KENDIRYA VIDYALAYA SANGATHAN
MODEL QUESTION PAPER -6
Class XII
Subject :- Computer Science (083)

Time 3 hrs **M.M 70**

Blue Print

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(1)
6	Boolean Algebra a) Introduction to Boolean Algebra& Laws b) SOP & POS c) Karnaugh Map d) Basic Logic Gates	 1(1)	 2(1) 2(1)	 3(1)		 2(1) 1(1) 3(1) 2(1)

7	Communication & Open Source Concepts a) Introduction to Networking b) Media,Devices, Topologies &Protocols c) Security d) Internet	 2(2) 3(3) 1(1)			 4(1)	 2(2) 4(1) 3(3) 1(1)
	TOTAL	9(9)	26(13)	15(5)	20(5)	70(32)

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

Q1.(a) Differentiate between entry control loop and exit control loop. Give suitable example each (2)
(b) Which C++ header file(s) will be essentially required to be included to run /execute the following C++ code: (1)

```
void main()
{
        int enumber=256;
        char ename[]=”anita”;
        cout<<setw(5)<<enumber<<setw(25)<<ename<<endl;
}
```

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

```
#include [iostream.h]
CLASS  STUDENT
{
        int Mno;float Fees
        public:
        void Register(){cin<<Mno>>Fees;}
        void Display{cout<<Mno<<" : "<<Fees<<endl;}
};
void main()
{
        STUDENT m;
        Register();
        M.Display();
}
```

(d) Find the output of the following program: (3)

```
# include<iostream.h>
struct point
{
        int x,y,z;
};
void stepin  ( point &p, int step=1)
{
p.x+=step;
 p.y-=step;
p.z+=step; }
```

```
void stepout(point &p, int step=1 )
{
        p.x-=step;
        p.y+=step;
        p.z-=step;
}
void main( )
{
        point p1={15,25,5},p2={10,30,20};
        stepin(p1);
        stepout(p2,4);
        cout<<p1.x<<", "<<p1.y<<","<<p1.z<<endl;
        cout<<p2.x<<","<<p2.y<<","<<p2.z<<endl;
        stepin(p2,12);
        cout<<p2.x<<","<<p2.y<<","<<p2.z<<endl;
}
```

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

```
#include<iostream.h>
#include<ctype.h>
void changeit(char text[], char c)
{
        for(int k=0;text[k]!='\0';k++)
        {
        if(text[k]>='F' && text[k]<='L')
                text[k]=tolower(text[k]);
        else
                if(text[k]= = 'E' || text[k] = = 'e')
                        text[k]=C;
                else
                        if(k%2==0)
                                text[k]=toupper(text[k]);
                        else
                                text[k]=text[k-1];
        }
}
void main( )
{
char oldtext[ ]="pOwERALone";
changeit(oldtext,'%');
cout<<"new text:"<<oldtext<<endl;
}
```

(f) In the following game, what will be the expected output(s) from the following options (i), (ii), (iii) and (iv) so that he wins the game? (2)

```
#include <iostream.h>
#include <stdlib.h>
const int low=15;
void main( )
{
        randomize( );
```

```
        int point=5,number;
        for(int i=1;i<=4;i++)
        {
        number = low +random(point);
        cout<<number<<";";
        point--;
        }
}
```

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

Q2 (a) What do you understand by polymorphism in context of classes and objects using C++. (2)

(b) Answer the following questions going through the following class: (2)

```
class test
{
        int regno,max,min,score;
        public:
        test( )                                  function 1
        {
        regno=101;max=100;min=40;score=75;}
        test(int pno,int pscore)                 function2
        {regno=pno;
        score=pscore;
        }
        ~test() {                                function 3
        cout<<"test over";
        }
};
```

(i) Which concept is illustrated by function 1 and function 2?
(ii) What is function3 called as and when it will be invoked?

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

private members:

- rollno integer
- name string
- hindi float
- English float
- Science float
- Per float
- Grade char
- Cal() function to calculate the total, percentage and display the grade as per the following criteria:

  Total =hindi+English+science

Percentage	**Grade**
If percentage > =90	grade a
Percentage between 70 to 90	grade b
Percentage between 50 to 70	grade c
Below 50	grade d

Public members

- Getdetails( ) function will take name , rollno, marks in three subjects and invoke the function Cal( ).
- Display( ) function will display the name, rollno and grade.

(d) Answer the questions (i) to (iv) based on the following code: (4)

```
class chairperson
{
        long cid;
        char cname[20];
        protected:
        char description[40];
        void allocate();
        public:
        chairperson( );
        void assign();
        void show();
};
class director
{
        int did;
        char dname[20];
        protected:
        char profile[30];
        public:
        director();
        void input();
        void output();
};
class company : private chairperson, public director
{
        int cid;    char city[20],country[20];
        public:
        company( );
        void enter ();
        void display( );
};
```

(i) Which type of inheritance is illustrated in the above C++ code?
(ii) Write the name of data members which are accessible by objects of class type company.
(iv) Write the name of all member functions which are accessible by objects of class type company.
(v) Write the name of all members which are accessible from member functions of class director.

3 (a) Write a function in C++ to merge the contents of two sorted arrays A and B into third array C. Assuming array A is sorted in ascending order, B is sorted in descending order, the resultant array is 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[15][5], if an element S[20][10] is stored at the memory location 5500. (3)

(c) Write a complete program in c++ to perform Push ,Pop operation and display the list in a dynamically allocated Stack containing names of students. (4)

(d) Write a function int skip(int a[][3],int n,int m) in C++ to find the sum of elements from all alternative elements of a two dimensional array(matrix). (2)

(e) Evaluate the following postfix notation of expression. (2)
20,30,+,50,40,-,*

Q4 (a) Observe the program segment given below carefully and fill the blanks marked as statement 1 and statement 2 using tellg() and seekp() functions for performing the required task . (1)

```
class client
{
    long cno ; char name[20] , email[30];
    public :
    void enter();          // function to allow user to enter the cno , name , email
    void Modify();         // function to allow user to enter (modify) email
    long ReturnCno()
    {
        return cno;
    }
};
    void changeemail()
    {
        client C;
        fstream F;
        F.open ("info.dat" , ios::binary |ios::in|ios::out);
        long cnoc;
        cin>>cnoc;
        while(F.read((char*)&c , sizeof(c)))
        {
                if(cnoc == C.ReturnCno())
        {
                C.Modify();
                int Pos =  _____                    //Statement 1

                _____                               //Statement 2

            F.write((char*)&c , sizeof(c))

          }

    }
        F.close();
}
```

(b) write a function in c++ to count the word 'this' present in a text file "article.txt". (2)

(c) Write a function in C++ to read and display the detail of all the members whose membership type is 'J' or 'S' from binary file " DASH.DAT" . Assume the binary file "DASH.DAT" contains objects of class DASH , which is defined as follows. (3)

```
class DASH
  {
        int Mno;
        char Mname[20];
        char type;
        public :
        void register( );
        void display ( );
        char whattype( )
                { return type ; }
  };
```

5 (a) What do you understand by Cartesian Product? Give an example to illustrate Cartesian Product? (2)

Consider the following tables STORE and SUPPLIERS and answer (b) and (c) parts of this question:

Table: STORE

ITEMNO	ITEM	SCODE	QTY	RATE	LASTBUY
2005	SHARPNER	23	60	8	31 JUNE 09
2003	BALLPEN0.25	22	50	25	1 FEB 10
2002	GEL PEN	21	150	12	24 FEB 10
2006	GELPENC	21	250	20	11 MARCH 09
2001	ERASERSMALL	22	220	6	19 JAN 09
2004	ERASERBIG	22	110	8	2 DEC 09
2009	BALLPEN0.5	21	180	18	3 NOV 09

Table: SUPPLIERS

SCode	Name
21	PREMIMUM STATIONERY
23	SOFT PLASTICS
22	TETRA SUPPLY

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

(i) To display the detail of all ITEMS with their itemno in descending order.

(ii) To display sum of quantity from the table store.

(iii) To display the scode ,qty ,rate and name of those items whose scode is 22

(iv) To display minimum rate of items for each supplier individually as per the scode form the table store.

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

(i) SELECT COUNT(DISTINCT scode) FROM store;

(ii) SELECT MAX(lastbuy),MIN(lastbuy) FROM store;

(iii) SELECT item,sname from store s, supplier p where s.scode=p.scode and itemno=2006;

(iv) SELECT rate * qty from store where itemno=2004;

Q6 (a) state and verify Absorption law using truth table. (2)

(b) Draw a logical circuit diagram for the following Boolean expression (1)

x'.(y' + z)

(c) Write the POS form of a Boolean function G, which is represented in a truth table as follows: (2)

P	Q	R	G
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

(d) Reduce the following Boolean expression using K-map: (3)

$F(A,B,C,D) = \Sigma (3,4,5,6,7,13,15)$

Q7 (a) What is the difference between LAN & WAN? (1)

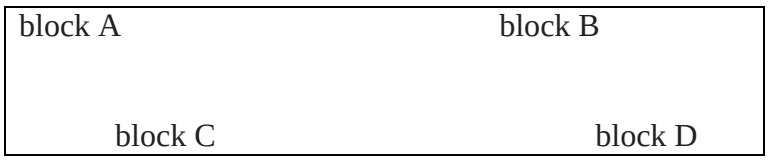
(b) Expand the following (1)

(i) HTML (ii)WWW

(c) What is protocol? Which protocol is used to copy a file from / to a remote server (1)

(d) write the two advantages of Satellite communication. (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)



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

1) Suggest a cable layout of connections between the blocks.

2) Suggest the most suitable place (i.e. block) to house the server of this organization with a suitable reason.

3) Suggest the placement of the following devices with justification

(i) Repeater

(ii) Hub/Switch

4) 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 Firewall? (1)

(g) Give one advantage of Open source & Proprietary software. (1)

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MARKING SCHEME

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Q1 (a) while and for are entry control loops as condition tests first and then executes whereas do while is exit control the condition is tested after execution.

```
int i=10;
while(i<10)
{
}
```

```
int i=10; do{  } while(i<10);
```

(1 mark for correct definition and 1 mark for example each.) 2

(b) (i) iomanip.h (ii) iostream.h 1

(½ Mark for mentioning each correct header filename)

(c) #include [iostream.h] 2

```
CLASS  STUDENT
{
int Mno;float Fees
PUBLIC:
void Register(){cin<<Mno>>Fees;}
void Display{cout<<Mno<<" : "<<Fees<<endl;}
};
void main()
{
STUDENT m;
Register();
M.Display();
}
```

(½ Mark each correction)

(d) 16,24,6 3
6,34,16
18,22,28
(1 Mark for each correct line of output)

(e) PPW%RRllN% 2
(2 Marks for correct line of output)

(f) (iv) 19:16:15:16 2
(2 Marks for mentioning correct option)

Q2 (a) When one function's name is reused with different signatures. In c++ it is observed in function overloading.
1 mark for the polymorphism and 1 mark for its reference with c++.

(b)(i) POLYMORPHISM.
(ii) function3 is destrustor and it will be executed when object goes out of scope.
(1+1 mark for each correct answer)

(C) class student 4

```
{
int rollno;
float hindi,English,science,per;
char name[20],grade;
void cal();
public:
void getdetails();
void display();
};
void student::cal()
{int total=hindi+English+science;
per=total/3;
If (per>=90)
Grade=’A’;
If (per>=70)
Grade=’B’;
If (per>=50)
Grade=’C’;
If (per<50)
Grade=’D’;
}
void student::getdetails()
{
cout<<"rollno :";cin>>rollno;
cout<<"Name :";gets(name);
cout<<"hindi :";cin>>hindi;
cout<<"english :";cin>>english;
cout<<"science :";cin>>science;
caldisc();
}
void student::display()
{
cout<<"rollno :";cout<<rollno;
cout<<"Name :";cout<<name;
cout<<"perentage :";cout<<Per;
cout<<"grade :";cout<<grade;

}
```

(½ Mark for correct syntax for class header)
(½ Mark for correct declarations of data members)
(1 Mark for appropriate definition of function cal())
(1 Mark for appropriate definition of getdetails() with a call for cal())
(1 Mark for appropriate definition of display())

(D) **(i)** Multiple inheritance. 4

(1 Mark for correct answer)

(ii) no one as all members are private or public. *(1 Mark for correct answer)*

(iii) director();void input();void output();company();void enter ();void display( );
(1 Mark for correct answer)

(iv) did;dname[20];profile[30];director();void input();void output();

(1 Mark for correct answer)

Q3 (a) void merge(int A[], int B[], int C[],int n, int m, int &k) 3

```
{
int I=0,j=m-1;
k=0;
while(i<n && j>=0)
{
if (A[I]<=B[j])
C[k++] = A[I++];
Else
C[k++] = B[j--];
}
if (I<n)
while(I<n)
{C[k++] = A[I++];
}
if (j>=0)
while(j>=0)
{
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)

(b) formula B+W(C(I-0)+(J-0))

5500 = B+2(30(20-0)+(10-0))

=B+2(600+10) =B+2(610)= B+ 1220= B= 5500-1220= 4280.

S[15][5]= 4280+2(30(15-0)+(5-0))=4280+2(455)=4280+910 =5190

(1 Mark for writing correct formula (for row 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
{ char name[20];
node * next;
};
class stack
```

```
{
node *top;
public:
stack ( ){next=NULL;}
void push ( );
void pop();
void display();
};
void stack::push( )
{
node *temp;
temp= new node;
gets(temp->name);
temp->next = top;
top=temp;
}
void stack::pop()
{if(top!=NULL)
{ node *temp=top;
top=top->next;
delete temp;
}
else
cout<<"stack empty";
}
void display()
{
node *temp=top;
while(temp!=NULL)
{
cout<<temp->name<<endl;
temp=temp->next;}
}
```

(1 Mark for creating a new node and assigning/entering appropriate values in it)
(1 Mark for push)
(1 Mark for pop)
(1 Mark for display)

(d)
```
void skipsum(int a[][3], int n, int m)
{
int s=0,c=1;
for(int i=0;i<n;i++)
for (int j=0;j<m; j++)
{ if(c%2!=0)
s=s+a[i][j];
c++;
}
return s;
}
```
2

(½ Mark for correct function header)
(½ Mark for initialization of s as 0)
(½ Mark for appropriate loop)
(½ Mark for correct expression for adding elements)
(E)500 2
(½ Mark for correctly evaluating each operator)
(½ Mark for the correct result)

Q4(a) 1

Statement 1 :
F.tellg()
(b) F.seekp(-sizeof(C) , ios::cur)
Or
F.seekp(Pos-sizeof(C));

(½ Mark for each correct Statement)

```
(B) void countthe( ) 2
    {
    ifstream fil("article.txt");
    ;int c1=0;
    char word[80];
    while (!fil.eof())
    { fil>>word;
    if(strcmp(word,"this")==0)
    c1++;}
    cout<<"count of –this in file"<<c1;
    }
```

(½ Mark for opening ARTICLE.TXT correctly)
(½ Mark for initializing a counter variable as 0)
(½ Mark for comparing)
(½ Mark for correctly incrementing the counter)

```
( c) Void Details ( ) 3
{
Fstream afile
DASH  D;
char  P;
afile.open("DASH.DAT", ios::in);
while (afile)
{
afile.read((char *)&D , sizeof(DASH));
P = D.whattype();
If(P == 'J')||(P=='S')
D.display();
```

}

Afile.close( );

}

(1 Mark for opening dash.DAT correctly)
(½ Mark for reading each record from dash.DAT)
(½ Mark for correct loop / checking end of file)
(1/2 Mark for comparing type)
(½ Mark for displaying the matching record)

5 (a) Cartesian product is a relation algebra operation that generates a relation by concating tuples of one relation with the tuples of another relation. If a relation A has m tuples and B has n tuples then the resultant relation A X B will have m X n tuples. *(1 Mark definition and 1 mark for example)* 2
(b) (i) SELECT* from store order by itemno desc; 4

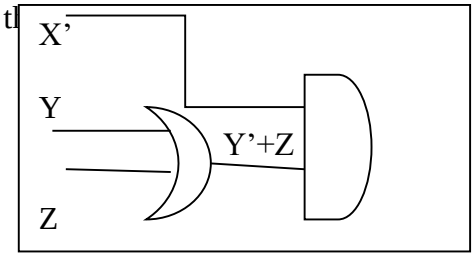
(1 Mark for correct query)
OR
(½ Mark for partially correct answer)
(ii) SELECT SUM(qty) from store;
(1 Mark for correct query)
OR
(½ Mark for partially correct answer)
(iii) SELECT sname , scode,qty,rate FROM store s, supplier p where s.scode=p.scode and scode=22;
(1 Mark for correct query)
OR
(½ Mark for partially correct answer)
(iv) select scode,min(rate) from store group by scode;
1 Mark for correct query)
OR
(½ Mark for partially correct answer)

(c) 2
(i) 3 *(½ Mark for correct output)*
(ii) max 24-Feb-10 min 19-Jan-09 *(½ Mark for correct output)*
(iii) gelpen c premium stationary
(½ Mark for correct output)
(iv)) 880 *(½ Mark for correct output)*

6(a) X+XY =X

INPUT(X)	Y	XY	OUTPUT(X+XY)
0	0	0	0
0	1	0	0
1	0	0	1
1	1	1	1

½ mark for the correct statement. 2
1 and ½ marks for th



(B)

1 mark for the correct diagram.

(C) (P+Q+R). (P+Q+R'). (P'+Q+R')

(1/2 mark for each correct expression)

(D) F(A,B,C,D) = A'B+BD+A'CD

(3 marks for the correct expression)

Q7 (a) LAN Local area network include few kilometer. WAN wide area network covering wide range two cities two countries. (1 mark for correct definition)

(b) (i) Hyper Text Markup Language

(ii) world wide web

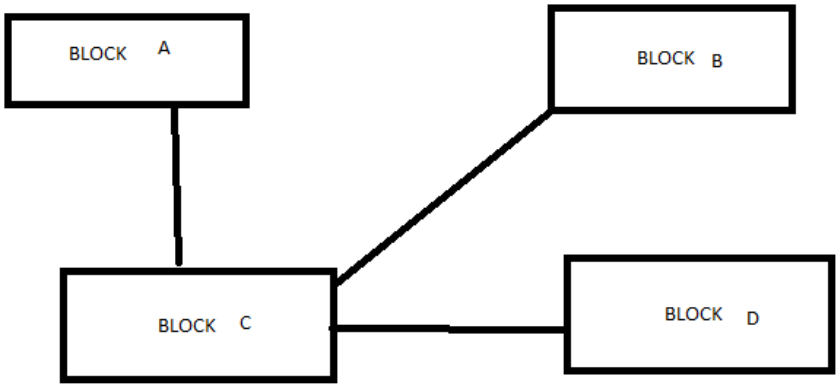
(1/2 mark for each correct answer)

(C)set of rules one has follow. FTP (1/2 mark for each correct answer.)

(D) (I) It is free from the hassle of cabling & tampering

(ii) it can reach to hills and cross sea..(1/2 mark for correct statement)

(e) 1)



(Any of the option) 4

(1 Mark for showing any suitable cable layout)

2) The most suitable place / block to house the server of this organization 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)

3) (i)between c to b *(½ Mark for suggesting suitable place for connecting repeater)*

(ii) in every building *(½ Mark for suggesting suitable place for connecting hub)*

4) 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) Firewall is restriction we put to computer not to allow unauthorized access. 1

(1 Mark for the definition of Spam Mails)

(g) An open source software is freely and liberally licensed . A proprietary software has a copy owner who restrict the user control. 1

(1/2 mark for each correct answer)