

Computer Science (Code 083)
Sample Paper Set - 1

Max. Marks: 70

Duration: 3 Hours

1.

- (a) What is the difference between Global Variable and Local Variable? 2
- (b) Write the names of the header files to which the following belong: 1
(i) strcmp() (ii) fabs()
- (c) Rewrite the following program after removing the syntactical errors (if any). 2
Underline each correction.

```
#include [iostream.h]
class PAYITNOW
{
    int Charge;
PUBLIC:
    void Raise() {cin>>Charge;}
    void Show{cout<<Charge;}
};
void main()
{
    PAYITNOW P;
    P.Raise();
    Show();
}
```

- (d) Find the output of the following program: 3
- ```
#include <iostream.h>
struct PLAY
{ int Score, Bonus;};
void Calculate(PLAY &P, int N=10)
{
 P.Score++;P.Bonus+=N;
}
void main()
{
 PLAY PL={10,15};
 Calculate(PL,5);
 cout<<PL.Score<<" : "<<PL.Bonus<<endl;
 Calculate(PL);
 cout<<PL.Score<<" : "<<PL.Bonus<<endl;
 Calculate(PL,15);
 cout<<PL.Score<<" : "<<PL.Bonus<<endl;
}
```

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

```
#include <iostream.h>
#include <ctype.h>
void Encrypt(char T[])
{
 for (int i=0;T[i]!='\0';i+=2)
 if (T[i]=='A' || T[i]=='E') T[i]='#';
 else if (islower(T[i])) T[i]=toupper(T[i]);
 else T[i]='@';
}
void main()
{
 char Text[]="SaVE EArth";//The two words in the string Text
 //are separated by single space
 Encrypt(Text);
 cout<<Text<<endl;
}
```

(f) In the following program, if the value of N given by the user is 15, what maximum and minimum values the program could possibly display? 2

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
 int N,Guessme;
 randomize();
 cin>>N;
 Guessme=random(N)+10;
 cout<<Guessme<<endl;
}
```

2.

(a) What do you understand by Data Encapsulation and Data Hiding? 2

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

```
class Seminar
{
 int Time;
public:
 Seminar() //Function 1
 {
 Time=30;cout<<"Seminar starts now"<<endl;
 }
 void Lecture() //Function 2
 {
 cout<<"Lectures in the seminar on"<<endl;
 }
 Seminar(int Duration) //Function 3
 {
 Time=Duration;cout<<"Seminar starts now"<<endl;
 }
 ~Seminar() //Function 4
 {
 cout<<"Vote of thanks"<<endl;
 }
};
```

- i) In Object Oriented Programming, what is **Function 4** referred as and when does it get invoked/called?
- ii) In Object Oriented Programming, which concept is illustrated by **Function 1** and **Function 3** together? Write an example illustrating the calls for these functions.

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

**Private Members**

- a. TestCode of type integer
- b. Description of type string
- c. NoCandidate of type integer
- d. CenterReqd (number of centers required) of type integer
- e. A member function CALCNTR() to calculate and return the number of centers as (NoCandidates/100+1)

**Public Members**

- A function SCHEDULE() to allow user to enter values for TestCode, Description, NoCandidate & call function CALCNTR() to calculate the number of Centres
- A function DISPTEST() 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 PUBLISHER
{
 char Pub[12];
 double Turnover;
protected:
 void Register();
public:
 PUBLISHER();
 void Enter();
 void Display();
};

class BRANCH
{
 char CITY[20];
protected:
 float Employees;
public:
 BRANCH();
 void Haveit();
 void Giveit();
};

class AUTHOR:private BRANCH,public PUBLISHER
{
 int Acode;
 char Aname[20];
 float Amount;

public:
 AUTHOR();
 void Start();
 void Show();
};

```

- (i) Write the names of data members, which are accessible from objects belonging to class AUTHOR.
- (ii) Write the names of all the member functions which are accessible from objects belonging to class BRANCH.
- (iii) Write the names of all the members which are accessible from member functions of class AUTHOR.
- (iv) How many bytes will be required by an object belonging to class AUTHOR?

3.

- (a) Write a function in C++ to merge the contents of two sorted arrays A & B into third array C. Assuming array A is sorted in ascending order, B is sorted in descending order, the resultant array is required to be in ascending order. 4
- (b) An array S[40][30] is stored in the memory along the row with each of the element occupying 2 bytes, find out the memory location for the element S[20][10], if an element S[15][5] is stored at the memory location 5500. 4
- (c) Write a function in C++ to perform Insert operation in a dynamically allocated Queue containing names of students. 4
- (d) Write a function in C++ to find the sum of both left and right diagonal elements from a two dimensional array (matrix). 2
- (e) Evaluate the following postfix notation of expression: 2  
20,30,+,50,40,-,\*

4.

- (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekp() and seekg() functions for performing the required task. 1

```
#include <fstream.h>
class Item
{
 int Ino;char Item[20];
public:
 //Function to search and display the content from a particular
 //record number
 void Search(int);
 //Function to modify the content of a particular record number
 void Modify(int);
};

void Item::Search(int RecNo)
{
 fstream File;
 File.open("STOCK.DAT",ios::binary|ios::in);

 //Statement 1
 File.read((char*)this,sizeof(Item));
 cout<<Ino<<"==>"<<Item<<endl;
 File.close();
}
void Item::Modify(int RecNo)
```

```

{
 fstream File;
 File.open("STOCK.DAT", ios::binary|ios::in|ios::out);
 cout>>Ino;cin.getline(Item,20);

 //Statement 2
 File.write((char*)this,sizeof(Item));
 File.close();
}

```

(b) Write a function in C++ to count the number of lines present in a text file "STORY.TXT". 2

(c) Write a function in C++ to search for a BookNo from a binary file "BOOK.DAT", assuming the binary file is containing the objects of the following class. 3

```

class BOOK
{
 int Bno;
 char Title[20];
public:
 int RBno(){return Bno;}
 void Enter(){cin>>Bno;gets(Title);}
 void Display(){cout<<Bno<<Title<<endl;}
};

```

5. (a) What do you understand by Degree and Cardinality of a table? 2

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

**Table: ACTIVITY**

| ACode | ActivityName  | ParticipantsNum | PrizeMoney | ScheduleDate |
|-------|---------------|-----------------|------------|--------------|
| 1001  | Relay 100x4   | 16              | 10000      | 23-Jan-2004  |
| 1002  | High jump     | 10              | 12000      | 12-Dec-2003  |
| 1003  | Shot Put      | 12              | 8000       | 14-Feb-2004  |
| 1005  | Long Jump     | 12              | 9000       | 01-Jan-2004  |
| 1008  | Discuss Throw | 10              | 15000      | 19-Mar-2004  |

**Table: COACH**

| PCode | Name          | ACode |
|-------|---------------|-------|
| 1     | Ahmad Hussain | 1001  |
| 2     | Ravinder      | 1008  |
| 3     | Janila        | 1001  |
| 4     | Naaz          | 1003  |

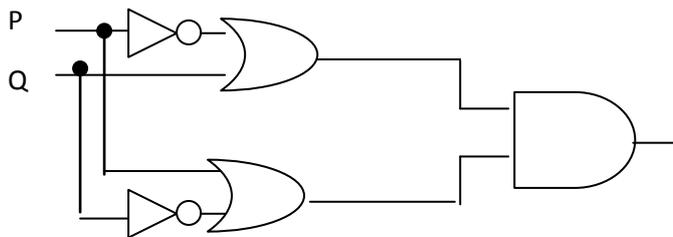
(i) To display the name of all activities with their Acodes in descending order.

(ii) To display sum of PrizeMoney for each of the Number of participants groupings (as shown in column ParticipantsNum 10,12,16)

- (iii) To display the coach's name and ACodes in ascending order of ACode from the table COACH
- (iv) To display the content of the GAMES table whose ScheduleDate earlier than 01/01/2004 in ascending order of ParticipantNum.
- (v) `SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;`
- (vi) `SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM ACTIVITY;`
- (vii) `SELECT SUM(PrizeMoney) FROM ACTIVITY;`
- (viii) `SELECT DISTINCT ParticipantNum FROM COACH;`

6.

- (a) State and verify Demorgan's Laws. 2
- (b) Write the equivalent Boolean Expression for the following Logic Circuit 2



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

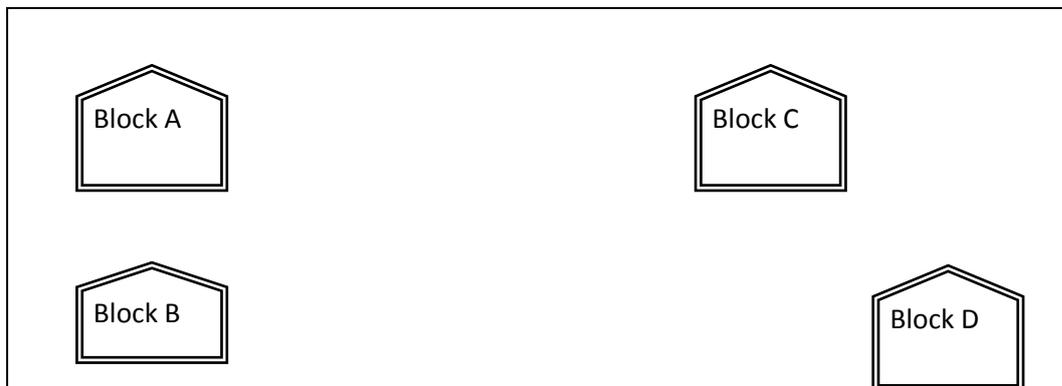
| U | V | W | F |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

- (d) Reduce the following Boolean Expression using K-Map: 3  
 $F(A,B,C,D)=\Sigma(0,1,2,4,5,6,8,10)$

7.

- a) What is the significance of ARPANET in the network? 1
- b) Expand the following terminologies: 1
  - (i) CDMA
  - (ii) GSM
- c) Give two major reasons to have network security. 1
- d) What is the purpose of using a Web Browser? Name any one commonly used Web Browser. 1

e) Knowledge Supplement Organisation has set up its new center at Mangalore for its office and web based activities. It has 4 blocks of buildings as shown in the diagram below:



Center to center distances between various blocks

|                    |       |
|--------------------|-------|
| Block A to Block B | 50 m  |
| Block B to Block C | 150 m |
| Block C to Block D | 25 m  |
| Block A to Block D | 170 m |
| Block B to Block D | 125 m |
| Block A to Block C | 90 m  |

Number of Computers

|         |     |
|---------|-----|
| Block A | 25  |
| Block B | 50  |
| Block C | 125 |
| Block D | 10  |

- e1) Suggest a cable layout of connections between the blocks. 1
- e2) Suggest the most suitable place (i.e. block) to house the server of this organisation with a suitable reason. 1
- e3) Suggest the placement of the following devices with justification 1
- (i) Repeater
  - (ii) Hub/Switch
- e4) The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed? 1

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# **CBSE OUTSIDE DELHI 2013-14**

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**Series OSR**

Code No. **91**

Roll No.

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Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **16** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

## **COMPUTER SCIENCE**

*Time allowed : 3 hours*

*Maximum Marks : 70*

**Instructions :**

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

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

- (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;

}
```

- (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];

 cout<<Txt<<endl;

}
```

- (d) Obtain the output from the following C++ program as expected to appear on the screen after its execution. 2

**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;
}
```

- (e) Obtain the output of the following C++ program, which will appear on the screen after its execution. 3

**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);
 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;
}

```

- ) 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

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

(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.

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

Data Members

- CNo - to store Cab No
- CType - to store a character '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 | PerKM |
|-------|-------|
| 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 screen.

- (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).

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   |

- (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

- (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

- (d) Evaluate the following postfix expression. Show the status of stack after execution of each operation separately : 2

T, F, NOT, AND, T, OR, F, AND

- (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;
};
```

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

1

```
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();
}

```

- (b) 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).

2

**Example :**

If the file content is as follows :

```

CBSE enhanced its
CCE guidelines further.

```

The `AECOUNT()` function should display the output as

```

A:1
E:7

```

- (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 children of AgeRange "5 to 8".

3

```
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;}
};
```

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 | Geeks Tecno 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 |

(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.

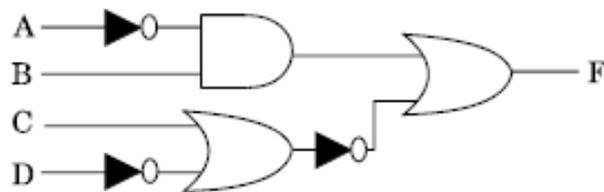
(c) Write the output of the following SQL commands : 2

- (i) `SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE >= 5000;`
- (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');`

6. (a) Name the law shown below and verify it using a truth table. 2

$$X+X' \cdot Y = X+Y$$

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



- (c) Write the Product of Sum form 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 |

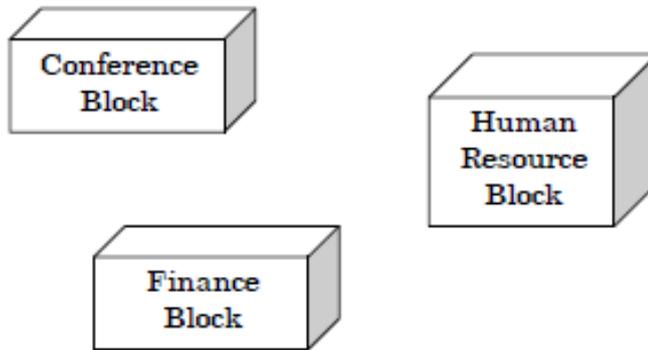
- (d) Obtain the minimal form for the following Boolean expression using Karnaugh's Map : 3

$$F(A, B, C, D) = \Sigma(1, 3, 4, 5, 6, 7, 12, 13)$$

7. (a) Write two characteristics of Wi-Fi. 1
- (b) What is the difference between E-mail and Chat ? 1
- (c) Expand the following : 1
- GSM
  - GPRS
- (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

- (e) Tech Up Corporation (TUC) is a professional consultancy company. The company is planning to set up their new offices in India 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.

**Physical Locations of the blocks of TUC**



**Block to Block distances (in Mtrs.)**

| Block (From)   | Block (To) | Distance |
|----------------|------------|----------|
| Human Resource | Conference | 60       |
| Human Resource | Finance    | 120      |
| Conference     | Finance    | 80       |

**Expected Number of Computers to be installed in each block**

| Block          | Computers |
|----------------|-----------|
| Human Resource | 125       |
| Finance        | 25        |
| Conference     | 60        |

- (i) What will the most appropriate block, where TUC should plan to install their server ? 1
- (ii) Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication. 1
- (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 based office ? 1
- Infrared
  - Satellite Link
  - Ethernet Cable
- (iv) Which of the following devices will be suggested by you to connect each computer in each of the buildings ? 1
- Gateway
  - Switch
  - Modem
- (f) Write names of any two popular Open Source Software, which are used as Operating Systems. 1
- (g) Write any two important characteristics of Cloud Computing. 1