XII COMPUTER SCIENCE

CBSE Board - 2012

[Time allowed: 3hours] *[Maximum Marks: 70]*

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

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
• Type Casting is used to convert value of one type to another type	• Automatic Type Conversion is the type conversion done by the compiler wherever required.

• for example
float x=(float) 3 / 2;
// 1.5 will be assigned as result, because 3 is converted into 3.0
	• for example
	float x=3/2;
	//here 1.0 will be assigned as result, because 1 is automatically converted in 1.0

(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-strlen(TEXT)<<endl;
}
```

Ans.

i. iostream.h
ii. string.h

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

```
#include <iostream.h>
Class Item
{
    long IId,Qty;
public:
    void Purchase{cin>>IId>>Qty;}
          void Sale()
          {
                cout<<setw(5)<<IId<<"   Old:"<<Qty<<endl;
                cout<<"New:"<<--Qty<<endl;
         }
};
void main( )
{
    Item I;
          Purchase();
          I.Sale();
          I.Sale()
}
```

Ans.

```
#include <iostream.h>
#include <iomanip.h>
class Item
{
    long IId,Qty;
public:
    void Purchase(){cin>>IId>>Qty;}
```

```
            void Sale()
            {
                   cout<<setw(5)<<IId<<"   Old:"<<Qty<<endl;
                   cout<<"New:"<<--Qty<<endl;
           }
};
void main( )
{
    Item I;
           I.Purchase();
           I.Sale();
           I.Sale();
}
```

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

```
#include<iostream.h>
class METRO
{
        int Mno,TripNo,PassengerCount;
   public:
        METRO(int Tmno=1)
        {
            Mno=Tmno;TripNo=0;PassengerCount=0;
       }
      void Trip(int PC=20)
      {
    TripNo++;PassengerCount+=PC;
      }
     void StatusShow()
     {
            cout<<Mno<<":"<<TripNo<<":"<<PassengerCount<<endl;
     }
};
void main()
{
      METRO M(5),T;
      M.Trip();
      T.Trip(50);
      M.StatusShow();
      M.Trip(30);
      T.StatusShow();
      M.StatusShow();
}
```

Ans.

5:1:20

1:1:50

5:2:50

(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.

```
vR2Good
R2GoOd
2GOOd
gOOd
```

(f) Observe the following program and find out, which output(s) out of(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 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#

Ans.

```
(iii) 19#16#
Minimum Value: 16
Maximum Value: 20
```

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.

Private	Protected
Private members of a class are accessible only from within other members of the same class or from their friends.	Protected members are accessible from members of their same class and from their friends, but also from members of their derived classes.

Example
`#include <iostream>`
`class Example`
`{`
`  public:`
`  int a;`
`  int add();`
`  private:`
`  int b;`
`};`
`int Example::add()`
`{`
	Example
	`#include <iostream.h>`
	`class ExBase`
	`{`
	`  protected:`
	`  int i, j;`
	`};`
	
	`class ExDerived : public ExBase {`
	`public:`
	`  void show()`
	`  {`

```
    return a+b ;
}
void main( )
{
   Example ex;
   ex.a = 10; // OK: because a is
public
   ex.b = 20; // Error: because b is
private
   int sum=ex.add(); // local
variable
   cout << "Sum of a + b : " <<
}
```

Output: Error due to access of private member

```
    i=35;
    j=45;
//both i & j are accessible here
    cout<<"Value of i "<<i;
    cout<<"Value of j "<<j;
  }
};
void main()
{
  ExDerived exd;
  exd.show();
//both I and j are not accessible
  exd.i=50;
  exd.j=60;
}
```

(b) Answer the question (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,"DELHI");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?

Ans.

(i) Polymorphism OR Constructor Overloading
(ii) Function 3: Destructor

A destructor called/invoked when an object of that class is destroyed. When a variable goes out of scope, or a dynamically allocated variable is explicitly deleted using the delete keyword, the class destructor is called to help clean up the class before it is removed from memory.

(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 values 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 concept of all the data members.

Ans.

```
class RESTRA
 {
      int FoodCode;
      char Food[20];
      char FType[20];
      char Sticker[20];
      void GetSticker();
public:
      void GetFood();
      void ShowFood();
};
void RESTRA::GetFood()
{
            cin>>FoodCode;
            cin>>Food;
            cin>>FType;
            GetSticker ();
}
void RESTRA:: GetSticker ()
{
            if (strcmp(FType,"Vegetarian"))
               strcpy(Sticker,"GREEN");
            else if (strcmp(FType,"Contains Egg"))
               strcpy(Sticker,"YELLOW");
            else if(strcmp(FType,"Non-Vegetarian"))
               strcpy(Sticker,"RED");
}
void RESTRA:: ShowFood ()
{
            cout<< FoodCode <<'\t'<<Food<<'\t'<<FType<<'\t'<<Sticker<<endl;
}
```

(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 names 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.

Ans.

(i) Hierarchical Inheritance
(ii) None of the data members can be accessible except SHOP class data members.
(iii) Register( ),Enter( ) and Show( ) of Factory class.
(iv) Input( ), Output( )

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.

```
#include <iostream.h>
#include <conio.h>
void SWAP2BEST(int ARR[], int Size);
int main ()
{
   //Here we are taking different values for more perfect result with more
   //numbers of array elements. You can change the values and number of array
   //elements as per your choice.
   int ListofNum[8] = {6, 28, 30, 17, 50, 45, 80, 82};
   clrscr();
   SWAP2BEST(ListofNum, 8 ) ;
   return 0;
}
void SWAP2BEST(int ARR[], int Size)
{
  int i= 0;
  int temp=0;
```

```
  for (i = 0; i < Size; ++i)//loop for printing original array values
  {
      cout<<ARR[i]<<" ";
  }
  cout<<endl;
  for (i = 0; i < Size; ++i)
  {
      if(ARR[i+1]=='\0')
      {
      }
      else
      {
         if(ARR[i+1]%10==0)
         {
            temp=ARR[i];
            ARR[i]=ARR[i+1];
            ARR[i+1]=temp;
         }
      }
  }
  for (i = 0; i < Size; ++i)  //loop for printing swapped array value
  {
      cout<<ARR[i]<<" ";
  }
}
```

(b)	An array T[20][10] is stored in the memory along the column with each of the element occupying 2 bytes, find out the memory location of T[10][5], if an element T[2][9] is stored at location 7600.	3
Ans.	Assuming LBR=LBC=0 B=7600 W=2 bytes Number of Rows(N)=20 Number of Columns(M)=10 LOC(Arr[I] [J]) = B +(I + J*N)*W LOC(T[10][5]) = 7600+(10+5*20)*2 = 7600 + (300*2) = 7600 + 600 = 8200	

(c)	Write a function in C++ to perform insert operation in a static circular Queue containing Book's information (represented with the help of an array of structure BOOK).
	`struct BOOK`
	`{`
	`  long Accno;  // Book Accession Number`
	`  char Title[20];  // Book Title`
	`};`
		4

Ans.	Student try to answer this question	
(d)	Write a function ALTERNATE (int A[][3],int N,int M) in C++ to display all alternate element from two-dimensional array A (starting from A[0][0]). For example: If the array is containing: 23 54 76	2

	37 19 28 62 13 19 The output will be: 23 76 19 62 19	

Ans.	`#include <iostream.h>`
	`#include <conio.h>`
	`void process_Array(int Arr[][3],int x, int y);`
	`void process_Array(int A[][3],int N, int M)`
	`{`
	`  clrscr();`
	`  for (int R = 0; R < N; R++)`
	`  {`
	`  if(R%2==0)`
	`  {`
	`  for (int C = 0; C < M; C=C+2)`
	`  {`
	`  cout<< A[R][C]<<" ";`
	`  }`
	`  }`
	`  else`
	`  {`
	`  for (int C = 1; C < M;C=C+2)`
	`  {`
	`  cout<< A[R][C]<<" ";`
	`  }`
	`  }`
	`  }`
	`cout<<endl;`
	`cout<<endl;`
	`  for (int I = 0; I < N; I++)`
	`  {`
	`  for (int J = 0; J < M; J++)`
	`  {`
	`  cout << A[I][J]<<" ";`
	`  }`
	`  cout<<endl;`
	`  }`
	`}`
	`int main ()`
	`{`
	`  int arr[3][3] ={{23, 54, 76},`
	`  {37, 19, 28},`
	`  {62, 13, 19},`
	`  };`
	`  process_Array(arr,3,3);`
	`  return 0;`
	`}`	

(e)	Evaluate the following POSTFIX notation. Show status of stack after every step of evaluation (i.e. after each operator): True,False,NOT,AND,False,True,OR,AND	**2**
Ans.	Student try to answer this question	
4 (a)	Observe the program segment given below carefully and the question that follow: `class Stock`	1

```
{
    int  Ino,Qty; char Item[20];
public:
    void Enter() {cin>>In0;gets(Item); cin>>Qty;}
    void Issue(int Q) { Qty+=Q}
    void Purchase(int Q) { Qty-=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=0;
    while (Success==0 && File.read((char*)&S, sizeof(S)))
    {
        if (Pino==S.GetIno())
        {
            S.Purchase(PQty);
            File.seekp(Success);                    //Statement 1
            File.write((char*) &S, sizeof(S));      //statement 2
           Success++;
        }
    }
    if (Success==1)
        cout<<"Purchase Updated"<<endl;
    else
        cout<<"Wrong Item 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 item.

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

Ans. Statement 1 - File.seekp(Success);
Statement 2 - File.write((char*) &S, sizeof(S));

(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.

```
#include<fstream.h>
#include<conio.h>
int main()
{
     ifstream fin;
     fin.open("out.txt");
     char str[80]; int count=0;
     clrscr();
     while(!fin.eof())
     {
        fin.getline(str,80);
        if(str[0]=='D' || str[0]=='M')
        {
            cout<<str<<endl;
         }
           count++;
     }
```

```
    cout<<"Number of lines in file is "<<count;
    fin.close();
    getch();
    return 0;
}
```

(c) Write a function in C++ to search for the details (Phoneno 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( ) { gets(Phoneno); cin>>Calls; }
    void Billing( ) { cout<<Phoneno<<"#"<<Calls<<endl; }
    int GetCalls( )
    {
        return Calls;
    }
};
```

(Ans)

```
void search ()
{
      Phone pObj;
      ifstream ifs;
      ifs.open("phones.dat",ios::binary);
      while(ifs.read((char*)&pObj,sizeof(pObj)))
      {
             if(pObj.GetCalls()>=800)
            pObj.Billing();
      }
      ifs.close();
}
```

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

Ans. Primary Key: Primary key is a set of one or more fields/columns of a table that uniquely identify a record in database table. It cannot accept null, duplicate values. Only one Candidate Key can be Primary Key.
Alternate key: Alternate key is a key that can be work as a primary key. Basically it is a candidate key that currently is not primary key.
Example: In below table AdmissionNo becomes Alternate Keys when we define RegistrationNo as Primary Key.

Student Registration Table:

RegistrationNo	AdmissionNo	Name	Phone	Gender	DOB
CBSE4554	215647	Mihir Ranjan	9568452325	Male	1992-04-15
CBSE6985	265894	Amita Guha	8456985445	Female	1993-03-24
CBSE5668	458961	Rajesh Singh	9654212440	Male	1992-12-04
CBSE3654	469799	Mohit Patel	7421589652	Male	1992-05-16

Primary Key – Registration Number
Alternate Key –Admission No

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

TABLE: CARDEN

Ccode	CarName	Make	Color	Capacity	Charges
501	A-Star	Suzuki	RED	3	14
503	Indigo	Tata	SILVER	3	12
502	Innova	Toyota	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
1002	Feroza Shah	503
1004	Ketan Dhal	502

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

(i) To display the names of all the 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.

Ans.

```
(i) SELECT CarName FROM carden WHERE Color LIKE 'Silver';
(ii) SELECT CarName,Make,Capacity FROM carden ORDER BY Capacity;
(iii) SELECT MAX(Charges) FROM carden;
(iv) SELECT Cname,CarName FROM carden,customer WHERE
     carden.Ccode=customer.Ccode;
```

(c) Give the output of the following SQL 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 WHERE Capacity=4;

Ans.

(i)
COUNT(DISTINCT Make)
4

(ii)
MAX(Charges)	MIN(Charges)
35	12

(iii)
COUNT(*)	Make
5	Suzuki

(iv)
CarName
SX4
C Class

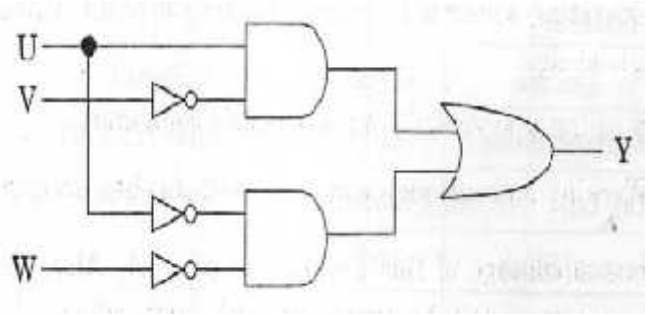
6 (a) Verify the following using truth table: **2**

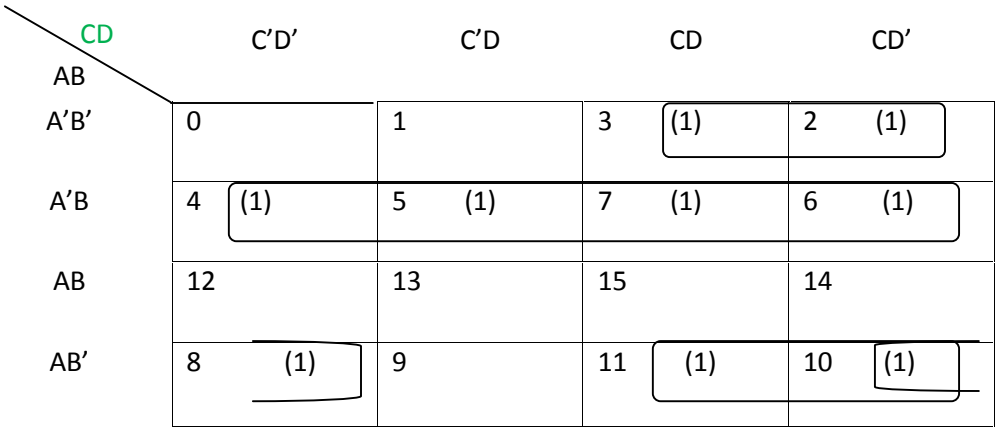
(i) X.X'=0
(ii) X+1=1

Ans.

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

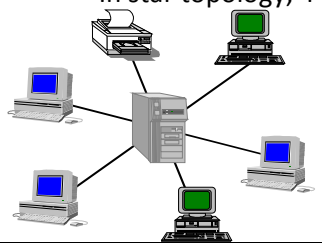
(b) Write the equivalent Boolean Expression for the following Logic Circuit: **2**



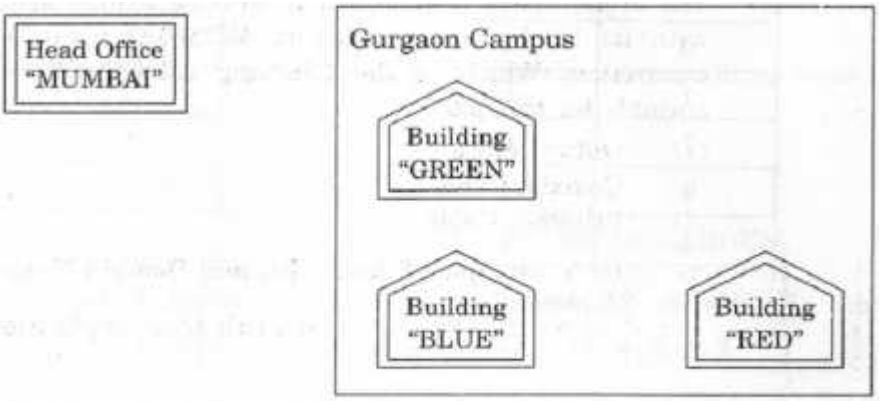
Ans.	Y=(U.V')+(U'.W')	
(c)	Write the SOP form of a Boolean Function F, which is represented in a truth table as follows: X Y Z F 0 0 0 1 0 0 1 0 0 1 0 1 0 1 1 0 1 0 0 1 1 0 1 0 1 1 0 0 1 1 1 1	1
Ans.	(X'Y'Z')+(X'+Y+Z')+(XY'Z')+(X+Y+Z)	
(d)	Reduce the following Boolean Expression using K-Map: F(A,B,C,D) = ∑(2,3,4,5,6,7,8,10,11)	3
Ans.	 F(A,B,C,D) = A'B+AB'C+AB'D'	
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) VoIP (ii) email (iii) FTP	1
Ans.	(i) VoIP	
(b)	Name one server side scripting language and one client side scripting language.	1
Ans.	➢ Client side script: (a) Javascript ➢ server side script: (a) ASP	
(c)	Which out of the following comes under Cyber Crime? (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.	1
Ans.	(i) Operating someone's internet banking account, without his knowledge.	
(d)	Write one advantages of Bus Topology of network. Also, illustrate how 4 computers can be connected with each other using star topology of network.	1

Ans.

- ✓ Easy to extend
- ✓ In star topology, 4 computers can be connected with each other through a server.



(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: **4**



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

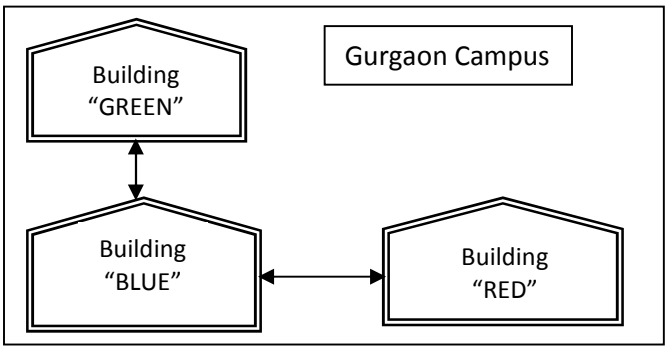
Building "GREEN"	32
Building "RED"	150
Building "BLUE"	45
Head Office	10

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

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

(iii) Suggest the placement of the following device with justification:
- (1) Switch
- (2) Repeater

(iv) The organization is planning to provide a high speed link with its head office situated in MUMBAI using a wired connection. Which of the following cables will be most suitable for this job?
- (1) Optical Fiber
- (2) Co-axial Cable
- (3) Ethernet Cable

Ans. (ei)	RED building because maximum number of computers are there OR BLUE building because closest to all other building (minimum cable length required)	
Ans. (eii)		
Ans. (eiii)	Switch. By using 1 switch per building we can use maximum numbers of computers to connect them in network.	
Ans. (eiv)	Optical Fiber	
(f)	Give one suitable example of each URL and Domain Name.	1
Ans.	URL - http://www.cbsecsnip.in/index.php Domain - cbsecsnip	
(g)	Name two Proprietary software along with their application.	1
Ans.	(i) Microsoft Office – Microsoft Office belongs to Microsoft Corporation. This software is used for office automation and also can be used other than office productivity at personal level. Microsoft Office contains following other applications like Microsoft Word, Microsoft Excel, Microsoft PowerPoint, etc. (ii) Oracle – Oracle Corporation is the owner of Oracle software. Oracle is one of most popular RDBMS software in world.	