XII COMPUTER SCIENCE

CBSE Board - 2014

1(a) **What is the difference between call by reference and call by value with respect to memory allocation? Give a suitable example to illustrate using C++ code.** **2**

Ans.

Call By Value	Call by reference
✓ Call by value is used to create a temporary copy of the data which is transferred from the actual parameter in the final parameter.	✓ Call by reference is used to share the same memory location for actual and formal parameters
✓ The changes done in the function in formal parameter are not reflected back in the calling environment.	✓ The changes done in the function are reflected back in the calling environment.

Example:

```
void compute (int A, int & B)
{
         A++;
         B++;
        cout<<"The function on display gives ";
        cout<<"A = "<<A<<"&"<<"B="<<B<<endl;
}
void main( )
{
        int I=50, J=25;
        cout<<"Initial of function call "<<endl;
        cout<<"I="<<I<<"&"<<"J="<<J<<endl;
        compute(I,J); cout<<"After the call of the function"<<endl;
        cout<<"I="<<I<<"&"<<"J="<<J<<endl;
        getch( );
 }
```

(b) **Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run it in a C++ compiler:** **1**

```
void main()
{
        char CH, STR[20];
        cin>>STR;
        CH=toupper(STR[0]);
        cout<<STR<<"starts with"<<CH<<endl;
}
```

Ans.
(i) iostream.h
(ii) ctype.h

(c) **Rewrite the following C++ code after removing all the syntax error(s), if present in the code. Make sure that you underline each correction done by you in the code.** **2**

Important Note:

- **Assume that all the required header files are already included, which are essential to run this code.**
- **The corrections made by you do not change the logic of the program.**

```
typedef char[80] STR;
void main()
{
        Txt STR;
        gets(Txt);
        cout<<Txt[0]<<'\t<<Txt[2];
```


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	cout<<Txt<<endline; **}**	

Ans.	typedef char STR[80];
	void main()
	{
	STR Txt;
	gets(Txt);
	cout<<Txt[0]<<'\t'<<Txt[2];
	cout<<Txt<<endl;
	}	

(d)	**Obtain the output from the following C++ program as expected to appear on the screen after its execution.** **Important Note:** **All the desired header files are already included in the code, which are required to run the code.** **void main()** **{** **char *Text="AJANTA";** **int *P, Num[]={1, 5, 7, 9};** **P=Num;** **cout<<*P<<Text<<endl;** **Text++;** **P++;** **cout<<*P<<Text<<endl;** **}**	**2**
Ans.	1AJANTA 5JANTA	
(e)	**Obtain the output from the following C++ program, which will appear on the screen after its execution.** **Important Note:** **All the desired header files are already included in the code, which are required to run the code.** **class Game** **{** **int Level, Score;** **char Type;** **public:** **Game(char GType='P')** **{** **Level=1;** **Score=0;** **Type=GType;** **}** **void Play(int GS);** **void Change();** **void Show()** **{** **cout<<Type<<"@"<<Level<<endl;** **cout<<Score<<endl;** **}** **};** **void main()** **{** **Game A('G'), B;** **B.Show();** **A.Play(11);**	**3**

```
        A.Change();
        B.Play(25);
        A.Show();
        B.Show();
}
void Game::Change()
{
        Type=(Type=='P')?'G':'P';
}
void Game::Play(int GS)
{
        Score+=GS;
        if(Score>=30)
                Level=3;
        else if(Score>=20)
                Level=2;
        else
                Level=1;
}
```

Ans:

P@1
0
P@1
11
P@2
25

(f) **Read the following C++ code carefully and find out, which out of the given options (i) to (iv) are the expected correct output(s) of it. Also, write the maximum and minimum value that can be assigned to the variable Taker used in the code:** **2**

```
void main()
{
        int GuessMe[4]={100, 50, 200, 20};
        int Taker=random(2)+2;
        for(int Chance=0;Chance<Taker;Chance++)
                cout<<GuessMe[Chance]<<"#";
}
```

(i) 100#
(ii) 50#200#
(iii) 100#50#200#
(iv) 100#50

Ans. **100#50#**

Note: that if you run the following program, again and again, the same random numbers will be generated. That is, TurboC always seeds the random number generator with the same starting number.
Therefore, the function "randomize()" may be used to seed the random number generator with a number which is developed from the system clock, which of course, is always changing.
So, Taker always have 2 as random is generating 2 on every execution of code.

2(a) **What is function overloading? Write an example using C++ to illustrate the concept of function overloading.** **2**

Ans. A function name having several definitions that are differentiable by the number or types of their arguments is known as **function overloading.**

Example :

```
#include <iostream.h>
class printData
{
```

```
public:
      void print(int i)
      {
            cout << "Printing int: " << i << endl;
      }
      void print(double f)
      {
            cout << "Printing float: " << f << endl;
      }
      void print(char* c)
      {
            cout << "Printing character: " << c << endl;
      }
};
int main(void)
{
      printData pd;
      // Call print to print integer
      pd.print(5);
      // Call print to print float
      pd.print(500.263);
      // Call print to print character
      pd.print("Hello C++");
      return 0;
}
```

When the above code is compiled and executed, it produces following result:

Printing int: 5
Printing float: 500.263
Printing character: Hello C++

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

```
class Hospital
{
      int Pno, Dno;
public:
      Hospital(int PN);          //Function 1
      Hospital();                //Function 2
      Hospital(Hospital &H);     //Function 3
      void In();                 //Function 4
      void Disp();               //Function 5
};
void main()
{
      Hospital H(20);            //Statement 1
}
```

(i) Which of the functions out of Function 1, 2, 3, 4 or 5 will get executed when the Statement 1 is executed in the above code?

(ii) Write a statement to declare a new object G with reference to already existing object H using Function 3.

Ans.
(i) Function 1 will get executed when the statement 1 is executed in the above code.
(ii) Hospital G(H);

(c) **Define a class Tourist in C++ with the following specification:** **4**

Data Members

- **CN0 - to store Cab No**
- **Ctype - to store a chahracter 'A', 'B' or 'C' as City Type**

- **PerKM - to store per Kilo Meter charges**
- **Distance - to store Distance travelled (in Km)**

Member Functions

- **A constructor function to initialize CType as 'A' and CNo as '0000'**
- **A function CityCharges() to assign PerKM as per the following table:**

CType	Per KM
A	20
B	18
C	15

- **A function RegisterCab() to allow administrator to enter the values for CNo and CType. Also, this function should call CityCharges() to assign PerKM Charges.**
- **A function Display() to allow user to enter the value of Distance and display CNo, CType, PerKM, PerKM*Distance (as Amount) on scree.**

Ans.

```
class Tourist
{
      int CNO;
      char Ctype;
      int PerKM;
      int Distance;
public:
      Tourist()
      {
            CType='A';
            CNO=0000;
      }
      void CityCharges()
      {
            if(CType=='A')
            {
                  PerKM=20;
            }
            else if(CType=='B')
            {
                  PerKM=18;
            }
            else if(CType=='C')
            {
                  PerKM=15;
            }
      }
      void RegisterCab()
      {
            cout<<"enter Cab No=";
            cin>>CNO;
            cout<<endl<<"enter city type=";
            cin>>CType;
            CityCharges();
      }
      void Display()
      {
            cout<<"enter distence in KM=";
            cin>>Distance;
            cout<<"Cab No ="<<CNO<<endl;
            cout<<"city Type="<<CType<<endl;
```

```
            cout<<"Kilo meter charges="<<PerKM<<endl;
            cout<<"Amount is="<<PerKM*Distance;
        }
};
```

(d) **Consider the following C++ code and answer the questions from (i) to (iv):** **4**

```
class University
{
        long Id;
        char City[20];
protected:
        char Country[20];
public:
        University();
        void Register();
        void Display();
};
class Department: private University
{
        long DCode[10];
        char HOD[20];
protected:
        double Budget;
public:
        Department();
        void Enter();
        void Show();
};
class Student: public Department
{
        long RollNo;
        char Name[20];
public:
        Student();
        void Enroll();
        void View();
};
```

(i) Which type of inheritance is shown in the above example?
(ii) Write the names of those member functions, which are directly accessed from the objects of class Student.
(iii) Write the names of those data members, which can be directly accessible from the member functions of class Student.
(iv) Is it possible to directly call function Display() of class University from an object of class Department? (Answer as Yes or No).

Ans.
(i) Multilevel
(ii) void Enroll() and void view()
(iii) RollNo and Name[20]
(iv) No

3(a) **Write code for a function void EvenOdd(int T[], int c) in C++, to add 1 in all the odd values and 2 in all the even values of the array T.** **3**

Example : If the original content of the array T is

T[0]	T[1]	T[2]	T[3]	T[4]
35	12	16	69	26

The modified content will be:

T[0]	T[1]	T[2]	T[3]	T[4]
36	14	18	70	28

Ans.

```
void EvenOdd(int T[], int c)
{
      for(int i=0;i<c;++i)
      {
            if(T[i]%2==0)
                  T[i]+=2;
            else
                  T[i]+=1;
      }
}
```

(b) **An array A[20][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the base address of array A is 32000, find out the location of A[15][10]. Also, find the total number of elements present in this array.** **3**

Ans.

Base Address (i.e., address of A[0][0]) B = 32000
Element size w = 4 bytes
Rows, Columns in Array A R, C = 20, 30
Location of array A I, J = 15, 20
Address of A[I][J] = B + w * (I * C + J)
Address of A[15][20] = 32000 + 4 * (15 * 30 + 20)
= 33880

Total Number of elements present in array A is R * C i.e., 20 * 30 = 600

(c) **Write a user-defined function AddEnd2(int A[][4], int N, int M) in C++ to find and display the sum of all the values, which are ending with 2 (i.e., units place is 2).** **2**
for example if the content of array is:

22	16	12
19	5	2

The output should be
36

Ans.

```
#include <conio.h>
#include <iostream.h>
void AddEnd2(int A[][3], int N, int M)
{
    int num,sum=0;
    for(int i=0; i<N; i++)
    {
      for(int j=0; j<M; j++)
      {
         num=A[i][j];
         int last=num%10;
         if(last==2)
           sum=sum+num;
      }
    }
    cout<<sum;
}
void main()
{
    int arr[2][3] ={{22, 16, 12}, {19, 5, 2}};
    clrscr();
```

```
    AddEnd2(arr,2,3);
}
```

(d) **Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:**
T, F, NOT, AND, T, OR, F, AND **2**

Ans.

token scanned from postfix expression	Stack status (bold letter shows the top of the stack) after processing the scanned token	Operation performed
True	**True**	Push True
False	True, **False**	Push False
Not	True, **True**	Op1=pop() i.e. False Push(NOT False) i.e. NOT False=True
And	**True**	Op2=pop() i.e. True Op1=pop() i.e. True Push(Op2 AND Op1) i.e. True AND True=True
True	True, **True**	Push True
Or	True	Op2=pop() i.e. True Op1=pop() i.e. True Push(Op2 OR Op1) i.e. True OR True=True
False	True, **False**	push False
And	**False**	Op2=pop() i.e. False Op1=pop() i.e. True Push(Op2 AND Op1) i.e. False AND True=False
NULL	Final result **False**	Pop True and return False

(e) **Write a function PUSHBOOK() in C++ to perform insert operation on a Dynamic Stack, which contains Book_no and Book_Title. Consider the following definition of NODE, while writing your C++ code.** **4**

```
struct NODE
{
      int Book_No;
      char Book_Title[20];
      NODE *Next;
};
```

Ans.

```
struct NODE
{
      int Book_No;
      char Book_Title[20];
      NODE *Next;
}*top, *newptr, *save;
void PUSHBOOK(NODE*);
void PUSHBOOK(NODE *np)
{
   if(top==NULL)
      top=np;
   else
   {
      save=top;
      top=np;
      np->Next=save;
   }
}
```

4(a) — **1**

Fill in the blanks marked as Statement 1 and Statement 2, in the program segment given below with appropriate functions for the required task.

```
class Agency
{
        int ANo;     //Agent Code
        char AName[20];     //Agent Name
        char Mobile[12];     //Agent Mobile
public:
        void Enter();   //Function to enter details of agent
        void Disp();     //Function to display details of agent
        int RAno()
        {
                return ANo;
        }
        void UpdateMobile()   //Function to update Mobile
        {
                cout<<"Updated Mobile";
                gets(Mobile);
        }
};
void AgentUpdate()
{
        fstream F;
        F.open("AGENT.DAT",ios::binary|ios::in|ios::out);
        int Updt=0;
        int UAno;
        cout<<"Ano (Agent No - to update mobile):";
        cin>>UAno;
        Agency A;
        while(!Updt && F.read((char*)&A,sizeof(A)))
        {
                if(A.RAno()==UAno)
                {
                        //Statement 1 : To call the function to update Mobile No.
                        _____;
                        //Statement 2: To reposition file pointer to re-write the updated object back in the file
                        _____;
                        F.write((char*)&A, sizeof(A));
                        Updt++;
                }
        }
        if (Updt)
                cout<<"Mobile Updated for Agent"<<UAno<<endl;
        else
                cout<<"Agent not in the Agency"<<endl;
        F.close();
}
```

Ans.

Statement 1: F. UpdateMobile();
Statement 2: F.seekp(Pos-sizeof(A));

(b) — **2**

Write a function AECount in C++, which should read each character of a text file NOTES.TXT, should count and display the occurrence of alphabets A and E (including small cases a and e too).

	Example: **If the file content is as follows:** **CBSE enhanced its** **CCE guideline further.** **The AECount() function should display the output as** **A:1** **E:7**	

Ans.	`void AECount()`
	`{`
	`  ifstream fin;`
	`  fin.open("NOTES.TXT", ios::in);`
	`  char word[50];`
	`  int c1=0,c2=0;`
	`  while(!fin.eof())`
	`  {`
	`  fin>>word;`
	`  if(strcmp(word,"A")==0||strcmp(word,"a")==0)`
	`  c1++;`
	`  if(strcmp(word,"E")==0||strcmp(word,"e")==0)`
	`  c2++;`
	`  }`
	`  cout<<"A  :"<<c1;`
	`  cout<<"E :"<<c2;`
	`  fin.close();`
	`}`	

(c)	**Assuming the class TOYS as declared below, write a function in C++ to read the objects of TOYS from binary file TOYS.DAT and display those details of those TOYS, which are meant for childern of AgeRange "5 to 8".** **class TOYS** **{** **int ToyCode;** **char ToyName[10];** **char AgeRange;** **public:** **void Enter()** **{** **cin>>ToyCode;** **gets(ToyName);** **gets(AgeRange);** **}** **void Display()** **{** **cout<<ToyCode<<":"<<ToyName<<endl;** **cout<<AgeRange<<endl;** **}** **char* WhatAge()** **{** **return AgeRange;** **}** **};**	**3**
Ans.	`void DisplayAgeRange()`	

```
{
   TOYS C;
   fstream fin;
   fin.open("TOYS.DAT", ios:: binary | ios::in);
   while(fin.read((char*)&C, sizeof(C)))
   {
       if(C.WhatAge()==5|| C.WhatAge()==6|| C.WhatAge()==7|| C.WhatAge()==8)
          C.Display();
   }
   fin.close();
}
```

5(a) **Explain the concept of Cartesian product between two tables, with the help of appropriate example.** **2**

NOTE: Answer the questions (b) and (c) on the basis of the following tables SHOPPE and ACCESSORIES.

Table: SHOPPE

Id	SName	Area
S001	ABC Computronics	CP
S002	All Infotech Media	GK II
S003	Tech Shoppe	CP
S004	Geek Tenco Soft	Nehru Place
S005	Hitech Tech Store	Nehru Place

TABLE: ACCESSORIES

No	Name	Price	Id
A01	Mother Board	12000	S01
A02	Hard Disk	5000	S01
A03	Keyboard	500	S02
A04	Mouse	300	S01
A05	Mother Board	13000	S02
A06	Keyboard	400	S03
A07	LCD	6000	S04
T08	LCD	5500	S05
T09	Mouse	350	S05
T10	Hard Disk	4500	S03

Q. No. b iv SHOPPE and ACCESSORIES table ID values are totally different, answer prepared assuming values are same in both the tables in Id attribute.

Q. No. c iv is wrong ACCESSORIES table does not have any attribute SNO , answer prepared assuming attribute name 'Id' in query.

Ans. When you join two or more tables without any condition, it is called Cartesian product or Cross Join.

Example –

SELECT * FROM SHOPPE, ACCESSORIES;

(b) **Write the SQL queries:** **4**

(i) To display Name and Price of all the Accessories in ascending order of their Price.

(ii) To display Id and SName of all Shoppe located in Nehru Place.

(iii) To display Minimum and Maximum Price of each Name of Accessories.

(iv) To display Name, Price of all Accessories and their respective SName where they are available.

Ans.

(i) SELECT Name, Price FROM ACCESSORIES ORDER BY Price;

(ii) SELECT Id, SName FROM SHOPPE WHERE Area='Nehru Place';

(iii) SELECT Name, MAX(Price), MIN(Price) FROM ACCESSORIES ;

(iv) SELECT Name,Price,SName FROM ACCESSORIES A, SHOPPE S WHERE A.Id=S.Id;

(c) **Write the output of the following SQL commands:**

(i) SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE>=5000; 2
(ii) SELECT AREA , COUNT(*) FROM SHOPPE GROUP BY AREA;
(iii) SELECT COUNT(DISTINCT AREA) FROM SHOPPE;
(iv) SELECT NAME, PRICE*0.05 DISCOUNT FROM ACCESSORIES WHERE SNO IN ('S02', 'S03');

Ans.

(i)

Name
Mother Board
Hard Disk
LCD

(ii)

AREA	COUNT
CP	2
GK II	1
Nehru Place	2

(iii)

COUNT
3

(iv)

NAME	PRICE
Keyboard	25.00
Mother Board	650.00
Keyboard	20.00
Hard Disk	225.00

6(a) **Name the law shown below and verify it using a truth table.** **2**
X+ X'.Y=X+Y

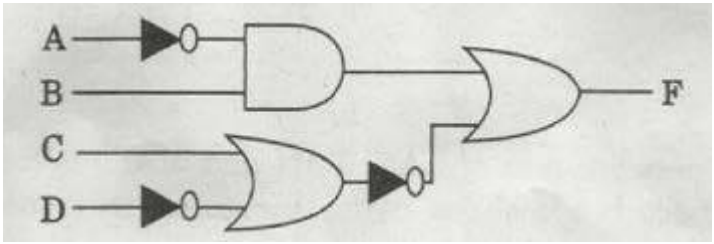
Ans.

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

Prove algebraically that X + X'Y = X + Y.

L.H.S. = X + X'Y
= X.1 + X'Y (X . 1 = X property of 0 and 1)
= X(1 + Y) + X'Y (1 + Y = 1 property of 0 and 1)
= X + XY + X'Y
= X + Y(X + X')
= X + Y.1 (X + X' =1 complementarity law)
= X + Y (Y . 1 = Y property of 0 and 1)
= R.H.S. Hence proved.

(b) **Obtain the Boolean Expression for the logic circuit shown below:** **2**



Ans. A'.B+(C+D')'

(c) **Write the Product of Sum from of the function F(X, Y, Z) for the following truth table representation of F:** **1**

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

0	1	0	0	
0	1	1	1	
1	0	0	0	
1	0	1	0	
1	1	0	1	
1	1	1	1	

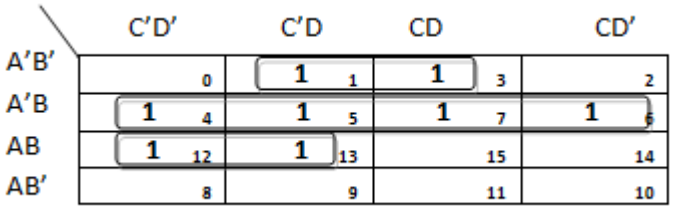
Ans.

X	Y	Z	F	MAX TERMS
0	0	0	1	X+Y+Z
0	0	1	0	X+Y+Z'
0	1	0	0	X+Y'+Z
0	1	1	1	X+Y'+Z'
1	0	0	0	X'+Y+Z
1	0	1	0	X'+Y+Z'
1	1	0	1	X'+Y'+Z
1	1	1	1	X'+Y'+Z'

Now by multiplying Maxterms for the output 0s, we get the desired product of sums expression which is
(X + Y + Z')(X + Y' + Z')(X'+Y+Z)(X' + Y + Z')

(d) **Obtain the minimal form for the following Boolean expression using K-Map :**
F (A,B,C,D) = Σ (1, 3, 4, 5, 6, 7, 12, 13) **3**

Ans.



A'B'C'D + A'B'CD + A'BC'D' +A'BC'D+A'BCD +A'BCD'+ABC'D' + ABC'D
A'B'D(C'+C) + A'BC'(D+D') + A'BC(D+D') +ABC'(D'+D)
A'B'D+A'BC'+A'BC+ABC'
A'B'D+A'B(C'+C) +ABC'
A'B'D+A'B+ABC'
A'D(B'+B) +ABC'
A'D+ABC'
D(A'+A)+BC'
D+BC'

7(a) **Write two characteristics of Wi-Fi.** **1**

Ans.
1. It allows an electronic device to exchange data or connect to the internet wirelessly using microwaves.
2. Network range of wi-fi is very less than other network technologies like wired LAN.

(b) **What is the difference between E-mail and Chat?** **1**

Ans.
- ✓ Chat is a type of software while Email is a protocol
- ✓ Chat requires the permission of both parties while Email does not
- ✓ Chat is typically software dependent while Email is not
- ✓ Chat needs accounts on the same provider while Email does not

(c) **Expand the following:** **1**
- **GSM**
- **GPRS**

Ans. **GSM –** Global System for Mobile Communications

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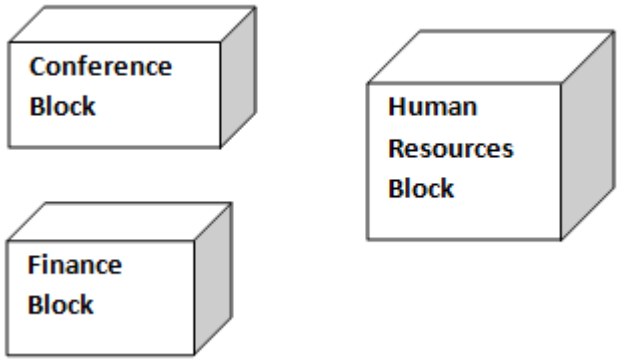
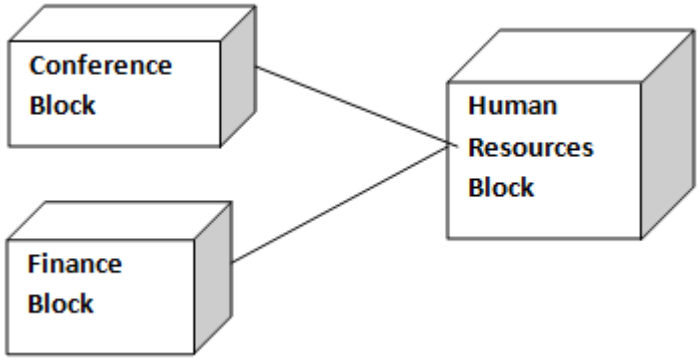
	GPRS –General Packet Radio Service	
(d)	**Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a video?**	**1**
Ans.	PAN	
(e)	**Tech Up Corporation (TUC) is a professional consultancy company. The company is planning to set up their new offices in Indian with its hub at Hyderabad. As a network adviser, you have to understand their requirement and suggest to them the best available solutions. Their queries are mentioned as (i) to (iv) below.** **<u>Physical Locations of the blocks of TUC</u>**  **<u>Block to Block distances (in Mtrs.)</u>** **Block (From) / Block (To) / Distance** **Human Resources / Conference / 60** **Human Resources / Finance / 120** **Conference / Finance / 60** **<u>Expected Number of Computers to be installed in each block</u>** **Block / Computers** **Human Resources / 125** **Finance / 25** **Conference / 60**	**4**
(i)	**What will the most appropriate block, where TUC should plan to install their server?**	**1**
Ans.	Human Resources will the most appropriate block, where TUC should plan to install their server.	
(ii)	**Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication.**	**1**
Ans.	 	
(iii)	**What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London base office?** • **Infrared**	**1**

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	• **Satellite Link** • **Ethernet Cable**	
Ans.	Ethernet Cable	
(iv)	**Which of the following devices will be suggested by you to connect each computer in each of the buildings?** • **Gateway** • **Switch** • **Modem**	**1**
Ans.	**Switch**	
(f)	**Write names of any two popular Open Source Software, which are used as Operating Systems.**	**1**
Ans.	Linux OpenSolaris	
(g)	**Write any two important characteristics of cloud computing.**	**1**
Ans.	**Reduction of costs –** unlike on-site hosting the price of deploying applications in the cloud can be less due to lower hardware costs from more effective use of physical resources. **Choice of applications –** This allows flexibility for cloud users to experiment and choose the best option for their needs. Cloud computing also allows a business to use, access and pay only for what they use, with a fast implementation time.	

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