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KENDRIYA VIDYALAYA SANGATHAN



Class XII

Computer Science

Higher Order Thinking Skills

2009-10

KENDRIYA VIDYALAYA SANGATHAN

CHENNAI REGION

**QUESTION BANK
HIGHER ORDER THINKING SKILLS
CLASS XII – COMPUTER SCIENCE**

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Salient features of this HOTS study material

1. This study material is in the form of question bank comprising of both solved and unsolved questions from each chapter of the syllabus.
2. It is a collection of a number of challenging questions based on High Order Thinking Skill of students. However, it shall prove to be a helping tool for all types of students.
3. It aims at providing help to very high scorer students who may miss 100 out of 100 because of not being exposed to new type of questions, being used to only conventional types of question, and not paying attention towards the topics which are given in the reference books and syllabus of Computer Science as per CBSE guidelines (For example Relational Algebra in database concepts and extraordinary questions based on pointers in C++ programming).
4. It contains guidelines, hints, and solutions for really challenging questions and topics.
5. It contains a number of fresh/new questions(solved & unsolved), which shall increase the confidence level of the students when they solve them.
6. Such questions shall draw the attention of both the students and the teachers, and the preparation to achieve 100% shall be boosted.

ALL THE BEST TO ALL OUR STUDENTS.....

INDEX

S.No.	Type of Questions	Page No.
1.	Programming in C++	
A.	1 Mark Questions	5-12
B.	2 Marks Questions	13-23
C.	3 Marks Questions	24-36
D.	4 Marks Questions	37-51
E.	Programming in C++ : Answers	52-77
2.	Data Structures	
A.	4 Marks Questions	78-84
B.	Data Structures: Answers	85-99
3.	SQL and Database Concepts.	
A.	1 Mark Questions	100-101
B.	6/8 Marks Questions	102-107
C.	SQL: Answers	108-110
4.	Boolean Algebra	
A.	2 Marks Questions	111-112
B.	3 Marks Questions	113-113
C.	Boolean Algebra: Answers	114-119
5.	Communication and Network Concepts:	
A.	1 Mark Questions	120-120
B.	4 Marks Questions	121-125
C.	Communication and Network Concepts:Answers	126-128

1 Mark Questions Programming in C++

1. Observe the program segment carefully and answer the question that follows:

```
class item
{
int item_no;
char item_name[20];
public:
void enterDetail( );
void showDetail( );
int getItem_no( ){ return item_no;}
};
void modify(item x, int y )
{
fstream File;
File.open( "item.dat", ios::binary | ios::in | ios::out) ;
item i;
int recordsRead = 0, found = 0;
while(!found && File.read((char*) &i , sizeof (i)))
{
recordsRead++;
if(i . getItem_no( ) == y )
{
_____//Missing statement
File.write((char*) &x , sizeof (x));
found = 1;
}
}
if(! found)
cout<<"Record for modification does not exist" ;
File.close() ;
}
```

If the function modify() is supposed to modify a record in the file “ item.dat “, which item_no is y, with the values of item x passed as argument, write the appropriate statement for the missing statement using seekp() or seekg(), whichever is needed, in the above code that would write the modified record at its proper place.

2. Observe the program segment carefully and answer the question that follows:

```
class member
{
int member_no;
char member_name[20];
public:
void enterDetail( );
```

```

void showDetail( );
int getMember_no( ){ return member_no;}
};
void update(member NEW )
{
fstream File;
File.open( "member.dat", ios::binary|ios::in|ios::out) ;
member i;
while(File .read((char*) & i , sizeof (i)))
{
if(NEW . getMember_no( ) == i . getMember_no( ))
{
_____//Missing statement
File.write((char*) &NEW , sizeof (NEW));
}
}
File.close() ;
}

```

If the function update() is supposed to modify the member_name field of a record in the file " member.dat" with the values of member NEW passed as argument, write the appropriate statement for the missing statement using seekp() or seekg(), whichever is needed, in the above code that would write the modified record at its proper place.

3. Observe the program segment carefully and answer the question that follows:

```

class item
{
int item_no;
char item_name[20];
public:
void enterDetails( );
void showDetail( );
int getItem_no( ){ return item_no;}
};
void modify(item x )
{
fstream File;
File.open( "item.dat", _____ ) ; //parameter missing
item i;
while(File .read((char*) & i , sizeof (i)))
{
if(x . getItem_no( ) == i . getItem_no( ))
{
File.seekp(File.tellg( ) – sizeof(i));
File.write((char*) &x , sizeof (x));
}
}
else
File.write((char*) &i , sizeof (i));
}

```

```

}
File.close() ;
}

```

If the function modify() modifies a record in the file “ item.dat “ with the values of item x passed as argument, write the appropriate parameter for the missing parameter in the above code, so as to modify record at its proper place.

4. Observe the program segment carefully and answer the question that follows:

```

class member
{
int member_no;
char member_name[20];
public:
void enterDetails( );
void showDetail( );
int getMember_no( ){ return member_no;}
};
void update(member NEW )
{
fstream File;
File.open( “member.dat”, ios::binary|ios::in|ios::out ) ;
member i;
while(File .read((char*) & i , sizeof (i)))
{
if(NEW . getMember_no( ) = i . getMember_no( ))
{
File.seekp( _____ , ios::cur ) //Parameter Missing
File.write((char*) &NEW , sizeof (NEW));
}
}
File.close() ;
}

```

If the function update() is supposed to modify a record in the file “ member.dat” with the values of member NEW passed as argument, write the appropriate parameter for the missing parameter in the above code, so as to modify record at its proper place.

5. Observe the program segment given below carefully, and answer the question that follows:

```

class Applicant
{
    long AId;                //Applicant’s Id
    char Name[20];          //Applicant’s Name
    float Score;           //Applicant’s Score
public:
    void Enroll();

```

```

        void Disp();
        void MarksScore(); //Function to change Score
        long R_Aid() {return Aid;}
};
void ScoreUpdate(long Id)
{
    fstream File;
    File.open("APPLI.DAT",ios::binarylios::inlios::out);
    Applicant A;
    int Record=0,Found=0;
    while (!Found&&File.read((char*)&C, sizeof(c)))
    {
        if (Id==A.R_Aid())
        {
            cout<<"Enter new Score...";
            cin>>A.MarksScore();
            _____ //statement 1
            _____ //statement 2

            Found = 1;
        }
        Record++;
    }
    if(Found==1) cout<<"Record Updated";
    File.close();
}

```

Write the Statement1 to position the File Pointer at the beginning of the Record for which the Applicant's Id matches with the argument passed, and Statement2 to write the updated Record at that position.

6. Observe the program segment carefully and answer the question that follows:

```

class student
{
int student_no;
char student_name[20];
int mark;
public:
void enterDetail( );
void showDetail( );
void change_mark( ); //Function to change the mark
int getStudent_no( ){ return student_no;}
};
void modify( int y )
{
fstream File;
File.open( "student.dat", ios::binarylios::inlios::out) ;
student i;

```

```

int recordsRead = 0, found = 0;
while(!found && File .read((char*) & i , sizeof (i)))
{
recordsRead++;
if(i . getStudent_no( ) == y )
{
i . change_mark( );
_____//Missing statement 1
_____//Missing statement 2
found = 1;
}
}
if( found == 1)
cout<<"Record modified" ;
File.close() ;
}

```

If the function modify() is supposed to change the mark of a student having student_no y in the file “student.dat”, write the missing statements to modify the student record.

7. Observe the program segment carefully and answer the question that follows:

```

class item
{
int item_no;
char item_name[20];
public:
void enterDetail( );
void showDetail( );
int getItem_no(){ return item_no;}
};
void modify(item x )
{
fstream File;
File.open( "item.dat", ios::binary|ios::in|ios::out );
item i;
while(File .read((char*) & i , sizeof (i))//Statement 1
{
if(x . getItem_no( ) == i . getItem_no( ))
{
File.seekp(File.tellg( ) – sizeof(i));
File.write((char*) &x , sizeof (x));
}
}
File.close() ;
}

```

If the function modify() modifies a record in the file “ item.dat” with the values of item x passed as argument, rewrite statement 1 in the above code using eof() ,

so as to modify record at its proper place.

- 8.. 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.

```
#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);
cout>>Ino;
cin.getline(Item,20);
_____ //Statement 2
File.write((char*)this,sizeof(Item));
File.close();
}
```

9. 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
{
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::binarylios::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;
}

```

10. 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.

```

class Library
{
long Ano;
char Title[20];
int Qty;
public:
void Enter(int);
void Display();
void Buy(int Tqty)
{
Qty+=Tqty;
}
long GetAno( ) { return Ano;}
};
void BuyBook(long BAno. Int BQty)
{
Fstream File;
File.open("STOCK>DAT",ios::binarylios::inlios::out);
int Position=-1;
Library L;
while(Position== -1&&File.read((char*)&L, sizrof(L))
{
If(L.GetAno()==BAno)
{
L.Buy(BQty);
Position=File.teeg()-sizeof(L);
//Line1: To place the file pointer to the required position
_____
;

//Line2: To write the object L on to the binary file

```

```
_____  
}  
If(position==-1)  
cout<<"No updation done as required Ano not found";  
File.close();  
}
```

11. A file named as "STUDENT.DAT" contains the student records, i.e. objects of class student. Write the command to open the file to update a student record. (Use suitable stream class and file mode(s)).
12. A file named as "EMPLOYEE.DAT" contains the employee records, i.e. objects of class employee. Assuming that the file is just opened through the object FILE of fstream class, in the required file mode, write the command to position the put pointer to point to fifth record from the last record.
13. A file named as "EMPLOYEE.DAT" contains the student records, i.e. objects of class employee. Assuming that the file is just opened through the object FILE of fstream class, in the required File mode, write the command to position the get pointer to point to eighth record from the beginning.

2 Marks Questions Programming in C++

1. Rewrite the following codes after removing errors, if any, in the following snippet. Explain each error.

```
#include<iostream.h>
void main( )
{
int x[5], *y, z[5]
for (i = 0; i < 5; i ++
{
x[i] = i;
z[i] = i + 3;
y = z;
x = y;
}
```

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

```
#include <iostream.h>
void main( )
{
int x, sum =0;
cin>>n;
for (x=1;x<100, x+=2)
if x%2=0
sum+=x;
cout<< "sum=" >>sum;
}
```

3. Rewrite the following program after removing the syntactical error(s), if any Underline each correction:

```
#include <iostream.h>
void main( )
{
struct Book
{
char Book_name[20];
char Publisher_name[20];
int Price = 170;
} New Book;
gets(Book_name);
gets(Publisher_name);
}
```

4. 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();
}
```

5. 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);
}
```

6. Rewrite the following program after removing the error(s), if any. Underline each correction.

```
#include <iostream.h>
void main( )
{
int x, sum =0;
cin>>n;
for (x=1;x<100, x+=2)
if x%2=0
sum+=x;
cout<< "sum=" >>sum;
}
```

7. Will the following program execute successfully? If no, state the reason(s) :

```
#include<iostream.h>
#include<stdio.h>
#define int M=3;
void main( )
{
const int s1=10;
int s2=100;
char ch;
getchar(ch);
s1=s2*M;
s1+M = s2;
cout<<s1<<s2 ;
}
```

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

```
#include<iostream.h>
void main()
{
char arr{ } = { 12, 23, 34, 45};
int ptr = arr;
int val = *ptr; cout << *val << endl;
val = *ptr++; cout << val << endl;
val = *ptr : cout << val >> endl;
val = *++ptr; cout << val << endl;
}
```

9. Rewrite the following program after removing the syntactical error (s), if any. Underline each correction.

```
#include<iostream.h>
const int divisor 5;
void main( )
{ Number = 15;
for(int Count=1;Count=<5;Count++,Number -= 3)
if(Number % divisor = 0)
{
cout<<Number / Dividor;
cout<<endl;
}
else
cout<<Number + Dividor <<endl;
}
```

- 10 Rewrite the following program after removing the syntactical error(s) if any. Underline each correction.
- ```
#include<iostream.h>
void main()
{
First = 10, Second = 30;
Jumpto(First;Second);
Jumpto(Second);
}
void Jumpto(int N1, int N2 = 20)
{
N1=N1+N2;
count<<N1>>N2;
}
```
11. Rewrite the following program after removing the syntactical error(s) if any. Underline each correction.
- ```
#include<iostream.h>
const int Max 10;
void main()
{
int Numbers[Max];
Numbers = {20,50,10,30,40};
for(Loc=Max-1;Loc>=10;Loc--)
cout>>Numbers[Loc];
}
```
12. Rewrite the following program after removing the syntactical error(s), if any. Underline each correction.
- ```
#include<iostream.h>
const int Multiple 3;
void main()
{
value = 15;
for(int Counter = 1;Counter = <5;Counter ++, Value -= 2)
if(Value%Multiple == 0)
{
cout<<Value * Multiple;
cout<<endl;
}
else
cout<<Value + Multiple <<endl; }
```
13. Will the following program execute successfully? If not, state the reason(s). 2
- ```
#include<stdio.h>
void main( )
{ int s1,s2,num;
```

```

s1=s2=0;
for(x=0;x<11;x++)
{
cin<<num;
If(num>0)s1+=num;else s2=/num;
}
cout<<s1<<s2; }

```

14. Identify the errors if any. Also give the reason for errors.

```

#include<iostream.h>
void main()
{
const int i =20;
const int * ptr=&i;
(*ptr)++;
int j=15;
ptr =&j;
}

```

15. Identify the errors if any. Also give the reason for errors.

```

#include<iostream.h>
void main()
{
const int i =20;
const int * const ptr=&i;
(*ptr)++;
int j=15;
ptr =&j;
}

```

16. Identify errors on the following code segment

```

float c[ ]={ 1.2,2.2,3.2,56.2};
float *k,*g;
k=c;
g=k+4;
k=k*2;
g=g/2;
cout<<"*k="<<*k<<"*g="<<*g;

```

- 17.. Write the output of the following program. 2

```

void main( )
{
int x=5,y=5;
cout<<x- -;
cout<<" ";
cout<- - x;
}

```

```

cout<<" ";
cout<<y- -<<" "<<- -y;
}

```

18. Predict the output of the following code:

```

#include<iostream.h>
#include<conio.h>
void main()
{
int arr[] = { 12, 23, 34, 45 };
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = *ptr++; cout << val << endl;

val = *ptr; cout << val << endl;
val = *++ptr; cout << val << endl;
}

```

19. Find the output of the following code.

```

#include<iostream.h>
#include<conio.h>
void main()
{
int arr[] = { 12, 23, 34, 45 };
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = *ptr++; cout << val << endl;

val = *ptr; cout << val << endl;
val = *++ptr; cout << val << endl;
val = ++*ptr; cout << val << endl;
}

```

- 20.

```

#include<iostream.h>
#include<conio.h>
void main()
{
int arr[] = { 12, 23, 34, 45 };
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = (*ptr)++; cout << val << endl;
val = *ptr; cout << val << endl;
val = *++ptr; cout << val << endl;
}

```

21.

```
#include<iostream.h>
#include<conio.h>
void main()
{
int arr[] = {2, 33, 44, 55};
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = *++ptr ; cout << val << endl;
val = *ptr; cout << val << endl;
val = * ptr++; cout << val << endl;
}
```
22. Write the output of the following program:

```
#include<iostream.h>
#include<conio.h>
void main( )
{
clrscr( );
int a =32;
int *ptr = &a;
char ch = 'A';
char *cho=&ch;
cho+=a; // it is simply adding the addresses.
*ptr + = ch;
cout<< a << "" <<ch<<endl;
}
```
23. Write the output of the following program:

```
#include<iostream.h>
#include<conio.h>
void main( )
{
clrscr( );
int a =32;
int *ptr = &a;
char ch = 'A';
char *cho=&ch;
*cho+=a; // it is adding the values.
cout<< a << "" <<ch<<endl;
}
```
24. Write the output of the following program:

```
#include<iostream.h>
#include<conio.h>
```

```

void main( )
{
clrscr( );
int a =32;
int *ptr = &a;
char ch = 'A';
char *cho=&ch;
*cho+=a;
*ptr += ch;
cout<< a << "" <<ch<<endl;
}

```

25. Write a function in C++ to print the count of the word the as an independent word in a text file STORY.TXT.
For example, if the content of the file STORY.TXT is
There was a monkey in the zoo.
The monkey was very naughty.
Then the output of the program should be 2.
26. Assume a text file “coordinate.txt” is already created. Using this file create a C++ function to count the number of words having first character capital.

Example:

Do less Thinking and pay more attention to your heart. Do Less Acquiring and pay more Attention to what you already have. Do Less Complaining and pay more Attention to giving. Do Less criticizing and pay more Attention to Complementing. Do less talking and pay more attention to SILENCE.

Output will be : Total words are 16

27. Write a function in C++ to count the number of lines present in a text file “STORY.TXT”.
28. Write a function in C++ to count the number of alphabets present in a text file “NOTES.TXT”.
29. Write a function in C++ to write the characters entered through the keyboard into the file“myfile.txt”, until a ‘#’ character is entered.

30. **Answer the questions (i) and (ii) after going through the following class:**

```

class Seminar
{
int Time;
public:

```

```

Seminar() //Function 1
{
Time=30;cout<<"Seminar starts now"<<endl;
}
void Lecture() //Function 2
{
cout<<"Lectures in the seminar on"<<endl;
}
Seminar(int Duration) //Function 3
{
Time=Duration;cout<<"Seminar starts now"<<endl;
}
~Seminar()
//Function 4
{
cout<<"Vote of thanks"<<endl;
}
};

```

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.

31. Answer the questions (i) and (ii) after going through the following program

```

#include<iostream.h>
#include<string.h>
class Bazar
{
    char Type[20];
    char Product[20];
    int Qty;
    float Price;
    Bazar() //Function 1
    {
        strcpy (Type,"Electronic");
        strcpy (Product,"Calculator");
        Qty = 10;
        Price=225;
    }

public:
    void Disp() //Function 2
    {
        cout<<Type<<"-"<<Product<<":"<<Qty
        <<"@"<<Price<<endl;
    }

};

```

```

void main( )
{
    Bazar B;           //Statement 1
    B.Disp();         //Statement 2
}

```

- (i) Will Statement 1 initialize all the data members for object B with the values given in the Function 1? (Yes OR No). Justify your answer suggesting the correction(s) to be made in the above code.
- (ii) What shall be the possible output when the program gets executed? (Assuming, if required – the suggested correction(s) are made in the program)

32. Given a class as follows:

```

class Match
{
int Time;
int Points;
public:
Match(int y, int p) //Conctructor1
{
Time=y;
Points =p;
}
Match(Match &M);    // Constructor 2
};

```

- (i) Create an object, such that it invokes Constructor 1.
- (ii) Write complete definition for Constructor 2.

33. Answer the questions (i) and (ii) after going through the following class:

```

class player
{
    int health;
    int age;
public:
    player() { health=7; age=17 }           //Constructor1
    player(int h, int a) {health =h; age = a ; } //Constructor2
    player( player &p) { }                 //Constructor3
    ~player() { cout<<"Memory Free"; }    //Destructor
};
void main(){
    player p1(9,26);           //Statement1
    player p3 = p1;           //Statement3
}

```

- (i) When p3 object created specify which constructor invoked and why?
- (ii) Write complete definition for Constructor3?

- 34.. Assume a text file “Test.TXT” is already created. Using this file, create a function to create three files “LOWER.TXT” which contains all the lowercase vowels and “UPPER.TXT” which contains all the uppercase vowels and “DIGIT.TXT” which contains all digits.
35. Assume that a text file named text1.txt already contains some text written into it, write a function named vowelwords(), that reads the file text1.txt and create a new file named text2.txt, which shall contain only those words from the file text1.txt which don't start with an uppercase vowel(i.e., with 'A', 'E', 'I', 'O', 'U'). for example if the file text1.txt contains:
Take One Apple And one glass milk daily.
Then the file text2.txt shall contain :
Take one glass milk daily.
36. Assume a text file “Test.TXT” is already created. Using this file, create a function to create three files “LOWER.TXT” which contains all the lowercase vowels and “UPPER.TXT” which contains all the uppercase vowels and “DIGIT.TXT” which contains all digits.
37. Write a function in C++ to calculate the average word size in a text file “Report.txt”, each word is separated by single space or full stop.
38. Create a function FileLowerShow() in c++ which take file name(text files)as a argument and display its all data into lower case.

3 Marks Questions Programming in C++

1. Write the output of the following program:
- ```
#include<iostream.h>
#include<conio.h>
int a =3;
void demo(int &x, int y, int *z)
{
a+= x;
y*=a;
*z = a+y;
cout<< a << " " << x << " " << y << " " << z << endl;
}
void main()
{
clrscr();
int a = 2, b =5;
demo(::a,a, &b);
cout<< ::a<< " " <<a<< " " << b<<endl;
}
```

2. Find the output of the following :
- ```
#include<iostream.h>
#include<conio.h>
#include<stdio.h>
#include<string.h>
#include<ctype.h>

void main()
{
char *Name= "IntRAneT";
for(int x =0; x<strlen(Name); x++)
{
if(islower(Name[x]) )
Name[x]=toupper(Name[x] );
else
if(isupper(Name[x]) )
if (x%2 ==0)
Name[x]=tolower(Name[x]);
else
Name[x]=Name[x-1];
}
puts(Name);
}
```

- 3.. Give the output of the following program:
- ```

void main()
{
int x [] = { 10, 20, 30, 40, 50};
int *p, **q, *t;
p = x;
t = x + 1;
q = &t;
cout << *p << "\t" << **q << "\t" << *t++;

```
- 4.. What will be the output of the program( Assume all necessary header files are included) :
- ```

#include<iostream.h>
void print (char * p )
{
p = "pass";
cout<<"value is "<<p<<endl;
}
void main( )
{
char * x = "Best of luck";
print(x);
cout<<"new value is "<<x<<endl;
}

```
5. What will be the output of the following program
- ```

#include<iostream.h>
#include<ctype.h>
#include<conio.h>
#include<string.h>
void changestring(char text[], int &counter)
{
char *ptr = text;
int length=strlen(text);
for(;counter<length-2;counter+=2, ptr++)
{
(ptr+counter) = tolower((ptr+counter));
}
}
void main()
{
clrscr();
int position = 0;
char message[]= "POINTERS FUN";
changestring(message, position);
cout<<message<< "@" <<position;
}

```
6. Find the output of the following program : 2

```

#include<iostream.h>
void main()
{
int Numbers[] = {2,4,8,10};
int *ptr = Numbers;
for (int C = 0; C<3; C++)
{
cout<< *ptr << "@";
ptr++;
}
cout<<endl;
for(C = 0; C<4; C++)
{
(*ptr)*=2;
--ptr;
}
for(C = 0; C<4; C++)
cout<< Numbers [C]<< "#";
cout<<endl;
}

```

7. What is the output of the following program if all the necessary header files have been included:

```

char *Name= "a ProFile";
for(int x =0; x<strlen(Name); x++)
{
if(islower(Name[x])
Name[x]=toupper(Name[x]);
else
if(isupper(Name[x])
if (x%2!=0)
Name[x]=tolower(Name[x-1]);
else
Name[x]--;
}
cout<<Name<<endl;

```

8. Find the output of the following program:

```

#include<iostream.h>
void main()
{
int U=10,V=20;
for(int I=1;I<=2;I++)
{
cout<<"[1]"<<U++<<"&"<<V - 5 <<endl;
cout<<"[2]"<<++V<<"&"<<U + 2 <<endl;
}

```

```
}
```

9. 

```
#include<stdlib.h>
#include<iostream.h>
void main()
{
randomize();
char City[][10]={“DEL”,“CHN”,“KOL”,“BOM”,“BNG”};
int Fly;
for(int I=0; I<3;I++)
{
Fly=random(2) + 1;
cout<<City[Fly]<<“:”;
}
}
```

Outputs:

- (i) DEL : CHN : KOL:
- (ii) CHN: KOL : CHN:
- (iii) KOL : BOM : BNG:
- (iv) KOL : CHN : KOL:

10. Find the output of the following program.

```
#include<iostream.h>
void Withdef(int HisNum=30)
{
for(int I=20;I<=HisNum;I+=5)
cout<<I<<“,”;
cout<<endl;
}
void Control(int &MyNum)
{
MyNum+=10;
Withdef(MyNum);
}
void main()
{
int YourNum=20;
Control(YourNum);
Withdef();
cout<<“Number=”<<YourNum<<endl;
```

11. Find the output of the following program:

```
#include<iostream.h>
void main()
{
long NUM=1234543;
int F=0,S=0;
```

```

do
{
int R=NUM % 10;
if (R %2 != 0)
F += R;
else
S += R;
NUM /= 10;
} while (NUM>0);
cout<<F-S;
}

```

12. Observe the following program GAME.CPP carefully, if the value of Num entered by the user is 14, choose the correct possible output(s) from the options from (i) to (iv), and justify your option.

```

//Program:GAME.CPP
#include<stdlib.h>
#include<iostream.h>
void main()
{
randomize();
int Num,Rndnum;
cin>>Num;
Rndnum=random(Num)+7;
for(int N=1;N<=Rndnum;N++)
cout<<N<<" ";
}

```

Output Options:

- (i) 1 2 3 (ii) 1 2 3 4 5 6 7 8 9 10 11  
 (iii) 1 2 3 4 5 (iv) 1 2 3 4

13. Give the output of the following program:

```

#include<iostream.h>
#include<conio.h>
int g=20;
void func(int &x,int y)
{
x=x-y;
y=x*10;
cout<<x<<','<<y<<'\n';
}
void main()
{
int g=7;
func(g,::g);
cout<<g<<','<<::g<<'\n';
}

```

```

func(::g,g);
cout<<g<<','<<::g<<'\n';
}

```

14. Find the output of the following program:

```

#include<iostream.h>
struct Box {
int Len, Bre, Hei;
};
void Dimension(Box B)
{
cout << B.Len << " X " << B.Bre << " X ";
cout << B.Hei << endl;
}
void main ()
{
Box B1 = { 10, 20, 8 }, B2, B3;
++B1.Hei;
Dimension (B1); //first calling
B3= B1;
++B3.Len;
B3.Bre++;
Dimension (B3); // second function calling
B2= B3;
B2.Hei += 5;
B2.Len - = 2;
Dimension (B2); // third function calling
}

```

15. Find the output of the following program:

```

#include <iostream.h>
struct PLAY
{ int Score, Bonus;
};

void Calculate(PLAY &P, int N=10)
{
P.Score++;P.Bonus+=N; }

void main()
{
PLAY PL={ 10,15};
Calculate(PL,5);
cout<<PL.Score<<":."<<PL.Bonus<<endl;
Calculate(PL);
}

```

```

cout<<PL.Score<<": "<<PL.Bonus<<endl;
Calculate(PL,15);
cout<<PL.Score<<": "<<PL.Bonus<<endl;
}

```

- 16.. In the following C++ program , what will the maximum and minimum value of r generated with the help of random function.

```

#include<iostream.h>
#include<stdlib.h>
void main()
{
 int r;
 randomize();
 r=random(20)+random(2);
 cout<<r;
}

```

17. Study the following program and select the possible output from it:

```

#include<iostream.h>
#include<stdlib.h>
const int Max=3;
void main()
{
 randomize();
 int Number;
 Number=50+random(Max);
 for(int P=Number; P >=50;P- -)
 cout<<P<<"#";
 cout<<endl;
}

```

- (i) 53#52#51#50#
- (ii) 50#51#52#
- (iii) 50#51#
- (iv) 51#50#

18. Find the output of the following program:

```

#include<iostream.h>
void main()
{
 int A[]={10,20,30,40,50};
 int *p=A;
 while(*p<30)
 {

```

```

if(*p%3!=0)
*p = *p+2;
else
*p=*p+1;
*p++;
}
for(int J=0;J<=4;J++)
{
cout<<A[J]<< "@";
if(J%3 == 0)
cout<<endl;
}
cout<<A[4]*3<<endl;
}

```

19. Find the output of the following program:

```

#include <iostream.h>
void Changethecontent(int Arr[], int Count)
{
for (int C=1;C<Count;C++)
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] <<'#'; }

```

20. 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

21. 

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

22. Find the output of the following code.

```
#include<iostream.h>
#include<conio.h>
void main()
{
clrscr();
int a =32;
int *ptr = &a;
char ch = 'D';
char *cho=&ch;
*cho+=a;
*ptr += ch;
*ptr *= 3;
ch=ch-30;
cout<< a << "" <<--ch<<endl;
}
```

23. Give the output of the following program.

```
#include<iostream.h>
```

```

void main()
{
char *p="Difficult";
char c;
c=*p++;
cout<<c<<c++<<"+c<<"\n";
char d =c+1;
cout<<d++<<"\n";
cout<<d<<"\n";
cout<<*p;
}

```

24. Given a binary file PHONE.DAT, containing records of the following structure type

```

class Phonlist
{
 char Name[20];
 char Address[30];
 char AreaCode[5];
 char PhoneNo[15];
public:
 void Register();
 void Show();
 int CheckCode(char AC[])
 {
 return strcmp(AreaCode,AC);
 }
};

```

Write a function TRANSFER ( ) in C++, that would copy all those records which are having AreaCode as "DEL" from PHONE.DAT to PHONBACK.DAT.

25. Given a binary file TELEPHON.DAT, containing records of the following class

```

Directory:
class Directory
{
 char Name[20];
 char Address[30];
 char AreaCode[5];
 char Phone_No[15];
public:
 void Register();
 void Show();
 int CheckCode(char AC[])
 {
 return strcmp(AreaCode,AC[]);
 }
};

```

Write a function COPYABC in C++ that would copy only those records having AreaCode as “123” from TELEPHON.DAT to TELEBACK.DAT.

26. Given a binary file SPORTS.DAT, containing records of the following structure type :

```
struct Sports
{
char Event[20];
char Participant[10][30];
};
```

Write a function in C++ that would read contents from the file SPORTS.DAT and creates a file named ATHLETIC.DAT copying only those records from SPORTS.DAT where the event name is “Athletics”.

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

28. 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.

```
class STUD
{
 int Rno;
 char Name[20];
public:
 void Enter()
{
cin>>Rno;gets(Name);
}
 void Display(){cout<<Rno<<Name<<endl;}
};
```

29. Write a function in C++ to read and display the detail of all the members whose membership type is ‘L’ or ‘M’ from a binary file “CLUB.DAT”. Assuming the binary file “CLUB.DAT” is containing objects of class CLUB, which is defined as follows:

```

class CLUB
{
 int Mno.
 char Mname[20];
 char Type; //Member Type: L Life Member M Monthly member G Guest
public:
 void Register();
 void Display();
 char whatType() { return type; }
};

```

30. Assuming the class DRINKS defined below, write functions in C++ to perform the following :

- (i) write the objects of DRINKS to binary file.
- (ii) Read the objects of DRINKS from binary file and display them on screen when Dname has value “Pepsi”.

```

class DRINKS
{
 int DCode;
 char DName[13];
 int Dsize; // size in litres.
 float Dprice;
}
public:
void getdrinks()
{ cin>>DCode>>DName>>Dsize>>Dprice;}

void showdrinks()
{ cout<< DCode<<DName<,<Dsize<,<Dprice;}
char *getname()
{ return Dname;}
};

```

31. Write a function in C++ to add a new object in a binary file “Customer.dat”. assume the binary file is containing the objects of the following class:

```

class customer
{
 int CNo; Char CName[21];
public:
void Enterdata()
{ cin>>CNo.;gets(CName);}
void dispdata()
{ cout<<CNo.<<CName;}
};

```

32. Assuming the class DRINKS defined below, write functions in C++ to perform the following :

(iii) Write the objects of DRINKS to binary file.

(iv) Read the objects of DRINKS from binary file and display them on screen when DCode has value 1234.

```
class DRINKS
{
 int DCode;
 char DName[13];
 int Dsize; // size in litres.
 float Dprice;
}
public:
void getdrinks()
{ cin>>DCode>>DName>>Dsize>>Dprice;}

void showdrinks()
{ cout<< DCode<<DName<,<Dsize<,<Dprice;}
int getcode()
{ return Dcode;}
};
```

## 4 Marks Questions

### Programming in C++

1. 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 DISPTTEST() to allow user to view the content of all the data members

2. 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 |
|--------------------------------|------|
| $\leq 1000$                    | 500  |
| more than 1000 and $\leq 2000$ | 1100 |
| 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

3. Define a class Clothing in C++ with the following descriptions:

Private Members:

Code of type string  
Type of type string  
Size of type integer  
Material of type string  
Price of type float

A function Calc\_Price() which calculates and assigns the value of Price as follows:

For the value of Material as "COTTON"

|         |             |
|---------|-------------|
| Type    | Price (Rs.) |
| TROUSER | 1500        |
| SHIRT   | 1200        |

For Material other than “COTTON” the above mentioned Price gets reduced by 25%.

Public Members:

A constructor to assign initial values of Code, Type and Material with the word “NOT ASSIGNED” and Size and Price with 0.

A function Enter () to input the values of the data members Code, Type, Size and Material and invoke the CalcPrice() function.

A function Show () which displays the content of all the data members for a Clothing.

4. Define a class Travel in C++ with the description given below:

Private Members:

T\_Code of type string  
 No\_of\_Adults of type integer  
 No\_of\_Children of type integer  
 Distance of type integer  
 TotalFare of type float

Public Members:

A constructor to assign initial values as follows :  
 T\_Code with the word “NULL”  
 No\_of\_Adults as 0  
 No\_of\_Children as 0  
 Distance as 0  
 TotalFare as 0

A function AssignFare( ) which calculates and assigns the value of the data member TotalFare as follows :

For each Adult

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

For each Child the above Fare will be 50% of the Fare mentioned in the above table.

For example :

If Distance is 750, No\_of\_Adults = 3 and No\_of\_Children = 2

Then TotalFare should be calculated as

No\_of\_Adults \* 300 + No\_of\_Children \* 150

i.e.  $3 * 300 + 2 * 150 = 1200$

- A function EnterTraveK ) to input the values of the data members T\_Code, No\_of\_Adults, No\_of\_Children and Distance; and invoke the AssignFare( ) function.
- A function ShowTraveK) which displays the content of all the data members for a Travel.

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

```
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
{
char Voucher_No[10];
char Sales_Date[8];
public:
SHOP();
void Sales_Entry();
```

```
void Sales_Detail();
}
```

- (iii) Write the names of data members which are accessible from objects belonging to class CUSTOMER.
- (iv) Write the names of all the member functions which are accessible from objects belonging to class SALESMAN.
- (v) 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 SHOP?

6. 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
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.
- (iii) How many bytes will be required by an object belonging to class AUTHOR?

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

```
class Dolls
{
 char DCode[5];
protected:
 float Price ;
 void CalcPrice(float);
public:
 Dolls();
 void DInput();
 void DShow();
};
class SoftDolls: public Dolls
{
 char SDName[20];
 float Weight;
public:
 SoftDolls();
 void SDInput();
 void SDSHOW();
};
class ElectronicDolls: public Dolls
{
 char EDName[20];
 char BatteryType[10];
 int Battieries;
public:
 ElectronicDolls ();
 void EDInput();
 void EDSHOW();
};
```

- (i) Which type of Inheritance is shown in the above example?
- (ii) How many bytes will be required by an object of the class ElectronicDolls?
- (iii) Write name of all the data members accessible from member functions of the class SoftDolls.
- (iv) Write name of all the member functions accessible by an object.

8 consider the following class declaration and answer the question below :

```
class university {
int noc;
protected;
char uname[25];
public:
university();
char state[25];
void enterdata();
void displaydata();
};
class college:public university{
int nod;
char cname[25];
protected:
void affiliation();
public:
college();
void enrol(int ,int);
void show();
};
class department:public college{
char dname[25];
int nof;
public:
department();
void display();
void input();
};
```

- (i) Which class's constructor will be called first at the time of declaration of an object of class department?
- (ii) How many bytes does an object belonging to class department require?

(iii) Name the member function(s), which are accessed from the object of class department.

(iv) Name the data member, which are accessible from the object of class college.

9 Answer the questions(i) to (iv) based on the following :

```
class cloth
{
char category[5];
char description[25];
protected:
float price;
public:
void Entercloth();
void dispcloth();
};
class Design : protected cloth
{
char design[21];
protected:
float cost_of_cloth;
public:
int design_code;
Design();
void Enterdesign();
void dispdesign();
};
class costing : public cloth
{
float designfee;
float stiching;
float cal_cp();
protected:
float costprice;
float sellprice;
public:
void Entercost();
void dispcost();
costing () { };
};
```

- (i) Write the names of data members which are accessible from objects belonging to class cloth.
- (ii) Write the names of all the members which are accessible from objects belonging to class Design.
- (iii) Write the names of all the data members which are accessible from member functions of class costing.

(iv) How many bytes will be required by an object belonging to class Design?

10. Answer the questions(i) to (iv) based on the following :

```
class Regular
{
char SchoolCode[10];
public:
void InRegular();
void OutRegular();
};
class Distance
{
char StudyCentreCode[5];
public:
void InDistance();
void OutDistance();
};
class Course : public Regular, private Distance
char Code[5];
float Fees;
int Duration;
public:
void InCourse();
void OutCourse();
};
```

- (i) Which type of Inheritance is shown in the above example?
- (ii) Write names of all the member functions accessible from Outcourse function of class Course.
- (iii) Write name of all the members accessible through an object of the Class Course.
- (iv) Is the function InRegular( ) accessible inside the function InDistance ( )? Justify your answer.

11. Define a class named ADMISSION in C++ with the following descriptions:

Private members:

AD\_NO integer (Ranges 10 - 2000)

NAME Array of characters (String)

CLASS Character

FEES Float

Public Members:

- Function Read\_Data ( ) to read an object of ADMISSION type
- Function Display( ) to display the details of an object
- Function Draw\_Nos ( ) to choose 2 students randomly and display the details. Use random function to generate admission nos to match with AD\_NO.

12. Define a class named MOVIE in C++ with the following description:

Private members

HALL\_NO integer

MOVIE\_NAME Array of characters (String)

WEEK integer (Total number of weeks the same movie is shown)

WEEK\_COLLECTION Float

TOTAL\_COLLECTION Float

Public Members

- Function Read\_Data( ) to read an object of ADMISSION type
- Function Display( ) to display the details of an object
- Function Update( ) to update the total collection and Weekly collection once in a week changes. Total collection will be incremented by Weekly collection and Weekly collection is made Zero

13. Consider the following declarations and answer the questions given below:

```
class Mydata
```

```
{ protected:
```

```
int data;
```

```
public:
```

```
void Get_mydata(int);
```

```
void Manip_mydata(int);
```

```
void Show_mydata(int);
```

```
Mydata();
```

```
~Mydata();
```

```
};
```

```
class Personal_data
```

```
{
```

```
protected:
```

```
int data1;
```

```
public:
```

```
void Get_personaldata(int);
```

```
void Show_personaldata(int);
```

```
Personal_data1();
```

```
~Personal_data1();
```

```
};
```

```
class Person: public Mydata, Personal_data
```

```
{
```

```
public:
```

```
void Show_person(void);
```

```
Person();
```

```
~Person();
```

```
};
```

i) How many bytes will be required by an object belonging to class Person?

ii) Which type of inheritance is depicted in the above example?

iii) List the data members that can be accessed by the member function

Show\_person( ).

iv) What is the order of constructor execution at the time of creating an object of class Person?

14. Answer the questions (i) to (iv) based on the following:

```
class Book
{
int year_publication;
char title[25];
float price;
public:
Book();
void input_data();
void output_data();
};
class Tape
{
char comp_name[20];
protected:
char comp_addr[35];
public:
Tape();
void read_data();
void show_data();
};
class Publication : private Book , public Tape
{
int no_copies;
public:
Publication();
void Pub_Entry();
void Pub_Detail();
};
```

- (i) Write the names of data members which are accessible from objects belonging to class Publication.
- (ii) Write the names of all the member functions which are accessible from objects belonging to class Tape.
- (iii) Write in which order the constructors will be invoked when an object of class Publication is created .
- (iv) How many bytes will be required by an object belonging to class Publication?

15. Answer the questions (i) to (iv) based on the following code:

```
class vehicle
{
int wheels;
protected:
int passenger;
public:
void inputdata();
void outputdata();
};
```

```

class heavyvehicle : protected vehicle
{
int diesel_petrol;
protected:
int load;
public:
void readdata(int, int);
void writedata();
};
class bus : private heavyvehicle
{
char make[20];
public:
void fetchdata();
void displaydata();
};

```

- i) Name the base class and derived class of heavyvehicle class.
- ii) Name the data member(s) that can be accessed from the function displaydata( ).
- iii) How many bytes will be required by an object of vehicle and heavyvehicle classes respectively?
- iv) Is the member function outputdata( ) accessible to the objects of the class heavyvehicle?

16.. Consider the following declarations and answer the questions given below:

```

class Animal
{
int leg;
protected:
int tail;
public:
void INPUT (int);
void OUT ();
};
class wild : private Animal
{
int carniv;
protected:
int teeth;
Public:
void INDATA (int, int)
void OUTDATA();
};
class pet : public Animal
{
int herbiv;
public:
void Display (void);
};

```

- (i) Name the base class and derived class of the class wild.
- (ii) Name the data member(s) that can be accessed from function Display ( ).
- (iii) Name the member function(s), which can be accessed from the objects of class pet.
- (iv) Is the member function OUT ( ) accessible by the objects of the class wild?

17. Answer the questions (i) to (iv) based on the following class declaration:

```

class Medicine
{
char category[10];
char Date_of_Manufacture[10];
char Date_Of_Expiry[10];
protected:
char company[20];
public:
int x,y;
Medicine();
void Enter();
void Show();
};
class Tablet :protected Medicine
{
protected:
char tablet_name[30];
char volume_label[20];
void disprin();
public:
float price;
Tablet();
void enterdet();
void showdet();
};
class PainReliever : public Tablet
{
int Dosage_units;
long int tab;
char effects[20];
protected:
I int use_within_Days;
public :
PainReliever();
void enterpr();
showpr();
};

```

- (i) How many bytes will be required by an object of class Drug and an object of class PainReliever respectively.
- (ii) Write names of all the data members which are accessible from the object of class PainReliever.
- (iii) Write names of all member functions which are accessible from objects of class

PianReliever.

(iv) Write the names of all the data members which are accessible from the functions enterpr().

18. Answer the questions (i) to (iv) based on following code:

```
class World
{
int H;
protected
int s;
public:
void INPUT(int);
void OUTPUT();
};
class Country : private World
{
int T;
protected:
int U;
public :
void INDATA(int, int);
void OUTDATA();
};
class State : Public Country
{
int M;
public :
void DISPLAY(void);
};
```

(i) Name the base class and derived class of the class Country.

(ii) Name the data member that can be accessed from function DISPLAY( )

(iii) Name the member functions, which can be accessed from the objects of class State.

(iv) Is the member function OUTPUT() accessible by the objects of the class Country ?

19. Answer the questions (i) to (v) based on the following code :

```
class Employee
{
int id;
protected:
char name[20];
char doj[20];
public :
Employee();
~Employee();
void get();
void show();
};
class Daily_wager : protected Employee
```

```

{
int wphour;
protected :
int nofhworked;
public :
void getd();
void showd();
};
class Payment : private Daily_wager
{
char date[10];
protected :
int amount;
public :
Payment();
~Payment();
void show();
};

```

- (i) Name the member functions, which are accessible by the objects of class Payment.
- (ii) From the following, Identify the member function(s) that can be called directly from the object of class Daily\_wager class show( ), getd( ), get( )
- (iii) Find the memory size of object of class Daily\_wager.
- (iv) Is the constructors of class Employee will copied in class Payment Due to Inheritance?

20. Answer the questions (i) to (iii) based on the following code:

```

class toys
{
char Code;
char Manufacturer [10];
public:
toys();
void Read_toy_details ();
void Disp_toy_details();
};
class electronic : public toys
{
int no_of_types;
float cost_of_toy;
public:
void Read_elect_details ();
void Disp_elect_details ();
};
class infants : private electronic
{
int no_of_buyers;

```

```
char delivery date[10];
public:
void Read_infant_details ();
void Disp_infant_details();
};
void main ()
{
 infants MyToy;
}
```

- (a) Mention the member names which are accessible by MyToy declared in main ( ) function.
- (b) What is the size of MyToy in bytes?
- (c) Mention the names of functions accessible from the member function Read\_infant\_details () of class printer.
- (d) Which type of inheritance shown in the above code?

## ANSWERS: 1 MARK Questions

### PROGRAMMING IN C++

1.

Using seekp()

```
File.seekp(Record * sizeof(i)); //object name
```

OR

```
File.seekp(Record * sizeof(item)); // class name
```

OR

```
File.seekp(File.tellg() - sizeof(i));
```

OR

```
File.seekp(File.tellg() - sizeof(item));
```

OR

```
File.seekp(-sizeof(i), ios::cur);
```

Using seekg()

OR

```
File.seekg(Record * sizeof(i));
```

OR

```
File.seekg(Record * sizeof(item));
```

OR

```
File.seekg(-sizeof(i), ios::cur);
```

2. Same as previous question. Just change the class name or object name.

3. You have to complete the syntax of file opening.

```
File.open("item.dat", ios::binaryios::inios::out);
```

4. `File.seekp( -sizeof(i), ios::cur );`

5. Statement 1:

```
File.seekp(Record * sizeof(A)); //object name
```

OR

```
File.seekp(Record * sizeof(Applicant)); // class name
```

```
File.seekp(File.tellg() - sizeof(A));
```

OR

```
File.seekp(File.tellg() - sizeof(Applicant));
```

OR

```
File.seekp(-sizeof(A), ios::cur);
```

```
File.seekg(Record * sizeof(A));
```

OR

```
File.seekg(Record * sizeof(Applicant));
```

OR

```
File.seekg(-sizeof(A), ios::cur);
```

Statement 2:

```
File.write((char*)&A, sizeof(A));
```

OR

```
File.write((char*)&A, sizeof(Applicant));
```

6. Same as previous question. In this question it is not defined explicitly that the function of statement1 and statement2 but here first we have to move file pointer at the appropriate place ( statement1) and the write the record on that location(statement2) Write any one of statement1 and statement 2 from Q.5.
7. 

```
while(!File.eof ()) ;{
(File .read((char*) & i , sizeof (i));
:
:
```
8. 

```
File.seekg(RecNo*sizeof(Item)); //Statement 1
File.seekp(RecNo*sizeof(Item)); //Statement 2
```
9. 

```
File.seekg(0,ios::end); //Statement 1
File.tellg(); //Statement 2
```
10. Line1:  

```
File.seekp(Position);
OR
File.seekp(-sizeof(L), ios::cur);
OR
File.seekg(-sizeof(L), ios::cur);
OR
File.seekg(Position);
```

  
Line2:  

```
File.write((char*)&L, sizeof(L));
OR
File.write((char*)&L, sizeof(Library));
```
11. 

```
fstream inof(“STUDENT.DAT”,ios::inlios::outlios::binary)
or
fstream inof;
inof.open(“STUDENT.DAT”,ios::inlios::outlios::binary)
```
12. 

```
File.seekp(-5,ios::end);
```
13. 

```
File.seekg(8,ios::beg);
```

## ANSWERS: 2 MARKS PROGRAMMING IN C++

1. In this question first we have to write complete program after removing all the errors.

```
#include<iostream.h>
void main()
{
int x[5], *y, z[5] ; // semi colon must be used here
for (int i = 0; i < 5; i ++) // data type of i and closing) should be there.
{
x[i] = i;
z[i] = i + 3;
*y = z; // wrong assignment (integer to pointer)
x = *y; // wrong assignment (Pointer to integer)
}
```

2. Corrected code:

```
#include <iostream.h>
void main()
{
int x, sum =0;
cin >> x; // x in place of n
for (x=1; x<100 ;x+=2) //semicolon
if x%2== 0 // double =due to assignment
sum+=x;
cout<< "sum=" <<sum; //<<
}
```

3. #include <iostream.h>

```
#include<stdio.h>
void main()
{
struct Book
{
char Book_name[20];
char Publisher_name[20];
int Price;
} Book New;
gets(New. Book_name);
gets(New. Publisher_name);
}
```

4. #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();
}

```

```

5. #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);
 }

```

```

6. #include <iostream.h>
 void main()
 {
 int x, sum =0;
 cin >> x; // x in place of n
 for (x=1; x<100 ;_x+=2) //semicolon
 if x%2= = 0 // double =
 sum+=x;
 cout<< "sum=" << sum; //<<
 }

```

```

7. #include<iostream.h>
 #include<stdio.h>
 #define int M=3;
 void main()
 {
 const int s1=10;
 int s2=100;
 char ch;
 getchar(ch);
 s1=s2*M;
 s1+M = s2;
 cout<<s1<<s2 ;

```

- ```

}

```
8.

```

include<iostream.h>
void main()
{
int arr[ ] = { 12, 23, 34, 45};
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = *ptr++; cout << val << endl;
val = *ptr ; cout << val >> endl;
val = *++ptr; cout << val << endl;
}

```
 9.

```

#include<iostream.h>
const int divisor= 5;
void main( )
{
int Number = 15;
for(int Count=1;Count<=5;Count++,Number -= 3)
if(Number % divisor == 0)
{
cout<<Number / Dividor;
cout<<endl;
}
else
cout<<Number + Dividor <<endl; }

```
 10.

```

#include<iostream.h>
void Jumpto(int N1,int N2=20); //Prototype missing
void main( )
{
int First = 10, Second = 30; //Data type missing
Jumpto(First , Second); //Comma to come instead of ;
Jumpto(Second);
}
void Jumpto(int N1, int N2=20)
{
N1=N1+N2;
cout<<N1<<N2; //Output operator << required
}

```
 11.

```

#include<iostream.h>
const int Max = 10; //Constant Variable 'Max' must be
//initialized. Declaration Syntax Error

void main( )
{
int Numbers[Max]={ 20,50,10,30,40};
for(Loc=Max-1;Loc>=0;Loc--)
cout>>Numbers[Loc];
}

```

```

12. #include<iostream.h>
    const int Multiple=3;
    void main( )
    {
    int Value = 15;
    for(int Counter = 1;Counter <=5;Counter ++, Value -= 2)
    if(Value%Multiple == 0)
    {
    cout<<Value * Multiple;
    cout<<endl;
    }
    else
    cout<<Value + Multiple <<endl;}

```

13. The program will not execute successfully. Because some syntax errors are there in the program. They are

(i) cin and cout, stream objects used but iostream.h header file is not included in the program.

(ii) x is not declared, it should be declared as int.

(iii) With cin, we should use >> instead of <<.

(iv) The shorthand operator /=, is given wrongly as =/.

So the corrected program is as follows:

```

#include<iostream.h>
void main( )
{ int s1,s2,num;
s1=s2=0;
for(int x=0;x<11;x++)
{
cin>>num;
if(num>0)s1+=num;else s2/=num;
}
cout<<s1<<s2; }

```

```

14. #include<iostream.h>
    void main()
    {
    const int i=20;
    int * ptr=&i;
    (*ptr)++; //can not modify a const object
    int j=15;
    ptr =&j;
    }

```

```

15. #include<iostream.h>
    void main()
    {
    const int i =20;
    const int * const ptr=&i; //can not modify a const object
    (*ptr)++;
    int j=15;

```

```
ptr=&j; //can not modify a const pointer
}
```

16. The error statements are
`k=k*2; g=g/2;` as pointer multiplication and division is not possible.

17. 5,3,4,4

```
18. int arr[] = {12, 23, 34, 45};
    int *ptr = arr;
    int val = *ptr; cout << val << endl;
    val = *ptr++; cout << val << endl; // first print value then increment the
    address(post
                                     // increment in value)
    val = *ptr; cout << val << endl; // only values are changing
    val = *++ptr; cout << val << endl; // first increment the address and then print the
    value.
}
```

12
12
23
34

Coding only for explanation. Don't write coding in answer
 Write only the correct output.

19. `int arr[] = {12, 23, 34, 45};`

```
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = *ptr++; cout << val << endl; // first print value then increment the address(post
//increment in value)
val = *ptr; cout << val << endl; // only values are changing
val = *++ptr; cout << val << endl; // first increment the address and then print the
value.
val = ++*ptr; cout << val << endl;
}
```

12
12
23
34
35

20.

```
int arr[] = {12, 23, 34, 45};
int *ptr = arr;
int val = *ptr; cout << val << endl;
val = (*ptr)++; cout << val << endl; // (post increment in value)
val = *ptr; cout << val << endl; // only values are changing
val = *++ptr; cout << val << endl; // first increment the address and then print the
//value.
}
```

12
12
13
23

21. `int arr[] = {2, 33, 44, 55};
 int *ptr = arr;
 int val = *ptr; cout << val << endl;
 val = *++ptr ; cout << val << endl;
 val = *ptr; cout << val << endl;
 val = * ptr++; cout << val << endl;
 }`

2
33
33
33

22. 97A

23. The meaning of line `*cho+=a` is:
`*cho= *cho +32`
`= A+32`
`=97`
`= 'a' (ASCII value of character a)`
 cho contains the address of ch so `ch = 'a'`;
 Therefore output would be : 32a

24. 129a
`ch =97 (from *cho+=a)`
`*ptr+=ch`
`*ptr= *ptr+ch`
`= 32+ 'a' (Character a)`
`=32+97`
`=129`
 Since `*ptr` or variable `a` both are same so variable `a =129` and `ch = 'a'`.

25. `void thewordCount()
 {
 ifstream Fil("STORY.TXT");
 char String[20];
 int C=0;
 while(Fil)
 {
 Fil>>String;
 if(strcmpi(String,"the")==0)//case insensitive
 C=C+1;
 }
 cout<<C<<endl;
 Fil.close();
 }`

OR

`void thewordCount()
 {
 ifstream Fil("STORY.TXT");
 char String[20];
 int C=0;
 while(Fil`

```

{
Fil>>String;
if(strcmp(String,"the")==0 || strcmp(String,"The")==0)
C=C+1;
}
cout<<C<<endl;
Fil.close();
}

```

OR

```

void thewordCount()
{
ifstream F("STORY.TXT");
char Str[4];
int C=0;
while(F.getline(Str,4,' '))
{
if(strcmp(Str,"the")==0 || strcmp(Str,"The")==0)
C=C+1;
}
cout<<C<<endl;
F.close();
}

```

26. Hint: Use isupper(word[0])

```

27. void CountLine()
{
    ifstream FIL("STORY.TXT");
    int LINES=0;
    char STR[80];
    while (FIL.getline(STR,80))
        LINES++;
    cout<<"No. of Lines:"<<LINES<<endl;
    FIL.close();
}

```

```

28. void CountAlphabet()
{
    ifstream FIL("NOTES.TXT");
    int CALPHA=0;
    char CH=FIL.get();
    while (FIL)
    {
        if (isalpha(CH)) CALPHA++;
        CH=FIL.get();
    }
    cout<<"No. of Alphabets:"<<CALPHA<<endl;
    FIL.close();
}

```

```
}
```

29.

```
void entercharacter{
    ofstream fout;
    fout.open("string.txt");
    if(!fout) {
        cout<<"\n Unable to open file";
        exit(1);
    }
    char c;
    while((c=cin.get())!='#') // or while((c=getchar())!= '#')
    {
        fout.put(c);
    }
    fout.close();
}
```
30. i) Destructor, it is invoked as soon as the scope of the object gets over.
ii) Constructor Overloading (or Function Overloading or Polymorphism)
Seminar S1; //Function 1
Seminar S2(90); //Function 3
31. (i) No, since the constructor Bazar has been defined in private section or constructor has not been defined in public section.
Suggested Correction: Constructor Bazar() to be defined in public
(ii) If the constructor is defined as a public member, the following output shall be generated:
Electronic-Calculator:10@225
32. (i)

```
Match M1(0,0);
```


(ii)

```
Match (Match &M)
{
    Time=M.Time;
    Points=M.Points;
}
```
33. (i) When p3 object created, Constructor 3 will be invoked since it is copy constructor.
(ii) complete definition for Constructor 3

```
player( player &p)
{
    health = p.health;
    age= p.age;
}
```

Questions from 34 to 38 do your self.

ANSWERS: 3 MARKS

PROGRAMMING IN C++

1. In function definition, 1 variable by reference, 1 normal variable and 1 pointer variable is used.

In calling for a pointer variable, always use & symbol.

Calling : demo(3,2,Address of b);

::a and x are having same address (due to by reference)

a =a+x
=3+3=6

y = y * a
= 2*6=12

*z = a + y
= 6+12 = 18

First output : 6(value of a), 6 (value of x), 12, z will be any valid address
0xfff4

Second output: 6,2,18(value stored at the address pointed by z i.e. value
of b)

2. iNTTaNEE

3. 10 20 30

Explanation:

here 3 pointer variables p, q and t.

p=x means p contains base address i.e. address of first element of array x.

t = x+1 means t contains address of second element i.e. address of second
element i.e. address of 20.

q =&t means q contains address of t.

```
cout << *p << "\t" << **q << "\t" << *t++;
```

In this expression Evaluation will start from right to left.

*t++ means first print the value stored at the address pointed by t i.e.

Value of second element i.e. 20. after that the address pointed by t will be
incremented 1 int. (2 bytes). Now t will contain the address of 30.

Since q contains address of t so *q will give the address of t. therefore **q

will give 30.

4. value is pass
New value is Best of luck
5. pOInTErS fUN@10
6. 2@4@8@
4#8#16#20#
7. A OROoILE
If *Name = "a ProFile" then output would be:
A OROoHLE
8. [1]10&15
[2]21&13
[1]11&16
[2]22&14
9. Since random(2) gives either 0 or 1, Fly value will be either 1 or 2.
(random(n) gives you any number between 0 to n-1)
City[1] is "CHN"
City[2] is "KOL"
Since I value from 0 to 2 (ie<3), 3 iterations will takes place.
So the possible output consists 3 strings separated by :, each of them may be either "CHN" or "KOL". So the possible output will be
(ii) CHN : KOL : CHN:
(iv) KOL :CHN : KOL:
10. 20,25,30,
20,25,30,
Number=30
11. 2
12. Expected Output
(ii) 1 2 3 4 5 6 7 8 9 10 11
13. -13,-130
-13,20
33,330
-13,33
14. Execution starts from main()
Output due to first function calling

10X20X9

Due to B3=B1

All the values of B1 will be assigned to B3.

Now B3 contains: Length=10, Breadth=20, Height=9

Due to ++B1. Len, Length will be 11.

Due to B3. Bre++, Breadth will be 20 (Post Increment) but in next statement incremented value will be used.

So second calling will take (11,21,9).

Therefore output for second calling:

11X21X9

9X21X14 (Third calling)

Therefore final output will be:

10X20X9

11X21X9

9X21X14

15. 11:20

12:30

13:45

16. Minimum Value: 0

Maximum Value:20

17. 51#50#

18. 12@

22@30@40@

50@150

19. 7#9#5#

30#50#70#40#

20. (i) ABBC

21. #agaSbarr

22. 396 E

23. FEE

G

H
i

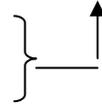
24.

```
void TRANSFER()
```

```
{  
    Phonlist P;  
    fstream fin,fout;  
    fin.open("PHONE.DAT",ios::binaryios::in);  
    fout.open("PHONBACK.DAT",ios::binaryios::out);  
    while(fin.read((char*)&P,sizeof(P)))  
    {  
        if(P.CheckCode("DEL")==0)  
            fout.write((char*)&P,sizeof(P));  
    }  
    fin.close(); //ignore  
    fout.close(); //ignore  
}
```

OR

```
ifstream fin("PHONE.DAT",ios::binary);  
ofstream fout("PHONBACK.DAT",ios::binary);
```



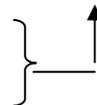
OR

```
void TRANSFER()
```

```
{  
    Phonlist P;  
    fstream fin,fout;  
    fin.open("PHONE.DAT",ios::binaryios::in);  
    fout.open("PHONBACK.DAT",ios::binaryios::in);  
    if(fin)  
    {  
        fin.read((char*)&P,sizeof(P));  
        while(!fin.eof())  
        {  
            if(P.CheckCode("DEL")==0)  
                fout.write((char*)&P,sizeof(P));  
            fin.read((char*)&P,sizeof(P));  
        }  
    }  
    fin.close(); //ignore  
    fout.close(); //ignore  
}
```

OR

```
ifstream fin("PHONE.DAT",ios::binary);  
ofstream fout("PHONBACK.DAT",ios::binary);
```



25. //Function to copy records from TELEPHON.DAT to
 //TELEBAC.DAT
void COPYABC()
 {
 fstream IS(“TELEPHON.DAT”,ios::binarylios::in);
 fstream OA(“TELEBACK.DAT”,ios::binarylios::out);
 Directory D;
 while(IS.read((char*) &D,sizeof(D)))
 {
 if(D.CheckCode(“123”)==0)
 OA.write((char *)&D,sizeof(D));
 }
 IS.close();
 OA.close();
 }
26. //Function to copy records from SPORTS.DAT to
 //ATHELETIC.DAT
void SP2AT()
 {
 Sports S;
 fstream IS(“SPORTS.DAT”,ios::binarylios::in);
 fstream OA(“ATHLETIC.DAT”,ios::binarylios::out);
 while(IS)
 {
 IS.read((char*) &S,sizeof(S));
 if(strcmp(S.Event,”Athletics”)==0)
 OA.write((char *)&S,sizeof(S));
 }
 IS.close();
 OA.close();
 }
 OR
void SP2AT()
 {
 fstream F1,F2;
 Sports S;
 F1.open(“SPORTS.DAT”,ios::binarylios::in);
 F2.open(“ATHLETIC.DAT”,ios::binarylios::out);
 while(F1.read((char*) &S,sizeof(S)))

```

{
if(!strcmp(S.Event,"Athletics"))
F2.write((char *)&S,sizeof(S));
}
F1.close();
F2.close();
}

```

OR

```

void SP2AT()
{
fstream F1,F2;
Sports S;
F1.open("SPORTS.DAT",ios::binary|ios::in);
F2.open("ATHLETIC.DAT",ios::binary|ios::out);
while(F1)
{
F1.read((char*) &S,sizeof(S));
if(!strcmp(S.Event,"Athletics"))
F2.write((char *)&S,sizeof(S));
}
F1.close();
F2.close();
}

```

```

27. void BookSearch()
{
Fstream FIL("BOOK.DAT", ios::binary|ios::in);
BOOK B;
int bn, Found=0;
cout<<"Enter Book Num to search...";
cin>>bn;
while(FIL.read((char*)&S, sizeof(S)))
if(B.RBno()==bn)
{
B.Dispaly( );
Found++;
}
if(Found==0)
cout<<"Sorry!!! Book not found!!!"<<endl;

```

```
FIL.close();  
}
```

```
28. void Addnew()  
    {  
        fstream FIL("STUDENT.DAT",ios::binarylios::app);  
        STUD S;  
        int n;  
        cout<<"How many objects do you want to add??"  
        cin>>n;  
  
        for(int i=0; i<n;i++)  
        {  
            S.Enter();  
            FIL.write((char*)&S,sizeof(S));  
  
        }  
  
        FIL.close();  
    }
```

```
29. void DisplayL_M()  
    {  
        fstream fin("CLUB.DAT",ios::binarylios::in);  
        CLUB C;  
        while(fin.read((char*) &C,sizeof(C)))  
        {  
            if(C.whatType()=='L' || C.whatType()=='M')  
                C.Display();  
        }  
        fin.close();  
    }
```

OR

```
void DisplayL_M()  
  
    {  
        fstream fin("CLUB.DAT",ios::binarylios::in);  
        CLUB C;  
        while(fin)  
        {  
            fin.read((char*) &C,sizeof(C))
```

```

    {
        if(C.whatType()=='L' || C.whatType()=='M')
            C.Display();
    }
    fin.close();
}

```

30. (i) void write()
- ```

{
 DRINK D;
 ofstream outf("Drink.DAT",ios::binary);
 if(!outf)
 cout<<"Unable to open file for writing";
 else
 {
 D.getdrinks(); // reading values through object
 Outf.write((char*)&D; sizeof(D)); // writing object to file using fout.
 Outf.close();
 }
}

```
- (ii) void read( )
- ```

{
    DRINK D;
    ifstream inf("Drink.DAT",ios::binary);
    if(!inf)
        cout<<"Unable to open file for reading";
    else
    {
        while(inf)
        {
            inf.read((char*)&D; sizeof(D)); // reading object from file
            if((strcmp(D.getname(), "Pepsi")==0)
            {
                D.showdrinks( ); // display values through object of class
            }
            inf.close();
        }
    }
}

```

Note: (i) Due to more objects, we will use while.

(ii) To find out how many such records are found, then you may use count variable to count the number of records accordingly.

31. Note: in this question, we have to add new object, so we have to use app mode.

```
void add_obj( )
{
customer C;
ofstream outf ("Customer.dat", ios::binary|ios::app);
if(!outf)
{cout<<"Error"; exit(0);}
else
{
C.enterdata();
Outf.write((char*)&C, sizeof(C));
Outf.close();
}
}
```

32. (i) void write()

```
{
    DRINK D;
ofstream outf("Drink.DAT",ios::binary);
if(!outf)
cout<<"Unable to open file for writing");
else
{
D.getdrinks( ); // reading values through object
Outf.write((char*)&D; sizeof(D)); // writing object to file using fout.
Outf.close( );
}
}
```

- (ii) void read()

```
{
    DRINK D;
    ifstream inf("Drink.DAT",ios::binary);
    if(!inf)
    cout<<"Unable to open file for reading");
```

```

else
{
while(inf)
{
inf.read((char*)&D; sizeof(D)); // reading object from
file
if(D.getcode()==1234)
{
D.showdrinks( ); // display values through object
of class
}
inf.close();
}
}

```

Note: (i) To find out how many such records are found, then you may use count variable to count the number of records accordingly.

Answers: 4 Marks Programming in C++

1.

```
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;
}
}
```

2.

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

```

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;;
}

```

```

3. class Clothing
    {
    char Code[25];
    char Type[25];
    int Size ;
    char Material[30];
    float Price;
    public:
    Clothing();
    void Calc_Price();
    void Enter();
    void Show();
    };

```

```

    Clothing::Clothing()
    {
    strcpy(Code,"NOT ASSIGNED");
    strcpy(Type,"NOT ASSIGNED");
    Size=0;
    strcpy(Material,"NOT ASSIGNED");
    Price=0;
    }
    void Clothing::Calc_Price() or void Clothing::CalcPrice()
    {
        if(strcmp(Type,"TROUSER")==0 &&
strcmp(Material,"COTTON")==0)
            Price=1500;
    else if (strcmp(Type,"SHIRT")==0 &&
strcmp(Material,"COTTON")==0)
            Price=1200;
    else if (strcmp(Type,"TROUSER")==0 &&
strcmp(Material,"COTTON")!=0)
            Price=1500*0.75;
    else if (strcmp(Type,"SHIRT")==0)&& strcmp(Material,"COTTON")!=
0)
            Price=1200*0.75;
    }
    void Clothing::Enter()
    {
        gets(Code);    // or cin >> Code;
        gets(Type);// or cin >> Type;
        cin>>Size;
        gets(Material); // or cin >> Material;
        Calc_Price(); OR CalcPrice();
    }
    void Clothing::Show()
    {
        cout<<Code<<Type<<Size<<Material<<Price<<endl;
    }
}

```

4. class Travel


```

      {
      char TCode[5]; //OR char *Tcode;
      int No_of_Adults;
      int No_of_Children;
      
```

```

int Distance;
float TotalFare;

public:
Travel();
void AssignFare();
void EnterTravel();
void ShowTravel();
};
Travel::Travel()    //Constructor
{
strcpy(TCode,"NULL");// OR TCode[0]='\0' OR strcpy(TCode,"\0")
// OR TCode=NULL if TCode is declared as char pointer
No_of_Adults = 0;
No_of_Children = 0;
Distance = 0;
TotalFare = 0;
}
void Travel::AssignFare()
{
if(Distance>=1000)
TotalFare = 500*No_of_Adults+250*No_of_Children;
else
if (Distance >= 500)
TotalFare = 300*No_of_Adults+150*No_of_Children;
else
TotalFare = 200*No_of_Adults+100*No_of_Children;
}
void Travel::EnterTravel()
{
gets(TCode); // or cin >> TCode;
cin>>No_of_Adults>>No_of_Children>>Distance;
AssignFare();
}
void Travel::ShowTravel()
{
cout<<TCode<<No_of_Adults<<No_of_Children
<<Distance<<TotalFare<<endl;
}

```

5.
 - (i) None of data members are accessible from objects belonging to class AUTHOR.
 - (ii) Enter(), Show()
 - (iii) Data members: Voucher_No, Sales_Date, Salary
Member
function: Sales_Entry(), Sales_Detail(), Enter(), Show(), Register(),
Status()
 - (iv) 66

6.
 - (i) None of data members are accessible from objects belonging to class 4 AUTHOR.
 - (ii) Haveit(), Giveit()
 - (iii) Data members: Employees, Acode, Aname, Amount
Member function: Register(), Enter(), Display(), Haveit(), Giveit(), Start(),
Show(),
 - (iv) 70

7.
 - (i) Hierarchical Inheritance OR Single Level Inheritance
 - (ii) 41 bytes
 - (iii) SDName, Weight, Price
 - (iv) EDInput(), EDShow(), DInput(), DShow()

Note:

 - Constructor functions *ElectronicDolls()* & *Dolls()* to be ignored.

8.
 - (i) Constructor of University Class (Top most Base class)
 - (ii) 106 bytes
 - (iii) display(), input(), enrol(int,int), show(), enterdata(), displaydata()
 - (iv) state

9.
 - (i) None of the data members
 - (ii) void Enterdesign(), void dispdesign()
 - (iii) price, cost_of_cloth, design_code, designfee, stiching,

costprice, sellprice;

(iv) 61 bytes

10. (i) Multiple Inheritance

(ii) InCourse(), InDistance(), OutDistance(), InRegular(),
OutRegular()

(iii) InCourse(), OutCourse(), InRegular(), OutRegular()

(iv) No, function InRegular() is not accessible inside the function

InDistance(), because InRegular() is a member of class Regular
and InDistance() is a member of class Distance, and the class

Regular and Distance are two independent classes. OR

Yes, Reason is that if we call InRegular() inside the function InDistance () in
this way only

```
void InDistance( )  
{  
Regular R;  
R. InRegular();  
}
```

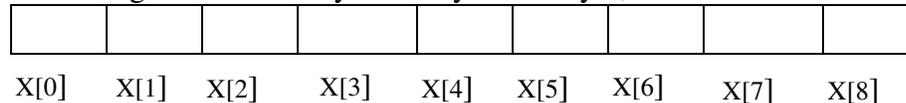
Questions 11 to 20 do your self

Unit 2: DATA STRUCTURES

ARRAYS

4 Marks Questions

An array is a simple data structure which can be used to store more than one values of same data type. Memory allocation for array is continuous. When ever we have to solve the single dimensional array problem we have to draw the diagram of the array with any name say x, as shown below.



Based on the above diagram we can easily identify the position of each item in the array and can be able to make necessary logic as per the question given.

- 1 Write a function in C++, which accepts an integer array and its size as parameters and rearrange the array in reverse. Example if an array of five members initially contains the elements as
6,7,8,13,9,19
Then the function should rearrange the array as 19,9,13,8,7,6
- 2 Write a function in C++, which accept an integer array and its size as arguments and swap the elements of every even location with its following odd location.
Example : if an array of nine elements initially contains the elements as 2,4,1,6,5,7,9,23,10
Then the function should rearrange the array as 4,2,6,1,7,5,23,9,10
- 3 Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having odd values with thrice and elements having even values with twice its value.
Example : If an array of five elements initially contains the elements 3,4,5,16,9
Then the function should rearrange the content of the array as 9,8,15,32,27
- 4 Write a function in C++ which accepts an integer array and its size as arguments and replaces elements having even values with its half and elements having odd values with twice its value
- 5 Write a function in C++ which accepts an integer array and its size as argument and exchanges the value of first half side elements with the second half side elements of the array.
Example : If an array of eight elements has initial content as 2,4,1,6,7,9,23,10
The function should rearrange the array as 7,9,23,10,2,4,1,6.

6 Write a function in c++ to find and display the sum of each row and each column of 2 dimensional array. Use the array and its size as parameters with int as the data type of the array.

7 Write function SORTPOINTS() in c++ to sort an array of structure Game in descending order of points using Bubble Sort

Note: Assume the following definition of structure Game

```
struct Game
{
    long PNo; // Player Number
    char PName[20];
    long points;
};
```

8 Write a c++ function to shift all the negative numbers to left and positive number in the right side.

9 Define a function SWPCOL() in C++ to swap (interchange) the first column elements with the last column elements, for a two dimensional array passed as the argument of the function.

Example : if the two dimensional array contains

2	1	4	9
1	3	7	7
5	8	6	3
7	2	1	2

After swapping of the content of 1st and last column, it should be

9	1	4	2
7	3	7	1
3	8	6	5
2	2	1	7

10 Define a function SWPROW() in C++ to swap (interchange) the first row elements with the last row elements, for a two dimensional array passed as the argument of the function.

Example : if the two dimensional array contains

2	1	4	9
1	3	7	7
5	8	6	3
7	2	1	2

After swapping of the content of the array will be

7	2	1	2
5	8	6	3
1	3	7	7
2	1	4	9

- 11 Write a function in C++ to print the product of each column of a 2D integer array passed as the argument of the function
Example : if the two dimensional array contains

2	1	4	9
1	3	7	7
5	8	6	3
7	2	1	2

Then the output should appears as

Product of Column1 = 70
Product Column2 = 48
Product of column3= 168
Product of Column4=378

- 12 Write a function in C++ to print the product of each row of a 2D integer array passed as the argument of the function
Example : if the two dimensional array contains

2	1	4	9
1	3	7	7
5	8	6	3
7	2	1	2

Then the output should appears as

Product of Row1 = 72
Product Row2 = 147
Product of Row3= 720
Product of Row4=28

13. Write a function which accept 2D array of integers and its size as arguments and displays the sum of elements which lie on diagonals.
[Assuming the 2D array to be a square matrix with odd dimension ie 3 x 3 , 4 x 4 etc]

Example of the array content is

5	4	3
6	7	8
1	2	9

Output through the function should be

Diagonal One Sum : 21
Diagonal Two: 11

14. Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements of middle row and the elements of middle column.

[Assuming the 2D array to be a square matrix with odd dimension ie 3 x 3 , 5 x 5, 7 x 7 etc]

Example of the array content is

```
5    4    3
6    7    8
1    2    9
```

Output through the function should be

```
Middle row:      6    7    9
Middle Column   4    7    2
```

15. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format

If the array is 1,2,3,4,5,6
The resultant 2D array is

```
1 2 3 4 5 6
1 2 3 4 5 0
1 2 3 4 0 0
1 2 3 0 0 0
1 2 0 0 0 0
1 0 0 0 0 0
```

if the array is 1,2,3
The resultant 2D array is

```
1 2 3
1 2 0
1 0 0
```

16. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format

If the array is 1,2,3,4,5,6
The resultant 2D array is

```
1 2 3 4 5 6
0 1 2 3 4 5
0 0 1 2 3 4
0 0 0 1 2 3
0 0 0 0 1 2
0 0 0 0 0 1
```

if the array is 1,2,3
The resultant 2D array is

```
1 2 3
0 1 2
0 0 1
```

17. Write a function in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format

If the array is 1,2,3,4,5,6

The resultant 2D array is
1 0 0 0 0 0

if the array is 1,2,3

The resultant 2D array is
1 0 0

```
1 2 0 0 0
1 2 3 0 0
1 2 3 4 0
1 2 3 4 5
1 2 3 4 5 6
```

```
1 2 0
1 2 3
```

18. Write a user defined function named upperhalf() which takes a 2D array A, with size n rows and n cols as arguments and print the upper half of the matrix. Example

```
1 2 3          1 2 3
6 7 8          7 8
2 3 4          4
```

19. Write a user defined function lowerhalf() which takes a 2D array, with size n rows and n cols as argument and prints the lower half of the matrix

Eg:-

```
1 2 3          1
5 6 7          5 6
9 1 2          9 1 2
```

- 20 Write the function to find the largest and second largest number from a two dimensional array. The function should accept the array and its size as argument.
- 21 Write a function in C++ to merge the contents of two sorted arrays A & 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.

Linked List, Stack, Queue

4 Mark Questions

- 1 Write a function in C++ to perform a PUSH operation in a dynamically allocated stack considering the following:
struct node
{ int x,y;
Node *Link;
};

- 2 Write a function in C++ to perform a DELETE operation in a dynamically allocated queue considering the following description:
struct Node
{ float U,V;
Node *Link;
};
class QUEUE
{
Node *Rear, *Front;
public:
QUEUE() { Rear =NULL; Front= NULL;}
void INSERT ();
void DELETE ();
~QUEUE ();
};

- 3 Write a function in C++ to perform a PUSH operation in a dynamically allocated stack considering the following :
struct Node
{
int X,Y;
Node *Link;
};
class STACK
{
Node * Top;
public:
STACK() { TOP=NULL;}
void PUSH();
void POP();
~STACK();
};

- 4 Define function stackpush() to insert nodes and stackpop() to delete nodes, for a linked list implemented stack having the following structure for each node:
struct Node

```
{
  char name[20];
  int age;
  Node *Link;
};
class STACK
{
  Node * Top;
public:
  STACK() { TOP=NULL;}
  void stackpush( );
  void stackpop( );
  ~STACK();
};
```

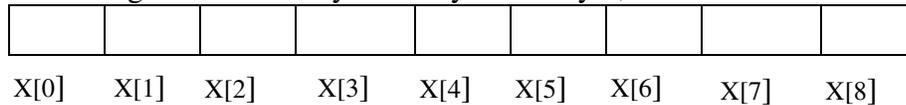
ANSWERS:Data Structures

ARRAYS

2 MARKS QUESTIONS

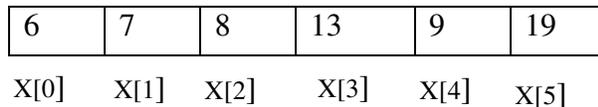
An array is a simple data structure which can be used to store more than one values of same data type. Memory allocation for array is continuous.

When ever we have to solve the single dimensional array problem we have to draw the diagram of the array with any name say x, as shown below.



Based on the above diagram we can easily identify the position of each item in the array and can be able to make necessary logic as per the question given.

1.



Reversing means swap first element and last element, second first element and second last element and so on.

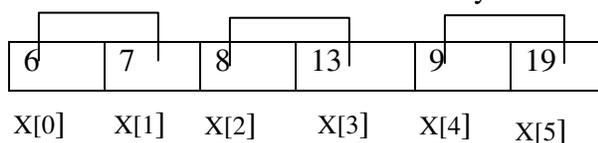
```
void ReverseArray(int x[], int N)
```

```
{
    int i,j,temp;
    /* i for taking the elements from the beginning onwards, so initialize it with 0
    and increment its value(i++). j for taking the elements from the end, so initialize
    it with N-1 and decrement its value each time (j--) */
    for(i=0,j=N-1;i<N/2;i++,j--)
    {
        temp=x[i];
        x[i]=x[j];
        x[j]=temp;
    }
    cout<<"After reversing the Array elements are"<<endl;
    for(i=0;i<N;i++)
    {
        cout<<x[i]<<" ";
    }
}
```

2.

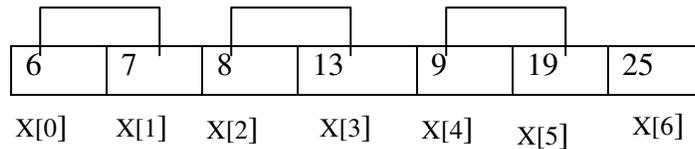
In this problem you have to take care of two situation.

1. Even number of elements in the array



In the above case x[0] and x[1] are replacing, x[2] and x[3] are replacing and x[4] and x[5] are replacing. Ie exact pair of elements are in the array.

2. Odd number of elements in the array



In the above case x[0] and x[1] are replacing, x[2] and x[3] are replacing and x[4] and x[5] are replacing and last one need not to be replaced because it has no pair. ie. in the case of odd number of elements the limit of the for loop is one less than the loop for the even number of elements

```
void ChangeOrder(int x[], int N)
{
    int i,j,temp,limit;
    if(N%2!=2)
    {
        limit=N-1;
    }
    else
    {
        limit=N;
    }
    for(i=0;i<limit;i+=2)
    {
        temp=x[i];
        x[i]=x[i+1];
        x[i+1]=temp;
    }
    for(i=0;i<N;i++)
    {
        cout<<x[i];
    }
}
```

3.

```
void ChangeValue(int x[],int N)
{
    for(int i=0;i<N;i++)
    {
        if(x[i]%2!=0) // Checking the element is Odd or not
        {
            x[i]=x[i]*3;
        }
        else
    }
```

```

        {
            x[i]=x[i]*2;
        }
    }
    cout<<endl;

    for(i=0;i<N;i++)
    {
        cout<<x[i]<<" ";
    }
}

```

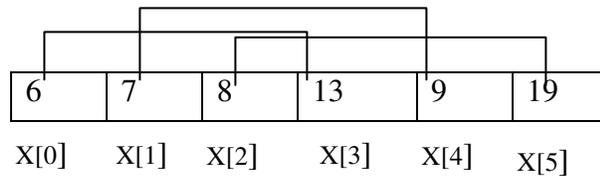
Note: If the Question is to make element in the odd position to thrice its value and element in the even position to twice its value, then you have to make only one change in the above program to get the answer ie **If((i+1)%2!=0) instead of if(x[i]%2 !=0)**

```

4. If (x[i]%2==0)
{
    x[i]=x[i]/2;
}
else
{
    x[i]=x[i]*2;
}

```

5. The exchanging is happening between the elements indicated by the line



i.e. first element with next element from the middle point, second element with second element from the middle point etc.

If i for representing the first element and j for representing the element after the middle point then initially i=0 and j=N/2 and both will increment in each step(i++ and j++).

```

void ChangeValue(int x[],int N)
{
    int temp;
    for(int i =0,j=N/2;i<N/2;i++,j++)
    {
        temp=x[i];
        x[i]=x[j];
        x[j]=temp;
    }

    cout<<endl;
}

```

```

for(i=0;i<N;i++)
{
    cout<<x[i]<<" ";
}
}

```

6.

AR[0][0]	AR[0][1]	AR[0][2]	RS[0]
AR[1][0]	AR[1][1]	AR[1][2]	RS[1]
AR[2][0]	AR[2][1]	AR[2][2]	RS[2]
CS[0]	CS[1]	CS[2]	

Actually we have to find the Sum of the elements in each row and sum of the elements in each column. Since in the above two dimensional array, three rows are there, so three sum will get and each sum will store in the array RS in the places RS[0], RS[1] and RS[2] respectively. Since column also contains three, three column sum will get and each will store in the array CS in the position CS[0], CS[1] and CS[2] respectively.

```

void FindRowColSum(int x[n][n],int R,int C)
{
    int temp,CSum=0,RSum=0;
    int CS[10],RS[10]; //for getting the Column sum and row sum

    /* Whenever we process a 2D array, we need two for loop. Outer for loop for
    processing row and inner for loop for processing the column */.
    /******* Finding the Row Sum *****/
    for(i=0;i<R;i++)
    {
        for(int j=0;j<C;j++)
        {
            RSum=RSum+x[i][j]; // Adding the elements in
                               // the same Rows. i denote the
                               // row and its value is not
                               // changing throughout this loop.
        }

        RS[i]=RSum; // Assining the Row sum to the array RS
        RSum=0;     //Making RSum Zero to assign the sum of the
                   // elements in the next row ;
    }

    cout<<" Printing the Row sum"<<endl ;
}

```

```

for(i=0;i<R;i++)
{
    cout<<RS[i]<<" ";
}
cout<<endl;

```

// ***** Finding the Column sum *****

/* Small changes are needed in the above code to find the column sum. They are underlined */

```

for(i=0;i<C;i++)
{
    for(int j=0;j<R;j++)
    {
        CSum=CSum+x[j][i]; // Adding the elements in the
                            // same Columns.
    }
    CS[i]=CSum; // Assigning the Column sum to the array CS
    CSum=0; //Making CSum Zero to assign the sum of
            //elements in the next column ;
}

cout<<"Printing the column sum"<<endl;
for(i=0;i<C;i++)
{
    cout<<CS[i]<<" ";
}

```

7. You know bubble sort, in which we are using simple array. Here you are asked to sort **structure array base on the element points.**

If in the normal array say x[10] , you are using x[i], here in the structure array say gm[10], you have to use gm[i].points because you are sorting based on the variable **points in the structure **Game****

```

void SORTPOINTS()
{
    Game gm[10];
    Game temp;
    Cout<<"Enter the details of 10 games"<<endl;
    For(int i=0;i<10;i++)
    {
        Cin>>gm[i].PNo;
        Gets(gm[i].PName);
        Cin>>gm[i].points;
    }
}
// Use the logic for bubble sort.

```

/*Points to note in bubble sort

1. Compare with the adjacent elements ie j and j+1
2. Bigger element goes to the top because the elements in the descending order.
3. Each iteration the smaller elements comes in the bottom.*/

```
for(i=0;i<n;i++)
{
    for(j=0;j<(n-1)-i;j++)    // j<(N-1)-i , subtracting i to avoid the
                               // last elements which are in the correct order
                               // after each loop execution.
    {
        If(gm[j] .points <gm[j+].points)
        {
            temp=gm[j];
            gm[j]=gm[j+1];
            gm[j+1]=temp;
        }
    }
}
```

8. 1. Take each element of the array from the beginning. say x[n]
2. Check x[n] is -ve or not. If it is negative number do the following steps
2. Check elements from the left side of x[n] and shift the left side element to next right position if it is +ve number..
3. Repeat step 2 till you gets a negative number or till reach the left end of the array.
4. Insert x[n].

```
void arrangeNegPosNumbers(int x[], int N)
{
    for(i=0;i<5;i++)
    {
        temp=x[i]; // Taking each element in the array to
                  //check +ve or -ve
        if(x[i]<0) // Checking it is -ve
        {
            j=i-1;
            while(j>=0)
            {
                if(x[j]<0)
                {
                    break;
                }
                else
                {
                    x[j+1]=x[j]; // Shift +ve number
                                // to right
                    j--;
                }
            }
        }
    }
}
```

```

    }
    }
    x[j+1]=temp; // Inserting the -ve number
}
}
}

```

9. void SWAPCOL(int x[n][n],int R,int C)

```

{
for(i=0;i<R;i++) // for each row
{
    Int temp;

    for(int j=0,k=C-1;j<C/2;j++,k--)
        /* j for taking the elements from the first columns and k for taking the
        elements from the last columns. So the initially j=0 and k=C-1 and j will
        increase (j++) and k will decrease (k--) * in each step/

        {
            temp=x[i][j]; //Swap elements in the first and last
            // columns
            x[i][j]=x[i][k];
            x[i][k]=temp;
        }
    }
    for(i=0;i<R;i++)
    {
        for(int j=0;j<C;j++)
        {
            cout<<x[i][j]<<" ";
        }
        cout<<endl;
    }
}
}

```

10. Only small changes have to make compare to the previous question , which are underlined and blackened.

```

void SWAPROW(int x[n][n], int R,intC)
{
int temp;
for(i=0;i<C;i++)
{

    for(int j=0,k=R-1;j<R/2;j++,k--)
    {
        temp=x[i][j];
x[i][j]=x[k][i];

```

```

        x[k][i]=temp;
    }
}
for(i=0;i<R;i++)
{
    for(int j=0;j<C;j++)
    {
        cout<<x[i][j]<<" ";
    }
    cout<<endl;
}
}

```

11. void FindColProd(int x[n][n],int R,int C)

```

{
    int Cprod;
    for(i=0;i<C;i++)
    {
        CProd=1;
        for(int j=0;j<R;j++)
        {
            CProd= CProd * x[j][i];
        }
        cout<<"Product of the Column "<<i+1<<" is"<<CProd<<endl;
    }
}

```

12. void FindRowProd(int x[n][n],int R,int C)

```

{
    int Rprod;
    for(i=0;i<R;i++)
    {
        RProd=1;
        for(int j=0;j<C;j++)
        {
            RProd= RProd * x[i][j];
        }
        cout<<"Product of the Row "<<i+1<<" is"<<RProd<<endl;
    }
}

```

13. In first diagonal elements both row index and column index is same.
In second diagonal element row index is increasing and column index is decreasing.

```

void findDiagonalSum(int x[n][n],int R,int C)
{
// Find the sum of the First diagonal numbers

```

```

for(i=0;i<R;i++)
{
    Sum1=Sum1+x[i][i]; // Row and Column are represented
                        // by i itself
}
// Find the sum of the Second diagonal elements
int j=C-1;
for(i=0;i<R;i++)
{
    Sum2= Sum2+x[i][j];
    j--;
}
cout<<endl;
cout<<Sum1<<endl;
cout<<Sum2;
}

```

14. The row number and Column number is odd numbers and both are same
The index of the middle row / column element is Row/2 or Column/2
void FindMiddle(int x[n][n], int size) // size represent No of rows and
//columns, since both are same.

```

{
    // Find the element in the middle row
    int j=size/2;
    // Middle Row
    for(i=0;i<size;i++)
    {
        cout<<x[j][i]<<" ";
    }
// Middle Column
    for(i=0;i<size;i++)
    {
        cout<<x[i][j]<<" ";
    }
}

```

Note If the question is to find the sum of the middle row and sum of the middle column, then the program should write as given below

```

void FindMiddleSum(int x[n][n], int size)
{
    int Sum1=0,Sum2=0;

    int j=size/2;
    for(i=0;i<size;i++)
    {
        Sum1=Sum1+x[j][i];
        Sum2=Sum2+x[i][j];
    }
}

```

```

        cout<<endl;
        cout<<Sum1<<" "<<Sum2;
    }

```

15. We are provided with 1D array and to make 2D array with the values provided in the ID array. By analyzing the 2D array(output) we will get the logic that for the position $(i+j) < \text{size}$ of the 2D array, elements are taken from the ID array and all other position value is zero. So the program is as below

```

void Change2Darray(int x[],int size)
    for(i=0;i<size;i++)
    {
        for(int j=0;j<size;j++)
        {
            if(i+j <size)
            {
                y[i][j]=x[j];
            }
            else
            {
                y[i][j]=0;
            }
        }
    }
    for(i=0;i<size;i++)
    {
        for(int j=0;j<size;j++)
        {
            cout<<y[i][j]<<" ";
        }
        cout<<endl;
    }
}

```

16. Condition for putting the value is the position **(i<=j) of 2D array** otherwise put zero

```

void Change2Darray(int x[],int size)
{
    for(i=0;i<size;i++)
    {
        int k=0;
        for(int j=0;j< size;j++)
        {
            if(i<=j)
            {
                y[i][j]=x[k];
                k++;
            }
        }
    }
}

```

```

        else
        {
            y[i][j]=0;
        }
    }
}
for(i=0;i< size;i++)
{
    for(int j=0;j< size;j++)
    {
        cout<<y[i][j]<<" ";
    }
    cout<<endl;
}
}

```

17. Condition for putting the value is the position (i>=j) of 2D array otherwise put zero

```

void Change2Darray(int x[],int size)
{
    for(i=0;i<size;i++)
    {
        for(int j=0;j< size;j++)
        {
            if(i>=j)
            {
                y[i][j]=x[j];
            }
            else
            {
                y[i][j]=0;
            }
        }
    }
    for(i=0;i< size;i++)
    {
        for(int j=0;j< size;j++)
        {
            cout<<y[i][j]<<" ";
        }
        cout<<endl;
    }
}

```

Note **All the above three cases only the condition is changing, which is darken and underlined.**

18. void upperhalf(int x[n][n],int R,int C)

```
{
for(i=0;i<R;i++)
    {
        for(int j=0;j<C;j++)
            {
                if(i<=j)
                    {
                        cout<<x[i][j];
                    }
                else
                    {
                        cout<<" ";
                    }
            }
        cout<<endl;
    }
}
```

19. void lowerhalf(int x[n][n], int R,int C)

```
for(i=0;i<R;i++)
{
    for(int j=0;j<C;j++)
        {
            if(i>=j)
                {
                    cout<<x[i][j];
                }
            else
                {
                    cout<<" ";
                }
        }
    cout<<endl;
}
```

20. void findLargestSecondLargest(int x[n][n], int R,int C)

```
{
    int mx,s_,max;
    max=x[0][0]; // Assuming x[0][0] as the largest element
    s_max=x[0][0]; // Assuming x[0][0] as the Second largest element
    for(i=0;i<R;i++)
        {
            for(int j=0;j<C;j++)
                {
                    if(max<x[i][j]) // if element in the array (x[i][j]) is
```

```

// greater than content in the
//variable max
{
    s_max=max; // content of the max will
               // become the second largest element
    max=x[i][j]; // x[i][j] becomes the largest element
}
else if(max>x[i][j] && s_max<x[i][j])

//if the element in the array is less than content of max but greater than s_mx

    s_max=x[i][j]; // x[i][j] becomes the second largest
                  // element
}
}
}
cout<<endl;
cout<<"Maximun Number"<<max<<endl;
cout<<"Second Max Number"<<s_max<<endl;
}

```

21. void AddNSave(int A[],int B[],int C[],int N,int M, int &K)

```

{
    int I=0,J=M-1;
    K=0;
    while (I<N && J>=0)
    {
        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 (int T=I;T<N;T++)
        C[K++]=A[T];
    for (T=J;T>=0;T--)
        C[K++]=B[T];
}

```

Answers
Linked List, Stack, Queue
4 Mark Questions

1. Insert at the beginning
void PUSH()
{
 Node *newptr=new Node;
 cin>>newptr->x;
 cin>>newptr->y;
 if(top==NULL) // Stack is empty
 {
 Top=newptr;
 }
 else
 {
 newptr->Link=start; // new node will point to the first node;
 top=newptr; // New node becomes to the first node
 }
}

2. Hint : delete node from the beginning
void DELETE()
{
 Node *temp;
 if(front==NULL) // No element in the queue
 {
 cout<<"UNDERFLOW.....";
 }
 else
 { temp=front;
 front=front->Link; // Making the second node as the first one
 delete temp; // deleting the previous first node.
 }
}

3. Insert new node as the first element
void PUSH()
{
 Node *newptr=new Node;
 cout<<"Enter the informations"<<endl;
 cin>>newptr->X;
 cin>>newptr->Y;
 if(top==NULL) // Linked list is empty
 {
 Top=newptr // New node is the first node
 }
}

```
        else
        {
            newptr->Link=Top;
            Top=newptr;
        }
    }
```

4. **Stackpush()** is already done // Write yourself

void stackpop() // Pop from the beginning

```
{ Node *temp;
    if(top==NULL)
    {
        cout<<"UNDERFLOW.....";
    }
    else
    {
        temp=Top;
        Top=Top->Link;
        delete temp;
    }
}
```

Unit 3 : Database and SQL

General Guidelines to solve questions based on Database Concepts:

1. *To answer the questions on Database Concepts, your answer should be to the point.*
2. *In case of few students who know the concept but are not able to write the answer, the practice in writing will help them prepare those questions.*
3. *Your answer may be supported with examples, if possible and required.*
4. *Sometimes 2 marks questions are asked clubbing two terms/definitions or concepts.*

General Guidelines to solve questions based on SQL:

1. *Always terminate SQL statement by ; in your answer.*
2. *Sometimes character or date values are enclosed with in “ “. It is normally not accepted in SQL. You can always write your answer using ‘ ‘ for character & date values.*
3. *In case of date values { } are sometimes used. However ‘ ‘ should be used for dates also, as mentioned in above point.*
4. *Only data is case sensitive, columns and table names may be written in any case.*

1 mark questions

Q1. Define the terms:

- i. Database Abstraction
- ii. Data inconsistency
- iii. Conceptual level of database implementation/abstraction
- iv. Primary Key
- v. Candidate Key
- vi. Relational Algebra
- vii. Domain
- viii. Projection

Q2 Write the purpose of following relational algebra statements:

- i. $\sigma \text{ price} > 50 (\text{PRODUCTS})$.
- ii. $\sigma \text{ city} = \text{'Chennai'} (\text{PRODUCTS})$
- iii. $\sigma \text{ price} > 20 \wedge \text{price} < 45 (\text{SALES})$

Q3 Write the expression in relational algebra to :

- i. Show the tuples from PRODUCT table where cost of the product is more than 5000.
- ii. Show the tuples from PRODUCT table where product_name is 'TV'.
- iii. Show the tuples pertaining to prices between 55 and 100 from the table Items.
- iv. Show the tuples whose price is more than 55 or qty < 10 from the table Items.
- v. Show the supplier_name, city where price is more than 1000 from the table Items.

**1 MARK QUESTIONS FOR PRACTICE
(UNSOLVED)**

- Q1. Define constraints in database.
- Q2. Define unique constraint.
- Q3. Explain the basic difference between simple view and complex view.
- Q4. What is default constraint?
- Q5. What is the difference between where and having clauses?
- Q6. What is the advantage of outer-join?
- Q7. What is schema?
- Q8. What is scalar expression in SQL?
- Q9. Up to which level can you nest subqueries in SQL?
- Q10. Write on working example of check constraint.

6/8 Marks Questions SQL (Solved)

1. Write SQL commands for (a) to (f) and write output for (g) on the basis of PRODUCTS relation given below:

PCODE	PNAME	COMPANY	PRICE	STOCK	MANUFACTURE	WARRANTY
P001	TV	BPL	10000	200	12-JAN-2008	3
P002	TV	SONY	12000	150	23-MAR-2007	4
P003	PC	LENOVO	39000	100	09-APR-2008	2
P004	PC	COMPAQ	38000	120	20-JUN-2009	2
P005	HANDYCAM	SONY	18000	250	23-MAR-2007	3

- a) To show details of all the PC with stock more than 110.
- b) To list the company which gives warranty for more than 2 years.
- c) To find stock value of the BPL company where stock value is sum of the products of price and stock.
- d) To show number of products from each company.
- e) To count the number of PRODUCTS which shall be out of warranty on 20-NOV-2010.
- f) To show the PRODUCT name which are within warranty as on date.
- g). Give the output of following statement.
 - (i) Select COUNT(distinct company) from PRODUCT.
 - (ii) Select MAX(price)from PRODUCT where WARRANTY<=3

2. Write SQL commands for (i) to (viii) on the basis of relations given below:

BOOKS

book_id	Book_name	author_name	Publishers	Price	Type	qty
k0001	Let us C	Sanjay mukharjee	EPB	450	Computers	15
p0001	Genuine	J. Mukhi	FIRST PUBL.	755	Fiction	24
m0001	Mastering c++	Kanetkar	EPB	165	Computers	60
n0002	Vc++ advance	P. Purohit	TDH	250	Computers	45
k0002	Near to heart	Sanjeev	FIRST PUBL.	350	Fiction	30

ISSUED

book_id	quantity_issued
k0002	4
p0001	5
m0001	2

- i. To show the books of FIRST PUBL Publishers written by P.Purohit.
- ii. To display cost of all the books written for FIRST PUBL.
- iii. Depreciate the price of all books of EPB publishers by 5%.
- iv. To display the BOOK_NAME, price of the books whose more than 3 copies have been issued.
- v. To show total cost of books of each type.
- vi. To show the detail of the most costly book.

SQL Questions for practice (Unsolved)

Q1. Consider the following tables Employee and salary. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to viii

Table : Employee

Eid	Name	Deptid	Qualification	Sex
1	Deepali Gupta	101	MCA	F
2	Rajat Tyagi	101	BCA	M
3	Hari Mohan	102	B.A	M
4	Harry	102	M.A	M
5	Sumit Mittal	103	B.Tech	M
6	Jyoti	101	M.Tech	F

Table : Salary

Eid	Basic	DA	HRA	Bonus
1	6000	2000	2300	200
2	2000	300	300	30
3	1000	300	300	40
4	1500	390	490	30
5	8000	900	900	80
6	10000	300	490	89

- (i) To display the frequency of employees department wise.
- (ii) To list the names of those employees only whose name starts with 'H'
- (iii) To add a new column in salary table . The column name is total_sal.
- (iv) To store the corresponding values in the total_sal column.

- (v) Select name from employee where eid=(select eid from salary where basic= (select max(basic) from salary));
- (vi) select max(basic) from salary where bonus >40;
- (vii) Select count(*) from employee group by sex;
- (viii) select Distinct deptid from Employee;

Q2. With reference to following relations personal and job answer the questions that follow:

Create following tables such that Empno and Sno are not null and unique, date of birth is after '12-Jan-1960' , name is never blank, Area and Native place is valid, hobby,dept is not empty, salary is between 4000 and 10000.

personal

Empno	Name	Dobirth	Native_place	Hobby
123	Amit	23-jan-1965	Delhi	Music
127	Manoj	12-dec-1976	Mumbai	Writing
124	Abhai	11-aug-1975	Allahabad	Music
125	Vinod	04-apr-1977	Delhi	Sports
128	Abhay	10-mar-1974	Mumbai	Gardening
129	Ramesh	28-oct-1981	Pune	Sports

job

Sno	Area	App_date	Salary	Retd_date	Dept
123	Agra	25-jan-2006	5000	25-jan-2026	Marketing
127	Mathura	22-dec-2006	6000	22-dec-2026	Finance
124	Agra	19-aug-2007	5500	19-aug-2027	Marketing
125	Delhi	14-apr-2004	8500	14-apr-2018	Sales
128	Pune	13-mar-2008	7500	13-mar-2028	Sales

1. Show empno, name and salary of those who have Sports as hobby.
2. Show name of the eldest employee.
3. Show number of employee area wise.
4. Show youngest employees from each Native place.
5. Show Sno, name, hobby and salary in descending order of salary.
6. Show the hobbies of those whose name pronounces as 'Abhay'.
7. Show the appointment date and native place of those whose name starts with 'A' or ends in 'd'.
8. Show the salary expense with suitable column heading of those who shall retire after 20-jan-2006.
9. Show additional burden on the company in case salary of employees having hobby as sports, is increased by 10%.
10. Show the hobby of which there are 2 or more employees.
11. Show how many employee shall retire today if maximum length of service is 20 years.
12. Show those employee name and date of birth who have served more than 17 years as on date.

13. Show names of those who earn more than all of the employees of Sales dept.
14. Show names of those who earn more than at least one of the employees of Marketing dept.
15. Increase salary of the employees by 5 % of their present salary with hobby as Music or they have completed atleast 3 years of service.

Write the output of:

1. Select distinct hobby from personal;
2. Select avg(salary) from personal,job where personal.empno=job.sno and area in('Agra','Delhi');
3. Select count(distinct Native_place) from personal.
4. Select name,max(salary) from personal,job where personal.empno=job.sno;

Now,

1. Add a new tuple in the table essentially with hobby as Music.
2. insert a new column email in job table
3. Create a table with values of columns empno,name, and hobby.
4. Create a view of personal and job details of those who have served less than 15 years.
5. Erase the records of employee from job table whose hobby is not Sports.
6. Remove the table personal.

Q3. With reference to the table below, answer the question that follow:(8 Marks)

Table: Hospital

No.	Name	Age	Department	Dateofadm	Charges	Sex
1	Sandeep	65	Surgery	23/02/98	300	M
2	Ravina	24	Orthopedic	20/01/98	200	F
3	Karan	45	Orthopedic	19/02/98	200	M
4	Tarun	12	Surgery	01/01/98	300	M
5	Zubin	36	ENT	12/01/98	250	M
6	Ketaki	16	ENT	24/02/98	300	F
7	Leena	29	Cardiology	20/02/98	800	F
8	Zareen	45	Gynecology	22/02/98	300	F
9	Kush	19	Cardiology	13/01/98	800	M
10	Shailya	31	Nuclear Medicine	19/02/98	400	F

- i. To show all information about the patients of cardiology department.
- ii. To list the names of female patients who are in orthopedic department.
- iii. To list names of all patients with their date of admission in ascending order.
- iv. To display patient's Name, Charges, AGE for only male patients only.
- v. To count the number of patients with Age greater than 30.
- vi. To insert a new row in the Hospital table with the following data:
11, 'Nipan ', 26 , 'ENT', '25/02/98', 50, ' M '
- vii. Give the output of following SQL statements:
 - a). Select COUNT(distinct Department) from Hospital;

- b). Select MAX(Age) from Hospital where Sex = 'M';
 c). Select AVG(Charges) from Hospital where Sex = ' F ' ;
 d). Select SUM(Charges) from Hospital where Dateofadm < '2/08/98';

Q4. Given the following **LAB** table, write SQL command for the questions (i) to (iii) and give the output of (iv).

LAB

No	ItemName	CostPerItem	Quantity	Dateofpurchase	Warranty	Operational
1	Computer	60000	9	21/5/96	2	7
2	Printer	15000	3	21/5/97	4	2
3	Scanner	18000	1	29/8/98	3	1
4	Camera	21000	2	13/10/96	1	1
5	Switch	8000	1	31/10/99	2	1
6	UPS	5000	5	21/5/96	1	4
7	Router	25000	2	11/1/2000	2	5

- (i) To select the ItemName, which are within the Warranty period till present date.
 (ii) To display all the itemName whose name starts with 'C'.
 (iii) To list the ItemName in ascending order of the date of purchase where quantity is more than 3.
 (iv) Give the output of the following SQL commands:
 (a) select min(DISTINCT Quantity) from LAB;
 (b) select max(Warranty) from LAB;
 (c) select sum(CostPerItem) from Lab;

Q5.

Employees

Empid	Firstname	Lastname	Address	City
010	Ravi	Kumar	Raj nagar	GZB
105	Harry	Waltor	Gandhi nagar	GZB
152	Sam	Tones	33 Elm St.	Paris
215	Sarah	Ackerman	440 U.S. 110	Upton
244	Manila	Sengupta	24 Friends street	New Delhi
300	Robert	Samuel	9 Fifth Cross	Washington
335	Ritu	Tondon	Shastri Nagar	GZB
400	Rachel	Lee	121 Harrison St.	New York
441	Peter	Thompson	11 Red Road	Paris

EmpSalary

Empid	Salary	Benefits	Designation
010	75000	15000	Manager
105	65000	15000	Manager
152	80000	25000	Director
215	75000	12500	Manager
244	50000	12000	Clerk
300	45000	10000	Clerk

335	40000	10000	Clerk
400	32000	7500	Salesman
441	28000	7500	Salesman

Write the SQL commands for the following using above tables:

- (i) To show firstname,lastname,address and city of all employees living in paris
- (ii) To display the content of Employees table in descending order of Firstname.
- (iii) To display the firstname,lastname and total salary of all managers from the tables Employee and empsalary , where total salary is calculated as salary+benefits.
- (iv) To display the maximum salary among managers and clerks from the table Empsalary.

Give the Output of following SQL commands:

- (i) Select firstname,salary from employees ,empsalary where designation = 'Salesman' and Employees.empid=Empsalary.empid;
- (ii) Select count(distinct designation) from empsalary;
- (iii) Select designation, sum(salary) from empsalary group by designation having count(*) >2;
- (iv) Select sum(benefits) from empsalary where designation ='Clerk';

Answers: 1 mark questions

Q1. Define the terms:

ix. Database Abstraction

Ans: Database system provides the users only that much information that is required by them, and hides certain details like, how the data is stored and maintained in database at hardware level. This concept/process is Database abstraction.

x. Data inconsistency

Ans: When two or more entries about the same data do not agree i.e. when one of them stores the updated information and the other does not, it results in data inconsistency in the database.

xi. Conceptual level of database implementation/abstraction

Ans: It describes what data are actually stored in the database. It also describes the relationships existing among data. At this level the database is described logically in terms of simple data-structures.

xii. Primary Key

Ans : It is a key/attribute or a set of attributes that can uniquely identify tuples within the relation.

xiii. Candidate Key

Ans : All attributes combinations inside a relation that can serve as primary key are candidate key as they are candidates for being as a primary key or a part of it.

xiv. Relational Algebra

Ans : It is the collections of rules and operations on relations(tables). The various operations are selection, projection, Cartesian product, union, set difference and intersection, and joining of relations.

xv. Domain

Ans : it is the pool or collection of data from which the actual values appearing in a given column are drawn.

xvi. Projection

Ans : It is the operation yielding a vertical subset of a given relation , i.e. data under specified columns , in contrast to the horizontal subset(rows) returned by a select operation.

Q2 Write the purpose of following relational algebra statements:

iv. $\sigma_{price > 50}(\text{PRODUCTS})$.

Ans: To select/show those rows from the table PRODUCTS whose price is more than 50.

v. $\sigma_{city = 'Chennai'}(\text{PRODUCTS})$

Ans: To select/show those rows from the table PRODUCTS where city is Chennai.

vi. $\sigma_{price > 20 \wedge price < 45}(\text{SALES})$

Ans: To select/show those rows from the table SALES where city is Chennai.

Q3 Write the expression in relational algebra to :

vi. Show the tuples from PRODUCT table where cost of the product is more than 5000.

Ans: $\sigma_{\text{cost}>5000}(\text{PRODUCTS})$

vii. Show the tuples from PRODUCT table where product_name is 'TV'.

Ans: $\sigma_{\text{product_name}='TV'}(\text{PRODUCTS})$

viii. Show the tuples pertaining to prices between 55 and 100 from the table Items.

Ans: $\sigma_{\text{price}>55 \wedge \text{price}<100}(\text{Items})$. Assuming 55 and 100 not included.
 $\sigma_{\text{price}>=55 \wedge \text{price}<=100}(\text{Items})$. Assuming 55 and 100 included.

ix. Show the tuples whose price is more than 55 or qty<10 from the table Items.

Ans : $\sigma_{\text{price}>=55 \vee \text{qty}<10}(\text{Items})$

x. Show the supplier_name, city where price is more than 1000 from the table Items.

Ans : $\Pi_{\text{supplier_name,city}}(\sigma_{\text{price}>1000}(\text{Items}))$

Answers: 6/8 Marks Questions:

1.

a) To show details of all the PC with stock more than 110.

Ans: select * from products where pname='TV' and stock>110;

b) To list the company which gives warranty for more than 2 years.

Ans: select company from products where warranty>2;

c) To find stock value of the BPL company where stock value is sum of the products of price and stock.

Ans: select sum(price*stock) from PRODUCTS where company='BPL';

d) To show number of products from each company.

Ans: select company,COUNT(*) from products group by company;

e) To count the number of PRODUCTS which shall be out of warranty on 20-NOV-2010.

Ans: select count(*) from products where (20-NOV-2010- manufacture)/365>warranty;

f) To show the PRODUCT name which are within warranty as on date.

Ans: select pname from products where (sysdate- manufacture)/365<warranty;

g). Give the output of following statement.

(i) Select COUNT(distinct company) from PRODUCT.

Ans: 4

(ii) Select MAX(price) from PRODUCT where WARRANTY <= 3

Ans: 39000

2.

i. To show the books of FIRST PUBL Publishers written by P.Purohit.

Ans: select * from books where publishers='FIRST PUBL'

ii. To display cost of all the books written for FIRST PUBL.

Ans: select sum(price*qty) from books where publishers='FIRST PUBL';

iii. Depreciate the price of all books of EPB publishers by 5%.

Ans: update books set price=price-0.5*price where publishers='EPB';

iv. To display the BOOK_NAME, price of the books whose more than 3 copies have been issued.

Ans: select BOOK_NAME, price from books, issued where books.book_id=issued.book_id and quantity_issued > 3;

v. To show total cost of books of each type.

Ans: select sum(price*qty) from books group by type;

vi. To show the detail of the most costly book.

Ans: select * from books where book_id=(select book_id from books where price=(select max(price) from books));

Boolean Algebra 2 Marks Questions

1. Convert the following Boolean expression into its equivalent Canonical Sum of Product Form((SOP)

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

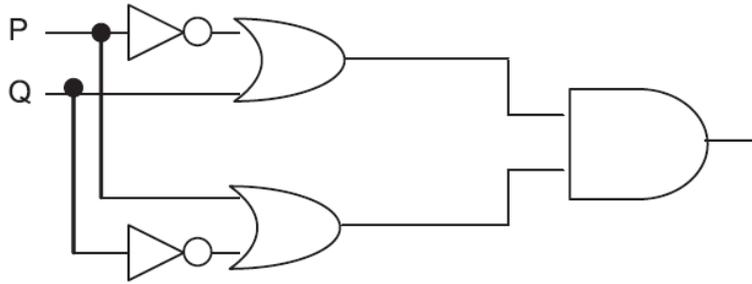
2. Convert the following Boolean expression into its equivalent Canonical Product of Sum form (POS):

$$A.B'.C + A'.B.C + A'.B.C'$$

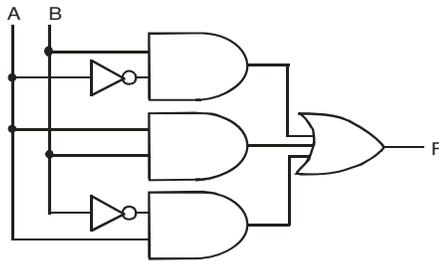
3. Draw a Logical Circuit Diagram for the following Boolean Expression:

$$A.(B+C')$$

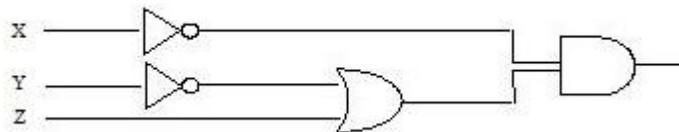
4. Write the equivalent Boolean Expression for the following Logic Circuit



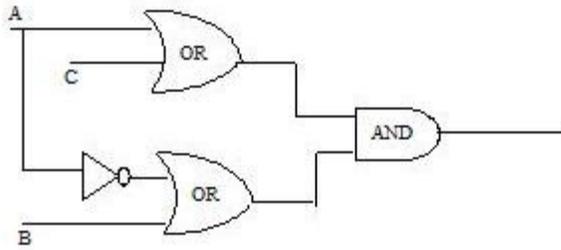
5. Write the equivalent Boolean Expression F for the following circuit diagram :



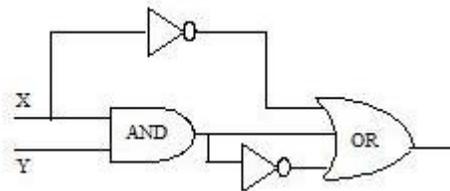
6. Write the equivalent Boolean Expression F for the following circuit diagram :



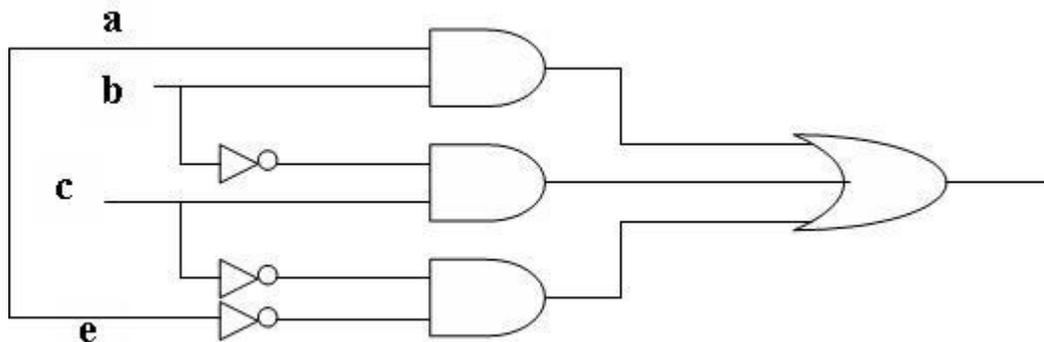
7. Write the equivalent Boolean Expression F for the following circuit diagram :



8. Prove that $XY+YZ+YZ'=Y$ algebraically
9. Express the $F(X,Z)=X+X'Z$ into canonical SOP form.
10. Write the equivalent Boolean Expression for the following Logic Circuit.



11. Interpret the following logical circuit as Boolean expression



12. Design $(A+B).(C+D)$ using NAND Gate
13. Simplify the following Boolean Expression using Boolean postulates and laws of Boolean Algebra.
 $Z=(a'+a).b'.c+a.b'.c'+a.b.(c+c')$
14. Prove $x'.y'+y.z = x'yz+x'yz'+xyz+x'yz$ algebraically.
15. Prove that $(a'+b')(a'+b)(a+b')=a'b'$.
16. A Boolean function F defined on three input variable X,Y,Z is 1 if and only if the number of 1(One) input is odd (e.g. F is 1 if $X=1,Y=0,Z=0$). Draw the truth table for the above function and express it in canonical sum of product form.

3 Marks Questions Boolean Algebra

1. Reduce the following Boolean expression using K-Map:
 $F(A,B,C,D)=\Sigma(0,1,2,4,5,8,9,10,11)$
2. Reduce the following Boolean expression using K – Map
 $F(A, B, C, D) =\Sigma (0,2,3,4,6,7,8,10,12)$
3. Reduce the following Boolean Expression using K-Map:
 $F(A,B,C,D)= \Sigma(0,1,2,4,5,6,8,10)$
4. Reduce the following Boolean expression using K-Map :
 $F(A, B, C, D) = \pi(5,6,7,8,9,12,13,14,15)$
5. Reduce the following Boolean expression using K-Map
 $F(U,V,W,Z) = \Sigma (0, 1, 2, 3, 4, 10, 11)$
6. **Reduce the following Boolean Expression using K-Map:**
 $F(U,V,W,Z)=\Pi(0,1,2,4,5,6,8,10)$
7. If $F(a,b,c,d)=\Sigma(0,2,4,5,7,8,10,12,13,15)$, obtain the simplified form using K-Map.
8. If $F(a,b,c,d) = \Sigma (0,1,3,4,5,7,8,9,11,12,13,15)$, obtain the simplified form using K-Map
9. Obtain a simplified form for a boolean expression
 $F(U,V,W,Z)= \prod (0,1,3,5,6,7,10,14,15)$
10. Reduce the following boolean expression using K-Map
 $F(A,B,C,D) = \prod (5,6,7,8,9,12,13,14,15)$

Answers: 2 Marks Questions

Boolean Algebra

1.

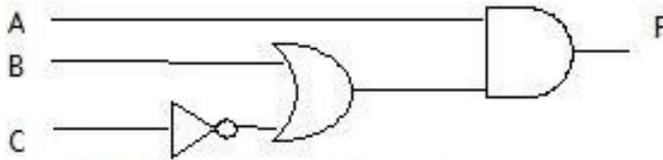
$$\begin{aligned} F(X, Y, Z) &= \prod(4, 5, 6, 7) \\ &= \Sigma(0, 1, 2, 3) \\ &= X' \cdot Y' \cdot Z' + X' \cdot Y' \cdot Z + X' \cdot Y \cdot Z' + X' \cdot Y \cdot Z \end{aligned}$$

2. $A \cdot B' \cdot C + A' \cdot B \cdot C + A' \cdot B \cdot C' = \prod(0, 1, 4, 6, 7)$

OR

$$= (A+B+C) \cdot (A+B+C') \cdot (A'+B+C) \cdot (A'+B'+C) \cdot (A'+B'+C')$$

3.



4. $F(P, Q) = (P' + Q) \cdot (P + Q')$

5. $A'B + AB + AB'$

6. $X'(Y' + Z)$

7. $(A + C)(A' + B)$

8. $XY + YZ + YZ' = Y$

L.H.S.

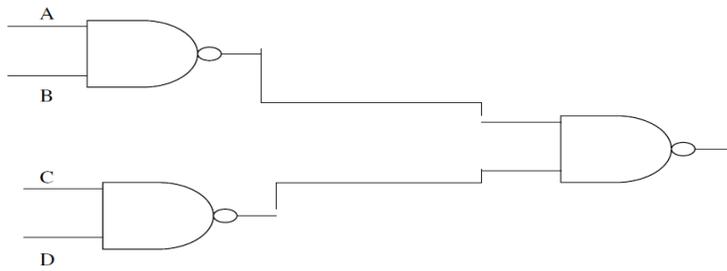
$$\begin{aligned} &XY + YZ + YZ' \\ &= XY + Y(Z + Z') \\ &= XY + Y = Y(X + 1) \\ &= Y \cdot 1 \\ &= Y = RHS \end{aligned}$$

9.
$$\begin{aligned} F(X, Z) &= X + X'Z = X(Y + Y') + X'(Y + Y')Z \\ &= XY + XY' + X'YZ + X'Y'Z \\ &= XY(Z + Z') + XY'(Z + Z') + X'YZ + X'Y'Z \\ &= XYZ + XYZ' + XY'Z + XY'Z' + X'YZ + X'Y'Z \end{aligned}$$

10. $XY + (XY)' + X'$

11. $ab + b'c + c'e'$

12.



13. $Z = (a' + a).b'.c + a.b'.c' + a.b.(c + c')$
 $RHS = (a' + a).b'.c + a.b'.c' + a.b.(c + c')$
 $= a'bc + ab'c + ab'c' + ab.1$
 $= a'bc + ab'c' + ab'c$
 $= ab'(c + c') + ab'c$
 $= ab' + ab'c$
 $= ab'(1 + c)$
 $= ab'$

14. $L.H.S. = x'y + y.z$
 $= x'y.1 + 1.y.z = x'y(z + z') + (x + x')y.z$
 $= x'yz + x'y'z' + xyz + x'y'z = RHS$

15. $LHS = (a' + b')(a' + b)(a + b')$
 $= (a'a' + a'b + a'b' + b'b)(a + b')$
 $= (a' + a'b + a'b' + 0)(a + b')$
 $= aa' + a'b' + aa'b + a'bb' + a'ab' + a'b'b'$
 $= 0 + a'b' + 0 + 0 + 0 + a'b' = a'b' = RHS$

16.

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Canonical SOP
 $XYZ' + XY'Z + XY'Z' + XYZ$

**Answers: 3 marks Questions
Boolean Algebra**

1.

	A' . B'	A' . B	A . B	A . B'
C' . D'	1	1		1
	0		4	12
C' . D	1	1		1
	1		5	13
C . D				
	3		7	15
C . D'	1			1
	2		6	14
				10

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

2.

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

$$F = C'.D' + A'.C + B'.D'$$

3.

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

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

4.

	A' . B'	A' . B	A . B	A . B'
C' D'	1	1		
C' . D	1			
C . D	1			1
C . D'	1			1

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

Or

	A + B	A+B'	A'+B'	A'+B
C+D			0	0
C+D'			0	0
C'+D'			0	1
C'+D			0	1

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

5.

	U' V'	U' V	UV	UV'
W' Z'	1	1		
W' Z	1			
WZ	1			1
WZ'	1			1

$$F = U' . V' + W . V' + U' . W' . Z'$$

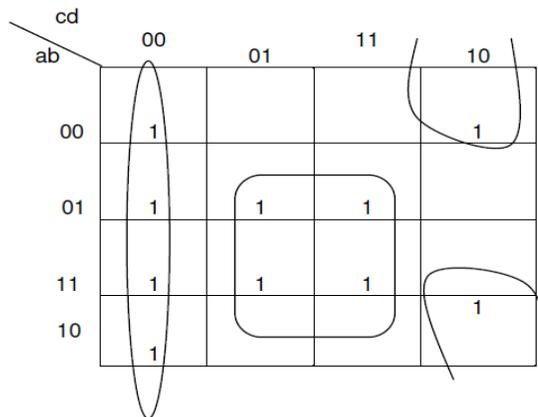
6. $F(U, V, W, Z) = \prod (0, 1, 2, 4, 5, 6, 8, 10)$
 $= \sum (3, 7, 9, 11, 12, 13, 14, 15)$

After that Draw the K map and solve using SOP form

	U'V'	U'V	UV	UV'
W'Z'			1	
W'Z	0	4	12	8
WZ	1	5	13	9
WZ'	3	7	15	11
	2	6	14	10

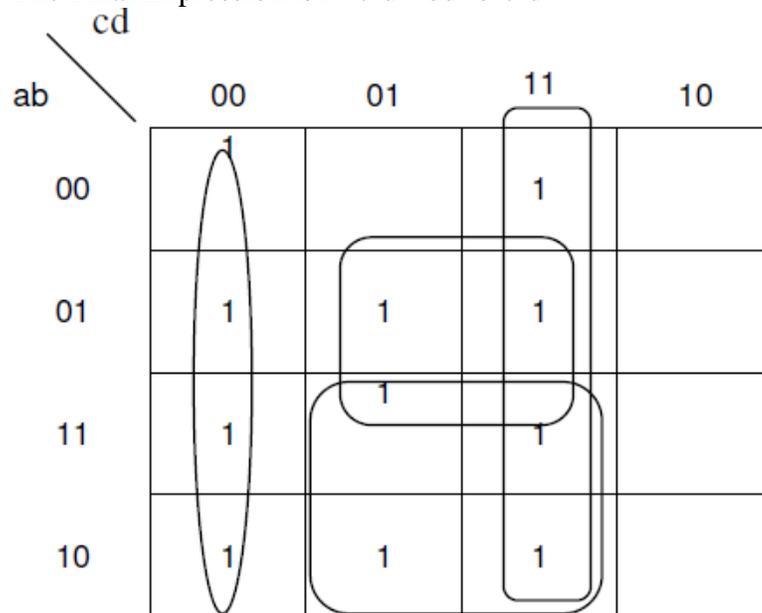
$$F(U, V, W, Z) = UV + WZ + UZ$$

7.



The Final Expression is $F = c'd' + bd + b'c'd$

8.



9.

		WZ			
		W+Z[00]	W+Z'[01]	W'+Z'[11]	W'+Z[10]
UV					
U+V[00]	0	0	0		
U+V'[01]		0	0	0	
U'+V'[11]			0	0	
U'+V[10]				0	

The POS form is $(U+Z').(V'+W').(U+V+W).(U'+W'+Z)$

10. Do your self

1 Mark Questions

Communication and Network Concepts

- 1 What is bleeding of signal?
- 2 Which communication medium is to be suggested for very effective and fast communication in guided medium?
- 3 In harsh industrial environment which cable would you like to use?
- 4 Which media have the ability to communicate over oceans?
- 5 What is the difference between microwave and radiowave transmission?
- 6 Which is the special case of microwave relay system?
- 7 Which transmission medium is useful for sparsely populated areas?
- 8 In which transmission medium Bandwidth allocation is limited?
- 9 What is baud?
- 10 Which network is easy to expand?
- 11 In which network there is no server?
- 12 In Ethernet card which connection is used for coaxial cable or twisted pair or for both?
- 13 Which device filter the data and which device can handle different protocol?
- 14 Which device do not control broadcast , filter traffic and filter collision?
15. Which networking device is used for less no. of nodes or which is for more no. of nodes?

4 Marks Questions

Communication and Network Concepts

1. 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:



Center to center distances between various blocks

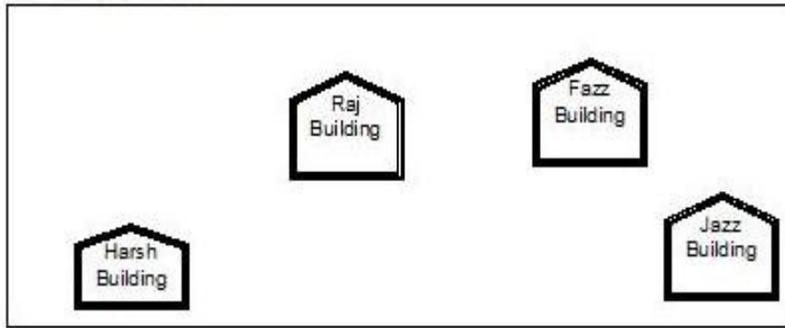
Block A to Block B	50 m
Block B to Block C	150 m
Block C to Block D	25 m
Block A to Block D	170 m
Block B to Block D	125 m
Block A to Block C	90 m

Number of Computers

Block 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?

2. 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:



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:

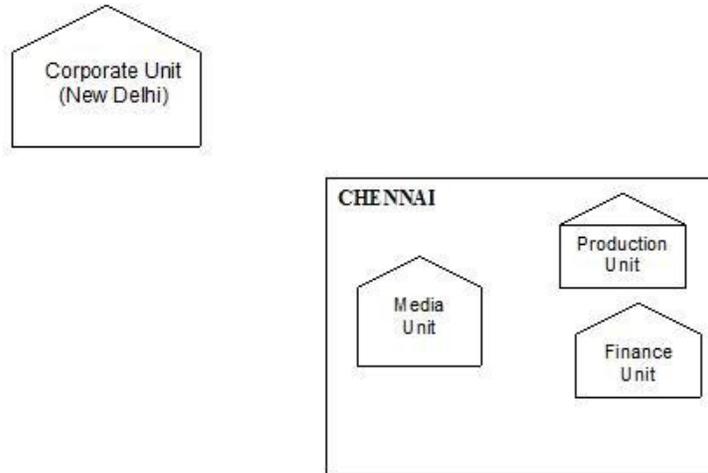
Harsh Building	15
Raj Building	150
Fazz Building	15
Jazz Bulding	25

- 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.

3. “China Middleton Fashion” is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their product. The company has planned to set up their main office units in Chennai at three locations and have named their offices as “Production Unit”, “Finance Unit” and “Media Unit”. The company has its corporate unit in New Delhi.

A rough layout of the same is as follows:

INDIA



Approximate distances between these Units is as follows:

From	To	Distance
Production Unit	Finance Unit	70 Mtr
Production Unit	Media Unit	15 KM
Production Unit	Corporate Unit	2112 KM
Finance Unit	Media Unit	15 KM

In continuation of the above, the company experts have planned to install the following number of computers in each of their office units:

Production Unit	150
Finance Unit	35
Media Unit	10
Corporate Unit	30

- i) Suggest the kind of network required (out of LAN,MAN,WAN) for connecting each of the following office units:

- Production Unit and Media Unit
- Production Unit and Finance Unit

- ii) Which one of the following devices will you suggest for connecting all the computers within each of their office units?
- Switch/Hub
 - Modem
 - Telephone
- iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local offices in Chennai for very effective (High Speed) communication?
- Ethernet cable
 - Optical fiber
 - Telephone cable

(iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

4. Nootan Vidya Mandir in OOTY is setting up the network between its different wings. There are 4 wings named as SENIOR(S), MIDDLE(M), JUNIOR(J) and OFFICE(O).

Distance between the various wings are given below:

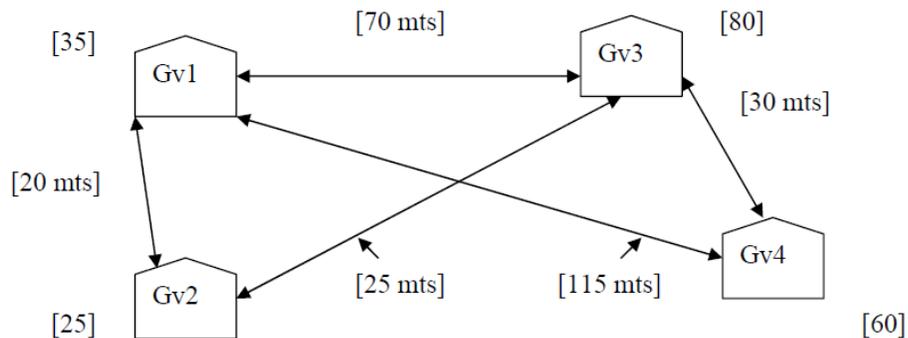
Wing O to Wing S	100m
Wing O to Wing M	200m
Wing O to Wing J	400m
Wing S to Wing M	300m
Wing S to Wing J	100m
Wing J to Wing M	450m

No. of Computers

Wing O	10
Wing S	200
Wing M	100
Wing J	50

- (i) Suggest a suitable Topology for networking the computer of all wings.
- (ii) Name the wing where the server to be installed. Justify your answer.
- (iii) Suggest the placement of Hub/Switch in the network.
- (iv) Mention an economic technology to provide internet accessibility to all wings.

5. Global Village Enterprises has following four buildings in Hyderabad city.



[] – Shows computers in each building

→ - Shows distance

Computers in each building are networked but buildings are not networked so far. The company has now decided to connect building also.

(a) Suggest a cable layout for these buildings.

(b) In each of the buildings, the management wants that each LAN segment gets a dedicated bandwidth i.e bandwidth must not be shared. How can this be achieved?

(c) The company also wants to make available shared Internet access for each of the buildings. How can this be achieved?

(d) The company wants to link its head office in GV1 building to its another office in Japan.

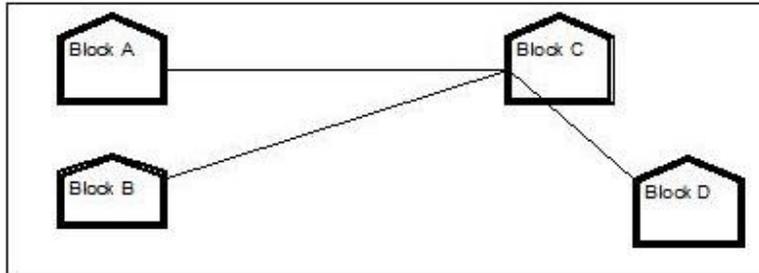
(i) Which type of transmission medium is appropriate for such a link?

(ii) What type of network would this connection result into?

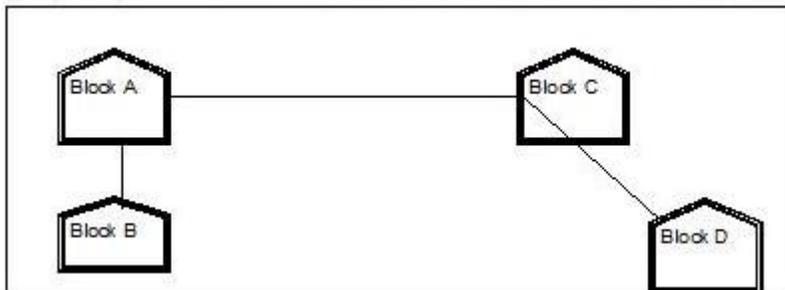
Answers of 1 mark Questions: Do your self

Answers: 4 Marks Communication and Network Concepts

1. (e1) (Any of the following option)
Layout Option 1



Layout Option 2



(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.

(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.

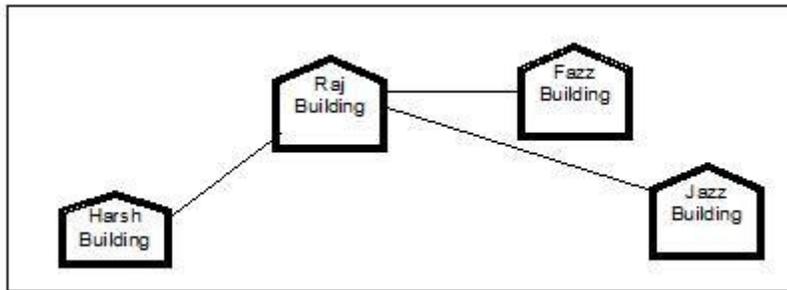
For layout 2, since the distance between Blocks A and C is large so a repeater would ideally be placed in between this path

(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.

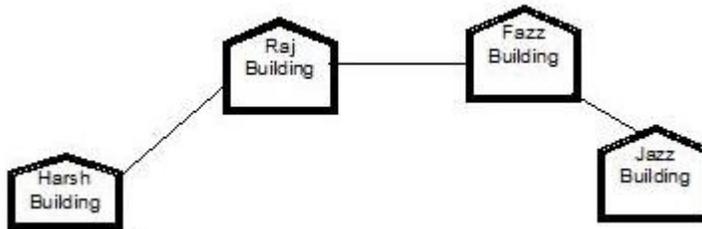
(e4) The most economic way to connect it with a reasonable high speed would be to use radio wave transmission, as they are easy to install, can travel long distances, and penetrate buildings easily, so they are widely used for communication, both indoors

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.

2. (e1) Any one layout
Layout option 1



Layout option 2



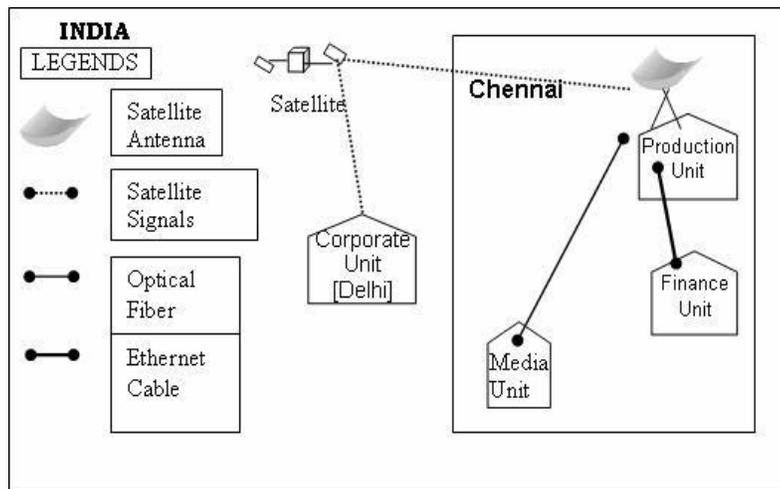
(e2) The most suitable place / block to house the server of this organisation would be Raj Building, as this block contains the maximum number of computers, thus decreasing the cabling cost for most of the computers as well as increasing the efficiency of the maximum computers in the network.

(e3)(i) Raj Building

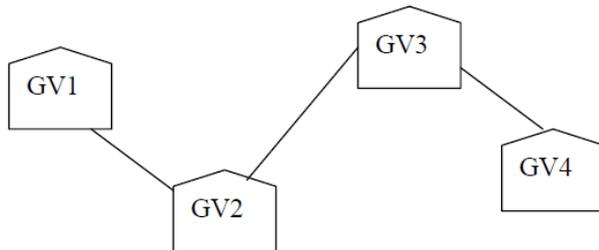
(ii) In both the layouts, a hub/switch each would be needed in all the buildings, to interconnect the group of cables from the different computers in each block

e4) MAN, because MAN (Metropolitan Area Networks) are the networks that link computer facilities within a city.

3. (i)(a) Production Unit and Media Unit :MAN
(b) Production Unit and Finance Unit:LAN
(ii) Switch/Hub
(iii) Optical fiber
(iv) Optical Fiber/Star Topology Wireless/Satellite Link/Leased Line



4. (i) Star or Bus or any other valid topology.
 (ii) Wing S, because maximum number of computers are located at Wing S.
 (iii) Hub/ Switch in all the wings.
 (iv) Coaxial cable/Modem/LAN/TCP-IP/Dialup/DSL/Leased Lines or any other valid technology.
5. (a) Total cable length required for this layout = 75 mts



- (b) To give dedicated bandwidth, the computers in each building should be connected via switches as switches offer dedicated bandwidths.
- (c) By installing routers in each building, shared internet access can be made possible
- (d) (i) Satellite as it can connect offices across globe.
 (ii) WAN (Wide Area Network)