

PRACTICE PAPER

*Class: XII*

*Subject: Computer Science*

*Time allowed: 3 hours*

*Maximum Marks: 70*

**Instructions:**

(i) All questions are compulsory. (ii)

Programming Language: C++

1. (a) List the basic concepts of C++. 2

(b) Which C++ header file(s) will be essentially required to be included to run/ execute the following C++ code? 1

```
void main()  
{  
    int Eno=123, char Ename[]="RehanSwamp";  
    cout<<setw(5)<<Eno<<setw(25)<<EName<<endl;  
}
```

(c) Rewrite the following C++ program code after removing the syntax error(s) (if any). Underline each correction. 2

```
include<iostream.h>  
class TRAIN  
{  
    long TrainNo;  
    char Description[25];  
public  
    void Entry()  
    {
```

```

        cin>>TrainNo;gets(Description);
    }
    VoidDisplay()
    {
        cout<<TrainNo<<":"<<Description<<endl;
    }
};

voidmain()
{
    TRAI NT;
    Entry.T();Display.T();
}

```

(d) Findtheoutputofthefollowingprogram:3

```

#include<iostream.h>
structPOINT
{intX,Y,Z};
voidStepIn(POINT&P,intStep=1)
{
    P.X+=Step;
    P.Y-=Step;
    P.Z+=Step;
}
voidStepOut(POINT&P,intStep=1)
{
    P.X-=Step;
    P.Y+=Step;
    P.Z-=Step;
}

```

```

}

void main()
{
    POINT P1={15,25,5}, P2={10,30,20};
    StepIn(P1);
    StepOut(P2,4);
    cout<<P1.X<<" " <<P1.Y<<" " <<P1.Z<<endl;
    cout<<P2.X<<" " <<P2.Y<<" " <<P2.Z<<endl;
    StepIn(P2,12);
    cout<<P2.X<<" " <<P2.Y<<" " <<P2.Z<<endl;
}

```

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

```

#include<iostream.h>
#include<ctype.h>
void ChangeIt(char Text[], char C)
{
    for(int K=0; Text[K]!='\0'; K++)
    {
        if(Text[K]>='F' && Text[K]<='L')
            Text[K]=tolower(Text[K]);
        else
            if(Text[K]=='E' || Text[K]=='e')
                Text[K]==C;
            else
                if(K%2==0)
                    Text[K]=toupper(Text[K]);
                else

```

```

        Text[K]=Text[K-1];
    }
}
voidmain()
{
    charOldText[]="pOwERALone";
    ChangeIt(OldText, '%');
    cout<<"NewTEXT:"<<OldText<<endl;
}

```

- (f) The following code is from a game, which generates a set of 4 random numbers. Yallavis playing this game, help him to identify the correct option(s) out of the four choices given below as the possible set of such numbers generated from the program codes so that he wins the game. Justify your answer.

2

```

#include<iostream.h>
#include<stdlib.h>c
onstintLOW=15;
voidmain()
{
    randomize();
    intPOINT=5,Number;
    for(intI=1;I<=4;I++)
    {
        Number=LOW+random(POINT);
        cout<<Number<<" ";
        POINT--;
    }
}

```

- (i) 19:16:15:18:
- (ii) 14:18:15:16:
- (iii) 19:16:14:18:
- (iv) 19:16:15:16:

2. (a) What do you understand by Polymorphism.? Also, give an example in C++ to illustrate the same. 2

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

```

class TEST
{
    int Regno, Max, Min, Score;
public:
    TEST() //Function1
    {
        Regno=101; Max=100; Min=40; Score=75;
    }
    TEST(int Pregno, int Pscore) //Function2
    {
        Regno=Pregno; Max=100; Min=40; Score=Pscore;
    }
    ~TEST() //Function3
    {
        cout<<"TESTOver"<<endl;
    }
    void Display() //Function4
    {
        cout<<Regno<<":"<<Max<<":"<<Min<<endl;
        cout<<"[Score]"<<Score<<endl;
    }
};

```

- (i) As per Object Oriented Programming, which concept is illustrated by **Function 1 and Function 2** together?
- (ii) What is **Function 3** specifically referred to as? When do you think, **Function 3** will be invoked/called?
- (c) Define a class ITEM in C++ with following description: 4

Private Members

Code of type integer (Item Code)

Iname of type string (Item Name)

Price of type float (Price of each item)

Qty of type integer (Quantity of item in stock)

Offer of type float (Offer percentage on the item)

A member function GetOffer() to calculate Offer percentage as per the following rule:

If Qty ≤ 50            Offer is 0

If 50 < Qty ≤ 100    Offer is 5

If Qty > 100        Offer is 10

Public Members

A function GetStock() to allow user to enter values for Code, Iname, Price, Qty and call function GetOffer() to calculate the offer

A function ShowItem() 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 Chairperson

{

    long CID;            // Chairperson Identification Number

    char CName[20];

protected:

    char Description[40];

    void Allocate();

```

public:
    Chairperson();
    voidAssign();
    voidShow();
};

classDirector
{
    intDID;           //DirectorID
    charDname[20];

protected:
    charProfile[30];

public:
    Director();
    voidInput();
    voidoutput();
};

classCompany:privateChairperson,publicDirector
{
    intCID;           //CompanyID
    charCity[20],Country[20];

public:
    Company();
    voidEnter();
    voidDisplay();
};

```

- (i) Which type of inheritance out of the following is specifically illustrated in the above C++ code?

- (a) SingleLevelInheritance
  - (b) MultiLevelInheritance
  - (c) MultipleInheritance
- (ii) Writethenamesofdatamembers,whichareaccessiblebyobjectsOfClass typeCompany.
  - (iii) Writethenamesofallmemberfunctions,whichareaccessiblebyobjects of classtypeCompany.
  - (iv) Writethenamesofallmembers,whichareaccessiblefrommemberfunctions ofclassDirector.
3. (a) WriteafunctionCHANGE0inC++,whichacceptsanarrayofintegerand its sizeasparametersanddivideallthosearrayelementsby7whichare divisibleby7andmultiplyother-arrayelementsby3.

3

SampleInputDataofthearray

A[0]	A[1]	A[2]	A[3]	A[4]
21	12	35	42	18

ContentofthearrayafterCallingCHANGE()function

A[0]	A[1]	A[2]	A[3]	A[4]
3	36	5	6	54

- (b) AnarrayP[50][60]isstoredinthememoryalongthecolumnwitheachofthe elementoccupying2bytes,findoutthememorylocationfortheelementP[10] [20],iftheBaseAddressofthearrayis6800.
- (c) Writeacompleteprograminc++toimplementadynamicallyallocatedStack containingnamesofCountries.
- (d) WriteafunctionintSKIPSUM(intA[][3],intN,intM)inC++tofindand returnthesumofelementsfromallalternateelementsofatawo-dimensional arraystartingfromA[0][0].

3

4

2

Hint:

Ifthefollowingisthecontentofthearray



A[0][0]	A[0][1]	A[0][2]
4	5	1
A[1][0]	A[1][1]	A[1][2]
2	8	7
A[2][0]	A[2][1]	A[2][2]
9	6	3

The function SKIPSUM() should add elements A[0][0], A[0][2], A[1][1], A[2][0] and A[2][2].

- (e) Evaluate the following postfix notation of expression:  
(Show status of Stack after each operation)

2

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

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

1

```
#include <fstream.h>

class Client
{
    long Cno; char Name[20], Email[30];
public:
    //Function to allow user to enter the Cno, Name, Email
    void Enter();

    //Function to allow user to enter (modify) Email
    void Modify();

    long ReturnCno() {return Cno;}
};

void ChangeEmail()
{
    Client C;
    fstream F;
```

```

F.open("INFO.DAT",ios::binary|ios::in|ios::out);
longCnoc;//Client'sno.whoseEmailneedstobe changed
cin>>Cnoc;
while(F.read((char*)&C,sizeof(C)))
{
    if(Cnoc==C.ReturnCno())
    {
        C.Modify();
                                                //Statement1
        intPos=//Tofindthecurrent
                positionoffilepointer
                                                //Statement2
        _____//Tomovethefile
                pointertowritethe
                //modifiedrecord
                backontothefile
                //forthedesiredCnoc
        F.write((char*)&C,sizeof(C));
    }
}
F.close();
}

```

- (b) Write a function in C++ to count the words "this" and "these" present in a text file "ARTICLE.TXT".

2

[Note that the words "this" and "these" are complete words]

- (c) Write a function in C++ to search and display details of all flights, whose destination is "Mumbai" from a binary file "FLIGHT.DAT". Assuming the binary file is containing the objects of the following class.

3

```

class FLIGHT
{
    int Fno;           //FlightNumber
    char From[20];    //FlightStartingPoint
    char To[20];      //FlightDestination

public:
    char* GetFrom() {return From;}
    char* GetTo() {return To;}
    void Enter() {cin >> Fno; gets(From); gets(To);}
    void Display() {cout << Fno << " : " << From << " : " << To << endl;}
};

```

5. (a) What do you understand by Candidate Keys in a table? Give a suitable example of Candidate Keys from a table containing some meaningful data.
- (b) Consider the following tables STORE and SUPPLIERS and answer (b1) and (b2) parts of this question:

2

Table: STORE

ItemNo	Item	Scode	Qty	Rate	LastBuy
2005	Sharpener Classic	23	60	8	31-Jun-09
2003	Ball Pen 0.25	22	50	25	01-Feb-10
2002	Gel Pen Premium	21	150	12	24-Feb-10
2006	Gel Pen Classic	21	250	20	11-Mar-09
2001	Eraser Small	22	220	6	19-Jan-09
2004	Eraser Big	22	110	8	02-Dec-09
2009	Ball Pen 0.5	21	180	18	03-Nov-09

Table: SUPPLIERS

Scode	Sname
21	Premium Stationers
23	Soft Plastics
22	Tetra Supply

(b1) Write SQL commands for the following statements: 4

- (i) To display details of all the items in the Store table in ascending order of LastBuy.
- (ii) To display ItemNo and Item name of those items from Store table whose Rate is more than 15 Rupees.
- (iii) To display the details of those items whose Supplier code (Scode) is 22 or Quantity in Store (Qty) is more than 110 from the table Store.
- (iv) To display Minimum Rate of items for each Supplier individually as per Scode from the table Store.

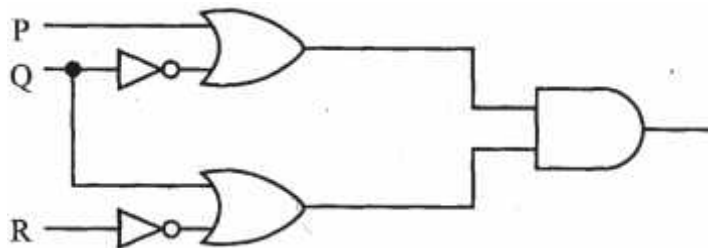
(b2) Give the output of the following SQL queries: 2

- (i) `SELECT COUNT(DISTINCT Scode) FROM Store;`
- (ii) `SELECT Rate * Qty FROM Store WHERE ItemNo = 2004;`
- (iii) `SELECT Item, Sname FROM Store S, Suppliers P  
WHERE S.Scode = P.Scode AND ItemNo = 2006;`
- (iv) `SELECT MAX(LastBuy) FROM Store;`

6. (a) Verify the following algebraically. 2

$$(A' + B') \cdot (A + B) = A' \cdot B + A \cdot B'$$

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



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

1

X	Y	Z	H
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	1
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

$$F(U, V, W, Z) = \Sigma(3, 5, 7, 10, 11, 13, 15)$$

7. (a) What was the role of ARPANET in the Computer Network?

1

- (b) Which of the following is not a unit for data transfer rate?

1

(i)

bps (ii)

abps (iii)

gbps (iv)

- (c) What is the difference between Worms and virus in terms of computers?

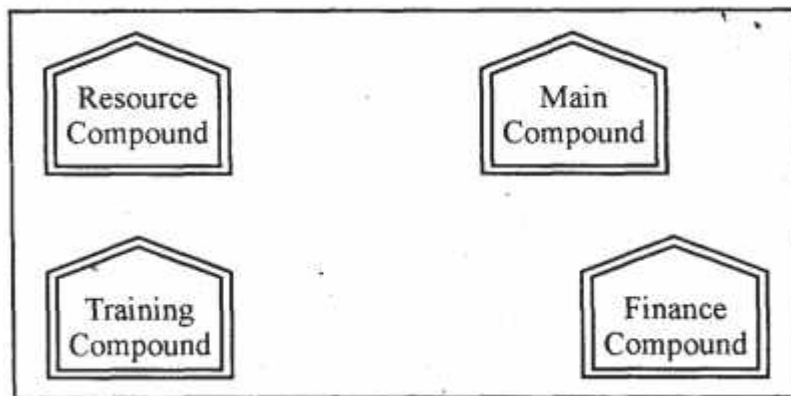
1

- (d) What term we use for a software/hardware device, which is used to block, unauthorized access while permitting authorized communications. This term is also used for a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria.

1

- (e) "Learn Together" is an educational NGO. It is setting up its new campus at Jabalpur for its web-based activities. The campus has 4 compounds as shown in the diagram below:

4



CentertocenterdistancesbetweenvariousCompoundsasperarchitectural drawings(inMetre)isasfollows:

Main Compound to Resource Compound	110 m
Main Compound to Training Compound	115 m
Main Compound to Finance Compound	35 m
Resource Compound to Training Compound	25 m
Resource Compound to Finance Compound	135 m
Training Compound to Finance Compound	100 m

ExpectedNumberofComputersineachCompoundisasfollows:

Main Compound	5
Resource Compound	15
Training Compound	150
Accounts Compound	20

- (e1) Suggestacablelayoutofconnectionsbetweenthecompounds.
- (e2) Suggestthemosuitableplace(i.e.compound)tohousetheserver forthisNGO.Also,provideasuitablereasonforyoursuggestion.
- (e3) Suggesttheplacementofthefollowingdeviceswithjustification:

(i) Repeater

(ii) Hub/Switch

(e4) The NGO is planning to connect its International offices situated in Mumbai, which out of the following wired communication link, you will suggest for a very high speed connectivity?

(i) Telephone Analog Line

(ii) Optical Fiber

(iii) Ethernet Cable

(f) Write the full forms of the following:

**1**

(f1) GNU

(f2) XML

(g) Write one advantage of Open Source Software

1

---

PRACTICE PAPER

*Class: XII*

*Subject : Computer Science*

*Time allowed: 3 hours*

*Maximum Marks: 70*

1. (a) What is the difference between call by value and call by reference? Also, give a suitable C++ code to illustrate both. **2**

- (b) Which C++ header file(s) will be essentially required to be included to run/execute the following C++ code: **1**

```
void main()  
{  
    int Rno=24; char Name[]="AmenSinghania";  
    cout<<setw(10)<<Rno<<setw(20)<<Name<<endl;  
}
```

- (c) Rewrite the following C++ program code after removing the syntax error(s) (if any). Underline each correction. **2**

```
include<iostream.h>  
class FLIGHT  
{
```



```

longFlightCode;
    charDescription[25];
public
    voidAddInfo()
    {
        cin>>FlightCode;gets(Description);
    }
    voidShowInfo()
    (
        cout<<FlightCode<<":"<<Description<<endl;
    }
};
voidmain()
{
    FLIGHTF;
    AddInfo.F();ShowInfo.F();
}

```

(d) Findtheoutputofthefollowingprogram:

3

```

#include<iostream.h>
structTHREE_D
{intX,Y,Z};
voidMoveIn(THREE_D&T,intStep=1)
{
    T.X+=Step;
    T.Y-=Step;
    T.Z+=Step;
}

```

```

}

void MoveOut (THREE_D&T, int Step=1)
{
    T.X-=Step;
    T.Y+=Step;
    T.Z-=Step;
}

void main()
{
    THREE_DT1={10,20,5}, T2={30,10,40};
    MoveIn(T1);
    MoveOut(T2,5);
    cout<<T1.X<<" , "<<T1.Y<<" , "<<T1.Z<<endl;
    cout<<T2.X<<" , "<<T2.Y<<" , "<<T2.Z<<endl;
    MoveIn(T2,10);
    cout<<T2.X<<" , "<<T2.y<<" , "<<T2.Z<<endl;
}

```

(e) Find the output of the following program:

2

```

#include<iostream.h>
#include<ctype.h>
void MyCode (char Msg[ ], char CH)
{
    for (int (Cnt=0; Msg[Cnt]!='\0'; Cnt++)
    {
        if (Msg[Cnt]>='B' && Msg[Cnt]<='G')
            Msg[Cnt]=tolower(Msg[Cnt]);
    }
}

```

```

        else
            if (Msg[Cnt] == 'A' || Msg[Cnt] == 'a')
                Msg[Cnt] = CH;
        else
            if (Cnt % 2 == 0)
                Msg[Cnt] = toupper(Msg[Cnt]);
            else
                Msg[Cnt] = Msg[Cnt - 1];
    }
}
void main()
{
    char MyText[] = "ApEACeDrivE";
    MyCode(MyText, '@');
    cout << "NEWTEXT: " << MyText << endl;
}

```

- (f) The following code is from a game, which generates a set of 4 random numbers. Praful is playing this game, help him to identify the correct option(s) out of the four choices given below as the possible set of such numbers generated from the program code so that he wins the game. Justify your answer.

2

```

#include <iostream.h>
#include <stdlib.h>
const int LOW = 25;
void main()
{
    randomize();
    int POINT = 5, Number;
    for (int I = 1; I <= 4; I++)

```

```

    {
        Number=LOW+random(POINT);
        Cout<<Number<<" ";
        POINT--;
    }
}

```

(i) 29:26:25:28:

(ii) 24:28:25:26:

(iii) 29:26:24:28:

(iv) 29:26:25:26:

2. (a) What do you understand by Data Encapsulation and Data Hiding? Also, give an example in C++ to illustrate both. 2

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

```

class Exam
{
    int Rno, MaxMarks, MinMarks, Marks;
public:
    Exam() //Module1
    {
        Rno=101; MaxMarks=100; MinMarks=40; Marks=75;
    }
    Exam(int Prno, int Pmarks) //Module2
    {
        Rno=Prno; MaxMarks=100; MinMarks=40; Marks=Pmarks;
    }
    ~Exam() //Module3

```

```

    {
        cout<<"ExamOver"<<endl;
    }
voidShow() //Module4
{
    cout<<Rno<<":"<<MaxMarks<<":"<<MinMarks<<endl;
    cout<<" [MarksGot ]"<<Marks<<endl;
}
};

```

- (i) Asper Object Oriented Programming, which concept is illustrated by **Module1**and**Module2**together?
- (ii) What is **Module3** referred as? When do you think, **Module3** will be invoked/called?
- (c) Define a class **STOCK** in C++ with following description: 4

Private Members

ICode of type integer (Item Code)

Item of type string (Item Name)

Price of type float (Price of each item)

Qty of type integer (Quantity in stock)

Discount of type float (Discount percentage on the item)

A member function **FindDisc()** to calculate discount as per the following rule:

If Qty ≤ 50                      Discount is 0

If 50 < Qty ≤ 100              Discount is 5

If Qty > 100                    Discount is 10

Public Members

A function **Buy()** to allow user to enter values for ICode, Item, Price, Qty and call function **FindDisc()** to calculate the Discount.

A function ShowAll() 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 Director
{
    long DID; // Director Identification Number
    char Name[20];
protected:
    char Description[40];
    void Allocate();
public:
    Director();
    void Assign();
    void Show();
};

class Ractory: public Director
{
    int FID; // Factory ID
    char Address[20];
protected:
    int NOE; // No. of Employees
public:
    Factory();
    void Input();
    void Output();
};

class ShowRoom: private Factory
```

```

{
    intSID;        //ShowroomID
    charCity[20];
public:
    ShowRoom();
    voidEnter();
    voidDisplay();
};

```

- (i) Which type of inheritance out of the following is illustrated in the above C++ code?
- (a) Single Level Inheritance  
(b) Multi Level Inheritance  
(c) Multiple Inheritance
- (ii) Write the names of data members, which are accessible by objects of class type ShowRoom.
- (iii) Write the names of all member functions which are accessible by objects of class type ShowRoom.
- (iv) Write the names of all members, which are accessible from member functions of class Factory.
3. (a) Write a function REASSIGNO in C++, which accepts an array of integers and its size as parameters and divide all those array elements by 5 which are divisible by 5 and multiply other array elements by 2.

3

Sample Input Data of the array

A[0]	A[1]	A[2]	A[3]	A[4]
20	12	15	60	32

Content of the array after calling REASSIGNO function

A[0]	A[1]	A[2]	A[3]	A[4]
4	24	3	12	64

- (b) An array  $T[90][100]$  is stored in the memory along the column with each of the elements occupying 4 bytes. Find out the memory location for the element  $T[10][40]$ , if the Base Address of the array is 7200. 3
- (c) Write a complete program in C++ to implement a dynamically allocated Queue containing names of Cities. 4
- (d) Write a function `int ALTERSUM(int B[][5], int N, int Min)` in C++ to find and return the sum of elements from all alternate elements of a two-dimensional array starting from  $B[0][0]$ . 2

Hint:

If the following is the content of the array

<b>B[0][0]</b>	B[0][1]	<b>B[0][2]</b>
<b>4</b>	5	<b>1</b>
B[1][0]	<b>B[1][1]</b>	B[1][2]
2	<b>8</b>	7
<b>B[2][0]</b>	B[2][1]	<b>B[2][2]</b>
<b>9</b>	6	<b>3</b>

The functions should add elements  $B[0][0]$ ,  $B[0][2]$ ,  $B[1][1]$ ,  $B[2][0]$  and  $B[2][2]$ .

- (e) Evaluate the following postfix notation of expression: 2  
 (Show status of Stack after each operation)  
 True, False, NOT, OR, False, True, OR, AND
4. (a) Observe the program segment given below carefully and fill the blank marked as Statement 1 and Statement 2 using `tellg()` and `seekp()` functions for performing the required task. 1

```
#include <fstream.h>

class Customer
{
    long Cno; char Name[20], Mobile[12];
public:
```



```

        //FunctiontoallowusertoentertheCno,Name, Mobile
voidEnter();

        //Functiontoallowusertoenter(modify)mobile number
voidModify();

        //FunctiontoreturnvalueofCno
        longGetCno(){returnCno;}
};

voidChangeMobile()
{
    CustomerC; fstreamF;
    F.open("CONTACT.DAT",ios::binary|ios::in|ios::out);
    longCnoc;//Customerno.whosemobilenumberneeds
    tobechanged
    cin>>Cnoc;
    while(F.read((char*)&C,sizeof(C)))
    {
        if(Choc==C.GetCno())
        {
            C.Modify();
                                                    //Statement1

            intPos=//Tofindthecurrent
                    positionoffilepointer
                                                    //Statement2

            _____//Tomovethefilepointertowritethe
                    //modifiedrecordbackontothe file
                    //forthedesiredCnoc
            F.write((char*)&C,sizeof(C));
        }
    }
    F.close();
}

```

- (b) Write a function in C++ to count the words “to” and “the” present in a text file “POEM.TXT”. 2

[Note that the words “to” and “the” are complete words]

- (c) Write a function in C++ to search and display details of all trains, whose destination is “Delhi”, from a binary file “TRAIN.DAT”. Assuming the binary file is containing the objects of the following class. 3

```
class TRAIN
{
    int Tno; //TrainNumber
    char From[20]; //TrainStartingPoint
    char To[20]; //TrainDestination
public:
    char* GetFrom() {return From;}
    char* GetTo() {return To;}
    void Input() {cin >> Tno; gets(From); gets(To);}
    void Show() {cout << Tno << " : " << From << " : " << To << endl;}
};
```

5. (a) What do you understand by Primary Key? Give a suitable example of Primary Key from a table containing some meaningful data. 2
- (b) Consider the following tables STOCK and DEALERS and answer (b1) and (b2) parts of this question:

Table: STOCK

ItemNo	Item	Dcode	Qty	UnitPrice	StockDate
5005	Ball Pen 0.5	102	100	16	31-Mar-10
5003	Ball Pen 0.25	102	150	20	01-Jan-10
5002	Gel Pen Premium	101	125	14	14-Feb-10
5006	Gel Pen Classic	101	200	22	01-Jan-09
5001	Eraser Small	102	210	5	19-Mar-09
5004	Eraser Big	102	60	10	12-Dec-09
5009	Sharpener Classic	103	160	8	23-Jan-09

Table: DEALERS

Dcode	Dname
101	Reliable Stationers
103	Classic Plastics
102	Clear Deals

(b1) Write SQL commands for the following statements:

4 (i)

To display details of all items in the Stock table in ascending order of StockDate.

(ii) To display ItemNo and Itemname of those items from Stock table whose UnitPrice is more than Rupees 10.

(iii) To display the details of those items whose dealer code (Dcode) is 102 or Quantity in Stock (Qty) is more than 100 from the table Stock.

(iv) To display Maximum UnitPrice of items for each dealer individually as per Dcode from the table Stock.

(b2) Give the output of the following SQL queries:

2 (i)

SELECT COUNT(DISTINCT Dcode) FROM Stock;

(ii) SELECT Qty \* UnitPrice FROM Stock WHERE ItemNo = 5006;

(iii) SELECT Item, Dname FROM Stock S, Dealers D  
WHERE S.Dcode = D.Dcode AND ItemNo = 5004;

(iv) SELECT MIN(StockDate) FROM Stock;

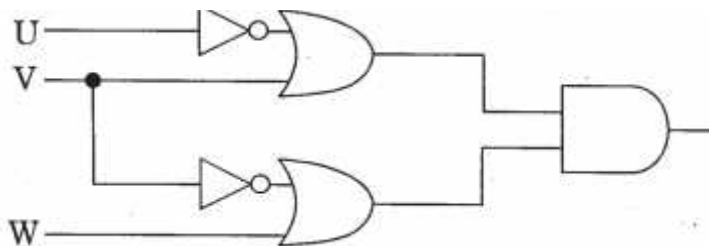
6. (a) Verify the following algebraically:

2

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

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

2



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

1

P	Q	R	G
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
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:  
 $F(A,B,C,D) = \Sigma(3,4,5,6,7,13,15)$

3

7. (a) What was the role of ARPANET in the Computer Network?

1

- (b) Which of the following is not a unit for data transfer rate?

1

(i)

mbps (ii)

kbps (iii)

sbps (iv)

- (c) Define Trojan Horse.

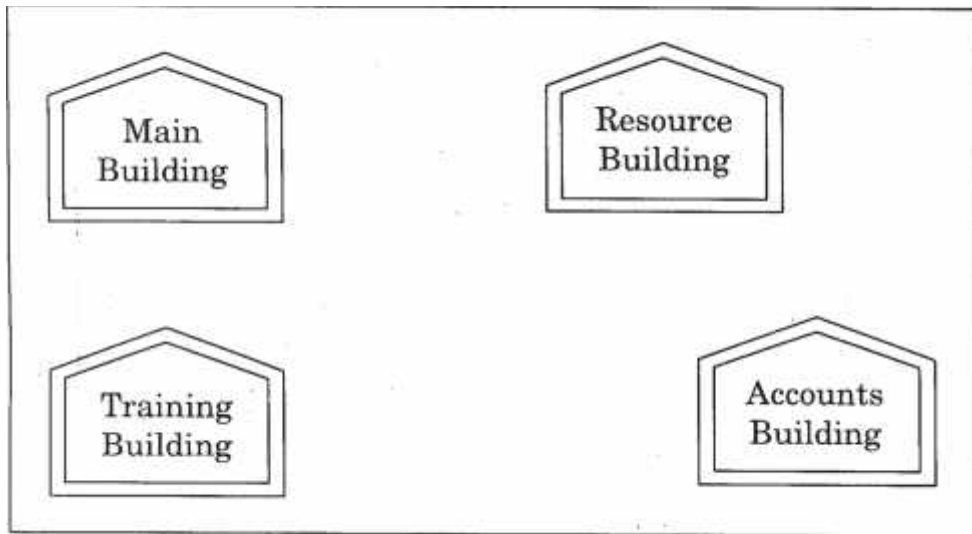
1

- (d) What term do we use for a software/hardware device, which is used to block unauthorized access while permitting authorized communications? This term is also used for a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria.

1

- (e) "Vidya for All" is an educational NGO. It is setting up its new campus at Jaipur for its web-based activities. The campus has four buildings as shown in the diagram below:

4



Centertocenterdistancesbetweenvariousbuildingsasperarchitectural drawings(inmeters)isasfollows:

Main Building to Resource Building	120 m
Main Building to Training Building	40 m
Main Building to Accounts Building	135 m
Resource Building to Training Building	125 m
Resource Building to Accounts Building	45 m
Training Building to Accounts Building	110 m

ExpectedNumberofComputersineachBuildingisasfollows:

Main Building	15
Resource Building	25
Training Building	250
Accounts Building	10

- (e1) Suggestacablelayoutofconnectionsbetweenthebuildings.
- (e2) Suggestthemosuitableplace(i.e.building)tohousetheserverfor thisNGO.Also,provideasuitablereasonforyoursuggestion.
- (e3) Suggesttheplacementofthefollowingdeviceswithjustification: (i)  
Repeater  
(ii) Hub/Switch

- (e4) The NGO is planning to connect its International offices situated in Delhi.  
Which out of the following wired communication links, will you suggest for a very high speed connectivity?
- (i) Telephone Analog Line
  - (ii) Optical Fiber
  - (iii) Ethernet Cable
- (f) Write the full forms of the following: 1
- (f1) FTP
  - (f2) FSF
- (g) Name any two topologies. 1