# INDIAN SCHOOL DARSAIT

## SECOND TERM EXAMINATION - DECEMBER, 2017

## COMPUTER SCIENCE (083)- Answer Scheme

Class: XII
Date: -11-2017

Max. Marks: 70
Time: 3hr

***General Instructions:***

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

| | | | |
|---|---|---|---|
| 1. | a) | Bring out the difference between actual and formal argument with an example.<br>Actual arguments:<br>The arguments that are passed in a function call are called actual arguments. These arguments are defined in the calling function.<br>Formal arguments:<br>The formal arguments are the parameters/arguments in a function declaration. The scope of formal arguments is local to the function definition in which they are used. Formal arguments belong to the called function. Formal arguments are a copy of the actual arguments. A change in formal arguments would not be reflected in the actual arguments.<br><br>Example:<br>#include <stdio.h><br>void sum(int i, int j, int k);<br>/* calling function */<br>int main() {<br>int a = 5;<br>// actual arguments<br>sum(3, 2 * a, a);<br>return 0;<br>}<br>/* called function */<br>/* formal arguments*/<br>void sum(int i, int j, int k) {<br>int s;<br>s = i + j + k;<br>printf("sum is %d", s);<br>}<br>Here 3,2*a,a are actual arguments and i,j,k are formal arguments. | 2 |
| | b) | Anil typed the following C++ code and during compilation he found three errors as follows:<br>(i) Function setw() should have prototype<br>(ii) Undefined symbol cout<br>On asking, his teacher told him to include necessary header files in the code. Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code<br>void main()<br>{ int a=5;<br>char ch = ‘g’;<br>cout<<setw(5)<<ch;<br>}<br><br>ctype.h, iomanip.h, iostream.h, math.h | 1 |

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

```
#include<conio.h>
#include<iostream.h>
#include<string.h>
#include<stdio.h>
class product
{
 int product_code,qty,price;
 char name[20];
 public:
 product(){
 product_code=0;qty=0;price=0;
 name=NULL;
 }
 void entry()
 {
 cout<<"\n Enter code,qty,price";
 cin>>product_code>>qty>>price;
 gets(name);
 }
 void tot_price() {return qty*price;}
};
void main()
{
 p product;
 p.entry();
 cout<<tot_price();
}
```

Corrected Code:

```
#include<iostream.h>
#include<string.h>
#include<stdio.h>
class product{
 int product_code,qty,price;
 char name[20];
 public:
 product(){
 product_code=0;qty=0;price=0;
 strcpy(name,NULL);}
 void entry()
 {
 cout<<"\n Enter code,qty,price";
 cin>>product_code>>qty>>price;
 gets(name);
 }
 int tot_price() {return qty*price;}
};
void main(){
 product p;
 p.entry();
 cout<<p.tot_price();}
```

| | | | |
|---|---|---|---|
| | d) | Find and write the output of the following C++ program code:<br>Note: Assume all required header files are already included in the program.<br>#include<iostream.h><br>#include<conio.h><br>void main( )<br>{ int I,Array[]={4,6,10,12};<br>int *pointer=Array;<br>for(int I=1;I<=3;I++)<br>{ cout<<*pointer<<"#";<br>pointer++;<br>}<br>cout<<endl;<br>for(I=1;I<=4;I++)<br>{ (*pointer)*=3;<br>--pointer;<br>}<br>for(I=1;I<5;I++)<br>cout<<Array[I-1]<<"@";<br>cout<<endl;<br>getch();<br>}<br><br>4#6#10#<br>12@18@30@36@ | 2 |
| | e) | Find and write the output of the following C++ program code:<br>Note: Assume all required header files are already being included in the program.<br>class Share<br>{<br>long int Code;<br>float Rate;<br>int DD;<br>public:<br>Share(){Code=1000;Rate=100;DD=1;}<br>void GetCode(long int C,float R)<br>{<br>Code=C;<br>Rate=R;<br>}<br>void Update(int Change,int D)<br>{<br>Rate+=Change;<br>DD=D;<br>}<br>void Status()<br>{<br>cout<<”Date:”<<DD<<endl;<br>cout<<Code<<”#”<<Rate<<endl;<br>}<br>};<br>void main()<br>{<br>Share S,T,U;<br>S.GetCode(1324,350);<br>T.GetCode(1435,250); | 3 |

```
S.Update(50,28);
U.Update(25,26);
S.Status();
T.Status();
U.Status();
}

Date:28
1324#400
Date:1
1435#250
Date:26
1000#125
```

f) Observe the following program carefully and attempt the given questions: (2)

```
#include<iostream.h>
#include<conio.h>
#include<stdlib.h>
void main()
{
clrscr();
randomize();
char courses[][10]={"M.Tech","MCA","MBA","B.Tech"};
int ch;
 for(int i=1;i<=3;i++)
 {
 ch=random(i)+1;
 cout<<courses[ch]<<"\t";
 }
getch();
}
```

I. Out of all the four courses stored in the variable courses, which course will never be displayed in the output and which course will always be displayed at first in the output?

II. Mention the minimum and the maximum value assigned to the variable ch?

I. M.Tech will never be displayed in the output.
MCA will always be displayed at first in the output.

II. Minimum value of ch=1
Maximum value of ch=3

2. a) Write any four important characteristics of Object Oriented Programming? Give example of any one of the characteristics using C++. (2)

- Encapsulation
- Data Hiding
- Polymorphism
- Inheritance

Example of Encapsulation

```
class student
{
int rno;
char name[20];
public:
```

```
void input()
{
cin>>rno;
gets(name);
}
void output()
{
cout<<rno<<" "<<name<<endl;
}
};
```

The data members and member functions are wrapped up together(encapsulated ) into a single unit called class.

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

```
class Retail
{ char Category[20];
 char Item[20];
 int Qty;
float Price;
 Retail() //Function 1
 { strcpy(Category,"Cereal");
 strcpy(Item,"Rice");
 Qty=100;
 Price=25;
 }
 public:
void Show()  //Function 2
 { cout<<Category<<"-"<<Item<<":"<<Qty<<"@"<<Price<<endl;
 }
 };
 void main()
 { Retail R; //Statement 1
R.Show(); //Statement 2
 }
```

i) Will Statement 1 initialize all the data members for object R with the values given in the Function 1? (Yes Or No).Justify your answer suggesting the correction(s) to be made in the above code.

ii) What shall be the possible output when the program gets executed? (Assuming, if required-the suggested correction(s) are made in the program)

i) No, since the constructor Retail has been defined in private section. ½
Suggested Correction: Constructor Retail() to be defined in public section of class. ½

ii) Cereal-Rice:100@25

c) Define a class Tour in C++ with the description given below: 4

***Private Members:***

TCode of type string
NoofAdults of type integer
NoofKids of type integer
Kilometres of type integer
TotalFare of type float

***Public Members:***

• A constructor to assign initial values as follows:
TCode with the word "NULL"

NoofAdults as 0
NoofKids as 0
Kilometres as 0
TotalFare as 0

• A function AssignFare( ) which calculate and assign the value of the data member TotalFare as follows:-
For each Adult:

| Fare(Rs) | For Kilometres |
|---|---|
| 500 | >=1000 |
| 300 | <1000 & >=500 |
| 200 | <500 |

For each Kid the above Fare will be 50% of the Fare mentioned in the above table
For example:
If Kilometres is 850, NoofAdults = 2 and NoofKids = 3
Then TotalFare should be calculated as
NumofAdults * 300 + NoofKids * 150
i.e. 2 * 300 + 3 * 150 = 1050

• A function EnterTour( ) to input the values of the data members TCode, NoofAdults, NoofKids and Kilometres; and invoke the AssignFare( ) function.

• A function ShowTour( ) will display the content of all the data members of a clam "Tour".

```
class Tour
 { char TCode[5];
int NoofAdults;
int NoofKids; 1
int Kilometres;
float TotalFare;
 public:
 Tour()
 { TCode = "NULL";
 NoofAdults = 0;
 NoofKids = 0; 1
 Kilometres = 0;
 TotalFare = 0;
 }
void AssignFare( )
{ if(Kilometres>=1000)
 TotalFare = NoofAdults*500 + NoofKids*250;
 else if(Kilometres>=500) 1
 TotalFare = NoofAdults*300 + NoofKids*150;
 else
 TotalFare = NoofAdults*200 + NoofKids*100;
}
void EnterTour( )
{ cin>>TCode;
cin>>NoofAdults;
cin>>NoofKids;
cin>>Kilometres;
AssignFare( ); 1
```

| | | | |
|---|---|---|---|
| | | }<br>void ShowTour( )<br>{ cout<<TCode<< “ ”<<NoofAdults<< “ ”<<NoofKids<< “ ”<<Kilometres;<br>cout<<TotalFare; 1<br>}<br>}; | |
| | d) | Consider the class definition given below and answer the following questions:<br>class film<br>{ int filmid ;<br>int filmname;<br>int leadroles<br>public:<br>char leadroleinmale[30];<br>char leadroleinfemale[30];<br>film( );<br>accept( );<br>display( );<br>};<br>class commercialfilm : public film<br>{ int no_of_songs;<br>flaot costpersong;<br>protected:<br>int typecode;<br>public:<br>char remake;<br>commercialfilm( );<br>acceptcomm( );<br>expenceonsong( );<br>display( );<br>};<br>class artfilm : private film<br>{ char theme[50];<br>public:<br>artfilm();<br>acceptart( );<br>display( );<br>};<br>i) Which type of Inheritance is shown in the above example?<br>ii) What is the size of the object of class artfilm?<br>iii) Which data members are accessible through the object of class artfilm?<br>iv) Which class constructor will be called first at the time of declaration of an object of class artfilm?<br><br>i) Hierarchical Inheritance is shown in the above example.<br>ii) 116 bytes<br>iii) None<br>iv) film class constructor will be called first at the time of declaration of an object of class artfilm. | 4 |
| | | | |
| 3. | a) | Write a 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).<br>For example:<br>If the content of array is as follows: | 2 |

| | | | |
|---|---|---|---|
| | | 22 16 12<br>19 5 2<br>Then function should display output as: 36<br><br>int ADDEnd2 (int A [ ][4], int N, int M)<br>{ int i, j, sum= 0;<br>for (i=0; i<N; ++i)<br>{ for (j=0; j<M; j++)<br>{ if(A[i][j]%10==2)<br>sum= sum + A[i][j];<br>}<br>}<br>cout<< sum;<br>} | |
| | b) | T[20][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[15][5], if the element T[10][8] is stored at the memory location 52000.<br><br>Loc(T[I][J])<br>=BaseAddress + W [( I – LBR)*C + (J – LBC)]<br>(where<br>W=size of each element = 4 bytes,<br>R=Number of Rows=20, C=Number of Columns=50)<br>Assuming LBR = LBC = 0<br>LOC(T[10][8])<br>52000 = BaseAddress + W[ I*C + J]<br>52000 = BaseAddress + 4[10*50 + 8]<br>52000 = BaseAddress + 4[500 + 8]<br>52000 = BaseAddress + 4 x 508<br>BaseAddress = 52000 - 2032<br>= 49968<br>LOC(T[15][5])= BaseAddress + W[ I*C + J]<br>= 49968 + 4[15*50 + 5]<br>= 49968 + 4[750 + 5]<br>= 49968 + 4 x 755<br>= 49968 + 3020<br>= 52988 | 3 |
| | c) | Write the definition of a member function push() for a class Library in C++ to insert a book information in a dynamically allocated stack of books considering the following code is already written as a part<br>of the program:<br>struct book<br>{<br>int bookid;<br>char bookname[20];<br>book *next;<br>};<br>class Library<br>{<br>book *top;<br>public:<br>Library() | 4 |

```
{
top=NULL;
}
void push();
void pop();
void disp();
~Library();
};

void Library::push()
{
book *nptr;
nptr=new book;
cout<<"Enter values for bookid and bookname";
cin>>nptr->bookid;
gets(nptr->bookname);
nptr->next=NULL;
if(top==NULL)
top=nptr;
else
 {
 nptr->next=top;
 top=nptr;
 }
}
```

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

For example:
If the array is containing:
23 54 76
37 19 28
62 13 19
The output will be: 23 76 19 62 19

```
void ALTERNATE (int A [ ][3], int N, int M)
{ int k=0;
 for(int i=0;i<N;++i)
 { for(int j=0;j<M;j++)
 { if(k%2==0)
 cout<< A[i][j]<< " ";
k++;
}
}
}
```

e) Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately: 2

45, 45, +, 32, 20, 10, /, -,*

| Element Scanned | Stack Status |
|---|---|
| 45 | 45 |
| 45 | 45, 45 |
| + | 90 |
| 32 | 90, 32 |
| 20 | 90,32,20 |
| 10 | 90,32,20,10 |
| / | 90,32,2 |
| - | 90,30 |
| * | 2700 |

4. a) Write a function in C++ to count and display the number of lines not starting with alphabet 'A' present in a text file "STORY.TXT". [2]

Example:
If the file "STORY.TXT" contains the following lines,
The rose is red.
A girl is playing there.
There is a playground.
An aeroplane is in the sky.
Numbers are not allowed in the password.

The function should display the output as 3

```
void countlines()
{
        ifstream fin;
        fin.open("STORY.TXT");
        char str[80];
        int count=0;
        while(!fin.eof())
        {
                fin.getline(str,80);
                if(str[0]!='A')
                        count++;
        }
        cout<<"Number of lines not starting with A are "<<count;
        fin.close();
}
```

b) Write a definition for function BUMPER() in C++ to read each object of a binary file GIFTS.DAT, find and display details of those gifts, which has remarks as "ON DISCOUNT". Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below : [3]

```
 class GIFTS
 {
 int ID; char Gift[20],Remarks[20]; float Price;
public:
 void Takeonstock()
 { cin>>ID;gets(Gift); gets(Remarks); cin>>Price; }
 void See()
 { cout<<ID<<":"<<Gift<<":"<<Price<<"":"<<Remarks<<endl; }
 char *GetRemarks() {return Remarks;} };

void BUMPER()
{
```

| | | | |
|---|---|---|---|
| | | GIFTS G;<br>ifstream fin;<br>fin.open("GIFTS.DAT", ios::binary);<br>while(fin.read((char*)&G, sizeof(G)))<br>{<br>if(strcmp(G.GetRemarks(),"ON DISCOUNT")==0)<br>G.See();<br>}<br>fin.close(); //Ignore<br>} | |
| | c) | Find the output of the following C++ code considering that the<br>binary file sp.dat already exists on the hard disk with 2 records in it.<br>class sports<br>{<br>int id;<br>char sname[20];<br>char coach[20];<br>public:<br>void entry();<br>void show();<br>void writing();<br>void reading();<br>}s;<br><br>void sports::reading()<br>{<br>ifstream i;<br>i.open("sp.dat");<br>1<br>while(1)<br>{<br>i.read((char*)&s,sizeof(s));<br>if(i.eof())<br>break;<br>else<br>cout<<"\n"<<i.tellg();<br>}<br>i.close();<br>}<br>void main()<br>{<br>s.reading();<br>}<br><br>42<br>84 | 1 |
| | | | |
| 5. | a) | What do you understand by Degree and Cardinality of a table? Draw table with degree 6 and cardinality 5 and fill it with valid data.<br><br>Degree: Number of Columns in a table 2<br>Cardinality: Number of rows in a table | 2 |

**Table: ACTIVITY**

| A Code | ActivityName | Stadium | Participants Num | Prize Money | Schedule Date |
|---|---|---|---|---|---|
| 1001 | Relay 100x4 | Star Annex | 16 | 10000 | 23-Jan-2004 |
| 1002 | High jump | Star Annex | 10 | 12000 | 12-Dec-2003 |
| 1003 | Shot Put | Super Power | 12 | 8000 | 14-Feb-2004 |
| 1005 | Long Jump | Star Annex | 12 | 9000 | 01-Jan-2004 |
| 1008 | Discuss Throw | Super Power | 10 | 15000 | 19-Mar-2004 |

b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables — 6

**DVD**

| DCODE | DTITLE | DTYPE |
|---|---|---|
| F101 | Henry Martin | Folk |
| C102 | Dhrupad | Classical |
| C101 | The Planets | Classical |
| F102 | Universal Soldier | Folk |
| R102 | A day in life | Rock |

**MEMBER**

| MID | NAME | DCODE | ISSUEDATE |
|---|---|---|---|
| 101 | AGAM SINGH | R102 | 2017-11-30 |
| 103 | ARTH JOSEPH | F102 | 2016-12-13 |
| 102 | NISHA HANS | C101 | 2017-07-24 |

i) To display all details from the table MEMBER in descending order of ISSUEDATE.

Ans SELECT * FROM MEMBER ORDER BY ISSUEDATE DESC;

ii) To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD

Ans SELECT DCODE,DTITLE FROM DVD WHERE DTYPE='Folk';

iii) To display the DTYPE and number of DVDs in each DTYPE from the table DVD

Ans SELECT COUNT(*),DTYPE FROM DVD GROUP BY DTYPE;

iv) To display all NAME and ISSUEDATE of those members from the table MEMBER who have DVDs issued (i.e ISSUEDATE) in the year 2017

Ans SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE>='2017-01-01' AND ISSUEDATE<='2017-12-31';

OR

SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE BETWEEN '2017-01-01' AND '2017-12-31';

OR

SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE LIKE '2017%';

v) SELECT MIN(ISSUEDATE) FROM MEMBER;

Ans MIN(ISSUEDATE)

2016-12-13

vi) SELECT DISTINCT DTYPE FROM DVD;

Ans DISTINCT DTYPE
Folk
Classical
Rock

vii) SELECT D.DCODE,NAME,DTITLE FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE ;

Ans DCODE NAME DTITLE
R102 AGAM SINGH A day in life
F102 ARTH JOSEPH Universal Soldier
C101 NISHA HANS The Planets

viii) SELECT DTITLE FROM DVD WHERE DTYPE NOT IN ( " Folk " , " Classical " );

Ans DTITLE
A day in life

6. a) Verify the following algebraically: 2

$X'.Y + X.Y' = (X'+Y').(X+Y)$

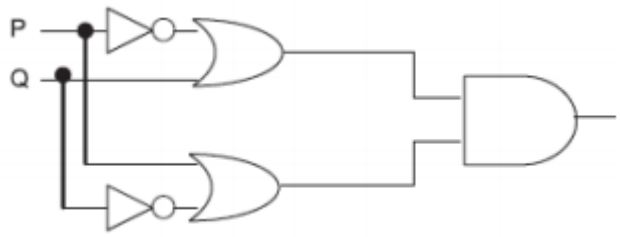
Ans. R. H . S

$(X'+y').(x+y)$
$= x'.(x+y)+y'.(x+y)$
$= x.x'+X'.y+y'.x+y'.y$
$= x'.y+y'.X$
$= x'.y+x.y'$

So L.H.S=R.H.S

b) Draw the equivalent Logic Circuit for the following Boolean Expression 2

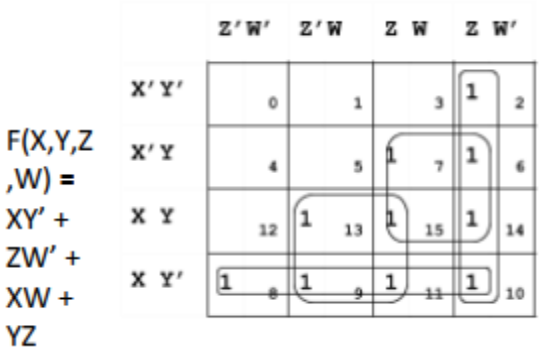
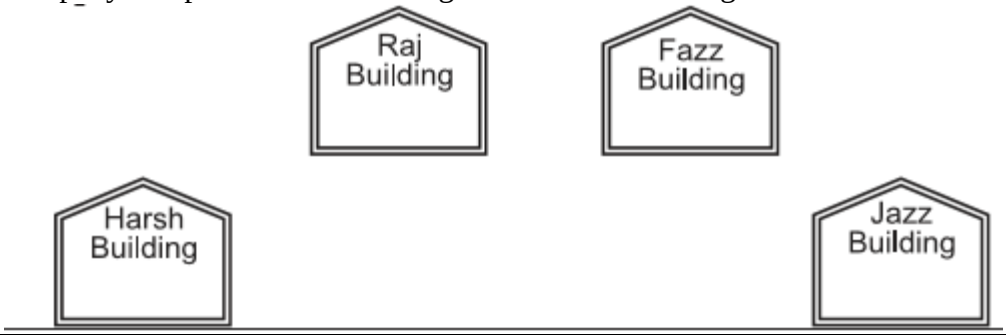
F(P,Q)=(P'+Q).(P+Q')




c) A Boolean function F defined on three input variable X,Y,Z is 1 if and only if the number of 1(One) input is odd (e.g. F is 1 if X=1,Y=0,Z=0). Draw the truth table for the above function and express it in canonical sum of product form. 1

| X | Y | Z | F |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

*Canonical SOP*
*XYZ'+XY'Z+XY'Z'+XYZ*

| | | | |
|---|---|---|---|
| | d) | Reduce the following Boolean Expression to its simplest form using K-Map : 3<br>F(X,Y,Z,W) = Σ(2,6,7,8,9,10,11,13,14,15)<br>  <br> | 3 |
| | | | |
| 7. | a) | Compare any two Switching techniques.<br>**Circuit Switching:** In the Circuit Switching technique, first, the complete end-to-end transmission path between the source and the destination computers is established and then the message is transmitted through the path. The main advantage of this technique is guaranteed delivery of the message. Mostly used for voice communication.<br>**Packet Switching:** In this switching technique fixed size of packet can be transmitted across the network. | 2 |
| | b) | Which of the following is not a Client Side script: 1 (i) VB Script (ii) Java Script (iii) ASP (iv) PHP<br>(iii) ASP and (iv) PHP are not client side scripts | 1 |
| | c) | If someone has hacked your Website, to whom you lodge the Complain?<br>cYBER cELL | 1 |
| | d) | Compare freeware and Shareware<br>Freeware, the name derived from words "free" and"software". It is a computer soft 1 ware that is available for use at no cost or for an optional fee. Freeware is generally proprietary software available at zero price, and is not free software. The author usually restricts one or more rights to copy, distribute, and make derivative works of the software. Shareware is usually offered as a trial version with certain features only available after the license is purchased, or as a full version, but for a trial period. Once the trial period has passed the program may stop running until a license is purchased. Shareware is often offered without support, updates, or help menus, which only become available with the purchase of a license. The words "free trial" or "trial version" are indicative of shareware. | 2 |
| | e) | Ravya Industries has set up its new center at Kaka Nagar for its office and web based activities. The company compound has 4 buildings as shown in the diagram below:<br>  <br> | 4 |

**Center to center distances between various buildings is as follows:**

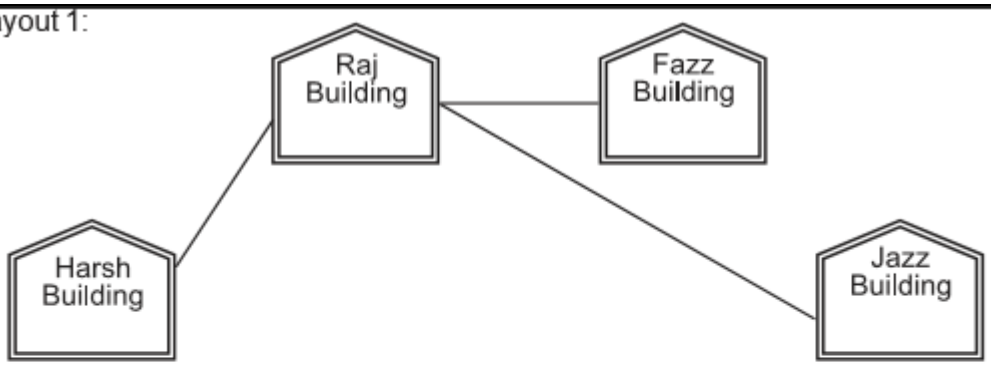
| | |
|---|---|
| Harsh Building to Raj Building | 50 m |
| Raz Building to Fazz Building | 60 m |
| Fazz Building to Jazz Building | 25 m |
| Jazz Building to Harsh Building | 170 m |
| Harsh Building to Fazz Building | 125 m |
| Raj Building to Jazz Building | 90 m |

**Number of Computers in each of the buildings is follows:**

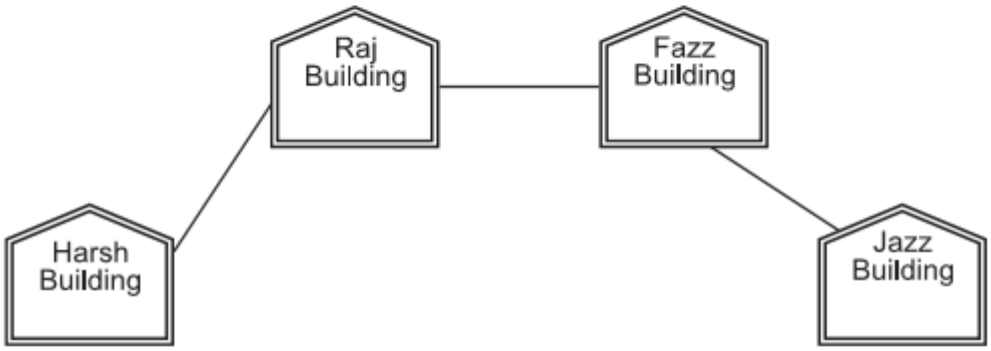
| | |
|---|---|
| Harsh Building | 15 |
| Raj Building | 150 |
| Fazz Building | 15 |
| Jazz Bulding | 25 |

Suggest a cable layout of connections between the buildings. e2) Suggest the most suitable place (i.e. building) to house the server of this organisation with a suitable reason. e3) Suggest the placement of the following devices with justification: (i) Internet Connecting Device/Modem (ii) Switch e4) The organisation is planning to link its sale counter situated in various parts of the same city, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

Layout 1:




Layout 2: Since the distance between Fazz Building and Jazz Building is quite short




*(1 Mark for any one of the two suggested layouts)*

The most suitable place / block to house the server of this organisation would be Raj Building, as this block contains the maximum number of computers, thus decreasing the cabling cost for most of the computers as well as increasing the efficiency of the maximum computers in the network.

*( 1 Mark for correct answer with suitable reason)*

(i) Raj Building

(ii) In both the layouts, a hub/switch each would be needed in all the buildings, to interconnect the group of cables from the different computers in each block

*( ½ Mark for each correct answer)*

The type of network that shall be formed to link the sale counters situated in various parts of the same city would be a MAN, because MAN (Metropolitan Area Networks) are the networks that link computer facilities within a city.