COMPUTER SCIENCE (Theory) - Class XII

Sample Question Paper–I

Subject Code - 083

TIME : 3 Hrs **MM : 70**

No.	Questions	Marks
1.		
(a)	**What is the difference between Global Variable and Local Variable? 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:**
	void main()
	{
	char Msg[ ]="Sunset Gardens";
	for (int I=5;I<strlen(Msg);I++)
	puts(Msg);
	}
		1

(c)	**Rewrite the following program after removing the syntactical errors (if any). Underline each correction.**
	#include [iostream.h]
	class MEMBER
	{
	int Mno;float Fees;
	PUBLIC:
	void Register(){cin>>Mno>>Fees;}
	void Display{cout<<Mno<<" : "<<Fees<<endl;}
	};
	void main()
	{
	MEMBER M;
	Register();
	M.Display();
	}
		2

No.	Questions	Marks

(d)	**Find the output of the following program:**
	#include <iostream.h>
	struct GAME
	{ int Score, Bonus;};
	void Play(GAME &g, int N=10)
	{
	g.Score++;g.Bonus+=N;
	}
	void main()
	{
	GAME G={110,50};
	Play(G,10);
	cout<<G.Score<<":"<<G.Bonus<<endl;
	Play(G);
	cout<<G.Score<<":"<<G.Bonus<<endl;
	Play(G,15);
	cout<<G.Score<<":"<<G.Bonus<<endl;
	}
		3

(e)	**Find the output of the following program:**
	#include <iostream.h>
	void Secret(char Str[ ])
	{
	for (int L=0;Str[L]!='\0';L++);
	for (int C=0;C<L/2;C++)
	if (Str[C]=='A' || Str[C]=='E')
	Str[C]='#';
	else
	{
	char Temp=Str[C];
		2

No.	Questions	Marks

	Str[C]=Str[L-C-1];
	Str[L-C-1]=Temp;
	}
	}
	void main()
	{
	char Message[ ]="ArabSagar";
	Secret(Message);
	cout<<Message<<endl;
	}	

(f)	**In the following program, if the value of Guess entered by the user is 65, what will be the expected output(s) from the following options (i), (ii), (iii) and (iv)?**
	#include <iostream.h>
	#include <stdlib.h>
	void main()
	{
	int Guess;
	randomize();
	cin>>Guess;
	for (int I=1;I<=4;I++)
	{
	New=Guess+random(I);
	cout<<(char)New;
	}
	}
	(i) ABBC
	(ii) ACBA
	(iii) BCDA
	(iv) CABD
		2

No.	Questions	Marks
2.		
(a)	**What do you understand by Data Encapsulation and Data Hiding? Also, give a suitable C++ code to illustrate both.**	2
(b)	**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"<<end1;
}
void Lecture()                              //Function 2
{
cout<<"Lectures in the seminar on"<<end1;
}
Seminar(int Duration)                       //Function 3
{
Time=Duration;cout<<"Seminar starts now"<<end1;
}
~Seminar()
                                            //Function 4
{
cout<<"Vote of thanks"<<end1;
}
};
```

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.

No.	Questions	Marks
(c)	**Define a class TEST in C++ with following description:** **Private Members** • TestCode of type integer • Description of type string • NoCandidate of type integer • CenterReqd (number of centers required) of type integer • 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	4

(d)	**Answer the questions (i) to (iv) based on the following:**
	class PUBLISHER
	{
	char Pub[12];
	double Turnover;
	protected:
	void Register();
	public:
	PUBLISHER();
	void Enter();
	void Display();
	};
	class BRANCH
	{
	char CITY[20];
	protected:
	float Employees;
		4

No.		Questions	Marks

		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 and B are sorted in ascending order and the resultant array C is also required to be in ascending order.	3
	(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 the Base Address of the array is 5000.	3
	(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 ele-	2

No.	Questions	Marks
	ments from a two dimensional array (matrix).	
	(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);
```

No.	Questions	Marks

	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.**
	class
	{
	int Bno;
	char Title[20];
	public:
	int RBno(){return Bno;}
	void Enter(){cin>>Bno;gets(Title);}
	void Display(){cout<<Bno<<Title<<endl;}
	};
		3

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

Consider the following tables ACTIVITY and COACH and answer (b) and (c) parts of this question:

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

No.	Questions	Marks

Table: COACH

PCode	Name	Acode	
1	Ahmad Hussain	1001	
2	Ravinder	1008	
3	Janila	1001	
4	Naaz	1003	

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

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

(ii) To display sum of PrizeMoney for the Activities played in each of the Stadium separately.

(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 Activity table whose ScheduleDate earlier than 01/01/2004 in ascending order of ParticipantsNum.

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

(i) SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;

(ii) SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM ACTIVITY;

(iii) SELECT Name,ActivityName FROM ACTIVITY A,COACH C

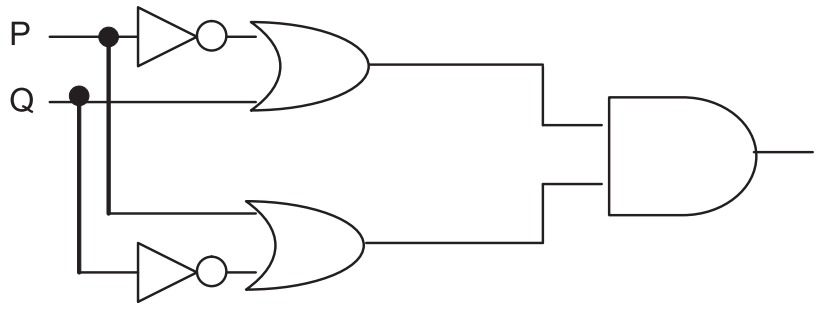
WHERE A.Acode=C.Acode AND A.ParticipantsNum=10;

(iv) SELECT DISTINCT Acode FROM COACH;

6.

(a) State and verify Demorgan's Laws algebraically. 2

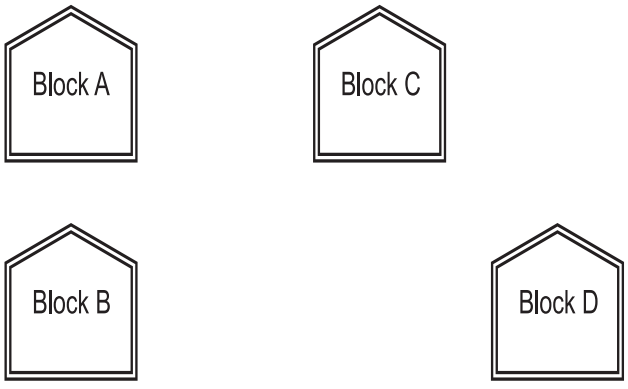
(b) Write the equivalent Boolean Expression for the following Logic Circuit 2



No.	Questions	Marks
(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:** F(A,B,C,D)= (0,1,2,4,5,6,8,10)	3
7.		
a)	**Compare any two Switching techniques.**	1
b)	**Which of the following is not a Client Side script:** (i) VB Script (ii) Java Script (iii) ASP (iv) PHP	1
c)	**If someone has hacked your Website, to whom you lodge the Complain?**	1
d)	**What do you mean by IP Address? How is it useful in Computer Security?**	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:**	4



No.	Questions	Marks
	Center to center distances between various blocks	

Black 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

Black A	25
Block B	50
Block C	125
Block D	10

e1)	Suggest a cable layout of connections between the blocks.	
e2)	Suggest the most suitable place (i.e. block) to house the server of this organisation with a suitable reason.	
e3)	Suggest the placement of the following devices with justification	
	(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?	
f)	What do you mean by Spam Mails? How can you protect your mailbox from Spams?	1
g)	Mention any two advantages of Open Source Software over Proprietary Software.	1

COMPUTER SCIENCE (Theory) - Class XII

Marking Scheme

Sample Question Paper–I

Subject Code - 083

TIME : 3 Hrs **MM : 100**

<table>
<tr><th>No.</th><th>Answers</th><th>Marks</th></tr>
<tr><td>1.
(a)</td><td>
<table>
<tr><td>Global Variable</td><td>Local Variable</td></tr>
<tr><td>• It is a variable which is declared outside all the functions
• It is accessible throughout the program</td><td>• It is a variable which is declared with in a function or with in a compound statement
• It is accessible only within a function/ compound statement in which it is declared</td></tr>
</table>
<pre>
#include <iostream.h>
float NUM=900;   //NUM is a global variable
void LOCAL(int T)
{
int Total=0;   //Total is a local variable
for (int I=0;I<T;I++)
Total+=I;
cout<<NUM+Total;
}
void main()
{
LOCAL(45);
}
</pre>
(1 Mark for two differences)
</td><td>2</td></tr>
</table>

No.	Answers	Marks
	(1 Mark for the suitable example) OR (Full 2 Mark for explanation of differences with the help of an example) OR *(1 Mark for only example with no explanation)*	
(b)	(i) string.h (ii) stdio.h *(½ Mark for mentioning each correct header filename)*	1

(c)	#include <iostream.h>
	class MEMBER
	{
	int Mno;float Fees;
	public:
	void Register(){cin>>Mno>>Fees;}
	void Display(){cout<<Mno<<":"<<Fees<<endl;}
	};
	void main()
	{
	MEMBER M;
	M.Register();
	M.Display();
	}
	(½ Mark each correction)
		2

(d)	111:60 112:70 113:85 *(1 Mark for each correct line of output)*	3

No.	Answers	Marks
(e)	#agaSbarr *(2 Marks for correct line of output)*	2
(f)	(i) ABBC *(2 Marks for mentioning correct option)*	2
2.		

(a)	Data Encapsulation: Wrapping up of data and functions together in a single unit is known as Data Encapsulation. In a class, we wrap up the data and functions together in a single unit.
	Data Hiding: Keeping the data in private visibility mode of the class to prevent it from accidental change is known as Data Hiding.
	class Computer
	{
	char CPU[10];int RAM; (Data Hiding)
	public: (Data Encapsulation)
	void STOCK();
	void SHOW();
	};
	(½ Mark each for appropriate definitions)
	(1 Mark for appropriate example showing both)
		2

(b)	i) Destructor, it is invoked as soon as the scope of the object gets over.
	(½ Mark for mentioning destructor)
	(½ Mark for remaining answer)
	ii) Constructor Overloading (or Function Overloading or Polymorphism)
	Seminar S1; //Function 1
	Seminar S2(90); //Function 3
	(½ Mark for mentioning the correct concept)
	(½ Mark for the example)
		2

No.	Answers	Marks

(c)	class TEST
	{
	int TestCode;
	char Description[20];
	int NoCandidate,CenterReqd;
	void CALCNTR();
	public:
	void SCHEDULE();
	void DISPTEST();
	};
	void TEST::CALCNTR()
	{
	CenterReqd=NoCandidate/100 + 1;
	}
	void TEST::SCHEDULE()
	{
	cout<<"Test Code :";cin>>TestCode;
	cout<<"Description :";gets(Description);
	cout<<"Number :";cin>>NoCandidate;
	CALCNTR();
	}
	void TEST::DISPTEST()
	{
	cout<<"Test Code :"<<TestCode<<endl;
	cout<<"Description :"<<Description<<endl;
	cout<<"Number :"<<NoCandidate<<endl;;
	cout<<"Centres :"<<CenterReqd<<endl;;
	}
	(½ Mark for correct syntax for class header)
	(½ Mark for correct declarations of data members)
	(1 Mark for appropriate definition of function CALCNTR())
	(1 Mark for appropriate definition of SCHEDULE() with a call for CALCNTR())
	(1 Mark for appropriate definition of DISPTEST())
		4

(d)	**(i)** None of data members are accessible from objects belonging to class AUTHOR.	4

No.		Answers	Marks
		(1 Mark for correct answer)	
	(ii)	Haveit(), Giveit() *(1 Mark for correct answer)*	
	(iii)	Data members: Employees, Acode, Aname, Amount Member function: Register(), Enter(), Display(), Haveit(), Giveit(), Start(), Show(), *(1 Mark for correct answer)*	
	(iv)	70 *(1 Mark for correct answer)*	

3.	**(a)**	void AddNSave(int A[ ],int B[ ],int C[ ],int N,int M, int &K)
		{
		int I=0,J=0;
		K=0;
		while (I<N && J<M)
		if (A[I]<B[J])
		C[K++]=A[I++];
		else
		if (A[I]>B[J])
		C[K++]=B[J++];
		else
		{
		C[K++]=A[I++];
		J++;
		}
		for (;I<N;I++)
		C[K++]=A[I];
		for (;J<M;J++)
		C[K++]=B[J];
		}
		(½ Mark for correct Function Header)
		(½ Mark for correct initialization of required variables)
		(½ Mark for correct formation of loop)
		(½ Mark for appropriate conditions and assignments in the loop)
		(½ Mark for appropriately transferring the remaining elements from first array)
		(½ Mark for appropriately transferring the remaining elements from second array)
			3

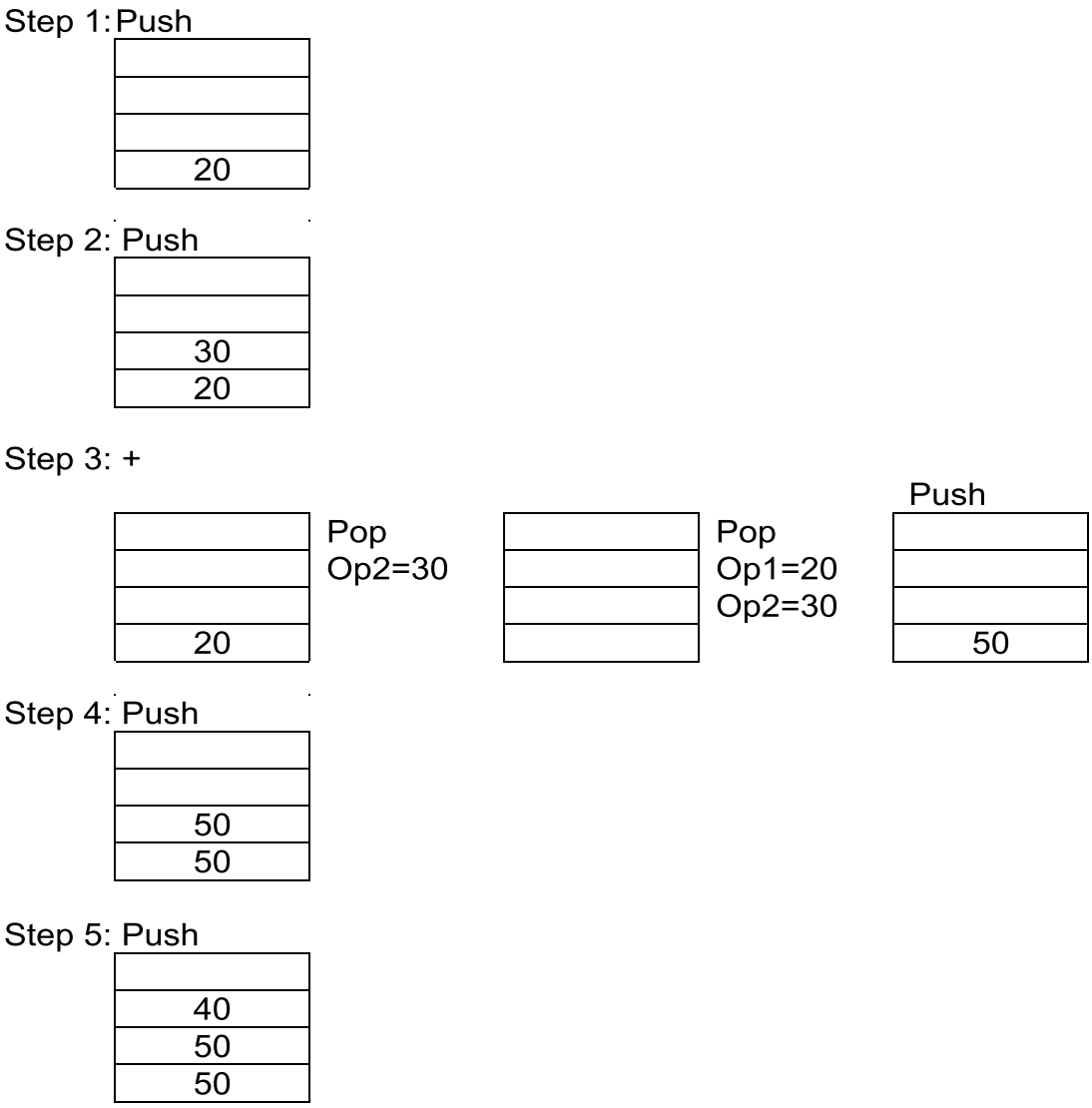
No.	Answers	Marks
(b)	Given, W=2 N=40 M=30 Base(S)=5000 Row Major Formula: Loc(S[I][J]) =Base(S)+W*(M*I+J) Loc(S[20][10]) =5000+2*(30*20+10) =5000+2*(600+10) =5000+1220 =6220 *(1 Mark for writing correct formula (for column major) OR substituting formula with correct values)* *(1 Mark for writing calculation step - at least one step)* *(1 Mark for correct address)*	3

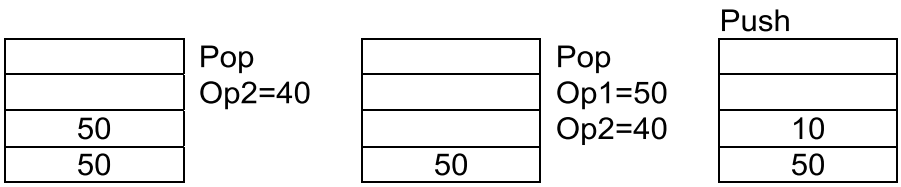
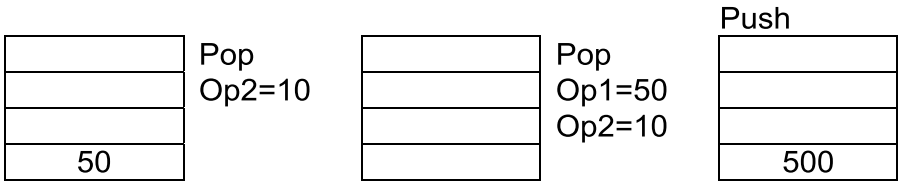
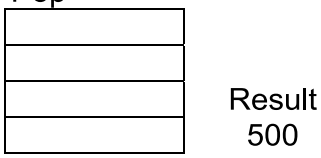
(c)	struct NODE
	{
	char Name[20];
	NODE *Link;
	};
	class QUEUE
	{ NODE *R,*F;
	public:
	QUEUE();
	void Insert();
	void Delete();
	};
	void QUEUE::Insert()
	{
		4

No.	Answers	Marks

	NODE *Temp;
	Temp=new NODE;
	gets(Temp->Name);
	Temp->Link=NULL;
	if (Rear==NULL)
	{
	Rear=Temp;
	Front=Temp;
	}
	else
	{
	Rear->Link=Temp;
	Rear=Temp;
	}
	}
	(1 Mark for creating a new node and assigning/entering appropriate values in it)
	(1 Mark for checking if Queue is Empty)
	(1 Mark for assigning Rear and Front as Temp - if Queue is Empty)
	(1 Mark for eassigning Rear->Link as Front and Rear as Temp)	

(d)	void DiagSum(int M[][4],int N,int M)
	{
	int SumD1=0,SumD2=0;
	for (int I=0;I<N;I++)
	{
	SumD1+=M[I][I];SumD2+=M[N-I-1][I];
	}
	cout<<"Sum of Diagonal 1:"<<SumD1<<endl;
	cout<<"Sum of Diagonal 2:"<<SumD2<<endl;
		2

No.	Answers	Marks
(e)	} *(½ Mark for correct function header)* *(½ Mark for initialization of SumD1 and SumD2 as 0)* *(½ Mark for appropriate loop)* *(½ Mark for correct expression for adding each diagonal elements)* 	2

No.	Answers	Marks
	Step 6: -  Step 7: *  Step 8: Pop  *(½ Mark for correctly evaluating each operator)* *(½ Mark for the correct result)*	

4.	a)
	File.seekg(RecNo*sizeof(Item)); //Statement 1
	File.seekp(RecNo*sizeof(Item)); //Statement 2
	(½ Mark for each correct Statement)
		1

	(b)
	void CountLine()
	{
	ifstream FIL("STORY.TXT");
	int LINES=0;
	char STR[80];
		2

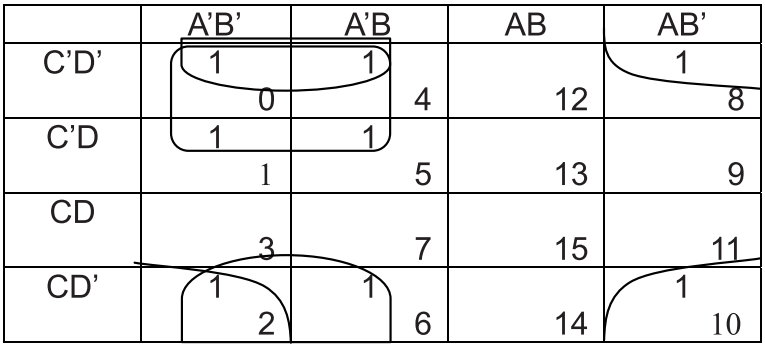
No.	Answers	Marks

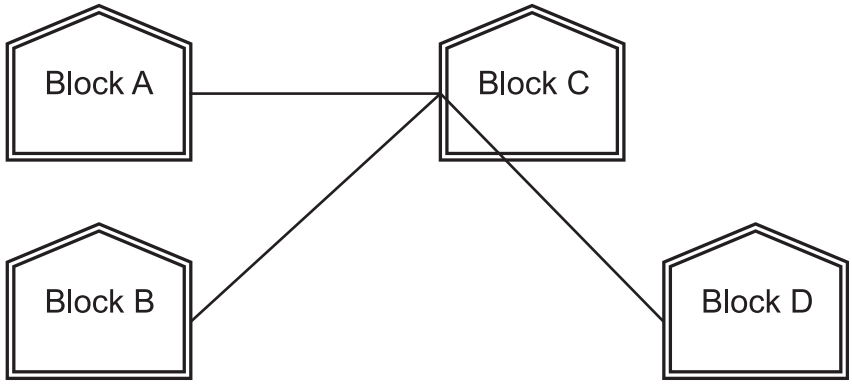
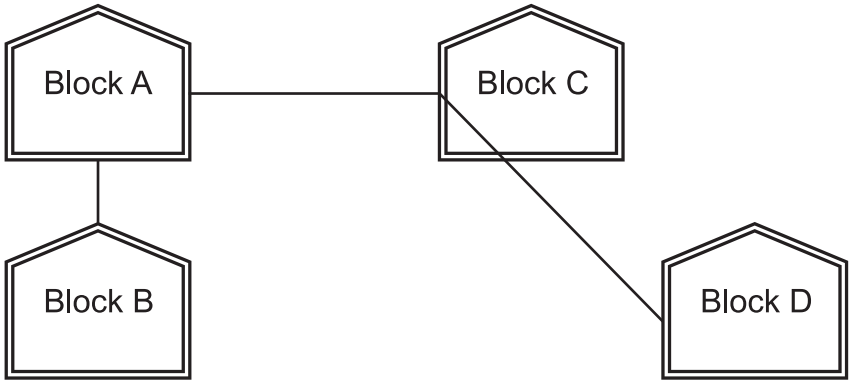
	while (FIL.getline(STR,80))
	LINES++;
	cout<<"No. of Lines:"<<LINES<<endl;
	f.close();
	}
	(½ Mark for opening STORY.TXT correctly)
	(½ Mark for initializing a counter variable as 0)
	(½ Mark for correctly reading a line from the file)
	(½ Mark for correctly incrementing the counter)	

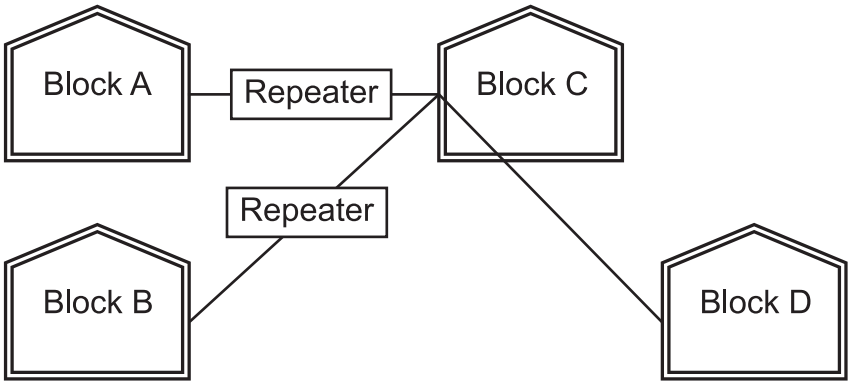
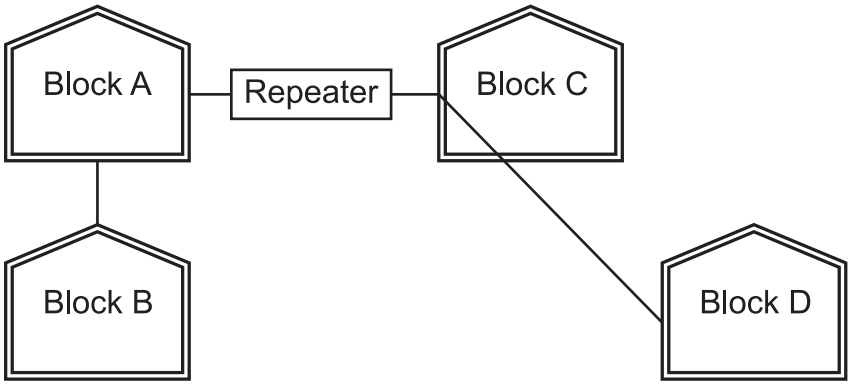
	(c) void BookSearch()
	{
	fstream FIL;
	FIL.open("BOOK.DAT",ios::binary|ios::in);
	BOOK B;
	int bn,Found=0;
	cout<<"Enter Book No. to search…"; cin>>bn;
	while (FIL.read((char*)&S,sizeof(S)))
	if (FIL.RBno()==bn)
	{
	S.Display();
	Found++;
	}
	if (Found==0) cout<<"Sorry! Book not found!!!"<<endl;
	FIL.close();
	}
	(½ Mark for opening BOOK.DAT correctly)
	(½ Mark for reading each record from BOOK.DAT)
	(½ Mark for correct loop / checking end of file)
	(1 Mark for comparing Book number)
	(½ Mark for displaying the matching record)
		3

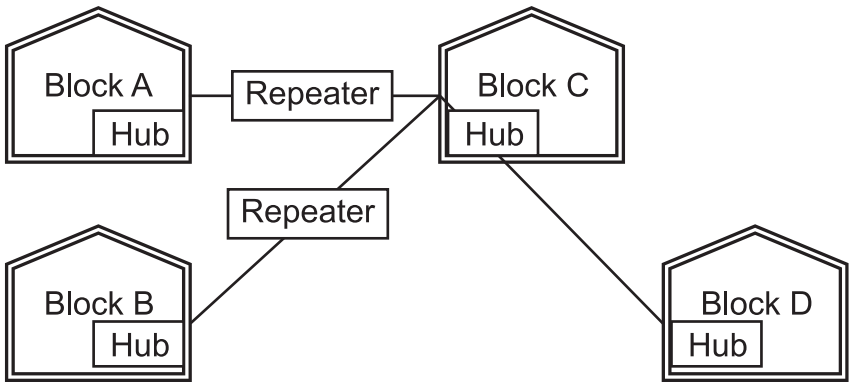
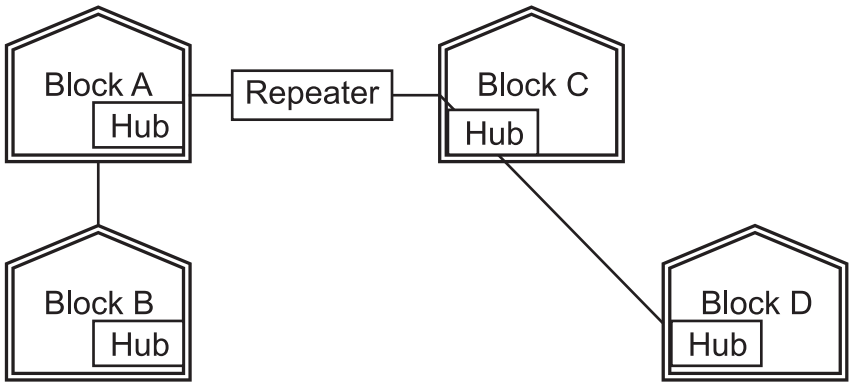
No.	Answers	Marks
5.		
(a)	Degree: Number of Columns in a table Cardinality: Number of rows in a table *(1 Mark for each definition)*	2
(b)	(i) SELECT Acodes, ActivityName FROM ACTIVITY ORDER BY Acode DESC; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)*	4
	(ii) SELECT SUM(PrizeMoney), Stadium FROM ACTIVITY GROUP BY Stadium; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)*	
	(iii) SELECT Name, Acode FROM COACH ORDER BY Acode; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)*	
	(v) SELECT * FROM ACTIVITY WHERE SchduleDate<'01-Jan-2004' ORDER BY ParticipantsNum; *1 Mark for correct query)* OR *(½ Mark for partially correct answer)*	
(c)		2
	(i) 3 *(½ Mark for correct output)*	
	(ii) 19-Mar-2004 12-Dec-2003 *(½ Mark for correct output)*	

No.	Answers	Marks
	(iii) Ravinder Discuss Throw *(½ Mark for correct output)* (iv) 1001 1003 1008 *(½ Mark for correct output)*	
6.	(X+Y)' = X'.Y' Verification (X+Y)'.(X+Y) = X'.Y'.(X+Y) 0 = X'.Y'.X + X'.Y'.Y 0 = X'.X .Y'+ X'.0 0 = 0 .Y'+ 0 0 = 0 + 0 0 = 0 L.H.S = R.H.S *(1 Mark for stating any one of the Demorgan's Law)* *(1 Mark for verifying the law)*	2
(b)	F(P,Q)=(P'+Q).(P+Q') *(2 Marks for the final expression)* OR *(1 Mark for any one of the correct terms out of P'+Q or P+Q')*	**2**
(c)	F(U,V,W) = (U+V+W').(U+V'+W').(U'+V+W') *(1 Mark for the correct expression)*	1

No.	Answers	Marks
(d)		3
	F(A,B,C,D)=A'C'+A'D'+B'D'	
	(½ Mark for placing all 1s at correct positions in K-Map) *(½ Mark for each grouping)* *(1 Mark for writing final expression in reduced/minimal form)* **Note:** Deduct ½ mark if wrong variable names are used	
7.		
a)	Appropriate comparison between any two out of Circuit Switching, Message Switching, Packet Switching (1 Mark for writing Appropriate comparison between any two switching technique)	1
b)	(iii) ASP and (iv) PHP are not client side scripts (1 Mark for correct answer)	1
c)	The complaint has to be lodged with the Police under IT Act (1 Mark for correct answer)	1
d)	An Internet Protocol (IP) address is a numerical identification and logical address that is assigned to devices connected in a computer network. An IP Address is used to uniquely identify devices on the Internet and so one can quickly know the location of the system in the network. *(½ Mark for meaning of IP Address)* *(½ Mark for mentioning the usefulness in network security)*	1

No.	Answers	Marks
e)	**e1)** (Any of the following option) Layout Option 1:  Layout Option 2: Since the distance between Block A and Block B is quite short  *(1 Mark for showing any of the above suitable cable layout)* **e2)** The most suitable place / block to house the server of this organisation would be Block C, 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. *(½ Mark for suggesting suitable place and ½ for appropriate reason)*	4

No.	Answers	Marks
e3)	(i) For Layout 1, since the cabling distance between Blocks A and C, and that between B and C are quite large, so a repeater each, would ideally be needed along their path to avoid loss of signals during the course of data flow in these routes.  For layout 2, since the distance between Blocks A and C is large so a repeater would ideally be placed in between this path  *(½ Mark for suggesting suitable place for connecting repeater)*	

No.	Answers	Marks
	(ii) In both the layouts, a hub/switch each would be needed in all the blocks, to interconnect the group of cables from the different computers in each block Layout 1  Layout 2  *(½ Mark for suggesting suitable place for connecting hub)*	
e4)	The most economic way to connect it with a reasonable high speed would be to use radio wave transmission, as they are easy to install, can travel long distances, and penetrate buildings easily, so they are widely used for communication, both indoors and outdoors. Radio waves also have the advantage of being omni directional, which is they can travel in all the directions from the source, so that the transmitter and receiver do not have to be carefully aligned physically. *(1 Mark for appropriate answer)*	
f)	Spam mails, also known as junk e-mail, is a subset of spam that involves nearly identical messages sent to numerous recipients by e-mail. We can protect our mailbox from spams by creating appropriate filters. *(½ Mark for the definition of Spam Mails)* *(½ Mark for the appropriate suggestion for protecting mailbox from it)*	1

No.	Answers	Marks
g)	Open Source's proponents often claim that it offers significant benefits when compared to typical Proprietary Software. Proprietary Software typically favour visible features (giving marketing advantage) over harder-to measure qualities such as stability, security and similar less glamorous attributes. Open Source Software developers are evidently motivated by many factors but favouring features over quality is not noticeable amongst them. For many developers, peer review and acclaim is important, so it's likely that they will prefer to build software that is admired by their peers. Highly prized factors are clean design, reliability and maintainability, with adherence to standards and shared community values preeminent. *(1 Mark for appropriate answer)*	1

COMPUTER SCIENCE (Theory) - Class XII

Sample Question Paper–II

Subject Code - 083

TIME : 3 Hrs **MM : 70**

No.	Questions	Marks
1.		
(a)	**What is the difference between Actual Parameter and Formal Parameters? Also, give a suitable C++ code to illustrate both**	2
(b)	**Write the names of the header files to which the following belong:** (i) frexp() (ii) isalnum()	1

(c)	**Rewrite the following program after removing the syntactical errors (if any). Underline each correction.**
	#include <iostream.h>
	struct Pixels
	{ int Color,Style;}
	void ShowPoint(Pixels P)
	{ cout<<P.Color,P.Style<<endl;}
	void main()
	{
	Pixels Point1=(5,3);
	ShowPoint(Point1);
	Pixels Point2=Point1;
	Color.Point1+=2;
	ShowPoint(Point2);
	}
		2

(d)	**Find the output of the following program:**
	#include <iostream.h>
	void Changethecontent(int Arr[ ], int Count)
	{
	for (int C=1;C<Count;C++)
		3

No.	Questions	Marks

	Arr[C-1]+=Arr[C];
	}
	void main()
	{
	int A[]={3,4,5},B[]={10,20,30,40},C[]={900,1200};
	Changethecontent(A,3);
	Changethecontent(B,4);
	Changethecontent(C,2);
	for (int L=0;L<3;L++) cout<<A[L]<<'#';
	cout<<endl;
	for (L=0;L<4;L++) cout<<B[L] <<'#';
	cout<<endl;
	for (L=0;L<2;L++) cout<<C[L] <<'#';
	}	

(e)	**Find the output of the following program:**
	#include <iostream.h>
	struct Game
	{
	char Magic[20];int Score;
	};
	void main()
	{
	Game M={"Tiger",500};
	char *Choice;
	Choice=M.Magic;
	Choice[4]='P';
	Choice[2]='L';
	M.Score+=50;
	cout<<M.Magic<<M.Score<<endl;
		2

No.	Questions	Marks
	Game N=M; N.Magic[0]='A';N.Magic[3]='J'; N.Score-=120; cout<<N.Magic<<N.Score<<endl; }	

(f)	**In the following program, if the value of N given by the user is 20, what maximum and minimum values the program could possibly display?**
	#include <iostream.h>
	#include <stdlib.h>
	void main()
	{
	int N,Guessnum;
	randomize();
	cin>>N;
	Guessnum=random(N-10)+10;
	cout<<Guessnum<<endl;
	}
		2

2.		
(a)	**What do you understand by Polymorphism? Give a suitable example of the same.**	2

(b)	**Answer the questions (i) and (ii) after going through the following program:**
	class Match
	{
	int Time;
	public:
	Match()
	//Function 1
	{
	Time=0;
	cout<<"Match commences"<<end1;
		2

No.	Questions	Marks

	}
	void Details() //Function 2
	{
	cout<<"Inter Section Basketball Match"<<end1;
	}
	Match(int Duration) //Function 3
	{
	Time=Duration;
	cout<<"Another Match begins now"<<end1;
	}
	Match(Match &M) //Function 4
	{
	Time=M.Duration;
	cout<<"Like Previous Match "<<end1;
	}
	};
	i) Which category of constructor - Function 4 belongs to and what is the purpose of using it?
	ii) Write statements that would call the member Functions 1 and 3	

(c)	**Define a class in C++ with following description:** **Private Members** • A data member Flight number of type integer • A data member Destination of type string • A data member Distance of type float • A data member Fuel of type float • A member function CALFUEL() to calculate the value of Fuel as per the following criteria Distance Fuel <=1000 500 more than 1000 and <=2000 1100	4

No.	Questions	Marks
	more than 2000 2200	
	Public Members	
	" A function FEEDINFO() to allow user to enter values for Flight Number, Destination, Distance & call function CALFUEL() to calculate the quantity of Fuel	
	" A function SHOWINFO() 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 CUSTOMER
	{
	int Cust_no;
	char Cust_Name[20];
	protected:
	void Register();
	public:
	CUSTOMER();
	void Status();
	};
	class SALESMAN
	{
	int Salesman_no;
	char Salesman_Name[20];
	protected:
	float Salary;
	public:
	SALESMAN();
	void Enter();
	void Show();
	};
	class SHOP : private CUSTOMER , public SALESMAN
	{	

No.	Questions	Marks

	char Voucher_No[10];
	char Sales_Date[8];
	public:
	SHOP();
	void Sales_Entry();
	void Sales_Detail();
	};	

(i)	Write the names of data members which are accessible from objects belonging to class CUSTOMER.	
(ii)	Write the names of all the member functions which are accessible from objects belonging to class SALESMAN.	
(iii)	Write the names of all the members which are accessible from member functions of class SHOP.	
(iv)	How many bytes will be required by an object belonging to class SHOP?	
3.		
(a)	**Write a function in C++ to combine the contents of two equi-sized arrays A and B by adding their corresponding elements as the formula A[i]+B[i]; where value i varies from 0 to N-1 and transfer the resultant content in the third same sized array C.**	3
(b)	**An array P[20][30] is stored in the memory along the column with each of the element occupying 4 bytes, find out the Base Address of the array, if an element P[2][20] is stored at the memory location 5000.**	3
(c)	**Write a function in C++ to perform Push operation on a dynamically allocated Stack containing real numbers.**	4
(d)	**Write a function in C++ to find sum of rows from a two dimensional array.**	2
(e)	**Evaluate the following postfix notation of expression:** True, False, AND, True, True, NOT, OR, AND	2
4.		
(a)	**Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using seekg() and tellg() functions for performing the required task.** #include <fstream.h> class Employee	1

No.	Questions	Marks
	{	
	int Eno;char Ename[20];	
	public:	
	//Function to count the total number of records	
	int Countrec();	
	};	
	int Item::Countrec()	
	{	
	fstream File;	
	File.open("EMP.DAT",ios::binary|ios::in);	
	_____ //Statement 1 - To take the file pointer to the end of file.	
	int Bytes =	
	_____ //Statement 2 - To return total number of bytes from the beginning of file to the file pointer.	
	int Count = Bytes / sizeof(Item);	
	File.close();	
	return Count;	
	}	
(b)	**Write a function in C++ to count the number of alphabets present in a text file "NOTES.TXT".**	2
(c)	**Write a function in C++ to add new objects at the bottom of a binary file "STUDENT.DAT", assuming the binary file is containing the objects of the following class.**	3
	class STUD	
	{	
	int Rno;	
	char Name[20];	
	public:	
	void Enter(){cin>>Rno;gets(Name);}	
	void Display(){cout<<Rno<<Name<<endl;}	
	};	

No.	Questions	Marks
5.		
(a)	**What do you understand by Primary Key & Candidate Keys?**	2

Consider the following tables GAMES and PLAYER and answer (b) and (c) parts of this question:

Table: GAMES

GCode	GameName	Type	Number	Prize Money	Schedule Date
101	Carom Board	Indoor	2	5000	23-Jan-2004
102	Badminton	Outdoor	2	12000	12-Dec-2003
103	Table Tennis	Indoor	4	8000	14-Feb-2004
105	Chess	Indoor	2	9000	01-Jan-2004
108	Lawn Tennis	Outdoor	4	25000	19-Mar-2004

Table: PLAYER

PCode	Name	Gcode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

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

(i) To display the name of all GAMES with their GCodes

(ii) To display details of those GAMES which are having PrizeMoney more than 7000.

(iii) To display the content of the GAMES table in ascending order of Schedule Date.

(iv) To display sum of PrizeMoney for each Type of GAMES

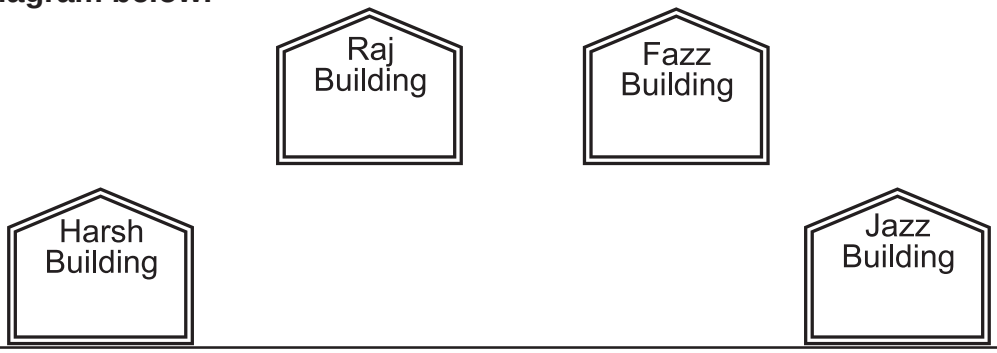
(c) **Give the output of the following SQL queries:** 2

(i) SELECT COUNT(DISTINCT Number) FROM GAMES;

(ii) SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM GAMES;

(ii) SELECT Name, GameName FROM GAMES G, PLAYER P

WHERE G.Gcode=P.Gcode AND G.PrizeMoney>10000;

<table>
<tr><th>No.</th><th>Questions</th><th>Marks</th></tr>
<tr><td></td><td>(iv) SELECT DISTINCT Gcode FROM PLAYER;</td><td></td></tr>
<tr><td>6.</td><td></td><td></td></tr>
<tr><td>(a)</td><td>State and algebraically verify Absorption Laws.</td><td>2</td></tr>
<tr><td>(b)</td><td>Write the equivalent Boolean Expression for the following Logic Circuit</td><td>2</td></tr>
<tr><td>(c)</td><td>Write the SOP form of a Boolean function G, which is represented in a truth table as follows:
<table>
<tr><th>P</th><th>Q</th><th>R</th><th>G</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>0</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>1</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>0</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>1</td></tr>
</table></td><td>1</td></tr>
<tr><td>(d)</td><td>Reduce the following Boolean Expression using K-Map:
F(U,V,W,Z)= π(0,1,2,4,5,6,8,10)</td><td>3</td></tr>
<tr><td>7.</td><td></td><td></td></tr>
<tr><td>a)</td><td>Define the term Bandwidth. Give any one unit of Bandwidth.</td><td>1</td></tr>
<tr><td>b)</td><td>When do you prefer XML over HTML and why?</td><td>1</td></tr>
<tr><td>c)</td><td>How firewall protect our Network?</td><td>1</td></tr>
<tr><td>d)</td><td>What is the importance of URL in networking?</td><td>1</td></tr>
<tr><td>e)</td><td>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:
 
</td><td>4</td></tr>
</table>

No.	Questions		Marks
	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	
e1)	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.		
f)	**Compare freeware and Shareware.**		1
g)	**How Trojan Horses are different from Worms? Mention any one difference.**		1

COMPUTER SCIENCE (Theory) - Class XII

Marking Scheme

Sample Question Paper–II

Subject Code - 083

TIME : 3 Hrs **MM : 100**

<table>
<tr><th>No.</th><th>Answers</th><th>Marks</th></tr>
<tr><td>1.

(a)</td><td>
<table>
<tr><td>Actual Parameter</td><td>Formal Parameter</td></tr>
<tr><td>It is a parameter, which is used in function call to send the value from calling environment</td><td>It is a parameter, which is used in function header, to receive the value from actual parameter</td></tr>
</table>
<pre>
#include <iostream.h>
void Calc(int T) //T is formal parameter
{
cout<<5*T;
}
void main()
{
int A=45;
Calc(A);//A is actual parameter
}
</pre>
(1 Mark for two differences)
(1 Mark for the suitable example)
OR
(Full 2 Mark for explanation of differences with the help of an example)
</td><td>2</td></tr>
<tr><td>(b)</td><td>(i) math.h (ii) ctype.h
(½ Mark for mentioning each correct header filename)</td><td>1</td></tr>
</table>

No.	Answers	Marks

(c)	#include <iostream.h>
	struct Pixels
	{ int Color,Style;};
	void ShowPoint(Pixels P)
	{ cout<<P.Color<<P.Style<<endl;}
	void main()
	{
	Pixels Point1={5,3};
	ShowPoint(Point1);
	Pixels Point2=Point1;
	Point1.Color+=2;
	ShowPoint(Point2);
	}
	(½ Mark for each correction)
		2

(d)	7#9#5# 30#50#70#40# 2100#1200# *(1 Mark for each line of output)*	3
(e)	TiLeP550 AiLJP430 *(1 Mark for each line of output)*	2
(f)	Maximum Value: 19 Minimum Value: 10 *(2 Marks for correct values)*	2

No.	Answers	Marks
2.		

(a)	Polymorphism: It is a method of using the same operator or function (method) to work using different set of inputs. Function overloading is one of the examples of polymorphism, where more than one function carrying same name behave differently with different set of parameters passed to them.
	void Display()
	{
	cout<<"Hello!"<<endl;
	}
	void Display(int N)
	{
	cout<<2*N+5<<endl;
	}
	(1 Mark each for appropriate definition)
	(1 Mark for appropriate example)
		2

(b)	i) Copy constructor, It will help to copy the data from one object to another.
	(½ Mark for mentioning copy constructor)
	(½ Mark for remaining answer)
	ii) Match M; //Function 1
	Match N(10); //Function 3
	(½ Mark for each statement)
		2

(c)	class FLIGHT
	{
	int Fno;
	char Destination[20];
	float Distance, Fuel;
	void CALFUEL();
	public:
		4

No.	Answers	Marks

	void FEEDINFO();
	void SHOWINFO();
	};
	void FLIGHT::CALFUEL()
	{
	if (Distance<=1000)
	Fuel=500;
	else
	if (Distance<=2000)
	Fuel=1100;
	else
	Fuel=2200;
	}
	void FLIGHT::FEEDINFO()
	{
	cout<<"Flight No :";cin>>Fno;
	cout<<"Destination :";gets(Destination);
	cout<<"Distance :";cin>>Distance;
	CALFUEL();
	}
	void FLIGHT::SHOWINFO()
	{
	cout<<"Flight No :"<<Fno<<endl;
	cout<<"Destination :"<<Destination<<endl;
	cout<<"Distance :"<<Distance<<endl;;
	cout<<"Fuel :"<<Fuel<<endl;;
	}
	(½ Mark for correct syntax for class header)
	(½ Mark for correct declarations of data members)	

No.	Answers	Marks
	(1 Mark for appropriate definition of function CALFUEL()) *(1 Mark for appropriate definition of FEEDINFO() with a call for CALFUEL())* *(1 Mark for appropriate definition of SHOWINFO())*	
(d)		4
	(i) None of data members are accessible from objects belonging to class AUTHOR. *(1 Mark for correct answer)*	
	(ii) Enter(), Show() *(1 Mark for correct answer)*	
	(iii) Data members: Voucher_No, Sales_Date, Salary Member function:Sales_Entry(),Sales_Detail(),Enter(),Show(),Register(), Status() *(1 Mark for correct answer)*	
	(iv) 66 *(1 Mark for correct answer)*	

3.	(a) void AddNSave(int A[ ],int B[ ],int C[ ],int N)
	{
	for (int i=0;i<N;i++)
	C[i]=A[i]+B[i];
	}
	(1 Mark for correct Function Header with appropriate parameters)
	(1 Mark for appropriate loop)
	(1 Mark for correct expression for addition of corresponding elements)
		3

	(b) Given, W=4 N=20 M=30 Loc(P[2][20])=5000	3

No.	Answers	Marks
	Column Major Formula: Loc(P[I][J]) =Base(P)+W*(N*J+I) Loc(P[2][20]) =Base(P)+4*(20*20+2) Base(P) =5000 -4*(400+2) =5000-1608 =3392 *(1 Mark for writing correct formula (for column major) OR substituting formula with correct values)* *(1 Mark for writing calculation step - at least one step)* *(1 Mark for correct address)*	

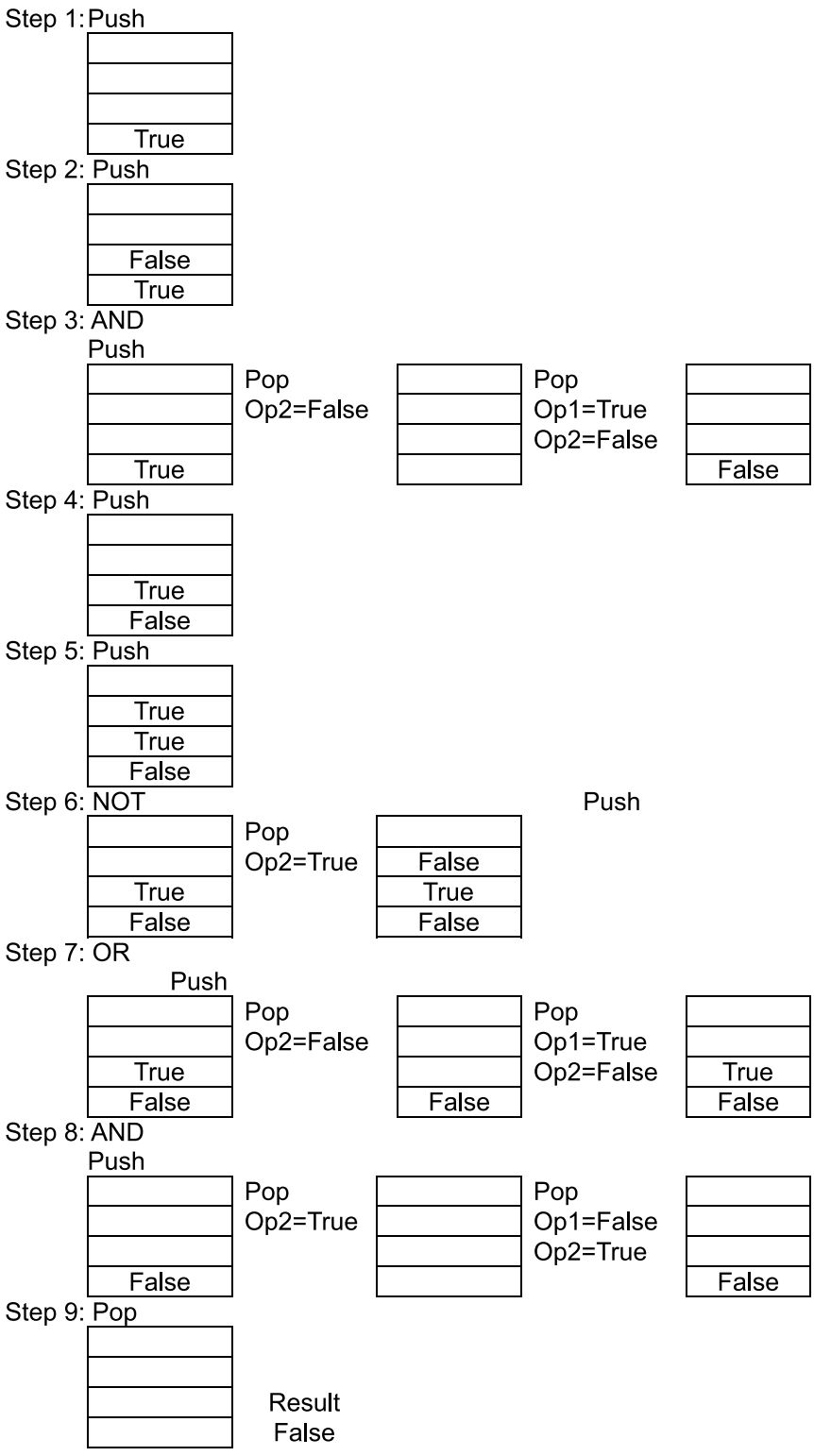
	(c) struct NODE
	{
	float Data; NODE *Link;
	};
	class STACK
	{
	NODE *Top;
	public:
	STACK();
	void Push();
	void Pop();
	void Display();
	~STACK();
	};
	void STACK::Push()
	{
	NODE *Temp;
	Temp=new NODE;
		3

No.	Answers	Marks
	cin>>Temp->Data; Temp->Link=Top; Top=Temp; } (1 Mark for declaring Temp pointer) *(1 Mark for creating a new node and assigning/entering appropriate values in it)* *(1 Mark for connecting link part of new node to top)* *(1 Mark for assigning Top as the new node i.e. Temp)*	

(d)	void MatAdd(int M[][4],int N,int M)
	{
	for (int R=0;R<N;R++)
	{
	int SumR=0;
	for (int C=0;C<M;C++)
	SumR+=M[C][R];
	cout<<SumR<<endl;
	}
	}
	(½ Mark for correct function header)
	(½ Mark for appropriate outer loop)
	(½ Mark for appropriate inner loop)
	(½ Mark for correctly initializing SumR and calculatin the sum)
		2

(e)	(½ Mark for correctly evaluating each operator) OR	2

No.	Answers	Marks
	(1 Mark for correct answer)	



No.	Answers	Marks

4.	**(a)** File.seekg(0,ios::end); //Statement 1
	File.tellg(); //Statement 2
	(½ Mark for each correct Statement)
		1

	(b) void CountAlphabet()
	{
	ifstream FIL("NOTES.TXT");
	int CALPHA=0;
	char CH=FIL.get();
	while (!FIL.eof())
	{
	if (isalpha(CH))
	CALPHA++;
	CH=FIL.get();
	}
	cout<<"No. of Alphabets:"<<CALPHA<<endl;
	}
	(½ Mark for opening NOTES.TXT correctly)
	(½ Mark for initializing a counter variable as 0)
	(½ Mark for correctly reading a character from the file)
	(½ Mark for correctly incrementing the counter)
		2

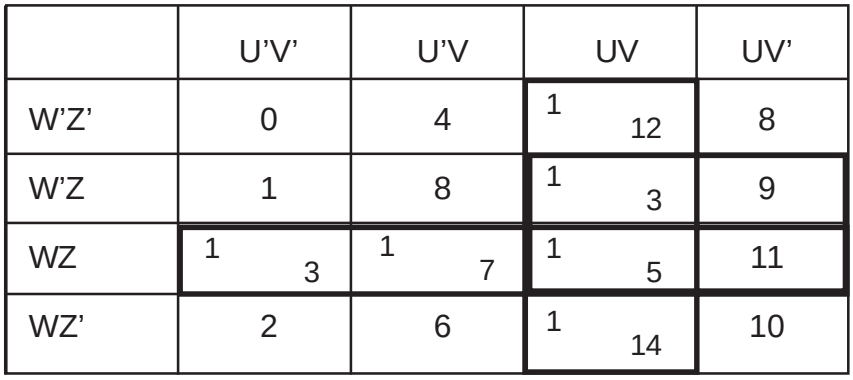
(c)	void Addnew() { fstream FIL; FIL.open("STUDENT.DAT",ios::binary|ios::app); STUD S; char CH; do {	3

No.	Answers	Marks

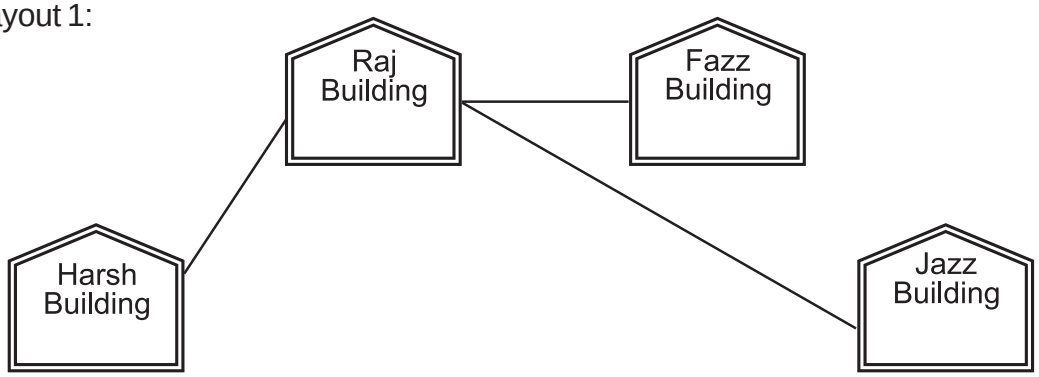
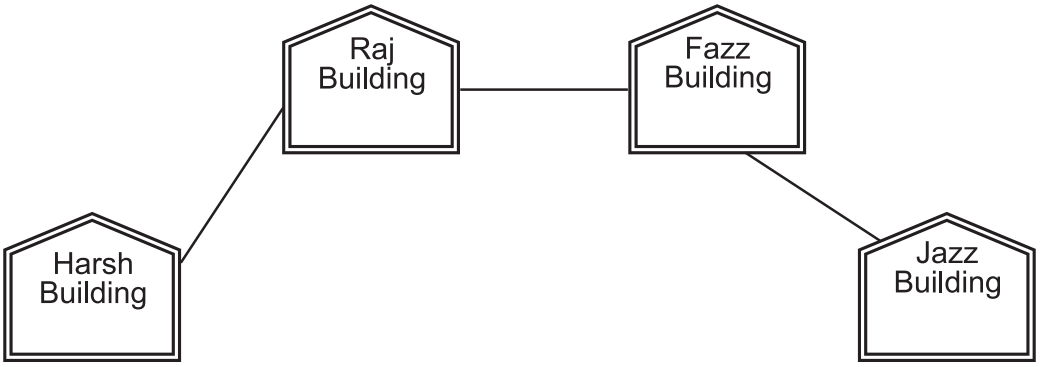
	S.Enter();
	FIL.write((char*)&S,sizeof(S));
	cout<<"More(Y/N)?";cin>>CH;
	}
	while(CH!='Y');
	FIL.close();
	}
	(½ Mark for opening STUDENT.DAT correctly)
	(½ Mark for user input for the new object)
	(1 Mark for appropriate loop)
	(1 Mark for writing the record on to the binary file)	

5.		
(a)	An attribute or set attributes which are used to identify a tuple uniquely is known as Primary Key. If a table has more than one such attributes which identify a tuple uniquely than all such attributes are known as Candidate Keys. *(1 Mark for each definition)*	2
(b)	**Write SQL commands for the flowing statements:** (i) SELECT GameName,Gcode FROM GAMES; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)* (ii) SELECT * FROM Games WHERE Prizemoney>7000; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)* (iii) SELECT * FROM Games ORDER BY ScheduleDate; *(1 Mark for correct query)*	4

No.	Answers	Marks
	OR *(½ Mark for partially correct answer)* (iv) SELECT SUM(Prizemoney),Type FROM Games GROUP BY Type; *(1 Mark for correct query)* OR *(½ Mark for partially correct answer)*	
(c)	(i) 2 *(½ Mark for correct output)* (ii) 19-Mar-2004 12-Dec-2003 *(½ Mark for correct output)* (iii) Ravi Sahai Lawn Tennis *(½ Mark for correct output)* (iv) 3 *(½ Mark for correct output)*	2
6.		
	(a) X+X.Y = X L.H.S = X+X.Y = X.1+X.Y = X.(1+Y) = X.1 = X = R.H.S X+X'.Y = X+Y L.H.S. = X+X'.Y	2

No.	Answers	Marks
	= (X+X').(X+Y) = 1.(X+Y) = X+Y = R.H.S *(1 Mark for stating any one of the Absorption Law)* *(1 Mark for verifying the law)*	
(b)	F(U,V)=U'.V+U.V' *(2 Marks for the final expression)* OR *(1 Mark for any one of the correct terms out of U'.V or U.V')*	2
(c)	F(P,Q,R) = P'.Q'R'+P'.Q'R+P'.Q.R+P.Q'.R *(1 Mark for the correct expression)*	1
(d)	 F(U,V,W,Z)=UV+WZ+UZ *(½ Mark for placing all 1s at correct positions in K-Map)* *(½ Mark for each grouping)* *(1 Mark for writing final expression in reduced/minimal form)* **Note:** Deduct ½ mark if wrong variable names are used	3

No.	Answers	Marks
7.		
a)	Bandwidth is referred to the volume of information per unit of time that a transmission medium (like an Internet connection) can handle. OR The amount of data that can be transmitted in a fixed amount of time is known as bandwidth. For digital devices, the bandwidth is usually expressed in bits per second(bps) or bytes per second. For analog devices, the bandwidth is expressed in cycles per second, or Hertz (Hz). *(½ Mark for writing appropriate definition)* *(½ Mark for giving the unit of bandwidth)*	1
b)	The first benefit of XML is that because you are writing your own markup language, you are not restricted to a limited set of tags defined by proprietary vendors. Rather than waiting for standards bodies to adopt tag set enhancements (a process which can take quite some time), or for browser companies to adopt each other's standards (yeah right!), with XML, you can create your own set of tags at your own pace. *(1 Mark for writing appropriate explanation)*	1
c)	A firewall is a part of a computer system or network that is designed to block unautho -rized access while permitting authorized communications. It is 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 Mark for writing appropriate explanation)*	1
d)	A Uniform Resource Locator (URL) is used to specify, where an identified resource is available in the network and the mechanism for retrieving it. A URL is also referred to as a Web address. *(1 Mark for writing appropriate explanation)*	1

No.	Answers	Marks
e)	**Suggest a cable layout of connections between the buildings.** 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)*	**4**
e2)	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)*	
e3)	(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)*	
e4)	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. *(1 Mark for correct answer with suitable justification)*	

No.	Answers	Marks
f)	Freeware, the name derived from words "free" and"software". It is a computer soft 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. *(1 Mark for appropriate difference)*	1
g)	A Trojan horse is a term used to describe malware that appears, to the user, to perform a desirable function but, in fact, facilitates unauthorized access to the user's computer system A computer worm is a self-replicating computer program. It uses a network to send copies of itself to other nodes (computers on the network) and it may do so without any user intervention. *(1 Mark for appropriate difference)*	1