark for partially correct answer)

(c)   Give the output of the following SQL queries:

(i)   SELECT COUNT (DISTINCT Make) from CABHUB;   2

Ans.

COUNT(DISTINCT Make)
4

(½ Mark for correct output)

(ii)   SELECT MAX   (Charges), MIN (Charges) FROM CABHUB;

Ans.

MAX (Chrges)	MIN (Charges)
35	12

(½ Mark for correct output)

(iii)   SELECT count (*), Make FROM CABHUB;

Ans.   Option 1:

(Ignoring Make for display)

COUNT (*)
5

OR

(assuming the presence of GROUP BY Make)

COUNT (*)	Make
2	SUZUKI
1	TATA
1	TOYOTA
1	MERCEDES

OR

No Output

OR

Incorrect Syntax/Error/Query will not run

(½ Mark for writing any of the above or any answer conveying same meaning)

OR

(½ Mark to be awarded if any two outputs out of (i) and (ii) are correct)

(iv)   SELECT Vehicle FROM CABHUB WHERE Capacity = 4;

Ans.   (Assuming VehicieName in place of Vehicle)

VehicleName
SX4
C Class

OR

No Output

OR

Incorrect Attribute Name

(½ Mark for writing any of the above or any answer conveying same meaning)

OR

6. (a) Verify the following using truth table: 2

(i) $X + 0 = X$

Ans.

x	x + 0
0	0
1	1

Verified

OR

(ii) $X + X' = 1$

Ans.

X	X'	X + X'	1
0	1	1	1
1	0	1	1

Verified

OR

(b) Write the equivalent Boolean Expression for the following Logic Circuit: 2

380

Ans. (U+V') . (U+W')

(2 Marks for the final expression (U+V').(U+W')

OR

(1 Mark for anyone of the correct terms out of (U+V') or (U+W')

(c) Write the POS form of a Boolean function G, which is represented in a truth
table as follows: 1

A	B	C	G
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Ans   (A+B+C) . (A+B' +C') . (A' +B+C) . (A' +B+C') OR $G(X,Y,Z) = n(0,3,4,5)$

(1 Mark for the correct P form)   Σ

(½ mark for any two correct terms)

NOTE: Marks should not be deducted for any other variable names

(d) Reduce the following Boolean Expression using K-Map:

F(P, Q, R, S) =   (1, 2, 3, 4, 5, 6, 7, 8, 10)

Ans

	R'S'	R'S	RS	RS'
P'Q'		1	1	1
	0	1	3	2
P'Q	1	1	1	1
	4	5	7	6
PQ				
	12	13	15	14
PQ'	1			1
	8	9	11	10

F (P, Q, R, S) = P' Q + P' S + P' R + PQ' S'

(½ Mark for placing all 1 s at correct positions in K-Map)

(½ Mark for each grouping)

(½ Mark for writing final expression in reduced/minimal form)

NOTE: marks should not be deducted for any other variable names

7. (a) What out of the following, you will use to have an audio-visual chat with an expert sitting in a faraway place to fix-up a technical issue? 1

   (i) Email

   (ii) VolP

   (iii) FTP

Ans (ii) VolP

   OR

   None of the Options

   (1 Mark for writing correct option)

(b) Name one Client side scripting language and one Serverside scripting language. 1

Ans. Client side scripts: Java script/ VB script / Perl / Tcl / Tk / REXX.

   Server side scripts: JSP / ASP / PHP / CGI / Perl

   (½ Mark for writing one correct Client side scripting language name)

   (½ Mark for writing one correct Server side scripting language name)

(c)   Which out of the following does not come under Cyber Crime?   1

        (i)   Stealing a mouse from someone's computer.

        (ii)   Operating someone's Internet Banking account, without his knowledge.

        (iii)   Entering in someone's computer remotely and copying data, without
                 seeking his permission.

Ans.   (i)   Stealing a mouse from someone's computer.

        (1 Mark for writing correct option)

(d)   Write one advantage of Star Topology of network. Also, illustrate how 5
        computers can be connected with each other using star topology of network.   1
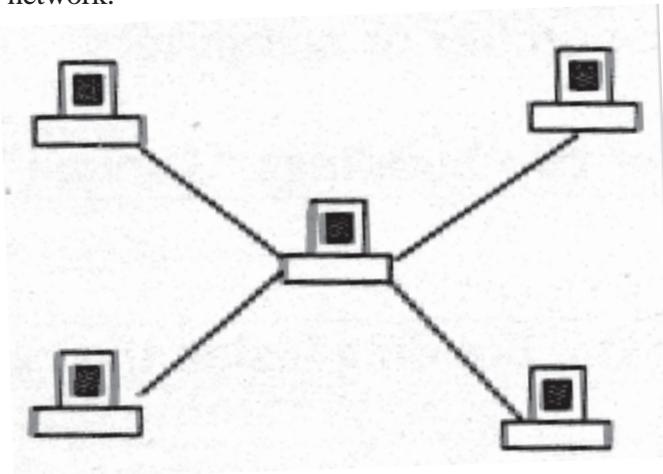
Ans.   Independent line of connection allows freedom of removing or adding nodes
        from the network

        OR

   Any other correct advantage of Star Topology of network.

        Illustration of 5 computers connected with each other using star topology of
        network.

        (½ Mark for writing one correct advantage)

        *(½ Mark for drawing / writing correct illustration OR any other
        diagrammatic representation for star topology)*

(e)   Granuda Consultants are setting up a secured network for their office campus
        at Faridabad for their day to day office and web based activities. They are
        planning to have connectivity between 3 building and the head office situated
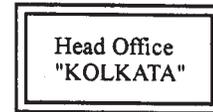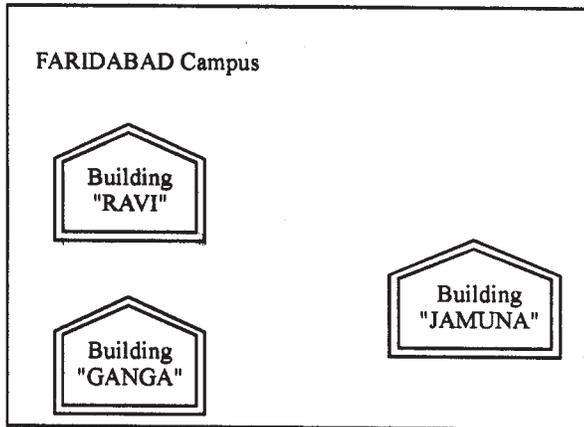
Distances between various buildings :

Building "RAVI" to Building "JAMUNA"	120 m
Building "RAVI" to Building "GANGA"	50 m
Building "GANGA" to Building "JAMUNA"	65 m
Faridabad Campus to Head Office	1460 KM

Number of Computers

Building "RAVI"	25
Building "JAMUNA"	150
Building "GANGA"	51
Head Office	10

in Kolkata. Answer the questions (e1) to (e4) after going through the building positions in the campus and other details, which are given below.   4

(e1)   Suggest the most suitable place (i.e. block) to house the server of this organization. Also give a reason to justify your suggested location.

Ans   Building "Jamuna", since it contains maximum number of computers

OR

Building "Ganga", since it is closest to the other two buildings "Jamuna" and "Ravi"
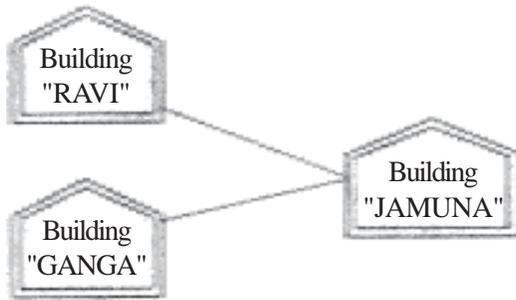
(½ Mark for writing any correct place)

(½ Mark for correct justification)

(e2)   Suggest a cable layout of connections between the building inside the campus.
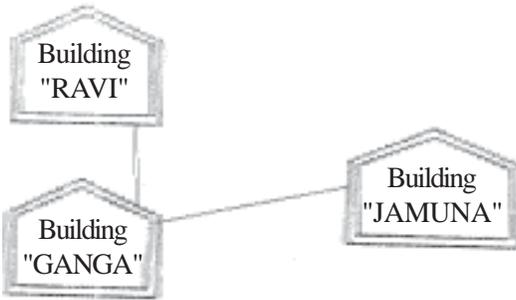
Ans | FARIDABAD Campus

OR

FARIDABAD Campus

(1 Mark for drawing /writing any valid connectivity or topology or diagram connecting various buildings inside the campus)

NOTE: Ignore placement/order of buildings in the diagrammatic representation

(e3) Suggest the placement of the following devices with justification

  (i) Switch

  (ii) Repeater

Ans. (i) Switch:
      In. each of the buildings, since. a network switch is a networking device that joins multiple computers together within one local area network (LAN).

  (ii) Repeater:
      For the Alternative 1 lavout drawn in (e2)- Between buildings" Jamuna" and "Ravi", since distance between these two buildings is greater than

385

70 m which will otherwise lead to loss of signal intensity for data to be transferred.

For the Alternative 2 layout drawn in (e2): Repeater is not needed, since distance between both the buildings connected to "Ganga" is less than 70 m not leading to any signal loss'.   .

OR

Any other placement of Repeater with proper justification

(½ Mark for writing correct placement and justification of Switch)

(½ Mark for writing correct placement and justification of Repeater, according to layout drawn for e2)

(e-4) The organization is planning to provide a high speed link with its head office situated in the KOLKATA using a wired connection. Which of the following cable will be most suitable for this job?

    (i)   Optical Fibre

    (ii)   Co-axial Cable

    (iii)   Ethernet Cable

Ans. (i)   Optical Fibre

(1 Mark for writing correct option)

(f)   Give one suitable example of each- URL and Domain Name   1

Ans. URL Example: http://www.w3schools.com/html/default.asp

                               OR

                               www.youtube.com

    Domain Name Example: w3schools.com

    OR

    Any other correct URL and Domain Name Examples

    NOTE: Domain names in both the examples may/may not be same

(½ Mark for writing any correct URL Example)

(½ Mark for writing any correct Domain Name Example)

(g) Name two Open Source software alongwith its application

Ans GNU: It is an Operating System composed entirely of free software

OR

Open Office: It is an open-source office productivity software suite whose main components are for word processing, spreadsheets, presentations, graphics, and databases

OR

GIMP(GNU Image Manipulation Program): It is a free and open 'source software raster graphics editor

OR

Blender: It is a free and open-source 3D computer graphics software

OR

Any other correct Open Source Software with its application

(7/2 mark each for any 2 of the above mentioned or any other Open Source software with/or without their application areas)

"Kindly read the instructions written on Page no. 1 carefully"

QUESTION PAPER CODE 91
EXPECTED ANSWERS

1 (a) Give the difference between the type casting and automatic type conversion. Also, give a suitable C++ code to illustrate both.   2

Ans

Type Casting	Automatic Type Conversion
Explicitly converting an expression of a given type into another type is known as type-casting.	Implicitly converting data from one data type to another by assigning to a variable of another type.

Example:
`float f=7.9;`
`int c=(int)f;`
`Cout<<c;`
`Output:`
`7`
	Example:
	`Char x=' A' ;`
	`Int c=x;`
	`Cout<<c;`
	`Output`
	`65`

387

(½ Mark for each correct explanation of Automatic Type Conversion) and Type Casting)

(½ Mark for each correct example of Automatic Type Conversion and Type Casting)

OR

(Full 2 Marks for correct example(s) demonstrating the meaning of or difference between Automatic Type Conversion and Type Casting)

OR

(Only 1½ Mark to be awarded if explanation without supporting examples)

(b)   Which C++ header file(s) are essentially required to be included to run/execute the following C++ source code (Note: Do not include any header file, which is/are not required) :   1

```
void main ( )
{
        char TEXT [ ] = "Something";
        cout << "Remaining SMS Chars : "<<160-atrlen (TEXT) << endl.;
}
```

Ans   `iostream.h/iomanip.h`

`string.h`

(½ Mark for writing each correct header file)

Note: Marks should not be deducted for mentioning extra header files in addition to the ones mentioned above

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

```
#include <iostream.h>

Class 1tem

{
```

```
        long IId, Qty;

    public :

        void Purchase{cin>>IId>>Qty;}

        void Sale ( )

        {

            cout«setw(5)<<IId<<"Old:"<<Qty<<endl;

            cout<<''New: "<<Qty«end1;

        }

    } ;

    void main ( )

    {

        Item I ;

        Purchase ( ) ;

        I.Sale ( ) ;

        I.Sale ( )

    }
```

Ans   #include<iosteam.h>

```
    class Item        // C Capital

    {

        long IId,Qty;

    public:

        void Purchase ( ){cin>>IId>>Qty;}

        void Sale ( )

        {

            Cout<<setw(5)<<IId<<" Old: "<<Qty<<endl;

            cout<<"New:"<<--Qty<<endl;
```

> Either the statement is removed or header file included as #include<iomanip.h>

```
        }
} ;

void main ( )

{

    Item I;

    I.Purchase ( );// Object missing

    I. Sale ( ) ;

    I. Sale ( ) ;                        // ; is missing

}
```

(½ Mark for each of any four corrections out of five corrections shown above)

OR

(1 Mark for only identifying any four errors)

Note: Marks should not be deducted for mentioning any other error/ correction

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

```
#include <iostream.h>

class METRO

{

    int Mno,TripNo,PassengerCount;

public:

    METRO(int Tmno=l) {Mno=Tmno;TripNo=0;PassengerCount=0;}

    void Trip(int PC=20) {TripNo++;PassengerCount+=PC; }

    void status Show ()

    {cout<<Mno<<":"<<TripNO<<":"<<PassengerCount<<endl:}

};

void main ()
```

```
{
    METRO M(5), T;

    M. Trip () ;

    M. StatusShow() ;

    T. StatusShow() ;

    M. Status Show () ;

}
```

Ans	(Full 3 Marks)	(2½ Marks)	(2½ Marks)
	5:1:20	5 1 20	5:1:20 1:1:50 5:2:50
	1:1:50	1 1 50	
	5:2:50	5 2 50	

(1 Mark for each correct line of output)

OR

(½ Mark to be awarded for writing only two of the correct values in each line)

Note: Deduct ½ Mark for not writing any/all : and/or for not considering end / at proper places

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

```
#include <iostream.h>

#include <ctype.h>

typedef char str80 [80] ;

void main ( )

{
    char *Notes ;

    str80 str="vR2GooD";

    int L=6;
```

```
Notes=Str;

while (L>=3)

{

    Str[L]=(isupper(Str[L])?tolower(Str[L]):
    toupper(Str[L]));

    cout<<Notes<<endl;

    L--;

    Notes++;

}

}
```

Ans

Full 2 Marks	1½ Marks	(1½ Marks)	(1½ Marks)
vR2Good	v	vR2Good	vR2GooD
R2GoOd	R	vR2GoOd	R2GooD
2GOOd	2	vR2GOOd	2GooD
gOOd	g	vR2g00d	GooD

(½ Mark for each correct line of Output)

Note: ½ mark to be deducted if all the values are written in the same line

(f)   Observe the following program and find out, which output(s} out if (i) to (iv) will not be expected from the program? What will be the minimum and the maximum value assigned to the variable Chance?   2

```
#include <iostream.h>

#include <stdlib.h>

void main ( )

{

    randomize ( ) ;

    int Arr[]={9,6}, N;

    int Chanoe=random(2) + 10 ;
```

```
        for (int C=0;C<2;C++)

        {

            N=random (2) ;

            cout<<Arr [N] + Chance<<"#";

        }

    }
```

(i)   9#6#

(ii)   19#17#

(iii)   19#16#

(iv)   20#16#

Ans The outputs not expected from the program are (i), (ii) and (iv)

Minimum Value of Chance = 10

Maximum Value of Chance = 11

(1 Mark for writing correct option for output NOT expected)

(½ Mark for writing correct Minimum Value of Chance)

(½ Mark for writing correct Maximum Value of Chance)

2   (a)   What is the difference between the members in private visibility mode and the members in protected visibility mode inside a class? Also, give a suitable C++ code to illustrate both.   2

Ans Option 1

Private Visibility	Protected Visibility
Members in private visibility mode are not accessible to the objects of class (They are only accessible inside the class to the member functions of the class).	Members in protected visibility mode of the class are accessible to the member functions of the same as well as that of its derived class

Example:

```
#include <iostream.h> #include<stdio.h>

const int Max=20;

class Hospital

{

    int Pno;

protected:

    char Name [20] ;

public:

void Register () {cin»Pno; gets (Name) ;}

void ShowStatus () {cout<<Pno<<N&me<<WardnO<<endl ; }

} ;
```

Members in Private Visibility Mode, accessible only to the member functions of same class

Members in Protected Visibility Mode, accessible to the member functions of same class as well as in member functions of derived class

Option 2:

Members are private by default inside a class

Protected visibility must be specified for a member to be declared as protected

Option 3:

No difference in accessibility of the members of the two visibility modes inside a class without inheritance

For Option 1:

(1 Mark for correct explanation)

OR

For Option 2 and 3:

(Full 2 Marks for writing any answer conveying same meaning)

OR

(Full 2 Marks for correct explanation OR example illustrating accessibility of Protected Member(s) inside derived class member function(s))

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

class Travel

{

    int PlaceCode; char Place[20] ; float Charges;

public:

    Travel ()   //Function 1

    {

        PlaceCode=l;strcpy (Place, "DELHJ:") ; Charges = 1000;

    }

    void TravelPlan (float C)   //Function 2

    {

        cout<<PlaceCode<<":"<<Place«":"<<Charges<<endl;

    }

    ~Travel ( )   //Function 3

    {

        Cout<<"Travel Plan Cancelled"<<endl;

    }

    Travel (int PC, char P[], float C)   //Function 4

    {

        PlaceCode=PC;strcpy(Place,P); Charges=C;

    }

} ;

(i) In Object Oriented Programming, what are Function 1 and Function 4 combined together referred as?

Ans (i) Polymorphism

       OR

Constructor Overloading

OR

Overloaded Constructor

OR

Function Overloading

OR

Overloaded Functions

OR

Default Constructor and Parameterized Constructor

(1 Mark for writing the feature name correctly)

Note:

(½ mark for writing only "constructor(s)")

(ii)   In Object Oriented Programming, which concept is illustrated by Function 3? When is this function calledlinvoked?

Ans. (ii)   Destructor. It is called / Invoked when an object of the class goes out of scope.

(½ Mark for writing the correct concept name)

(½ Mark for writing correct invocation)

Note:

(Full 1 Mark to be given if only the correct invocation is written)

(c)   Define a class RESTRA in C++ with following description :   4

Private Members

●   FoodCode of type int

●   Food of type string

●   FType of type string

●   Sticker of type string

- A member function GetSticker () to assign the following value for Sticker as per the given FType:

FType	Sticker
Vegetarian	GREEN
Contains Egg	YELLOW
Non-Vegetarian	RED

Public Members

- A function GetFood () to allow user to enter values for FoodCode. Food, FType and call function GetSticker() to assign Sticker.

- A function ShowFood() to allow user to view the content of all the data members.

Ans   class RESTRA

```
{
    int FoodCode;
    char Food[20], FType [20],Sticker[20];
    void GetSticker () ;
public:
    void GetFood () ;
    void ShowFood () ;
} ;
void RESTRA::GetSticker() {
    if (strcmp (FType, "Vegetarian") ==0)
        strcpy (Sticker,"GREEN") ;
    else if (strcmp (FType,"Contains Egg")==0)
        strcpy (Sticker, "YELLOW") ;
    else if (strcmp (FType,'Non-Vegetarian")==0)
        strcpy(Sticker,"RED");
```

```
}

void RESTRA::GetFood()

{

    cin>>FoodCode;

    gets (Food);

    gets (FType) ;

    GetSticker () ;

}

void RESTRA::ShowFood ()

{

cout<<FoodCode<<":"<<Food<<FType<<":"<<Sticker<<endl;

}
```

(½ Mark for correct syntax for class header)

(½Mark for correct declaration of data members)

(1 Mark for correct definition of GetSticker())

(1 Mark for correct definition of GetFood() with proper invocation of GetSticker() function)

(1 Mark for correct definition of ShowFood())

NOTE:

- ½ Mark to be deducted if GetSticker() is not invoked properly inside GetFood()function

- No marks to be deducted if member function definitions are written inside the class

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

```
class COMPANY

{

    char Location[20] ;
```

```cpp
        double Budget, Income ;
protected:
        void Accounts () ;
public:
        COMPANY () ;
        void Register();
        void Show() ;
} ;
class FACTORY:public COMPANY
{
        char Location[20] ;
        int Workers;
protected:
        double Salary ;
        void Computer() ;
public:
        FACTORY () ;
        void Enter () ;
        void Show() ;
} ;
class SHOP:private COMPANY
{
        char Location[20] ;
        float Area;
        double Sale;
public:
```

```
        SHOP () ;

        void Input( ) ;

        void Output ( ) ;

} ;
```

(i)   Name the type of inheritance illustrated in the above C++ code.

Ans   Hierarchical Inheritance

      OR

      Single Level Inheritance

      (1 Mark for writjng correct answer)

      (ii)   Write the name of data members, which are accessible from member
              functions of class SHOP.

Ans   Location, Area, Sale

      (1 Mark for writing correct answer)

      OR

      (½ Mark for writing any two correct data members)

      (iii)   Write the names of all the member functions, which are accessible from
               objects belonging to class FACTORY.

Ans   Enter ( ), FACTORY::Show ( ), Register ( ), COMPANY::Show ( )

      OR

      Enter ( ), Show ( ), Register ( ) // Show function may be present twice

      OR

      Enter, Show, Register

      (1 Mark for writing correct answer)

      OR

      (½ Mark for writing any two correct member functions)

      (iv)   Write the names of all the members, which are accessible from objects
              of class SHOP

Ans Input ( ), Output ( )

(1 Mark for writing correct answer)

OR

(½ Mark for writing any one correct member function)

3. (a) Write a function SWAP2BEST (int ARR[], int Size) in C++ to modify the content of the array in such a way that the elements, which are multiples of 10 swap with the value present in the very next position in the array. 　　　　3

For example:

If the content of array ARR is

90, 56, 45, 20, 34, 54

The content of array ARR should become

56, 90, 45, 34, 20, 54

Ans
```
void SWAP2BEST(int ARR[], int Size)
{
    int t;
    for(int i=0;i<Size-1;i++)
    {
    if (ARR[i] %10=0)
    {
        t=ARR[i];
        ARR[i]=ARR[i+1];
        ARR[i+1]=t;
        i++;          //Ignore if not. written
    }
    }
}
```

(½ Mark for correct loop)

(1 Mark for checking array elements which are multiples of 10)

(1½ Mark for swapping the element with value in the next position)

Note:

Marks not to be deducted for running the loop till i<Size instead of i< Size-1

Marks not to be deducted for not incrementing i inside the body of the if construct

(b)   An array T[20][10] is stored in the memory along the column with each of the elements occupying 2 bytes. Find out the memory location of T[10][5], if the element T[2][9] is stored at the location 7600.   3

Ans   Assuming LBR=LBC=0

W=2 bytes

Number of Rows (M) =20

Number of Columns (N)=10

LOC(T[I] [J]) = B +(I + J*M)*W

LOC(T[2] [9]) = B +(2+9*20)* 2

7600 = B + (182*2)

B = 7600 - 364

B = 7236

LOC (T[10] [5]) = 7236 +(10+5*20)* 2

= 7236 + (110*2)

= 7236 + 220

= 7456

OR

Assuming LBR=2, LBC=9 and B = 7600

W=2 bytes

Number of Rows (M) = 20

Number of Columns (N) = 10

```
LOC (T[I] [J]) = B + ((I-LBR) + (J-LBC)*M)*W

LOC (S[10] [5]) = 7600 + ((10-2) + (5-9)*20)*2

= 7600 + (8-80) * 2

= 7600 + (-72)) * 2

= 7600 - 144

= 7456
```

OR

```
Assuming LBR=LBC=1

W=2 bytes

Number of Rows (M) = 20

Number of Columns (N) = 10

LOC (T[I] [J]) = B +((I-LBR) + (J-LBC)*M)*W

LOC (T[2] [9]) = B +((2-1) + (9-1)*20)* 2

7600 = B + (161*2)

B = 7600 - 322

B = 7278

LOC (T[10] [5]) = 7278 +((10-1)+(5-1)*20)* 2

= 7278 + (9+80) *2)

= 7278 + 178

= 7456
```

(1 Mark for writing correct formula (for column major) OR substituting formula with correct values for calculating Address)

(1 Mark for correct calculation)

(1 marks for writing correct address)

Note:

- 1 Mark to be awarded for writing only the correct answer (i.e. 7456)

- 2 Marks to be awarded if the formula and/or substitution is correct and total number of rows is considered as 21

- Do not deduct any marks, if the formula/substitution is represented in any other eauivalent form

(c) Write a function in C++ to perform Insert operation in a static circular Queue containing Book's information (represented with the help of any array of structure BOOK) 4

```
struct BOOK
{
    long Accno;          //Book Accession Number
    char Title [20]      //Book Title
};
```

Ans
```
const int Max = 10;
void insert(Book B[], int &a, int F)
{
    if ( (R+l) %Max! =F)
    {
        R= (R+l) %Max;
        cin>>B [R] . Accno;
        //cin>>B[R].Title OR cin.getline(B[R] .Title,20); OR
        gets(B[R].Title) ;
    }
    else
        cout<<"Queue Full";
}
```

OR

```
const intmax =10;
```

404

```
void insert( long newAC, char newTitle[], Book B [],int &F,int &R)

{

    if ( (F = 0 && R=max-l) II (F=R+l))

        cout<<"Queue Overflow";

    else

    {

        if (R -1)

            F=0; R=0;

        else if (R = max-i)

            R = 0;

        else

            R = R + 1;

        B[R].Accno = newAC;//oR cin>>B[R].Accno;

        strcpy(B[R].Title, newTitle);

        // OR gets(B[R].Title); OR cin>>B[R].Title OR

        //cin.getline(B[R].Title,20) ;

    }

}
```

OR

Any other equivalent correct answer acceptable

(1 Mark for writing function header correctly)

(1 Mark for checking if Queue is Full)

(1 Mark for incrementing Rear)

(1 Mark for assigning Values to the Rear location of the Queue)

(d)   Write a function ALTERNATE (int A[ ] [3], int N, int M) in C++ to display all alternate elements from two-dimensional array A (staring from A [0] [0]).   1

For example:

If the array is containing:

23   54   76

37   19   28

62   13   19

The output will be

23   76   19   62   19

Ans.
```cpp
void ALTERNATE (int A [] [3], int N, int M)
{
int T=0;
for (int I=0 ; I<N; I++)
    for (int J=0 ; J<M ; J++)
    {
        if (T%2= =0)
            cout<<A[I] [J]<<" ";
        T++ ;
    }
}
```
OR
```cpp
void ALTERNATE (int A[] [3], int N, int M)
{
    int *P=&A[O] [0] ;
    for (int I=0; I<N*M ; I+=2)
    {
        cout<<*p<<" ";
        P+=2 ;
    }
}
```

OR

Any other equivalent correct answer acceptable

(1 Mark for writing Correct loops starting for location [0] [0])

(½ Mark for logic of checking alternate elements)

(½ Mark for displaying the alternate elements)

(e)   Evaluate the following POSTFIX notation. Show status of Stack after every step of evaluation (i.e. after each operator):   2

True, False, NOT, AND, False, True, OR, AND

Ans

Element Scanned	Stack Status
True	True
False	True, False
NOT	True, True
AND	True
False	True, False
True	True, False, True
OR	True, True
AND	True

Final Answer: True

(½ Mark for evaluating till NOT operator)

(½ Mark for evaluating till the next AND operator)

(½ Mark for evaluating till the next OR operator)

(½ Mark for evaluating till the last AND Operator and Final Answer)

Note:

(1 Mark for only writing the final answer as True without showina the Stack Status)

4   (a)   Observe the program segment given below carefully and the questions that follow: 1

```
class Stock
```

```cpp
{
    int Ino, Qty ; char Item [20];
public:
    void Enter() {cin>>Ino;qets(Item) ; cin>>Qty;}
    void issue(int Q){Qty+=O;}
    void Purchase(int Q){Q-=Q;}
    int GetIno () {return Ino;}
};
void PurchaseItem(int Pino,int PQty)
{
fstream File;
File.open("STOCK.DAT", ios::binary|ios: :in|ios: :out);
Stock S;
int Success=O;
while (Success==O && File.read((char*)&S,sizeof(S)))
{
    if (Pino==S. GetIno())
    {
    S.PurchaSe(PQ)      ;
    _____          // Statement 1
    _____          // Statement 2
    Success++;
    }
}
}
if (Success=l)
```

```
            Cout<<"Purchase Updated"<<endl;

    else

            Cout<<''Wronq Item No"<<endl;

    File.close() ;
```

(i)   Write statement 1 to position the file pointer to the appropriate place so that the data ucdation is done for the reauired item.

Ans   `File.seekp(File.tellg() - sizeof(Stock));`

OR

`File. seekp (-sizeof (Stock) ,ios::cur));`

(½ Mark for writing Statement 1 correctly)

Note:

Seekp() and seekg() may be used interchangeably

tel/p() and tel/g() may be used interchangeably

(ii)   Write statement 2 to perform the write operation so that the updation is done in the binary file.

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

OR

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

(½ Mark for writing any of the above statements)

(b)   Write a function in C++ to read the content of a text file "DELHI.TXT" and display all those lines on screen, which are either starting with 'D' or starting with 'M'   2

Ans
```
void DispDorM()

    {

        if stream File("DELHI.TXT");

        char Str[80];

        while(File.getline(Str,80))
```

```
        {
            if(Str[0]='D' || Str[0]='M')

                cout«Str«endl;

        }

        File.close(); //Ignore

    }
```

OR

Any other correct function definition performing the desired operation

(½ Mark for opening DELHI. TXT correctly)

(½ Mark for reading each Line (Whichever method adopted) from the file)

(½ Mark for checking lines starting with '0' or 'M')

(½ Mark for displaying the lines)

NOTE:

Ignore case sensitivity while checking for 'D' or 'M'

(c)   Write a function in C++ to search for the details (Phone no and Calls) of those Phones, which have more than 800 calls from a binary file "phones.dat" Assuming that this binary file contains records/objects of class Phone, which is defined below.   3

```
class Phone

{

    char Phoneno [10] ; int Calls ;

public:

void Get 0 {gets (Phoneno) ; cin>>ea11s;)

void Billing() {cout<<Phoneno<<"#"<<Ca11s«end1:}

int GetCa11s () {return Ca11s;}

} ;
```

Ans void Search ( )

```
    {
```

```
Phone P;

fstream fin;

fin. open ("phones. dat", ios: :binary| ios: :in);
```
Ignore

```
while (fin.read((char*) &P, sizeof (P)))

{

    if(P.GetCalls () > 800)

        P.Billing () ;

}

fin.close () ; // Ignore

}
```

OR

Any other correct function definition performing the desired operation

(½ Mark for declaration of object using fstream/ifstream)

(½ Mark for opening phones.dat correctly)

(½ Mark for reading record(s) from phones.dat)

(½ Mark for correct formation of/oop)

(½ Mark for checking if value returned by GetCalls ( ) > 800)

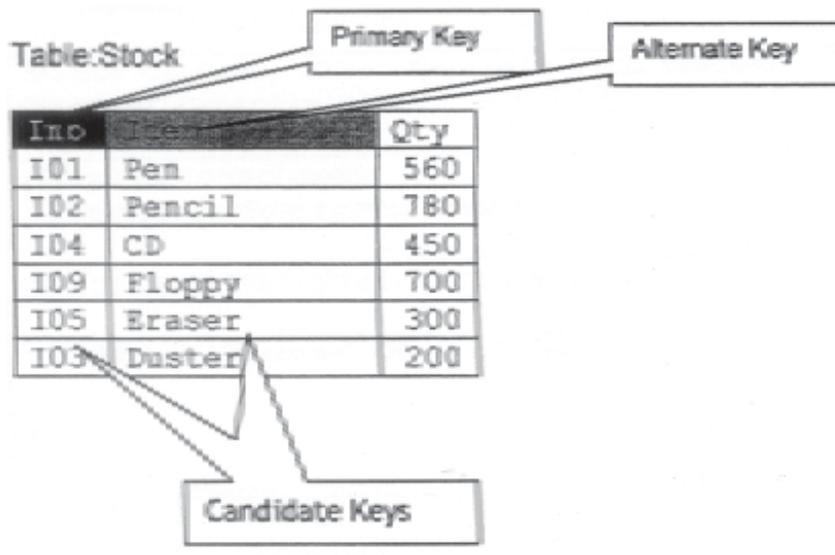*(½ Mark for displaying the matching record)*

Note:

Marks not to be deducted for the comparison as >= 800

5   (a)   Give a suitable example of a table with sample data and illustrate Primary and
            Alternate Keys in it.   2

     Ans   A table may have more than one such attribute/group of attribute that Identifies
            a row/tuple uniquely, all such attribute(s} are known as Candidate Keys. Out
            of the Candidate keys, one is selected as Primary Key. while the rest are the
            Alternate Keys

Table:Stock

Ino	Item	Qty
I01	Pen	560
I02	Pencil	780
I04	CD	450
I09	Floppy	700
I05	Eraser	300
I03	Duster	200

(1 Mark for writing suitable example / correct definition of a table)

(½ Mark for correct illustration / definition of Primary Key)

(½ Mark for correct illustration / definition of Alternate Keys)

Consider the following tables CARDEN and CUSTOMER and answer (b) and (c) parts of this question:

Table: CARDEN

Ccode	CarName	Make	Color	Capacity	Charges
501	A-Star	Suzuki	RED	3	14
503	Indigo	Tata	SILVER	3	12
502	Innova	Tovota	WHITE	7	15
509	SX4	Suzuki	SILVER	4	14
510	C Class	Mercedes	RED	4	35

Table: CUSTOMER

CCode	Cname	Ccode
1001	Hemant Sahu	501
1002	Raj Lal	509
1003	Feroza Shah	503
1004	Ketan Dhal	502

412

(b)   Write SQL commands for the following statements: 4

     (i)   To display the names of all silver colored Cars.

Ans `SELECT CarName FROM CARDEN`

     `WHER Color = 'SILVER';`

(1 Mark for correct query)

(½ Mark for partially correct answer)

     (ii)   To display name of car, make and capacity of cars in descending order of their sitting capacity.

Ans `SELECT CarName, Make, Capacity FROM CARDEN`

     `ORDER BY Capacity DESC;`

(1 Mark for correct query)

(½ Mark for partially correct answer)

     (iii)   To display the highest charges at which a vehicle can be hired from CARDEN.

Ans `SELECT MAX(Charges) FROM CARDEN ;`

     OR

     `SELECT CarName, MAX (Charges) FROM CARDEN GROUP BY CarName;`

(1 Marie for correct query)

(½ Mark for partially correct answer)

(iv)   To display the customer name and the corresponding name of the cars hired by them.

Ans `SELECT CName, CarName FROM CUSTOMER, CARDEN`
     `WHERE CUSTOMER.Ccode = CARDEN.Ccode;`

     OR

     `SELECT CUSTOMER. CName, CARDEN. CarName FROM CUSTOMER,`
     `CARDEN WHERE CUSTOMER.Ccode = CARDEN.Ccode;`

     OR

```
SELECT CName, CarName FROM CUSTOMER A, CARDEN B
WHERE A.Ccode = B.Ccode;

OR

SELECT A. CName, B. CarName FROM CUSTOMER A, CARDEN B
WHERE A.Ccode = B.Ccode;
```

(1 Mark for correct query)

(½ Mark for partially correct answer)

(c)   Give the output of the following SOL queries: 2

     (i)   SELECT COUNT (DISTINCT Make) FROM CARDEN;

Ans

COUNT (DISTINCT Make)
4

(½ Mark for correct output)

     (ii)   SELECT MAX (Charges), MIN (Charges) FROM CARDEN;

Ans

MAX (Charges)	MIN (Charges)
35	12

(½ Mark for correct output)

     (iii)   SELECT COUNT (*), Make FROM CARDEN;

Ans   (Ignoring Make for display)

COUNT (*)
5

OR

(assuming the presence of GROUP By Make)

COUNT(*)	Make
2	SUZUKJ:
1	TATA
1	TOYOTA
1	MERCEDES

OR

No Output

OR

Incorrect Syntax/Error/Query will not run

(½ Mark for writing any of the above or any answer conveying same meaning)

OR

(½ Mark to be awarded if any two outputs out of (i), (jj) and (iv) are correct.

(iv)   SELECT CarName FROM CARDEN WHE~ Capacity = 4;

Ans

CarName
Sx4
C Class

(½ Mark for correct output)

6.   (a)   Verify the following using truth table: 2

(i)   X,X' = 0

Ans

X	X'	X . X'	0
0	1	0	0
1	0	0	0

Verified

(1 Mark for correct verification)

OR

(½ Mark for any two correct columns)

(ii)   X+1=1

X	1	X +1
0	1	1
1	1	2

Verified

OR

(b)   Write the equivalent Boolean expression for the following Logic Circuit: 2

Ans.   U. V' + U' . W'

OR

(c)   Write the SOP form of a Boolean function $\sum$ F, which is represented in a truth
table as follows:

X	Y	Z	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans   X'Y'Z' + X'YZ' + XY'Z' + XYZ   OR F(X,Y, Z) =   (0, 2, 4, 7)

(d) Reduce the following Boolean Expression using K-Map: 3

F(A, B, C, D) =   (2, 3, 4, 5, 6, 7, 8, 10, 11)

Ans

	A'B'	A'B	AB	AB'
C'D'		1		1
C'D		1		
CD	1	1		1
CD'	1	1		1

OR

	C'D'	C'D	CD	CD'
A'B'			1	1
A'B	1	1	1	1
AB				
AB'	1		1	1

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

(½ Mark for placing all 1 s at correct positions in K-Map)

(½ Mark for each grouping)

(½ Mark for writing final expression in reduced/minimal form)

Note: marks should not be deducted for any other variable names

7 (a) What out of the following, will you use to have an audio-visual chat with an expert sitting in a far-away place to fix-up a technical issue?

(i)   VolP

(ii) Email

(iii) FTP

Ans (ii) VolP

OR

None of the Options

(1 Mark for writing correct option)

(b)   Name one server side scripting language and one client side scripting language.   1

Ans   Client side scripts: Java script / VB script / Peril Tcl/Tk / REXX.

Server side scripts: JSP / ASP / PHP / CGI / Perl

(½ Mark for writing one correct Client side scripting language name)

(½ Mark for writing one correct Server side scripting language name)

(c)   Which out of the following comes under Cyber Crime?   1

(i)   Operating someone's Internet banking account, without his knowledge.

(ii)   Stealing a keyboard from someone's computer.

(iii)   Working on someone's computer with his/her permission.

Ans   (i)   Operating someone's Internet banking account, without his knowledge.

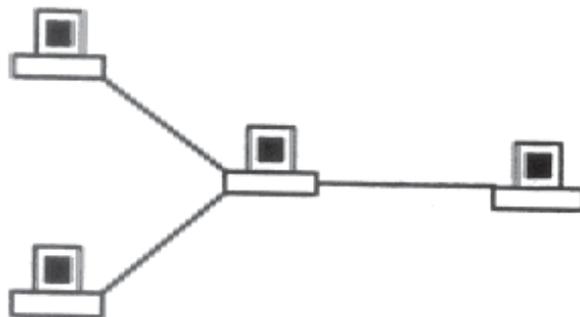*(1 Mark for writing correct option)*

(d)   Write one advantage of Bus Topology of network. Also, illustrate how 4 computers can be connected with each other using star topology of network.   2

Ans   Cable length required for this topology is the least compared to other networks.

OR

Any other correct advantage of Bus Topology of network.

Illustration of 4 computers connected with each other using star topology of network.
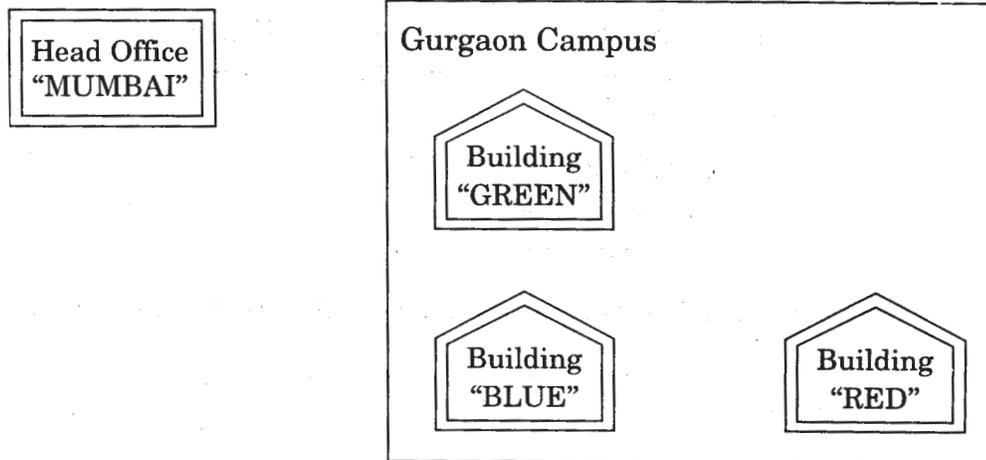

(½ Mark for writing one correct advantage)

(½ Mark for drawing / writing correct illustration OR any other diagrammatic representation for star topology)

418

(e) Workalot Consultants are setting up a secured network for their office campus at Gurgaon for their day-to-day office and web-based activities. They are planning to have connectivity between 3 buildings and the head office situated in Mumbai Answer the questions (i) to (iv) after going through the building positions in the campus and other details, which are given below: 3

Distances between various buildings

Building "GREEN" to Building "RED"	110 m
Building "GREEN" to Building "BLUE"	45 m
Building "BLUE" to Building "RED"	65 m
Gurgaon Campus to Head Office	1760 KM

Number of Computers

Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

(i) Suggest the most suitable place (Le. building) to house the server of this organization. Also give a reason to justify your location.

Ans Building "RED", since it contains maximum number of computers
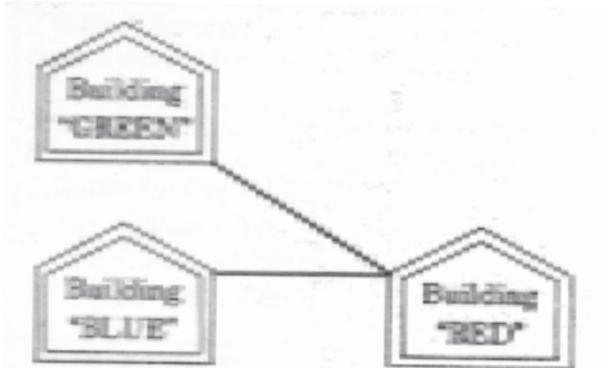
OR

Building "BLUE", since it is closest to "GREEN" and "RED"

(½ Mark for writing any correct place)

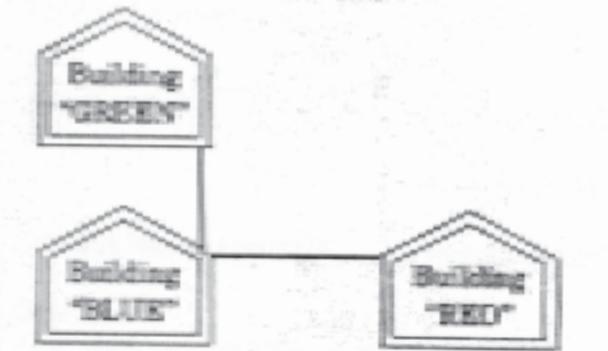*(½ Mark for correct justification)*

(ii)   Suggest a cable layout of connections between the buildings inside the campus.

Ans   Gurgaon Campus

OR

Gurgaon Campus

(1 Mark for drawing /writing any valid connectivity or topology or diagram connecting various buildings inside the campus)

NOTE: Ignore placement/order of buildings in the diagrammatic representation

(iii)   Suggest the placement of the following devices with justification:

(1)   Switch

(2)   Repeater

Ans (1) Switch:

In each of the buildings, since a network switch is a networking device that joins multiple computers together within one local area network (LAN).

(2) Repeater:

For the Layout 1 drawn in (e2)- Between buildings "GREEN" and "RED", since distance between these two buildings is greater than 70 m which will otherwise lead to loss of signal intensity for data to be transferred.

For the Layout 2 drawn in (e2): Repeater is not needed, since distance between both the buildings connected to "Ganga" is less than 70 m, not leading to any signal loss

OR

Any other placement of Repeater with proper justification

(½ Mark for writing correct placement and/or justification of Switch)

(½ Mark for writing correct placement and/or justification of Repeater, according to layout drawn for e2)

(iv) The organization is planning to provide a high speed link with its head office situated in the MUMBAI using a wired connection. Which of the following cable will be most suitable for this job?

(i) Optical Fibre

(ii) Co-axial Cable

(iii) Ethernet Cable

Ans (i) Optical Fibre

(1 Mark for writing correct option)

(f) Give one suitable example of each URL and Domain Name 1

Ans URL Example: http://www.w3schools. com/htmlldefault.asp

OR

www.youtube.com

Domain Name Example: w3schools.com

OR

Any other correct URL and Domain Name Examples

Note: Domain names in both the examples may/may not be same

(½ Mark for writing any correct URL Example)

(½ Mark for writing any correct Domain Name Example)

(g)   Name two Proprietary softwares along with their application.   1

Ans   Microsoft Office - For office applications

Adobe Photoshop - For design related works

Autocad - For professional Design

MAYA - For professional animations & Movie making

3D Studio - For 3 dimensional objects

Tally - For accounting

Oracle Database - For database management

(½ mark each for any 2 of the above mentioned or any other proprietary software with/or without their application areas)