KENDRIYA VIDYALAYA SANGATHAN
MODEL QUESTION PAPER-5
BLUE PRINT
CLASSS XII COMPUTER SCIENCE (083)

TIME: 03:00 Hrs. **MAX. MARKS: 70**

S.No.	UNIT	VSA (1 Mark)	SA I (2 Marks)	SA II (3 Marks)	LA (4 Marks)	TOTAL
1	**Review of C++ covered in Class XI**	1 (1)	8 (4)	3 (1)		12 (6)
2	**Object Oriented Programming in C++** a) Introduction to OOP using C++ b) Constructor & Destructor c) Inheritance		 2 (1) 2 (1)		 4 (1) 4 (1)	 6 (2) 2 (1) 4 (1)
3	**Data Structure & Pointers** a) Address Calculation b) Static Allocation of Objects c) Dynamic Allocation of Objects d) Infix & Postfix Expressions		 2 (1) 2 (1)	 3 (1) 3 (1)	 4 (1)	 3 (1) 5 (2) 4 (1) 2 (1)
4	**Data File Handling in C++** a) Fundamentals of File Handling b) Text File c) Binary Files	 1 (1)	 2 (1)	 3 (1)		 1 (1) 2 (1) 3 (1)
5	**Databases and SQL** a) Database Concepts b) Structured Query Language		 2 (1) 2 (1)		 4 (1)	 2 (1) 6 (2)
6	**Boolean Algebra** a) Introduction to Boolean Algebra					

	& Laws		2 (1)			2 (1)
	b) SOP & POS	1 (1)				1 (1)
	c) Karnaugh Map			3 (1)		3 (1)
	d) Basic Logic Gates		2 (1)			2 (1)
7	**Communication & Open Source Concepts**					
	a) Introduction to Networking	2 (2)				2 (2)
	b) Media,Dvices,Topologies & Protocols				4 (1)	4 (1)
	c) Security	2 (2)				2 (2)
	d) Webservers	1 (1)				1 (1)
	e) Open Source Terminologies	1 (1)				1 (1)
	TOTAL	**9 (9)**	**26 (13)**	**15 (5)**	**20 (5)**	**70 (32)**

KENDRIYA VIDYALAYA SANGATHAN

MODEL QUESTION PAPER-5
Class XII- COMPUTER SCIENCE (083)

TIME ALLOWED: 3:00 Hrs. **Max. Marks: 70**

Instructions:

i) All questions are compulsory.

ii) Programming language: C++.

Q.1.

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

(b) Name the header file(s) required for successful compilation of the given code: [**1]**

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

(c) Rewrite the following program after removing all the syntactical errors underlining each correction, if any: [**2]**

```
#include <iostream.h>
class FLIGHT
{       long FlightCode;
        char Description[25];
public
        void AddInfo( ){cin>>FlightCode; gets(Description);}
        void ShowInfo( ){cout<< FlightCode<<:<<Description<<endl;}
};
void main( )
{       FLIGHT  F;
        AddInfo.F();
        F.ShowInfo( );
}
```

(d) Write the output of the following program segment: [**3]**

```
#include<iostream.h>
struct THREE_D
{       int x,y,z;
};
void movein(THREE_D &T, int step=1)
{       T.x+=step;
        T.y-=step;
        T.z+=step;
}
void moveout(THREE_D &T, int step=1)
{       T.x-=step;
        T.y+=step;
```

```
        T.z-=step;
}


void main( )
{       THREE_D T1={10,20,5}, T2={30,10,40};
        movein(T1);
        moveout(T2,5);
        cout<<T1.x<<","<<T1.y<<","<<T1.z<<endl;
        cout<<T2.x<<","<<T2.y<<","<<T2.z<<endl;
        movein(T2,10);
        cout<<T2.x<<","<<T2.y<<","<<T2.z<<endl;
}
```

(e) Write the output of the following program segment: [**2]**

```
#include<iostream.h>
#include<ctype.h>
void main( )
{               char Mystring[ ] = "what@ANIDea!";
                for(int I=0; Mystring [I] ! = '\0' ; I++)
                {       if(!isalpha (Mystring[I]) )
                                Mystring[I]= ' * ';
                        else if(isupper (Mystring[I] ))
                                Mystring[I] = Mystring[I]+1;
                        else
                                Mystring[I]  = Mystring[I+1];
                }
        cout<<Mystring;
}
```

(f) In the following program, find the correct possible output(s) from the given options: **[2]**

```
# include <iostream.h>
# include <stdlib.h>
        const int limit = 4;
        void main ( )
        {       int points;
                randomize ( );
                points = 100 + random (limit);
                for (int P= points; P >= 100; P-- )
                        cout << P << "#";
                cout <<endl;
        }
```

Output options:
i) 103#102#101#100#
ii) 100#101#102#103#
iii) 100#
iv) 104#103#102#101#100#

Q.2.

(a) Define the term Data Hiding in the context of Object Oriented Programming. Give a suitable example using a C++ code to illustrate the same. [**2]**

(b) Answer the questions (i) and (ii) after going through the following class. [**2]**

```
class Basketball
{       int Time;
        public:
        Basketball( )                                   //Function 1
        {       Time = 0;
                cout<<"Match commences "<<endl;
        }
        void Details()                                  //Function 2
        { cout<<"Inter Section Basketball Match"<<endl; }
        Basketball(int Duration)                        //Function 3
        {       Time = Duration;
                cout<<"Another match begins now"<<endl; }
        Basketball(Basketball &M)                       //Function 4
        {       Time = M.Duration;
                cout<<"Like Previous Match"<<endl; }
};
```

(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 Function 1 and Function 3.

(c) Define a class **POWER** in C++ with following description: [**4**]

Private Members:

MNO of type long (Meter Number)
Name of type string (Consumer's Name)
Units of type long (Power Unit's Consumed)
Charges of type float (Charges to be paid by Consumer)

A member function CALCCHARGES( ) to calculate Charges according to the following conditions:

Units	**Charges**
Below 100 Units	Rs. 2.00 per Unit
Below 200 Units and > = 100 Units	Rs. 3.00 per Unit
> = 200 Units	Rs. 5.00 per Unit

For Example:

If the Units are 132, Charges should be calculated as
Charges = 99 * 2 + (Units – 99) * 3;

Public Members:

A constructor to initialize MNO as 251786, Name as "Moti Lal", Units as 100, Charges as 201.

A Function EnterData( ) to allow user to enter values for MNO, Name, Units & call the function CALCCHARGES( ) to calculate the Charges.
A Function ShowBill( ) to allow user to view the content of all the data members.

(d). Consider the following declarations and answer the questions given below: [**4]**

```
class Car
{       char Model[10];
        char Date_of_purchase[10];
        char Company[20];
        public:
        Car( );
        void entercardetail( );
        void showcardetail( );
};
class Accessories : private Car
{       protected:
        char stereo_tape[30];
        char sheet_cover[20];
        public:
        float Price;
        Accessories( );
        void enteraccessoriesdetails( );
        void showaccessoriesdetails( );
};
class Dealer : public Accessories
{       int No_of_dealers;
        char dealers_name[20];
        int No_of_products;
        public:
        Dealer( );
        void enterdealerdetails( );
        void showdealerdetails( );
};
```

(i) Name the type of Inheritance depicted in the above example.
(ii) How many bytes will be required by an object of class Accessories?
(iii) Write names of all the members which are accessible from the objects of class Dealer.
(iv) Write names of all data members accessible from member functions of class Dealer.

Q.3.

(a) 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[15][5], if an element S[20][10] is stored at the memory location 5500. **[3]**

(b) Write a function SWAP(int P[ ], int N) in C++ to modify the content of the array in such a way that the elements, which are multiples of 10 swap with the value present in the very next position in the array. **[3]**

For eg. If the content of the array P is
91, 50, 54, 22, 30, 56
Then, the content of array P should become
91, 54, 50, 22, 56, 30

(c) Write a function in C++ to print the product of each column of a two dimensional array passed as the arguments of the function. **[2]**

Example : If the two dimensional array contains

1	2	4
3	5	6
4	3	2
2	1	5

Then the output should appear as:

Product of Column 1 = 24
Product of Column 2 = 30
Product of Column 3 =240

(d) Write a function to perform *Insert* operation in a *dynamic Queue* containing DVD's information. [**4]**

```
struct DVD
{       long No;            //DVD No
        char Title[20];     //DVD Title
        DVD *Link;
};
```

(e) Evaluate the following postfix notation of expression: [**2]**

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

Q.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. [**1]**

```
#include <fstream.h>
class Employee
{
    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
        int Bytes = _____                       //Statement 2
        int Count = Bytes / sizeof(Item);
        File.close();
        return Count;
}
```

(b) Write a function in C++ to read the content of a text file "PLACES.TXT" and display all those lines on screen, which are either starting with 'P' or starting with 'S'. [**2]**

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

```
class PRODUCTS
{
        int Pcode;
        char Pname[20];
        float Price;
```

```
public :
        void getproducts()
        {
                cin>>Pcode>>Pname>>Price;
        }
        void showproducts()
        {
                cout<<Pcode<<Pname<<Price<<endl;
        }
        int getproduct()
        {
                return Pcode;
        }
};
```

Q.5.

(a) What do you understand by Candidate key & Primary key in a table? Give a suitable example of Candidate key and Primary key from a table containing some meaningful data. **[2]**

(b) Consider the following tables SCHOOL and ADMIN. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii). **[6]**

SCHOOL

CODE	TEACHERNAME	SUBJECT	DOJ	PERIODS	EXPERIENCE
1001	RAVI SHANKAR	ENGLISH	12/03/2000	24	10
1009	PRIYA RAI	PHYSICS	03/09/1998	26	12
1203	LISA ANAND	ENGLISH	09/04/2000	27	5
1045	YASHRAJ	MATHS	24/08/2000	24	15
1123	GANAN	PHYSICS	16/07/1999	28	3
1167	HARISH B	CHEMISTRY	19/10/1999	27	5
1215	UMESH	PHYSICS	11/05/1998	22	16

ADMIN

CODE	GENDER	DESIGNATION
1001	MALE	VICE PRINCIPAL
1009	FEMALE	COORDINATOR
1203	FEMALE	COORDINATOR
1045	MALE	HOD
1123	MALE	SENIOR TEACHER
1167	MALE	SENIOR TEACHER
1215	MALE	HOD

i) To decrease period by 10% of the teachers of English subject.

ii) To display TEACHERNAME, CODE and DESIGNATION from tables SCHOOL and ADMIN whose gender is male.

iii) To Display number of teachers in each subject.

iv) To display details of all teachers who have joined the school after 01/01/1999 in descending order of experience.

v) SELECT SUM (PERIODS), SUBJECT FROM SCHOOL GROUP BY SUBJECT;

vi) SELECT TEACHERNAME, GENDER FROM SCHOOL, ADMIN WHERE DESIGNATION = 'COORDINATOR' AND SCHOOL.CODE=ADMIN.CODE;

vii) SELECT DESIGNATION, COUNT (*) FROM ADMIN GROUP BY DESIGNATION HAVING COUNT (*) >1;

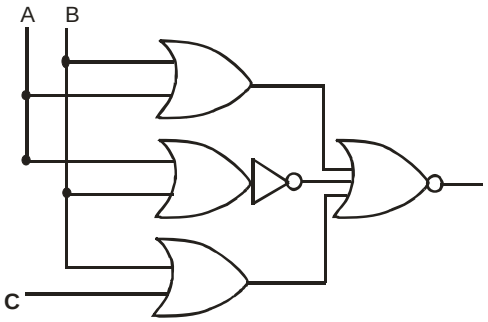
viii) SELECT COUNT (DISTINCT SUBJECT) FROM SCHOOL;

Q.6.

(a) Verify the following algebraically. **[2]**

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

(b) Write the equivalent Boolean expression for the following logic circuit: **[2]**



(c) Given the following truth table, write the sum-of-product form of the function F(x, y, z). **[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

(d) Reduce the following Boolean expression using K-Map **[3]**

F(A,B,C,D) = π (0,1,3,4,5,6,7,9,10,11,13,15).

Q.7.

(a) What is the importance of URL in networking? **[1]**

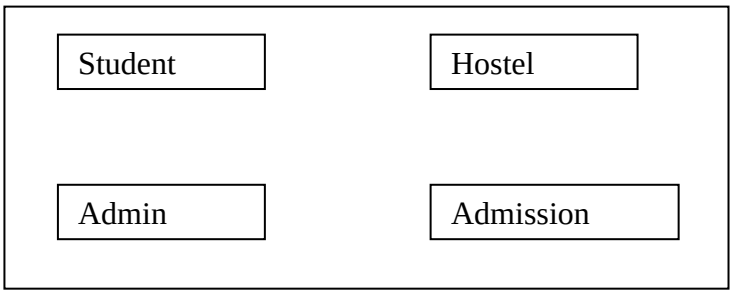
(b) Expand the following terminologies with respect to Networking: **[1]**

i) XML ii) CDMA.

(c) Define the term firewall. **[1]**

(d) Name one client side scripting language and one server side scripting language. **[1]**

(e) "NEXTGEN CLASSES" is located in Jaipur and is planning to go in for networking of four wings for better interaction. The details are as shown below: [**4]**



The distance between various wings are :

Student to Admin	265m
Student to Admission	495m
Student to Hostel	525m
Admission to Admin	200m
Admission to Hostel	195m
Admin to Hostel	325m

Number of computers are :

Student Wing	312
Admission Wing	156
Admin Wing	26
Hostel Wing	125

(i) Suggest a most suitable cable layout of the connection between the wings and topology.

(ii) Suggest the placement of the following devices with reasons :

a) Modem b) Switch

(iii) The Institute is planning to link its another branch "ABHI CLASSES" in Andaman & Nicobar. Suggest the type of network and a way to connect it with reasonably high speed, cost is not the factor. Justify your answer.

(iv) Suggest the type of networking (LAN, MAN, WAN) for connecting Hostel Wing to Admin Wing. Justify your answer.

KENDRIYA VIDYALAYA SANGATHAN
MODEL QUESTION PAPER-5
Class XII- COMPUTER SCIENCE (083)
MARKING SCHEME

Time Allowed: 3 Hours **Max. Marks: 70**

Q.No	Answer	Marks
1) a.	In call by value the changes made in formal arguments are not reflected back to the actual arguments. But in call by reference changes made in formal arguments are reflected back to the actual arguments. Example: Any correct example for both	2 (1 Mark for correct definition & 1 mark for example)
1) b.	iostream.h, (for cin, cout) iomanip.h (for setw)	1 (½ Mark for mentioning name of each header file)

1) c.	#include <iostream.h>
	#include <stdio.h>
	class FLIGHT
	{ long FlightCode;
	char Description[25];
	public:
	void AddInfo( ){cin>>FlightCode; gets(Description);}
	void ShowInfo( )
	{cout<<FlightCode<<":"<<Description<<endl;}
	};
	void main( )
	{ FLIGHT F;
	F.AddInfo( );
	F.ShowInfo();
	}
		2 (½ Mark for mentioning each error)

1) d.	11,19,6 25,15,35 35,5,45	3 (1 Mark for each correct line of output)
1) e.	hat@*BOJEa!*	2 marks for correct output
1) f.	i) and iii)	2 (1 Mark for each correct option)
2) a.	Data Hiding: Keeping the data in private visibility mode of the class to prevent it from accidental change is known as Data Hiding. Or Unessential features or background details are hidden from the outside world. Example: Any one correct example	2 (1 Mark for correct definition & 1 mark for example)
2) b.	**i)** Funtion 4- Copy Constructor It passes the values of one object into another object of same type. **ii)** For calling function F1- Basketball B1; For calling function F1- Basketball B2(90);	2 (1 Mark for correctly answering to each part.)
2) c.	class POWER { private: char Name[30]; long MNO, Units; float Charges; void CALCCHARGES( )	4 (½ Mark each for data members and constructor) (1 Mark for each function definition)

	{ if (Unit< 100)
	Charges= Units*2;
	else if (Units<200)
	Charges= 99*2 + (Units-99)*3;
	else
	Charges= 99*2 + 100*3 + (Units-199)*5;
	}
	public:
	POWER( )
	{ strcpy(Name, "Moti Lal");
	MNO= 251786;
	Units= 100;
	Charges= 201;
	}
	void EnterData( )
	{ gets(Name);
	cin>> NMO>> Units;
	CALCCHARGES( );
	}
	void ShowBill( )
	{ cout<<MNO<<Name<<Units<< Charges;
	}};	

2) d.	**i)** Multilevel inheritance **ii)** 94 bytes **iii)** Data members- Price. Member functions- enteraccessoriesdetails( ), showaccessoriesdetails( ), enterdealerdetails( ), showdealerdetails( ). **iv)** Data members- Price, No_of_dealers, dealers_name, No_of_products, stereo_tape, sheet_cover.	4 (1 Mark for each correct answer.) No marks to be given for partial answers
3) a.	Given, W=2 N_r =40 N_c=30 Address(S[20][10])=5500 Row Major Formula: Address (S[I][J]) = B + W [N_c (I - L_r) + (J- L_c)] Address (S[20][10])= B + 2 [30(20 - 0) + (10- 0)] 5500 = B + 2 [600 + 10] B= 5500-1220=4280 Address (S[15][5])= 4280 + 2 [30(15 - 0) + (5- 0)] =4280 + 2 [450 + 5] = 4280 + 910= 5190	3 (1 Mark for correct formula/substitution of values in formula) (1 Mark for correctly calculating Base Address) (1 Mark for correctly calculating address of desired location)

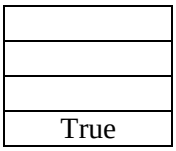
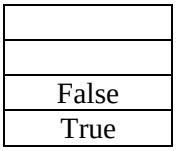
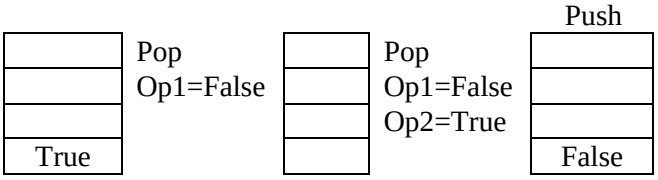
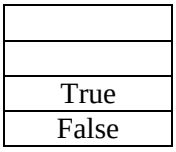
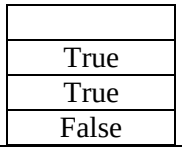
3) b.	void SWAP(int P[ ],int N)
	{ int temp;
	for(int i=0;i<N:i++)
	{ if(P[i]%10==0 && i<N-1)
	{ temp= P[i];
	P[i]=P[i+1];
	P[i+1]=temp;
	}
	}
		3
		(½ Mark for function header with desired parameters)
		(½ Mark initialising counters in loop)
		(1 Mark for correct condition)
		(1 Mark for correct swapping of elements in array)

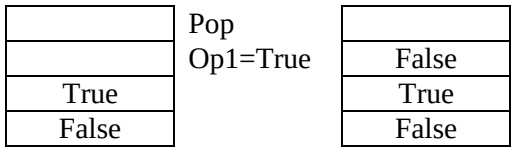
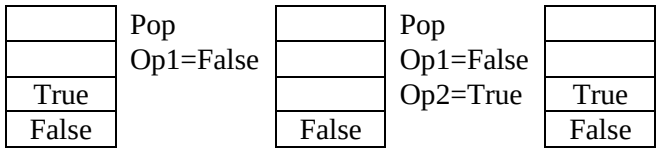
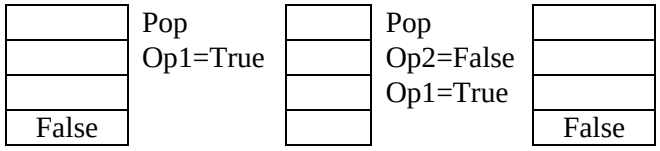
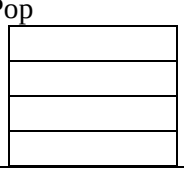
<table>
<tr><td>3) c.</td><td>

```
void productcol(int A[ ][ ],int r,int c)
        {    int i,j;
             for(j=0;j<c;j++)
             {      int prod[j]=1;
                    for(i=0;i<r;i++)
                              { prod[j]=prod[j]*A[i][j];
                              }
              cout<<"\nProduct of Column "<<j+1<<" = "<<prod[j];
             }
        }
```

</td><td>2
(½ Mark for function header with desired parameters)
(½ mark for correct formation of loop)
(½ Mark for correct condition)
(½ Mark for correct output format)</td></tr>
<tr><td>3) d.</td><td>

```
void Insert( )
{
DVD *ptr = new DVD;
cout<<"Enter DVD No";
cin>>ptr->No;
cout<<"Enter DVD Title";
gets(ptr->Title);
ptr->Link=NULL;
if (rear = = NULL)
    front= rear= ptr;
else
    {
     rear->Link = ptr;
     rear= ptr;
    }
}
```

</td><td>4
(½ Mark for appropriate function header)
(½ Mark for declaring a Temporary pointer - ptr)
(1 Mark for input values)
(1 Mark for correct condition)
(1 Mark for correct statements)</td></tr>
<tr><td>3) e.</td><td>Step 1: Push
 
Step 2: Push
 
Step 3: AND
 
Step 4: Push
 
Step 5: Push
  </td><td>2
(1½ Mark for showing stack position for operations NOT,OR and AND)
(½ Mark for correctly evaluating the final result)</td></tr>
</table>

	Step 6: NOT  Step 7: OR  Step 8: AND  Step 9: Pop  Result **False**	

4) a.	File.seekg(0,ios::end); //statement1
	File.tellg(); //statement2
		1
		(½ Mark for each correct statement)

4) b.	void readfile( )
	{ ifstream fin;
	fin.open("PLACES.TXT");
	char line[256];
	while (!fin.eof( ))
	{ fin.getline(line,255);
	if (line[0]= = 'P' || line[0]=='S')
	cout<< line;
	}
	fin.close();
	}
		2
		(½ mark for correct syntax of function header and opening the file in 'in' mode)
		(½ mark for reading content from file)
		(½ mark for correct condition for searching)
		(½ mark for displaying the result)

4) c.	void ProductSearch( )
	{
	ifstream fin;
	fin.open("PRODUCT.DAT",ios::binary|ios::in);
	PRODUCTS P;
	int p_code, Found=0;
	cout<<"Enter Product Code to be search:";
	cin>> p_code;
	while (!fin.eof( ))
	{ fin.read((char*)&P,sizeof(P));
	if (P.getproduct( )= = p_code)
	{
	P.showproducts();
	Found++;
	}
	}
		3
		(½ mark for correct syntax of function header and body)
		(½ mark for opening the file in 'in' mode)
		(½ mark for reading content from file into the ob ject of P)
		(½ mark for appropriate loop)
		(½ mark for correct condition for searching)
		(½ mark for displaying the content of the object)

	if (Found==0)
	cout<<"Sorry! Product not found!!!"<<endl;
	fin.close();
	}	

5) a.	Candidate key- All attributes combinations inside a relation that can serve as primary key are Candidate keys as they are candidates for the Primary Key position. Primary key- It is a set of one or more attributes that can uniquely identify tuples within the relation. **Eg.** A table STUDENT having columns rollno, regno, name, class, percentage. In which columns rollno and regno are candidate key as they are candidates for the Primary Key position. But we can declare any column as primary key because both uniquely identify tuples within the relation.	2 (1 mark for each correct definition and 1 mark for correct example)
5) b.	**i)** update school set periods=periods – 0.10*periods where subject="English"; **ii)** select teachername, A.code, designation from School S, Admin A where S.code=A.code and gender="male"; **iii)** select count(*) from school group by subject; **iv)** select * from school where doj>'01/01/1999' order by experience desc; **v)** sum(periods) subject 51 English 76 Physics 24 Maths 27 Chemistry **vi)** teachername gender Priya Rai female Lisa Anand female **vii)** designation count(*) Coordinator 2 HOD 2 Senior teacher 2 **viii)** count(distinct subject) 4	6 (1 mark for each correct query) (½ mark for each correct output)
6) a.	X'Y + X.Y'= (X'+Y').(X+Y) RHS= (X'+Y').(X+Y) = XX' + X'Y + Y'X + Y'Y = 0 + X'Y+ Y'X + 0 [X.X'=0 By Complmentarity Law] = X'Y+ Y'X [Y'X=XY' By Commutative Law] = X'Y+ XY'= LHS	2 (1 mark for stating the correct law & 1 mark for the appropriate verification using algebraic method)
6) b.	((A+B)+(A+B)'+(B+C))'	2 marks for obtaining the correct Boolean Expression for the Logic Circuit
6) c.	F (x,y,z)= x'y'z + x'yz' + xy'z' + xyz	(1 mark for correct SOP representation)

6) d.

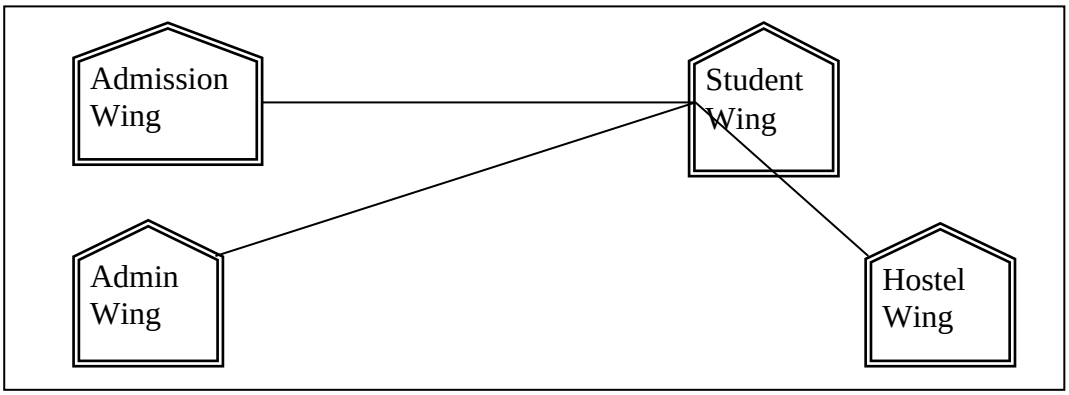
	C+D	C+D'	C'+D'	C'+D
A+B	**0** 0	**0** 4	**0** 12	8
A+B'	**0** 1	**0** 5	**0** 13	**0** 9
A'+B'	3	**0** 7	**0** 15	11
A'+B	2	**0** 6	**0** 14	**0** 10

F(A,B,C,D)= (B'). (A+C). (A+B'). (A'+B+C')

(1 mark for correctly drawing K-Map with 0s represented on right places)
(1 mark for minimizing each Octet, Quad and Pair)
(1 mark for writing the complete Boolean Expression)

7) a.	A URL (Uniform Resource Locator) that specifies the distinct address for each resource on the internet.	1Mark for correct definition
7) b.	XML- eXtensible Markup Language CDMA- Code Division Multiple Access	1 (½ Mark for each correct expansion)
7) c.	A system designed to prevent unauthorized access to or from a private network is called firewall.	1 Mark for correct definition
7) d.	Client side scripting language- JavaScript, VBScript server side scripting language- JSP, ASP	1 (½ Mark for each correct example)

7) e. (i) Layout Option 1: Star topology



(1 mark for any of the correct Layout)

(ii)	a) Modem in student wing as it has maximum no of computers & this wing is suitable for server position. b) Switch in all the four wings to connect all the computers with each other.	1 (½ Mark for each correct answer)
(iii)	WAN (Wide Area Network) & Satellite is a way to connect it with reasonably high speed as distance of ABHI classes is far away from NEXTGEN classes.	1 (½ Mark for each correct answer)
(iv)	LAN (Local Area Network) as distance is less which is within the wings of a building.	1 mark for correct answer