Sample Paper – 2014
Class – XII
Subject – COMPUTER SCIENCE

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

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

1(a) What is the difference between Type Casting and Automatic Type Conversion? Also, give a suitable C++ code to illustrate both. **2**

Ans:

Automatic Type Conversion	Type Casting
✓ It is an implicit process of conversion of a data from one type to another.	✓ It is an explicit process of conversion of a data from one type to another.

✓ **Example:**
`int N = 65;`
`char C = N; //`
`Automatic type conversion`
`cout<<C;`
 	
OUTPUT:
A
	✓ **Example:**
	`int A=1, B=2;`
	`float C = (float)A/B;`
	`//Type Casting cout<<C;`
	
	OUTPUT:
	0.5

(b) Write the names of the header files, which is/are essentially required to run/execute the following C++ code: **1**

```
void main()
{
  char CH,Text[]="+ve Attitude";
  for(int I=0;Text[I]!='\0';I++)
  if(Text[I]==' ')
      cout<<endl;
  else
  {
      CH=toupper(Text[I]);
      cout<<CH;
  }
}
```

Ans:
i. iostream.h
ii. ctype.h

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

```
include<iostream.h>
typedef char[80] String;
void main()
{
      String S="Peace";
      int L=strlen(S);
      cout<<S<<'has'<<L<<'characters'<<endl;
}
```

Ans:	`#include<iostream.h>`
	`#include<string.h>`
	`typedef char string[80];`
	`void main ( )`
	`{`
	`  string S= "Peace";`
	`  int L=strlen(S);`
	`  cout<<S<< "has" << L << "characters"<<endl;`	

	} 	

(d)	Find the output of the following program:
	`#include<iostream.h>`
	`void SwitchOver(int A[],int N,int Split)`
	`{`
	`  for(int K=0;K<N;K++)`
	`  if(K<Split)`
	`  A[K]+=K;`
	`  else`
	`  A[K]*=K;`
	`}`
	`void Display(int A[],int N)`
	`{`
	`  for(int K=0;K<N;K++)`
	`  (K%2==0)?cout<<A[K]<<"%":cout<<A[K]<<endl;`
	`}`
	`void main()`
	`{`
	`  int H[]={30,40,50,20,10,5};`
	`  SwitchOver(H,6,3);`
	`  Display(H,6);`
	`}`
		3

Ans:	30%41 52%60 40%25	

(e)	Find the output of the following program:
	`#include<iostream.h>`
	`void main()`
	`{`
	`  int *Queen,Moves[]={11,22,33,44};`
	`  Queen=Moves;`
	`  Moves[2]+=22;`
	`  cout<<"Queen @"<<*Queen<<endl;`
	`  *Queen-=11;`
	`  Queen+=2;`
	`  cout<<"Now @"<<*Queen<<endl;`
	`  Queen++;`
	`  cout<<"Finally @"<<*Queen<<endl;`
	`  cout<<"New origin @"<<Moves[0]<<endl;`
	`}`
		2

Ans:	Queen @11 Now @55 Finally @44 New origin @0	

(f)	Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output options(i) to (iv), Also write the minimum and maximum values, which can be assigned to the variable MyNum.
	`#include<iostream.h>`
	`#include<stdlib.h>`
	`void main()`
	`{`
	`randomize();`
	`int MyNum,Max=5;`
	`MyNum=20+random(Max);`
	`for (int N=MyNum;N<=25;N++)`
	`cout<<N<<"*";`
		2

	} (i) 20*21*22*23*24*25 (ii) 22*23*24*25 (iii) 23*24 (iv) 21*22*23*24*25	
Ans:	(i) 20*21*22*23*24*25 Least Value 20 Highest Value 25	
2(a)	Difference between Constructor and Destructor function with respect to Object Oriented Programming.	**2**

Ans:

Constructor	**Destructor**
Constructor is used to **initialize the instance of a class**.	Destructor **destroys the objects** when they are no longer needed.
Constructor is Called when new instance of a class is created.	Destructor is called when instance of a class is deleted or released.
Constructor **allocates the memory**.	Destructor **releases the memory**.
Constructors can have arguments.	Destructor cannot have any **arguments**.
Overloading of constructor is possible.	Overloading of Destructor is not possible.
Constructor has the same name as class name.	Destructor also has the same name as class name but with **(~) tiled operator**.

ClassName(Arguments)
{
//Body of Constructor
}
	~ ClassName()
	{
	}

(b)	Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the functions [I] to [IV].
	
	`#include<iostream.h>`
	`void Line()` `//Function[I]`
	`{`
	`  for(int L=1;L<=80;L++)`
	`  cout<<"-";`
	`  cout<<endl;`
	`}`
	`void Line(int N)` `//Function[II]`
	`{`
	`  for(int L=1;L<=N;L++)`
	`  cout<<"*";`
	`  cout<<endl;`
	`}`
	`void Print(char C,int N)` `//Function[III]`
	`{`
	`  for(int L=1;L<=N;L++)`
	`  cout<<"C";`
	`  cout<<endl;`
	`}`
	`void Print(int M,int N)` `//Function[IV]`
	`{`
	`  for(int L=1;L<=N;L++)`
		2

```
        cout<<endl;
}

void main()
{
      int A=9,B=4,C=3;
      char K='#';
      Line(K,B);
      Line(A,C);
}
```

(i) Function[I] will print a line of 80 dashes like this if it is corrected

---

Ans Function [II] will print 9 stars like this *********

Function [III] will not do anything because they are not called

Function [IV] will not do anything because they are not called

OR

(ii) Compilation Error as there is no overloaded functions for Line(K,B) and Line(A,C)

Features of OOP

Polymorphism

OR

Function Overloading

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

Private Members

- A data member ANo (Admission Number) of type long
- A data member Name of type string
- A data member Agg (Aggregate Marks) of type float
- A data member Grade of type char
- A member function GradeMe() to find the Grade as per the Aggregate Marks obtained by a student. Equivalent Aggregate Marks range and the respective Grades are shown as follows:

Aggregate Marks	**Grade**
>=80	A
Less than 80 and >=65	B
Less than 65 and >=50	C
Less than 50	D

Public Members

- A function ENETR() to allow user to enter values for ANo,Name,Agg & call function GradeMe() to find the Grade.
- A function RESULT() to allow user to view the content of all the data members.

Ans:

```
class Applicant
{
      long ANo;
      char Name[20],Grade;
      float Agg;
      void GradeMe();
   public:
      void ENETR();
      void RESULT();
};
void Applicant::ENETR()
{
      cin>>ANo;
```

```
      gets(Name);
      cin>>Agg;
      GradeMe();
}
void Applicant::GradeMe()
{
      if(Agg<50)
       Grade='D';
      else if(Agg>=50 && Agg<65)
       Grade='C';
      else if(Agg>=65 && Agg<80)
       Grade='B';
      else
       Grade='A';
}
void Applicant::RESULT()
{
   cout<<ANo<<'\t'<<Name<<'\t'<<Agg<<'\t'<<Grade<<endl;
}
```

(d)	Answer the questions (i) and (iv) based on the following:
	
	`class Student`
	`{`
	`  int Rollno;`
	`  char SName[20];`
	`  float Marks1;`
	`protected:`
	`  void Result();`
	`public:`
	`  Student();`
	`  void Enroll();`
	`  void Display();`
	`};`
	`class Teacher`
	`{`
	`  long TCode;`
	`  char TName[20];`
	`protected:`
	`  float Salary;`
	`public:`
	`  Teacher ();`
	`  void Enter();`
	`  void Show();`
	`};`
	`class Course:public Student,private Teacher`
	`{`
	`  long CCode[10]`
	`  char CourseName[50];`
	`  char StartDate[8],EndDate[8];`
	`public:`
	`  Course();`
	`  void Commence();`
	`  void CDetail();`
	`};`
		4

	(i) Write the names of member functions, which are accessible from objects of class Course. (ii) Write the names of all data members, which is/are accessible from member function Commence of class Course. (iii) Write the names of all the members, which are accessible from objects of class teacher. (iv) Which type of inheritance is illustrated in the above C++ code? fabulous	
Ans. **(i)**	Commence() CDetail() Enroll() Display()	
(ii)	Salary CCode CourseName StartDate EndDate	
(iii)	Enter() Show()	
(iv)	Multiple Inheritance	
3(a)	Write a Get2From2() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,…) of ALL[] and Even[] array should contain the values from even positions(0,2,4,…) of ALL[]. Example: If the ALL[] array contains 12,34,56,67,89,90 The ODD[] array should contain 34,67,90 And the EVEN[] array should contain 12,56,89	**3**

Ans:

```
#include<conio.h>
#include<iostream.h>
void Get1From2(int ALL[], int len)
{
   int *EVEN,*ODD,i;
   if(len%2==0)
   {
      EVEN=new int[len];
      ODD=new int[len];
   }
   else
   {
      EVEN=new int[(len/2)+1];
      ODD=new int[(len/2)];
   }
   for(int I=0;I<len; I++)
   {
     if (I%2==0)
     {
       EVEN[I]=ALL[I];
```

```
      }
      else
      {
        ODD[I]=ALL[I];
      }
   }
   cout<<"Even Array contains\n";
   for(i=0;i<len;i++)
   {
      if (i%2==0)
      {
       cout<<EVEN[i]<<", ";
      }
   }
   cout<<"\nOdd Array contains\n";
   for(i=0;i<len;i++)
   {
      if (i%2!=0)
      {
       cout<<ODD[i]<<", ";
      }
   }
}
void main()
{
      clrscr();
      int a[8]={12,34,56,67,89,90};
      int ALLlen=sizeof a/sizeof(int); // get the length of Array a
      clrscr();
      Get1From2(a,ALLlen);
      getch();
}
```

(b) An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes, find out the location of G[10][15], if G[0][0] is stored at 4200. **3**

Ans:

Given Data: G[15][20] W=8 B=? R=15 C=20 $L_r = 0$ $L_C = 0$

Address of G[10][15] = ?

Address of G[0][0] = 4200.

Address of an element (I,J) in row major = $B+W(C(I-L_r)+(J-L_C))$

Therefore, 4200 = B+8(20(0-0)+(0-0))

4200 = B+8(20*0+0)

4200 = B+8*0

4200 = B+8

B =4200-8

B=4192

Address of G[10][15] =4192+8(20*10+15)

=4192+8(215)

=4192+1720

=5192.

(c)	Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE.
	struct NODE
	{
	long Mno; //Member Number
	char Mname[20]; //Member Name
		4

	NODE*Link; };	

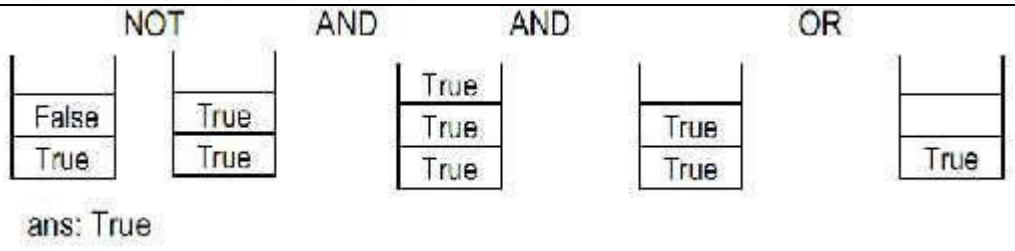
Ans:	struct NODE
	{
	long Mno; //Member Number
	char Mname[20]; //Member Name
	NODE *Link;
	};
	class Queue
	{
	NODE *Front, *Rear;
	public:
	Queue( ) {Front = NULL; Rear = NULL; }
	void DeleteQ() ;
	} ;
	void Queue::DeleteQ()
	{
	Node *temp;
	if(Front==NULL)
	cout<<"underflow";
	else
	{
	temp=Front;
	cout<<"\n the element deleted is \n"<<temp->Mname;
	if(Front==Rear)
	Front=Rear=NULL;
	else
	Front=Front->Link;
	delete temp;
	}
	}	

(d)	Write a DSUM() function in C++ to find sum of Diagonal Elements from a N×N Matrix. (Assuming that the N is a odd number)	**2**

Ans:

```
#include<conio.h>
#include<iostream.h>
int sum1,sum2;
void accept(int a[3][3],int size)
{
    cout<<"Diagonal One:";
    for (int i=0;i<size;i++)
        for(int j=0;j<size;j++)
          if (i==j)
          {
               sum1+=a[i][j];
          }
          cout<<"\n Sum of the Diagonal one is "<<sum1;
    cout<<"\n Diagonal Two:";
    for (i=0;i<size;i++)
       for(j=0;j<size;j++)
            if((i+j)==(size-1))
            {
                sum2+=a[i][j];
             }
             cout<<"\n Sum of the Diagonal two is "<<sum2;
}
void main()
```

	{
	int a[3][3]={{5,4,3},{6,7,8},{1,2,9}};
	clrscr();
	accept(a,3);
	getch();
	}	

(e)	Evaluate the following postfix notation of expression: True,False,NOT,AND,True,True,AND,OR	**2**
Ans:		

4(a)	Observe the program segment given below carefully and fill the blanks marked as statement 1 and statement 2 using seekg(), seekp(), tellp(), and tellg() functions for performing the required task.
	
	#include<fstream.h>
	class ITEM
	{
	int Ino;
	char Iname[20];
	float price;
	public:
	void ModifyPrice(); //the function is to modify price of a particular ITEM
	};
	void Item::ModifyPrice()
	{
	fstream File;
	File.open("ITEM.DAT",ios::binary|ios::in|ios::out);
	int CIno;
	cout<<"Item no to modify price:";
	cin>>CIno;
	while(File.read((char*)this,sizeof(ITEM)))
	{
	if(CIno==Ino)
	{
	cout<<"present Price:"<<price<<endl;
	cout<<"changed Price:";
	cin>>Price;
	int Filepos=_____; //statement 1
	_____; //statement 2
	File.write((char*)this,sizeof(ITEM)); //Re-writing the record
	}
	}
	File.close();
	}
		1

Ans:	Statement 1: File.tellg() ; OR File.tellp(); Statement 2: File.seekp(Filepos – sizeof(ITEM)); OR File.seekg(Filepos – sizeof(ITEM));	

(b)	Write a function in C++ to count the no of "He" or "She" words present in a text file "STORY.TXT". **If the file "STORY.TXT" content is as follows:** He is playing in the ground. She is playing with her dolls.	**2**

	The output of the function should be count of He/She in file.	

Ans:	`#include<conio.h>`
	`#include<fstream.h>`
	`#include <string.h>`
	`void countWORD( )`
	`{`
	`  char ch;`
	`  int count=0;`
	`  ifstream fis;`
	`  fis.open("STORY.txt");`
	`  char WORD[10];`
	`  while(!fis.eof ( ))`
	`  {`
	`  fis>>WORD;`
	`  if(strcmp(WORD,"He")==0||strcmp(WORD,"She")==0)`
	`  count++;`
	`  }`
	`  cout<<"Count of He/She in Story.txt : "<<count<<endl;`
	`  fis.close();`
	`}`
	`void main()`
	`{`
	`  clrscr();`
	`  countWORD();`
	`  getch();`
	`}`	

(c)	Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class CAMERA (as defined below). The user should enter the Model No and the function should search and display the details of the CAMERA.
	
	`class CAMERA`
	`{`
	`  long ModelNo;`
	`  float MegaPixel;`
	`  int Zoom;`
	`  char Details[120];`
	`public:`
	`  void Enter()`
	`  {`
	`  cin>>Modelno>>MegaPixel>>Zoom;`
	`  gets(Details);`
	`  }`
	`  void Display()`
	`  {`
	`  cout<<ModelNo<<RAM<< MegaPixel<<Zoom<<Details<<endl;`
	`  }`
	`  long GetModelNo()`
	`  {`
	`  return ModelNo;`
	`  }`
	`};`
		3

Ans:	void FindCam { CAMERA C; long modelnum;	

```
    cin>>modelnum;
    ifstream fis;
    fis.open ("CAMERA.DAT", ios: :binary | ios: :in);
    while(fis.read ((char*) &C,sizeof(C)))
    {
        if(C.GetModelNo( ) == modelnum)
              C.Display ( ) ;
    }
    fis.close() ;
};
```

5(a) What do you understand by Selection & Projection operation in relational algebra? **2**

Ans: The selection or σ operation selects rows from a table that satisfy a **condition**:

$$\sigma_{\text{< condition >}}\text{ < tablename >}$$

The projection or π operation selects a list of columns from a table.

$$\pi_{\text{< column list >}}\text{ < tablename >}$$

Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question:

Table : EMPLOYEE

Table : SALGRADE

SGARDE	SALARY	HRA
S01	56000	18000
S02	32000	12000
S03	24000	8000

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

(i) To display the details of all EMPLOYEEs in descending order of DOJ.

(ii) To display NAME and DESIGN of those EMPLOYEEs, whose SALGRADE is either S02 or S03?

(iii) To display the content of all the EMPLOYEEs table, whose DOJ is in between '09-Feb-2006' and '08-Aug-2009'.

(iv) To add a new row with the following:
109,'Harish Roy,'HEAD-IT','S02','9-Sep-2007','21-Apr-1983'

```
(i)    SELECT * FROM employee ORDER BY doj DESC;
(ii)   SELECT name,design FROM employee WHERE sgrade=S02 OR sgrade=S03;
(iii)  SELECT * FROM empoyee WHERE doj BETWEEN '09-Feb-2006' AND '08-Aug-
       2009';
(iv)   109, 'Harish Roy', 'HEAD-IT', 'S02', '9-Sep-2007', '21-Apr-1983';
```

(c) Give the output of the following SQL queries: **2**

(i) SELSECT COUNT(SGRADE),SGRADE FOM EMPLOYEE GROUP BY SGRADE;

(ii) SELECT MIN(DOB),MAX(DOJ) FROM EMPLOYEE;

(iii) SELECT Name, SALARY FROM EMPLOYEE E, SALGRADE S WHERE E.SGRADE=S.SGRADE AND E.ECODE<103;

(iv) SELECT SGRADE, SALARY+HRA FROM SALGRADE WHERE SGRADE ='S02';

Ans. (i)

COUNT(SGRADE)	SGRADE
2	S03
2	S02
1	S01

(ii)

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmad	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Ravi Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-Jun-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

MAX (DOB)	MIN (DOJ)
22-Jul-1987	23-Mar-2003

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(iii)

Name	Salary
Abdul Ahmad	24000
Ravi Chander	32000

(iv)

SGRADE	SALARY+HRA
P003	440000

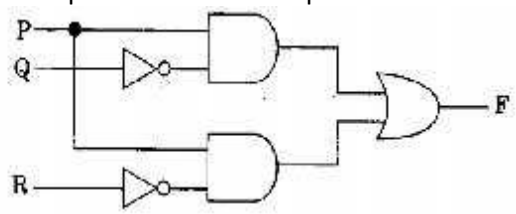
6(a) Verify the following using Truth Table: **2**

X+Y.Z=(X+Y).(X+Z)

Ans:

X	Y	Z	Y.Z	X+YZ	(X+Y)	(X+Z)	(X+Y)(X+Z)
0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	0
0	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1
1	0	1	0	1	1	1	1
1	1	0	0	1	1	1	1
1	1	1	1	1	1	1	1

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



Ans: $P\overline{Q} + P\overline{R}$

(c) Write the SOP from 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	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Ans: F=U'V'W'+U'VW+UVW'+UVW

(d) Reduce the following Boolean Expression using K-Map: **3**

F(A,B,C,D)=∑(0,1,2,4,5,6,8,10)

Ans.

	C'D'	C'D	CD	CD'
A'B'	1	1		1
A'B	1	1		1
AB				
AB'	1			1

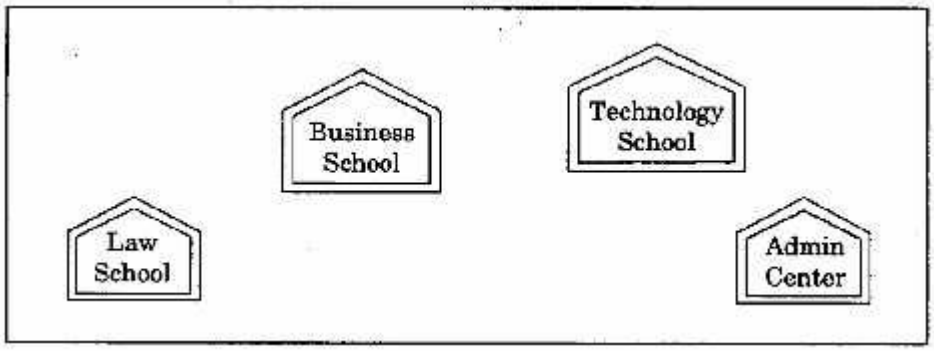
$F(A,B,C,D) = \overline{AC} + \overline{BD} + \overline{ACD}$

7(a)	In networking, what is WAN? How is it different from LAN?	**1**
Ans:	WAN: (Wide Area Network) Internet is an example of WAN. Most WANs exist to connect LANs that are not in the same geographical area. WAN is different from LAN due to its network range WAN is for connecting computers anywhere in the world without any geographical limitation where as LAN is confined within a range of 100m to 500m.	
(b)	Difference between XML and HTML.	**1**

Ans:

XML	HTML
Defines, stores and retrieves the data	Defines how webpage is displayed
XML tags are not predefined	HTML tags are predefined
New tags can be created as per need	New tags cannot be defined
XML tags must have a closing tag.	HTML tags may not have closing tag
XML tags are case-sensitive.	HTML tags are not case-sensitive.

(c)	What is WEB2.0?	**1**
Ans:	Web 2.0 is a concept that takes the network as a platform for information sharing, interoperability, user-centered design, and collaboration on the Internet or World Wide Web. A Web 2.0 site allows users to interact and collaborate with each other. Examples of Web 2.0 include social networking sites, facebook,google+,twitter etc.	
(d)	Out of the following, identify client side script(s) and server side script(s). (i) javascript (ii) ASP (iii) vbscript (iv) JSP	**1**
Ans:	Client Side Script • javascript • vbscript Server Side Script • ASP • JSP	
(e)	Great Studies University is setting up its Academic schools at sunder Nagar and planning to set up a network. The university has 3 academic schools and one administration center as shown in the diagram below:	**4**



Center to center distance between various buildings is as follows:

Number of computers in each of the schools/Center is follows:

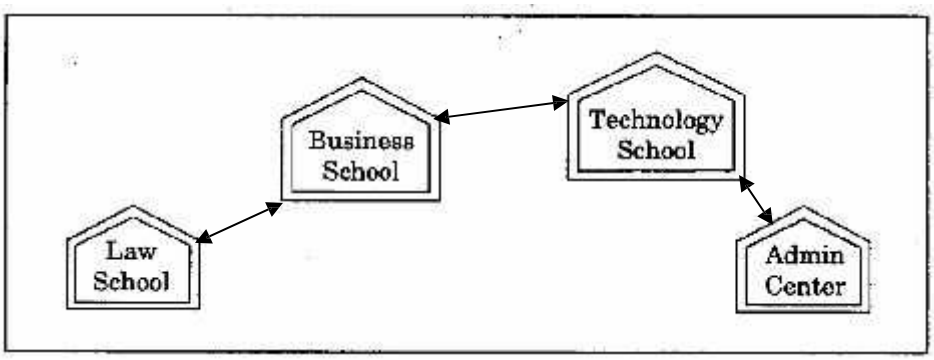
(i) Suggest the most suitable place (i.e. Schools/Center) to install the server of this university with a suitable reason.
(ii) Suggest an ideal layout for connecting these schools/center for a wired connectivity.
(iii) Which device will you suggest to be placed/install in each of these schools/center to efficiently connect all the computers within these school/center?
(iv) The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

(e1) Ans.	Admin Center because Admin Center have maximum number of computers or Business School because closest to all other Centers (minimum cable length required)	
(e2) Ans.	Suggested Layou	
(e3) Ans.	Switch	
(e4) Ans.	WAN is preferred network for this purpose because 350 KM is more than the range of LAN and MAN.	

(f)	Compare open source software and Proprietary software.	**1**
Ans.	**Open source software** is the software which can be used, studied, modified and redistributed and	

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to Admin Center	45m
Technology School to Admin Center	25m

Law School	25
Technology School	50
Admin Center	125
Business School	35



	whose source code is available. It may or may not be chargeable. **Proprietary software** is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret.	
(g)	What are cookies?	**1**
Ans.	Cookies are small files created on client computers when these systems browse certain websites.	

Sachin Kumar Mishra

RED School Jhajjar
HOD Computer Science
sachin_7nov@rediffmail.com