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IMPORTANT QUESTIONS
SUB: COMPUTER SCIENCE(083)
CLASS XII

Review of C++ covered in Class XI

Q1. What is difference between implicit and explicit type casting? Justify your answer with example.
Ans : Implicit is automatic type conversion of one data type into another i.e compiler does itself from lower range to higher range.

e.g. int x, char c='A';
x=c;
cout<<c;
Explicit is forcefully conversion of one data type into another.
e.g. int A,B;
float X;
X= float(A/B);

Q2. Differentiate between a Logical Error and Syntax Error. Also give suitable examples of each in C++.

Ans : Logical Error: Error occurred due to incorrect logic applied by the programmer.
Syntax Error: Error occurred due to not following the proper grammar/syntax of the language OR the error occurred due to violating rules of the programming language
Example:

```
//Program to find area and perimeter of rectangle

void main()
{
        int A=10, B=20, AR, P;
        AR=2*(A*B);                 //Logical Error – Wrong Formula
        P=2*(A+B);
        cout<<A<<P >>endl;          //Syntax Error – Use of >> with cout
}
```

Q3. What is the difference between a keyword and an identifier in C++? Give examples of both.
Ans : Keyword is a special word that has a special meaning and purpose. Keywords are reserved and are few. For example: goto, for, while, if, else etc.
Identifiers are the user-defined name given to a part of a program. Identifiers are not reserved. It should be the name of any keyword. For example: name, stud, _myfile, op etc.

Q4. What is a reference variable? What is its usage?
Ans : A reference variable is an alias name for a previously defined variable. The usage of it is that the same data object can be referred to by two names and these names can be used interchangeably.

Q5. What is the difference between Global Variable and Local Variable?
Ans:

Global Variable	Local Variable
• It is a variable, which is declared outside all the functions • It is accessible throughout the program.	• It is a variable, which is declared with in a function or with in a compound statement • It is accessible only within a function/ compound statement in which it is declared.

```
#include<iostream.h>
float NUM=900;                  //NUM is a global variable
void LOCAL(int T)
{
   int Total=0;                 //Total is a local variable
   for (int I=0;I<T;I++)
      Total+=I;
   cout<<NUM+Total;
}
void main()
{
  LOCAL(45);
}
```

Q6. What is the difference between Object Oriented Programming and Procedural Programming?
Ans :

Object Oriented Programming	Procedural Programming
• Emphasis on Data • Follows Bottom-Up approach in program design • Data hiding feature prevents accidental change in data • Features like data encapsulation, polymorphism, inheritance are present	• Emphasis on doing things (functions) • Follows Top-down approach in program design • Presence of Global variables increase chances of accidental change in data • Such features are not available

Q7. What is a parameter? Differentiate between an actual and a formal parameter with an example?
Ans : Parameter is the variable / value passed to a function or the variable that is used as the incoming values in a function. The variables / values passed to a function are called actual parameters. The variables that are used as the incoming values in a function are called formal parameters. For Example:

```
void change(int b)              // b is the formal parameter
{
        b = 10;
}
void main()
{
        int a = 5;
        change(a);              // a is the actual parameter
        cout<<"\n a = "<<a;
}
```

Q8. Differentiate between a Call by Value and Call by Reference, giving suitable examples of each?
Ans:

Call by Value	Call by Reference
• In this method separate memory created for formal parameters, so any change on formal parameters will the affect actual parameters. Hence actual parameters are preserved in this case.	• In this method no separate memory created for formal parameters, hence formal parameter share the same memory location of actual parameters. Therefore any change on formal parameters will automatically reflected back to actual paramters.

void change(int b)
{
b = 10;
}
void main()
{
int a = 5;
cout<<"\n a = "<<a;
change(a);
cout<<"\n a = "<<a;
}
Output will be: a = 5
a = 5
	void change(int &b)
	{
	b = 10;
	}
	void main()
	{
	int a = 5;
	cout<<"\n a = "<<a;
	change(a);
	cout<<"\n a = "<<a;
	}
	Output will be: a = 5
	a = 10

Q9. What is function prototype? What is its benefit in c++? Give example.
Ans: Function declaration terminated with semicolon is called prototype. Function Prototype, informs the compiler about the functions to be used in a program, the argument they take and the type of value they return.

```
int myfunction(int n);            /* Prototype */
void main( )
{          /* Calling function */
    cout<< myfunction(5);
}
  int myfunction(int n)          /* Called function definition */
  {
      if (n == 0)
          return 1;
      else
          return n * myfunction(n - 1);
   }
```

Questions based on Header Files (CBSE Q.NO. 1(b) for 1 mark)

Q1. Name the header file(s) that shall be needed for successful compilation of the following C++ code:

```
void main( )
{
        char sub[40];
        strcpy(sub, "Medieval History");
        puts(sub);
}
```

Ans : string.h

stdio.h

Q2. Name the header file(s) that shall be needed for successful compilation of the following C++ code:

```
void main( )
{
        char inp, outp;
        inp = getchar();
        outp = toupper(inp)
        cout<<"\nThe uppercase character of "<< inp <<" is "<<outp;
}
```

Ans : ctype.h
stdio.h

Q3. Name the header file(s) that shall be needed for successful compilation of the following C++ code:

```
void main( )
{
        char sname[20];
        gets(sname);
        cout<<setw(20)<<sname;
}
```

Ans : iomanip.h
stdio.h

Q4. Name the header file(s) that shall be needed for successful compilation of the following C++ code:

```
void main( )
{
        char mynum[]="1024";
        cout<<"\nThe next number to "<< mynum <<" is " <<atoi(mynum)+1;
        cout<<"\nThe square root of "<<mynum<<" is " <<sqrt(atoi(mynum));
}
```

Ans : stdlib.h
math.h

Questions based on Program Errors (CBSE Q.1.(C) for 2 marks)

Q1. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include<iostream.h>
void main()
{
        int X[ ]={60,50,30,40},Y; count=4;
        cin>>Y;
        for(i=count-1;i>=0;i--)
        switch(i)
        {
                case 1;
                case 2: cout<<Y * X; break;
                case 3: cout<<Y+ Y;
        }
}
```

Ans:
```
#include<iostream.h>
void main()
{
        int X[ ]={60,50,30,40},Y, count=4;      // multiple declaration separated by comma
        cin>>Y;
        for(int i=count-1; i>=0; i--)           // i should be declared
        switch(i)
        {
                case 1:;                                // case should follow by :
                case 2: cout<<Y*X[i]; break;            // Lvalue required for X
                case 3: cout<<Y + Y;
        }
}
```

Q2. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include<iostream.h>
int func(int y =10, int &x)
{
        if(x%y = 0) return ++x ; else return y-- ;
}
void main()
{
        int p = 20, q = 23;
        r = func(p,q);
        cout>>p>>q>>r;
}
```

Ans:

```
#include<iostream.h>
int func(int y , int &x)            // violating the rule of Default argument
{
        if(x%y = = 0) return ++x ; else return y-- ;            // = = relational operator
}
void main()
{
        int p = 20, q = 23;
        int r = func(p,q);                      // r should be declared
        cout << p << q << r;            // << operator for cout
}
```

Q3. 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);
```

```
}
```

Ans:

```
#include <iostream.h>
struct Pixels
{       int Color,Style;} ;       // Definition of structure Pixels must be ended with ;
void ShowPoint(Pixels P)
{       cout<<P.Color << P.Style<<endl;}        // In cascading of cout, << to be used
void main()
{
        Pixels Point1 = {5,3};          // { } to be used to initialise of members of the object
        ShowPoint(Point1);
        Pixels Point2=Point1;
        Point1.Color+=2;                // member to followed by the object using . operator
        ShowPoint(Point2);
}
```

Q4. Rewrite the following program after removing the syntactical errors (if any). Underline each correction.

```
#include <iostream.h>
class sum
{
        int x, y, total;
public :
        sum(int a, b)
        {
                x=a ; y = b * 2 ; total = 0 ;
        }
        void display()
        {
                c = x + y ;
                total += c ;
                cout << total ;
        }
}
void main()
{
        sum s(20, 10);
        display();
}
```

Ans :

```
#include <iostream.h>
class sum
{
        int x, y, total;
public :
        sum(int a, int b)                       // argument b should be declared separately
        {
                x=a ; y = b * 2 ; total = 0 ;
        }
        void display()
        {
                int c = x + y ;         // local variable c should be defined
                total += c ;
                cout << total ;
```

```
        }
};                                              // class definition must terminate with ;
void main()
{
        sum s(20, 10);
        s.display();            // member function must be invoked using . operator
}
```

Questions based on Finding Outputs (CBSE Q.1(d) for 2 marks)

Q1. Find the output of the following program:

```
#include <iostream.h>
void main()
{
    long NUM = 98534210;
    int f=0,s=0;
    do
    {
        int rem = NUM % 10;
        if( rem % 2 == 0)
            f += rem;
        else
            s += rem;
        NUM /= 10;
     }while(NUM > 0);
    cout<<"\n"<<f<<" – "<<s<<" = "<<f – s;
}
```

Ans : 14 – 18 = – 4

Q2. Find the output of the following program:

```
#include<iostream.h>
int a=10;
void main()
{
    void demo(int &, int , int * );
    int a=20,b=5;
    demo(::a,a,&b);
    cout<<"\n"<<::a<<" * "<<a<<" * "<<b;
}
void demo(int &x, int y, int *z)
{
     a = a + x;
     y = y * a;
    *z = a+y;
    cout<<"\n"<<x<<" * "<<y<<" * "<<*z ;
}
```

Ans: 20 * 400 * 420
20 * 20 * 420

Q3. Find the output of the following program:

```
#include <iostream.h>
#include<ctype.h>
void main()
{
        char *name= "ThE bESt meN wIN";
        for ( int i =0;  name[i]!='\0' ; i++)
       {
              if ( islower( name[i]) )
                    name[i] = toupper(name[i]) ;
              else
              if( isupper(name[i]) )
                if ( i%2 == 0)
                   name[i] – – ;
                else
                   name[i] = tolower(name[i–1]);
          }
          cout<<name;
}
```

Ans : SHD BbRT MEe WHh

Q4. Find the output of the following program:

```
#include <iostream.h>
struct Game
{
        char Magic[20];int Score;
};
void main()
{
        Game M={"Tiger",500};
        char *Choice;
        Choice=M.Magic;
        Choice[4]=’P’;
        Choice[2]=’L’;
        M.Score+=50;
        cout<<M.Magic<<M.Score<<endl;
        Game N=M;
        N.Magic[0]=’A’;N.Magic[3]=’J’;
        N.Score-=120;
        cout<<N.Magic<<N.Score<<endl;
}
```

Ans: TiLeP550
AiLJP430

Q5. Find the output of the following program:

```
#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(int C = 0; C<4; C++)
        {
                (*ptr)*=2;
                --ptr;
        }
        for(int C = 0; C<4; C++)
                cout<< Numbers [C]<< "#";
        cout<<endl;
}
```

Ans : 2@4@8@
4#8#16#20#

Q6. Find the output of the following program:

```
#include <iostream.h>
void myfunct( int p, int *q )
{
        p = *(q) += 2;
}
void main()
{
    int x, b = 5, a[2] = { 10, 20 };
    for( x = 1; x < 3 ; x++)
   {
       myfunct( a[x – 1], &b);
       cout<< "\n" << a[x - 1] <<" : " << b;
    }
}
```

Ans: 10 : 7
20 : 9

Questions based on Finding Outputs (CBSE Q.1(e) for 3 marks)

Q1. Give the output of the following program:

```
#include <iostream.h>
#include <string.h>
#include <ctype.h>
void yourstr(char *s, int n = 2)
{
        int i = n;
        while(i < strlen(s))
        {
                s[i] = '-';
                i = i + n;
        }
```

```
        i = 0;
        while(s[i] != '\0')
        {
            if(s[i] > 'A' && s[i] < 'P')
                s[i] = tolower(s[i]);
            else if(s[i] > 'a' && s[i] < 'p')
            {
                if(i % 3 == 0)
                    s[i] = tolower(s[i-1]);
                else
                    s[i] = tolower(s[i]);
            }
            i++;
        }
    }
    void main()
    {
        char str[] = "MiCroSoFT";
        yourstr(str,3); cout<<str;
    }
```

Ans : mic–oS–fT

Q2. Find the output of the following program:

```
    #include <iostream.h>
    #include<string.h>
    struct KEY
    {
        char word[10];
        int count;
    };
    void changekeyword(KEY somekey);
    void main()
    {
        KEY aKEY;
        strcpy(aKEY.word, "#define");
        aKEY.count=10;
        cout<<aKEY.word<< "\t"<<aKEY.count<< "\n";
        changekeyword(aKEY);
        cout<<aKEY.word<< "\t"<<aKEY.count<< "\n";
    }
    void changekeyword(KEY somekey)
    {
        strcpy(somekey.word, "const");
        somekey.count += 1;
        cout<<somekey.word<< "\t" <<somekey.count<< "\n";
    }
```

Ans : #define 10
#const 11
#define 10

Q3. Find the output of the following program:

```
#include <iostream.h>
int modify(int temp = 2)
{
        if(temp % 3 == 0)
                temp = temp + 1;
        else
                temp = temp + 3;
        return temp;
}
void UpdateMe(int m, int &n)
{
        static int i;
        i++;
        m = n + i;
        if(n > 10)
                n = modify();
        else
                n = modify(n);
        cout<<m<<" ; "<<n<<endl;
}
void main()
{
        int x = 8, y = 20;
        UpdateMe (x,y);
        cout<<x<<" ; "<<y<<endl;
        UpdateMe (y,x);
        cout<<x<<" ; "<<y<<endl;
        UpdateMe (y,x);
        cout<<x<<" ; "<<y<<endl;
}
```

Ans:
21 ; 5
8 ; 5
10 ; 11
11 ; 5
14 ; 5
5 ; 5

Q4. Give the output of the following program:

```
#include<iostream.h>
void main()
{
        int a, *b, **c, ***d;
        a=12, b=&a, c=&b, d=&c; ***d*=5;
        cout<<"\n"<<a<<","<< a + *b;
        (**c) += 10;
        cout<<"\n"<<**c + ***d;
```

```
        (***d)+= 10;
        cout<<"\n"<< a + *b;
    }
```
Ans: 60 , 120
140
160

Questions based on Finding Outputs using random() (CBSE Q.1(f) for 2 marks)

Q1. In the following program, write the correct possible output(s) from the options (i) to (iv).

```
#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:

Ans : The possible output will be (ii) CHN : KOL : CHN: and (iv) KOL :CHN : KOL:

Q2. In the following program, if the value of N given by the user is 50, what maximum and minimum values the program could possibly display?

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
        int N,Guessme;
        randomize();
        cin>>N;
        Guessme=random(N) + 5;
        cout<<Guessme<<endl;
}
```

Ans : Minimum : 5 Maximum : 54

Q3. 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#

Ans: 51#50#

Q4. In the following program, if the value of N given by the user is 20, what maximum and minimum values the program could possibly display?

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
        int N,Guessnum;
        randomize();
        cin>>N;
        Guessnum= random(N – 10)+10;
        cout<<Guessnum<<endl;
}
```

Ans : Maximum Value: 19 Minimum Value: 10

Q5. 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

Ans: (i) ABBC

OBJECT ORIENTED PROGRAMMING CONCEPTS

CBSE QUESTIONS BASED ON DESIGN OF CLASS (4 MARKS)

Question 1.

Define a class candidate in C++ with following Description:
Private Members

- A data member RNo (Registration Number) of type long
- A data member Name of type string
- A data member Score of type float
- A data member Remark of type string
- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score Remarks >=50 Selected less than 50 Not selected
Public members
A function ENTER( ) to allow user to enter values for RNo, Name, Score & call function AssignRem() to assign the remarks.
A function DISPLAY( ) to allow user to view the content of all the data members.

Solution:

```
class Candidate
 { long RNo;
 char Name[20];
 float Score;
 char Remarks[20];
 void AssignRem( ) ;
 public:
void Enter( );
 void Display( );
} ;
 void Candidate: :AssignRem( )
 { if (Score>=50)
       strcpy (Remarks,"Selected") ;
    else strcpy(Remarks,"Not Selected") ;
  }
void Candidate: : Enter ( )
{
   cin>>RNo ;
   gets (Name) ;
   cin>>Score;
   AssignRem( ) ;
```

```
}
void Candidate: :Display()
{
cout<<RNo<<Name<<Score<<Remarks<<endl;
}
```

Question 2.

Define a class ITEM in C++ with the following description :

Private Members

- Code of type integer (Item Code)
- Iname of type string (Item Name)
- Price of type float (Price of each item)
- Qty of type integer (Quantity of item in stock)
- Offer of type float (Offer percentage on the item)
- member function GetOffer( ) to calculate Offer percentage as per the following rule :

If Qty <= 50 Offer is 0 If 50 < Qty <= 100 Offer is 5 If Qty >100 Offer is 10

Public Members

- A function GetStock( ) to allow user to enter values for Code, Iname, Price, Qty and call function GetOffer( ) to calculate the offer.
- A function ShowItem( ) to allow user to view the content of all the data members.

Solution:

```
class ITEM
{ int Code;
  char Iname[20];
  float Price;
  int Qty;
  float Offer;
  void GetOffer();
public :
 void GetStock();
 void ShowItem();
};
void ITEM::GetOffer()
{
    if(Qty<=50)
        Offer = 0;
    else if (Qty <=100)
        Offer = 5;
    else Offer = 10;
}
void ITEM::GetStock()
{
  cin >> Code;
  gets(Iname);
```

```
  cin >> Price >> Qty;
  GetOffer();
  }
void ITEM::ShowItem()
{
 cout << Code << Iname << Price << Qty << Offer;
 }
```

CONSTRUCTOR AND DESTRUCTOR

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

```
class Exam
{
int Marks;
char Subject[20];
public:
Exam () //Function 1
{
Marks = 0;
strcpy (Subject,"Computer");
}
Exam(char S[]) //Function 2
{
Marks = 0;
strcpy(Subject,S);
}
Exam(int M) //Function 3
{
Marks = M;
strcpy(Subject,"Computer");
}
Exam(char S[], int M) //Function 4
{
Marks = M;
strcpy (Subject,S);
  }
   Exam(Exam &E); //Function 5
  ~Exam() //Function 6
   { }
  };
```

(i) Write statements in C++ that would execute Function 3 and Function 4 of class Exam.

(ii) Which feature of Object Oriented Programming is demonstrated using Function 1, Function 2, Function 3 and Function 4 in the above class Exam?

(iii) In Object Oriented Programming, what is Function 6 referred as and when does it get invoked/called?

(iv) Which category of constructor - Function 5 belongs to? Write complete definition of it.

Ans:

i) Exam obj(98);
Exam obj("Maths",89);

ii) Function overloading or polymorphism

iii) Destructor. It invokes automatically when object goes out of its scope.

iv) Copy constructor.

```
Exam::Exam(Exam &T)
{
Marks = T.Marks;
strcpy(Subject,T.subject);
}
```

INHERITANCE

1. 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 AUTHOR.

iii) Write the names of all the members which are accessible from member functions of class AUTHOR.

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

Ans :

i) None of the data member is accessible from object of class AUTHOR

ii) Enter(), Display(), Start(), Show()

iii) member functions : Register(), Enter(), Display(),Haveit(), Giveit(),Start(), Show() data members : Amount, Acode, Aname[20], Employees,

iv) 70

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

```
class Drug
{ char Category[10];
  char Date_of_manufacture[10];
  char Company[20];
 public:
  Drug();
   void enterdrugdetails();
     void showdrugdetails();
   };
 class Tablet : public Drug
 { protected:
   char tablet_name[30];
   char Volume_label[20];
   public:
   float Price;
   Tablet();
   void entertabletdetails();
   void showtabletdetails ();
  };

 class PainReliever : public Tablet
 { int Dosage_units;
   char Side_effects[20];
   int Use_within_days;
   public:
   PainReliever();
   void enterdetails();
   void showdetails();
  };
```

(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 the members accessible from member functions of class Tablet.

(iv) Write names of all the member functions which are accessible from objects of class PainReliever.

Ans :

i) Drug : 40 bytes PainReleliever: 118 bytes

ii) Price

iii) Data Members: tablet_name, Volume_label, Price Member Functions : enterdrugdetails(), showdrugdetails(), entertabletdetails(), showtabletdetails

iv) enterdrugdetails(), showdrugdetails(),entertabletdetails(),showtabletdetails(), enterdetails(), showdetails()

UNSOLVED QUESTIONS FOR PRACTICE

IMPORTANT/ CBSE QUESTION 2(b) – for 2 Marks	
1.	Define the term data hiding in the context of Object Oriented Programming. Give a suitable example using c++.
2.	Define the term encapsulation in the context of Object Oriented Programming. Give a suitable example using c++.
3.	Define the term inheritance in the context of Object Oriented Programming. Give a suitable example using c++.
4.	Define the term polymorphism in the context of Object Oriented Programming. Give a suitable example using c++.
5.	Define the term function overloading in the context of Object Oriented Programming. Give a suitable example using c++.
6.	Define the term constructor overloading in the context of Object Oriented Programming. Give a suitable example using c++.
7.	What is a class? How it is correlated with object?
8.	Differentiate between members, which are present within the private visibility mode with those which are present with in the public visibility modes.
9.	Differentiate between members, which are present within the private visibility mode with those which are present with in the protected visibility modes.
10.	What do you understand by default constructor and copy constructor used in classes? How are these constructors differ from other constructors?
11.	What is constructor? What is its need? Explain with the help of an example.
12.	Why constructor must be in public visibility of class?
13.	What is the use of destructor? When it will get invoked?
14.	What is the purpose of default constructor? Is it necessary to create default constructor in a class? Justify.
15.	What is difference between multiple and multi-level inheritance.

IMPORTANT/ CBSE QUESTION 2(b) – for 2 Marks	

1.	**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"<<end1;
	}
	void Lecture() //Function 2
	{
	cout<<"Lectures in the seminar on"<<end1;

```
}
Seminar(int Duration) //Function 3
{
Time=Duration;cout<<"Seminar starts now"<<end1;
}
~Seminar()
//Function 4
{
cout<<"Vote of thanks"<<end1;
}
};
```

i) In Object Oriented Programming, what is Function 4 referred as and when does it get invoked/ called?

ii) In Object Oriented Programming, which concept is illustrated by Function 1 and Function 3 together? Write an example illustrating the calls for these functions.

2. 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)

3.	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.

4.	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?

5.	Answer the questions after going through the following class.
	class Exam
	{
	char Subject[20] ;
	int Marks ;
	public :
	Exam() // Function 1
	{
	strcpy(Subject, "Computer") ;
	Marks = 0 ;
	}
	Exam(char P[ ]) // Function 2
	{
	strcpy(Subject, P) ;
	Marks=0 ;
	}
	Exam(int M) // Function 3

```
{
strcpy(Subject, "Computer") ;
Marks = M ;
}
Exam(char P[ ], int M) // Function 4
{
strcpy(Subject, P) ;
Marks = M ;
}
};
```

a) Which feature of the Object Oriented Programming is demonstrated using Function 1, Function2, Function 3 and Function 4 in the above class Exam?

b) Write statements in C++ that would execute Function 3 and Function 4 of class Exam.

CBSE/ IMPORTANT QUESTIONS CBSE QUESTION No 2(C) – for 4 Marks	
1.	Define a class REPORT with the following specification Private: Adno -4 digit admission number Name -20 characters Marks -an array of floating point values Averge- average marks obtained Getavg( ) to compute the average obtained in five subjects Public: Readinfo( ) function to accept values for adno, name, marks and Invoke the function Getavg( ) Displayinfo( ) function to display all data members on the screen.
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: <=1000 / 500; more than 1000 and <=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 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.

5. 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

6. 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.

IMPORTANT / CBSE QUESTIONS - CLASS – CBSE Question No. 2(d) for 4 Marks

1 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();
}

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?

2 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.

3	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.

4	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?

5	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.

6	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?

7	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?

8	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?

9	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?

10	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().

DATA FILE HANDLING IN C++

CBSE Q.4.(b)2 Marks :

Write a function in a C++ to read the content of a text file "DELHI.TXT" and display all those lines on screen, which are either starting with 'D' or starting with 'M'. [CBSE 2012]

```
void DispDorM()
{
        ifstream File("DELHI.TXT")
        char str[80];
        while(File.getline(str,80))
        {
                if(str[0] = ='D' || str[0] = ='M')
                        cout<<str<<endl;
        }
        File.close(); //Ignore
}
```

Write a function in a C++ to count the number of lowercase alphabets present in a text file "BOOK.txt".

```
int countalpha()
{       ifstream Fin("BOOK.txt");
        char ch;
        int count=0;
        while(!Fin.eof())
                {Fin.get(ch);
                if (islower(ch))
                        count++;
                }
        Fin.close();
        return count;
}
```

Function to calculate the average word size of a text file.

```
    void calculate()
    {   fstream File;
        File.open("book.txt",ios::in);
        char a[20];
        char ch;
        int i=0,sum=0,n=0;
        while(File)
        {    File.get(ch);
             a[i]=ch;
             i++;
             if((ch==' ') || ch(== '.')||(char==',')(ch=='\t')||(ch=='\n')
                  {i --;  sum=sum +i;
                  i=0;  N++;
             }
        }
        cout<<"average word size is "<<(sum/n);
        }
```

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.

```
int countword()
{       ifstream Fin("BOOK.txt");
        char ch[25];
        int count=0;
        while(!Fin.eof())
                {Fin>>ch;
                if (isupper(ch[0]))
                        count++;
                }
        Fin.close();
        return count;
}
```

Function to count number of lines from a text files (a line can have maximum 70 characters or ends at '.')

```
int countword()
{       ifstream Fin("BOOK.txt");
        char ch[70];
        int count=0;
        if (!Fin)
        {       cout<<"Error opening file!" ;
                exit(0);
        }

        while(1)
        {Fin.getline(ch,70,'.');
                if (Fin.eof())
                        break;
                count++;
        }
        Fin.close();
        return count;
        }
```

BASIC OPERATIONS ON BINARY FILE IN C++

Program to create a binary file 'student.dat' using structure.

```
#include<fstream.h>
struct student
{
char name[15];
float percent;
};
void main()
{
        ofstream fout;
        char ch;
```

```
        fout.open("student.dat", ios::out | ios:: binary);
        clrscr();
        student s;
        if(!fout)
        {
                cout<<"File can't be opened";
                break;
        }
        do
        {
        cout<<"\n enter name of student";
        gets(s);
        cout<<"\n enter persentage";
        cin>>percent;
        fout.write((char *)&s,sizeof(s));  // writing a record in a student.dat file
        cout<<"\n more record y/n";
        cin>>ch;
        }while(ch!='n' || ch!='N');
        fout.close();
}
```

Program to read a binary file 'student.dat' and display records on monitor.

```
#include<fstream.h>
struct student
{
char name[15];
float percent;
};
void main()
{
        ifstream fin;
        student s;
        fin.open("student.dat",ios::in | ios:: binary);
        fin.read((char *) &s, sizeof(student));  //read a record from file 'student.dat'
        while(file)
        {
        cout<<s.name;
        cout<<"\n has the percent: "<<s.percent;
        fin.read((char *) &s, sizeof(student));
        }
        fin.close();
}
```

Binary file using Objects and other file operations:

Consider the following class declaration then write c++ function for following file operations viz create_file, read_file, add new records, modify record, delete a record, search for a record.

```
#include<iostream.h>
class student
{
        int rno;
        char name[30];
        int age;
public:
        void input()
        {
                cout<<"\n enter roll no";
                cin>>rno;
                cout<<"\n enter name ";
                gets(name);
                cout<<"\n enter age";
                cin>>age;
        }
        void output()
        {
                cout<< "\n roll no:"<<rno;
                cout<< "\n name :"<<name;
                cout<< "\n age:"<<age;
        }
        int getrno() { return rno;}
};
void create_file()
{
        ofstream fout;
        char ch;
        fout.open("student", ios::out | ios:: binary);
        clrscr();
        student s;
        if(!fout)
        {cout<<"File can't be opened";
                break;
        }
        do
        {
        s.input();
        cout<<"\n more record y/n";
        cin>>ch;
        }while(ch!='n' || ch!='N');
        fout.close();
}
void read_file()
{
        ifstream fin;
```

```
        student s;
        fin.open("student.dat",ios::in | ios:: binary);
        fin.read((char *) &s,sizeof(student));
        while(file)
        {
        s.output();
        cout<< "\n";
        fin.read((char *) & s,sizeof(student));
        }
        fin.close();
}
void modify_record()
{       student s;
        fstream file;
        file.open("student.dat",ios::in|ios::out|ios::ate|ios::binary);
        int r,pos=-1;
        cout<<"\n enter the rollo no of student whom data to be modified";
        cin>>r;
        file.read((char *)&s,sizeof(s));
        while(file)
        {
                if (r==s.getrno())
                {
                cout<<"\n record is ";
                s.output();
                pos =file.tellg()-size(s);
                break;
                }
        file.read((char *)&s,sizeof(s));
        }
        if(pos>-1)
        {
        cout<< "\n enter new  record";
        s.input();
        file.seekp(pos,ios::beg);
        file.write((char *)&s,sizeof(s));
        cout<< "\n record modified successfully";
        }

        else
        cout<< "\n record not exist";
}

void delete_record()
{
fstream file("student.dat", ios::in|ios::binary);
fstream newfile("newstu.dat",ios::out|ios::binary);
student s;
cout<<"\n enter the rollno no of student whom record to be deleted";
cin>>r;
file.read((char *)&s,sizeof(s));
```

```
while(file)
        {
                if (r!=s.getrno())
                {
                newfile.write((char *)&s,sizeof(s));
                }
        file.read((char *)&s,sizeof(s));
        }
file.close();
newfile.close();
}
void search_record()
{
student s;
        fstream file;
        file.open("student.dat",ios::in|os::binary);
        int r,flag=-1;
        cout<<"\n enter the rollo no of student whom record to be searched";
        cin>>r;
        file.read((char *)&s,sizeof(s));
        while(file)
        {
                if (r==s.getrno())
                {
                cout<<"\n record is ";
                s.output();
                flag=1;
                break;
                }
        file.read((char *)&s,sizeof(s));
        }
        if(flag==1)
        cout<< "\n search successfull";
        else
        cout<< "\n search unsuccessfull";
        file.close();
}
```

CBSE Q.4(a) 1 Mark

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

```
class stock
{
        int Ino, Qty; Char Item[20];
public:
        void Enter() { cin>>Ino; gets(Item); cin>>Qty;}
        void issue(int Q) { Qty+=0;}
        void Purchase(int Q) {Qty-=Q;}
        int GetIno() { return Ino;}
};
void PurchaseItem(int Pino, int PQty)
{       fstream File;
```

```
        File.open("stock.dat", ios::binary|ios::in|ios::out);
        Stock s;
        int success=0;
        while(success= = 0 && File.read((char *)&s,sizeof(s)))
        {
                If(Pino= = ss.GetIno())
                {
                        s.Purchase(PQty);
                        _____    // statement 1
                        _____    // statement 2
                        Success++;
                }
        }
if (success = =1)
        cout<< "Purchase Updated"<<endl;
else
        cout<< "Wrong Item No"<<endl;
File.close() ;
}
```

Ans.1. i) Statement 1 to position the file pointer to the appropriate place so that the data updation is done for the required item.

File.seekp(File.tellg()-sizeof(stock);
OR
File.seekp(-sizeof(stock),ios::cur);

ii) Staement 2 to perform write operation so that the updation is done in the binary file.
File.write((char *)&s, sizeof(s)); OR File.write((char *)&s, sizeof(stock));

CBSE Q.4(c) 3 Marks

2. Write a function in c++ to search for details (Phoneno and Calls) of those Phones which have more than 800 calls from binary file "phones.dat". Assuming that this binary file contains records/ objects of class Phone, which is defined below.

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```
class Phone
{
        Char Phoneno[10]; int  Calls;
public:
        void Get() {gets(Phoneno); cin>>Calls;}
        void Billing() { cout<<Phoneno<< "#"<<Calls<<endl;}
        int GetCalls() {return Calls;}
};
```

Ans 2 :

```
 void Search()
{
        Phone P;
        fstream fin;
        fin.open( "Phone.dat", ios::binary| ios::in);
        while(fin.read((char *)&P, sizeof(P)))
        {
                if(p.GetCalls() >800)
                        p.Billing();
```

```
        }
        Fin.close(); //ignore
};
```

3. **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;}
};
```

Ans.3. void searchbook(int bookno)

```
{ifstream ifile("BOOK.DAT",ios::in|ios::binary);
 if(!ifile)
        {cout<<"could not open BOOK.DAT file"; exit(-1);}
else
        {BOOK b; int found=0;

                while(ifile.read((char *)&b, sizeof(b)))
                {if(b.RBno()==bookno)
                        {b.Display(); found=1; break;}
                }
        if(! found)
                cout<<"record is not found ";
        ifile.close();
        }
}
```

4. **Given a binary file PHONE.DAT, containing records of the following class type**

```
 class Phonlist
{
char name[20];
char address[30];
char areacode[5];
char Phoneno[15];
public:
void Register()
void Show();
void 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.

Ans 4. void TRANSFER()

```
{
        fstream File1,File2;
        Phonelist P;
        File1.open("PHONE.DAT", ios::binary|ios::in);
        File2.open("PHONEBACK.DAT", ios::binary|ios::OUT)
```

```
        while(File1.read((char *)&P, sizeof(P)))
        {               if( p.CheckCode( "DEL"))
                        File2.write((char *)&P,sizeof(P));      }
       File1.close();
       File2.close();
}
```

POINTERS

Question 1.

Find the output of the following program: # include <iostream.h> void main() { int Track [] = {10,20,30,40,}, *Striker ; Striker=Track ; Track [1] += 30 ; cout<<"Striker>"<<*Striker<<endl ; *Striker -=10 ; Striker++; cout<<"Next @"<<*Striker <<endl ; Striker+=2 ; cout<<"last @"<<*Striker<<endl ; cout<<"Reset To " <<Track [0] <<endl ;

}

Ans :

Striker>10

Next @50

Last @40

Reset To 0

Question 2.

Find the output of the following program : #include <iostream.h> void main () { intArray[] = {4,6,10,12}; int *pointer = Array; for (int I=1 ; I<=3 ; I++) { cout<<*pointer<<"#"; pointer++; } cout<<endl; for (I=1 ; I<=4 ; I++) { (*pointer)*=3 ; -- pointer; } for(I=1; I<5; I++) cout << Array [I-1] << "@"; cout << endl; }

Ans :

4#6#10#

12@18@30@36@

CBSE Q.1.(a to e) 2 MARKS PRACTICE QUESTIONS

1. Differentiate between static and dynamic allocation of memory.

2. Identify and explain the error in the following program :

```
#include<iostream.h>
int main()
{int x[] = { 1, 2, 3, 4, 5 };
    for (int i = 0; i < 5; i++)
    {
```

```
            cout << *x;
            x++;
    }
    return 0;
    }
```

3. Give the output of the following :

```
char *s = "computer";
for (int x = strlen(s) – 1; x >= 0; x--)
{
    for(int y =0; y <= x; y++)      cout << s[y];
    cout << endl;
    }
```

4. Identify the syntax error(s), if any, in the following program. Also give reason for errors.

```
void main()
{const int i = 20;
    const int * const ptr = &i;
    (*ptr++; int j= 15; ptr = &j;  }
```

5. What is 'this' pointer ? What is its significance ?
6. What will be the output of following program ?

```
#include<iostream.h>
void main()
{
    char name1[] = "ankur"; char name2[] =
    "ankur"; if (name1 != name2)
            cout << "\n both the strings are not equal";
     else
          cout << "\n the strings are equal";              }
```

7. Give and explain the output of the following code :

```
        void junk (int, int *);
int main()                  {
    int i = 6, j = -4;
    junk (i, &j);
    cout << "i = " << i << ", j = " << j << "\n";
    return 0;               }
void junk(int a, int *b)
{
    a = a* a;
          *b = *b * *b;                  }
```

UNIT-2 DATA STRUCTURES

Data Structure Arrays

CBSE QUESTION ON ARRAY (2 TO 3 MARKS WEIGHTAGE)

1. Write a function in C++ which accepts an integer array and its size as arguments/parameters and exchanges the values 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

Ans :

```
void exchange(int arr[],int s)
 {
int temp, mid=s/2;
 for(int i=0;i<s/2;i++,mid++)
 {
 temp=arr[i];
 arr[i]=arr[mid];
arr[mid]=temp;
}
 }
```

2. 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 i.e. 3x3, 5x5, 7x7 etc...] Example, if the array contents is 3 5 4 7 6 9 2 1 8 Output through the function should be: Middle Row : 7 6 9 Middle column : 5 6 1

Ans:

```
void mrowmcol(int ARR[3][3],int s)
 {
int mid=s/2;
 for(int i=0;i<s;i++)
 {
 cout << ARR[mid][i] << " ";
 }
 cout << endl;
for(i=0;i<s;i++)
{
 cout << ARR[i][mid] << " ";
}
 }
```

3. An array P[20][30] is stored in the memory **along the column** with each of the element occupying 4 bytes, find out the memory location for the element P[5][15], if an element P[2][20] is stored at the memory location 5000.

COLUMN MAJOR FORMULA

LOC (A[I][J]) = BASE(A) + W*[R*J + I]

Given,

LOC(A[2][20])=5000
W=4
I=2
J=20
R=20
C=30
BASE(A)=?

LOC (A[I][J]) = BASE(A) + W*[R*J + I]
5000=BASE(A) + 4[20*20 + 2]
5000=BASE(A) + 4*402
BASE(A) = 5000-1608
BASE(A)=3392
LOC(A[5][15]=?
W=4
I=5
J=15
R=20
C=30
BASE(A)=3392
LOC (A[I][J])= BASE(A) + W*[R*J + I]
=3392 + 4*[20*15 + 5]
=3392 + 4*305
=3392+1220
=4612

4. An array P[20][30] is stored in the memory **along the row** with each of the element occupying 4 bytes, find out the memory location for the element P[5][15], if an element P[2][20] is stored at the memory location 5000.
ROW MAJOR FORMULA
LOC (A[I][J]) = BASE(A) + W*[C*I + J]
Given,
LOC(A[2][20])=5000
W=4
I=2
J=20
R=20
C=30
BASE(A)=?
LOC (A[I][J]) = BASE(A) + W*[C*I + J]
5000=BASE(A) + 4[30*2 + 20]
5000=BASE(A) + 4*80
BASE(A) = 5000-320
BASE(A)=4680
LOC(A[5][15]=?
W=4
I=5
J=15
R=20
C=30
BASE(A)=4680
LOC (A[I][J]) = BASE(A) + W*[C*I + J]
=4680 + 4*[30*5 + 15]
=4680 + 4*165
=4680+660 =5340

STATIC STACK

CBSE 2 MARKS QUESTION ON CONVERSION AND EVALUATION OF POSTFIX

1. Change the following infix expression postfix expression. (A + B)*C+D/E-F

Ans :

ITEM SCANNED	STACK	OPREATION	EXPRESSION
(	(	PUSH	
A	(		A
+	(+	PUSH	A
B	(+		AB
)		POP	AB+
*	*	PUSH	AB+
C	*		AB+C
+	+	PUSH,POP	AB+C*
D	+		AB+C*D
/	+/	PUSH	AB+C*D
E	+/		AB+C*DE
-	+-	PUSH,POP	AB+C*DE/
F	+-		AB+C*DE/F
	EMPTY	POP	AB+C*DE/F-+

Postfix Expression AB+C*DE/F-+

Evaluation of Postfix expression using Stack

1. Algorithm to evaluate a postfix expression P.

2. Create an empty stack
3. i=0
4. while P[i] != NULL
    if P[i] is operand then
        Push(P[i])
        I=i+1
    Else if P[i] is a operator then
        Operand2=pop()
        Operand1=pop()
        Push (Operand1 operator Operator2)
    End if
4. End of while
5. return pop() // return the calculated value which available in the stack.

End of algorithm

2. Evaluate the following postfix expression showing stack status after every step

8, 2, +, 5, 3, -, *, 4 /

token scanned from postfix expression	Stack status (bold letter shows the top of the stack) after processing the scanned token	Operation performed
8	**8**	Push 8
2	8, **2**	Push 2
+	**10**	Op2=pop() i.e 2 Op1=pop() i.e 8 Push(op1+op2) i.e. 8+2
5	10, **5**	Push(5)
3	10, 5, **3**	Push(3)
-	10, **2**	Op2=pop() i.e. 3 Op1=pop() i.e. 5 Push(op1-op2) i.e. 5-3
*	**20**	Op2=pop() i.e. 2 Op1=pop() i.e. 10 Push(op1-op2) i.e. 10*2
4	20, **4**	Push 4
/	5	Op2=pop() i.e. 4 Op1=pop() i.e. 20 Push(op1/op2) i.e. 20/4
NULL	Final result 5	Pop 5 and return 5

3. Evaluate the following Boolean postfix expression showing stack status after every step

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

token scanned from postfix expression	Stack status (bold letter shows the top of the stack) after processing the scanned token	Operation performed
True	**True**	Push True
False	True, **False**	Push False
True	True, False, **True**	Push True
AND	True, **False**	Op2=pop() i.e. True Op1=pop() i.e. False Push(Op2 AND Op1) i.e. False AND True=False
OR	True	Op2=pop() i.e. False Op1=pop() i.e. True Push(Op2 OR Op1) i.e. True OR False=True
False	True, **False**	Push False
NOT	True, **True**	Op1=pop() i.e. False Push(NOT False) i.e. NOT False=True
AND	**True**	Op2=pop() i.e. True Op1=pop() i.e. True Push(Op2 AND Op1) i.e. True AND

		True=True
NULL	Final result **True**	Pop True and Return True

4. Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation : **20, 30, +, 50, 40, - ,***

ITEM SCANNED	**OPERATION**	**STACK**
20	PUSH 20	20
30	PUSH 30	20,30
+	POP 30, POP 20	20+30=50
	PUSH 50	50
50	PUSH 50	50,50
40	PUSH 40	50,50,40
-	POP 40, POP 50	50-40=10
	PUSH 10	50,10
*	POP 10, POP 50	50*10=500
	PUSH 500	500
	POP 500	

CBSE 2 TO 4 MARKS PRACTICE QUESTIONS

1. 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

2. 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.

3. 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.

4. 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

5. 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

6. 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

7. Convert the following infix expressions to postfix expressions using stack
   1. A + (B * C) ^ D – (E / F – G)
   2. A * B / C * D ^ E * G / H
   3. ((A*B)-((C_D)*E/F)*G

8. Evaluate the following postfix expression E given below; show the contents of the stack during the evaluation
   1. E= 5,9,+2,/,4,1,1,3,_,*,+
   2. E= 80,35,20,-,25,5,+,-,*
   3. E= 30,5,2,^,12,6,/,+,-
   4. E=15, 3, 2, +, /, 7, + 2, *

9. An array A[40][10] is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the location A[3][6] if the location A[30][10] is stored at the address 9000.

10 Define functions in C++ to perform a PUSH and POP 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( );
};
```

11. Write a function in C++ to perform a Add and Delete operation in a dynamically allocated Queue considering the following:

```
struct node
{ int empno ;char name[20] ;float sal ;
 Node *Link;
};
```

UNIT-3 DATABASE AND SQL
DATABASE AND SQL
2 marks Practice questions

1. What is relation? What is the difference between a tuple and an attribute?
2. Define the following terminologies used in Relational Algebra:
   (i) Selection (ii) projection (iii) union (iv) Cartesian product
3. What are DDL and DML?
4. Differentiate between primary key and candidate key in a relation?
5. What do you understand by the terms **Cardinality** and **Degree** of a relation in relational database?
6. Differentiate between DDL and DML. Mention the 2 commands for each category.

Database and SQL : 6 marks questions

- Write SQL Command for (a) to (d) and output of (g)

TABLE : GRADUATE

S.NO	NAME	STIPEND	SUBJECT	AVERAGE	DIV
1	KARAN	400	PHYSICS	68	I
2	DIWAKAR	450	COMP. Sc.	68	I
3	DIVYA	300	CHEMISTRY	62	I
4	REKHA	350	PHYSICS	63	I
5	ARJUN	500	MATHS	70	I
6	SABINA	400	CEHMISTRY	55	II
7	JOHN	250	PHYSICS	64	I
8	ROBERT	450	MATHS	68	I
9	RUBINA	500	COMP. Sc.	62	I
10	VIKAS	400	MATHS	57	II

(a) List the names of those students who have obtained DIV I sorted by NAME.

(b) Display a report, listing NAME, STIPEND, SUBJECT and amount of stipend received in a year assuming that the STIPEND is paid every month.

(c) To count the number of students who are either PHYSICS or COMPUTER SC graduates.

(d) To insert a new row in the GRADUATE table: 11,"KAJOL", 300, "computer sc", 75, 1

(e) Give the output of following sql statement based on table GRADUATE:

(i) Select MIN(AVERAGE) from GRADUATE where SUBJECT="PHYSICS";
(ii) Select SUM(STIPEND) from GRADUATE WHERE div=2;
(iii) Select AVG(STIPEND) from GRADUATE where AVERAGE>=65;
(iv) Select COUNT(distinct SUBJECT) from GRADUATE;

Sol :

(a) SELECT NAME from GRADUATE where DIV = 'I' order by NAME;
(b) SELECT NAME,STIPEND,SUBJECT, STIPEND*12 from GRADUATE;
(c) SELECT SUBJECT,COUNT(*) from GRADUATE group by SUBJECT
having SUBJECT='PHYISCS' or SUBJECT='COMPUTER SC';
(d) INSERT INTO GRADUATE values(11,'KAJOL',300,'COMPUTER SC',75,1);
(e) i) 63
ii) 800
iii) 475
iv) 4

UNIT-4 BOOLEAN ALGEBRA

1.Algebraic method: This method makes use of Boolean postulates, rules and theorems to simplify the expression.

Example No. 1: Reduce the expression $\overline{XY} + \overline{X} + XY$.

Solution. $\overline{XY} + \overline{X} + XY$

$= (\overline{X} + \overline{Y}) + \overline{X} + XY$ (*using DeMorgan's 2nd theorem i.e.,* $\overline{XY} = \overline{X} + \overline{Y}$)

$= \overline{X} + \overline{X} + \overline{Y} + XY$

$= \overline{X} + \overline{Y} + XY$ ($\because\ \overline{X} + \overline{X} = \overline{X}$ as X+X=X)

$= \overline{X} + XY + \overline{Y}$

$= (\overline{X} + \overline{\overline{X}}Y) + \overline{Y} = (\overline{X} + XY) + \overline{Y}$ (*putting* $X = \overline{\overline{X}}$)

$= \overline{X} + Y + \overline{Y}$ ($X + \overline{X}Y = X + Y$)

$= \overline{X} + 1$ (*putting* $Y + \overline{Y} = 1$)

$= 1$ (*putting* $\overline{X} + 1 = 1$ as $1 + X = 1$)

Example No. 2: Minimise $AB + \overline{AC} + A\overline{B}C(AB + C)$.

Solution. $AB + \overline{AC} + A\overline{B}C(AB + C) = AB + \overline{AC} + A\overline{B}CAB + A\overline{B}CC$

$= AB + \overline{AC} + AAB\overline{B}C + A\overline{B}CC$

$= AB + \overline{AC} + 0 + A\overline{B}CC$ (*putting* $B\overline{B} = 0$)

$= AB + \overline{AC} + A\overline{B}.C$ (*putting* $C.C = C$)

$= AB + \overline{A} + \overline{C} + A\overline{B}C$ (*putting* $\overline{AC} = \overline{A} + \overline{C}$ *DeMorgan's 2nd theorem*)

$= \overline{A} + AB + \overline{C} + A\overline{B}C$ (*rearranging the terms*)

$= \overline{A} + B + \overline{C} + A\overline{B}C$ (*putting* $\overline{A} + AB = A + B$ *because* $X + \overline{X}Y = X + Y$)

$= \overline{A} + \overline{C} + B + A\overline{B}C = \overline{A} + \overline{C} + B + \overline{B}AC$

$= \overline{A} + \overline{C} + B + AC$ (*putting* $B + \overline{B}AC = B + AC$ *because* $X + \overline{X}Y = X + Y$)

$= \overline{A} + B + \overline{C} + CA$

$= \overline{A} + B + \overline{C} + A$ ($\because\ \overline{C} + CA = \overline{C} + A$)

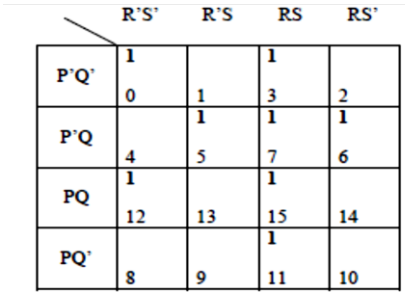
$= A + \overline{A} + B + \overline{C}$

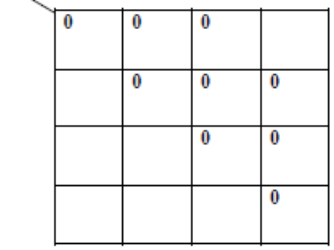
$= 1 + B + \overline{C}$ (*putting* $A + \overline{A} = 1$)

$= 1$ (*as* $1 + X = 1$ *i.e., anything added to 1 results in 1*)

2. Using Karnaugh Map :

Example1: Reduce the following Boolean expression using K-Map:
F(P,Q,R,S)=Σ(0,3,5,6,7,11,12,15)
Soln:
This is 1 quad, 2pairs & 2 lock
Quad(m3+m7+m15+m11) reduces to RS
Pair(m5+m7) reduces to P‟QS
Pair (m7+m6) reduces to P‟QR
Block m0=P‟Q‟R‟S‟
M12=PQR‟S‟
hence the final expressions is F=RS + P‟QS + P‟QR + PQR‟S‟ + P‟Q‟R‟S‟





Example2: Reduce the following Boolean expression using K-Map:
F(A,B,C,D)=Π(0,1,3,5,6,7,10,14,15)

Soln:
Reduced expressions are as follows:
For pair 1, (A+B+C)
For pair 2, (A‟+C‟+D)
For Quad 1, (A+D‟)
For Quad 2, (B‟+C‟)
Hence final POS expression will be
$Y(A,B,C,D) = (A+B+C)\ (A+\overline{C}+\overline{D})\ (A+\overline{D})\ (\overline{B}+\overline{C})$

OTHER IMPORTANT Questions: (Boolean Algebra)

a) State and verify absorption law in Boolean algebra.

Ans. Absorption Law states that :

a) X+XY=X b) X(X+Y)=X

b) Verify X'.Y+X.Y'=(X'+Y').(X+Y) algebraically.

Ans. LHS= X'Y + XY'

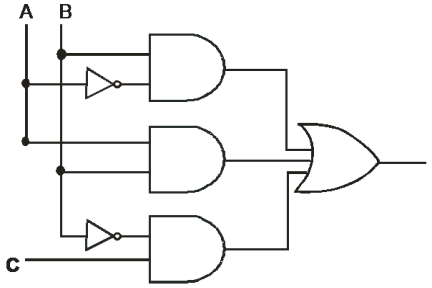
= (X'+X) (X'+Y') (Y+X) (Y+Y')

= 1.(X'+Y') (X+Y).1

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

= RHS, hence proved

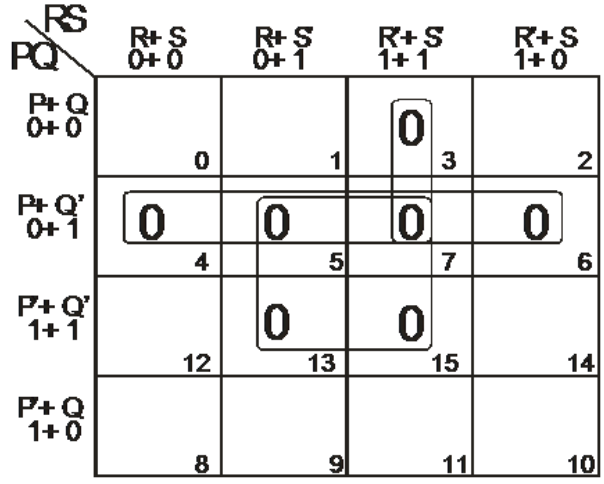
c) Write the equivalent Boolean Expression F for the following circuit diagram :



Ans.: A'B+AB+B'C

d) If F(P,Q,R,S) = ∏ (3,4,5,6,7,13,15) , obtain the simplified form using K-Map.

Ans.:



.

Reduction of groups following the reduction rule :

Quad1 = M4.M5.M6.M7

= P+Q’

Quad2 = M5.M7.M13.M15

= Q’+S’

Pair = M3.M7

= P+R’+S’

Therefore POS of F(P,Q,R,S) = (P+Q’)(Q’+S’)(P+R’+S’)

e) F(a,b,c,d)=Σ(0,2,4,5,7,8,10,12,13,15)

F(a,b,c,d)=B1+B2+B3

B1=m0+m4+m12+m8==c’d’

B2=m5+m7+m13+m15=bd

B3=m0+m2+m8+m10=b’d’

F(a,b,c,d)=c’d’+bd+b’d’

f) Write the equivalent Boolean expression for the following logic circuit:

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

- Express in the product of sums form, the Boolean function F(X,Y,Z), the truth table for which is given below:

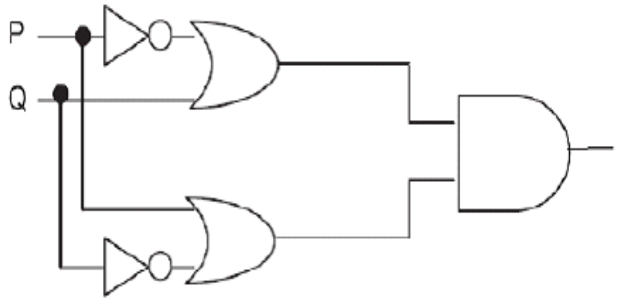
1/2 Marks Practice Questions:

1.State and Prove DeMorgan Law using Truth Table

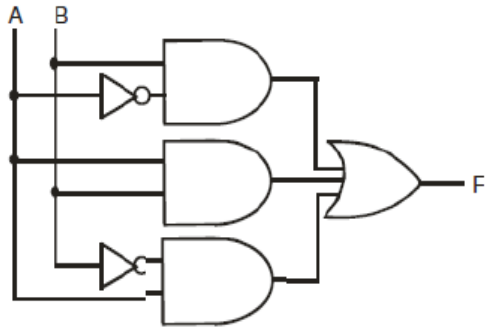
2. State and prove Absorption Law algebraically.

3. State and Prove Distributive Law algebraically.

4. Write the equivalent Boolean Expression for the following Logic Circuit 2



5. Write the equivalent Boolean Expression F for the following circuit diagram : 2



6 Write the equivalent Boolean Expression F for the following circuit diagram : 2

7. 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') 1

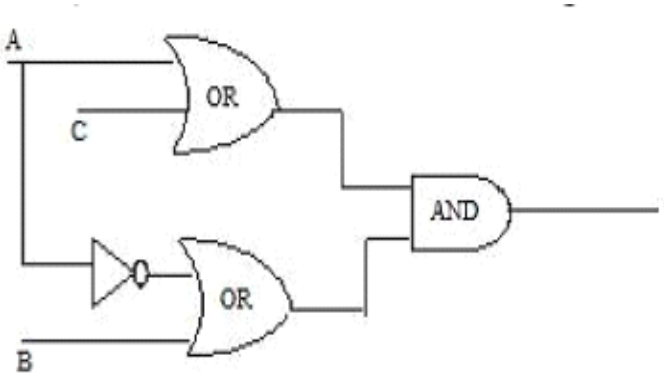
8. Convert the following Boolean expression into its equivalent Canonical Product of Sum form (POS):

A.B'.C + A'.B.C +A'.B.C' 1

9. Draw a Logical Circuit Diagram for the following Boolean expression:

A.(B+C') 2

10. Write the equivalent Boolean Expression F for the following circuit diagram: 2



11. Prove that XY+YZ+YZ'=Y algebraically 2

12. Design (A+B).(C+D) using NOR Gate. 2

3 Marks Practice Questions

13. If F(a,b,c,d)=Σ(0,2,4,5,7,8,10,12,13,15), obtain the simplified form using K-Map.

14. If F(a,b,c,d) =Σ(0,3,4,5,7,8,9,11,12,13,15), obtain the simplified form using KMap

15 Obtain a simplified form for a boolean expression

F(U,V,W,Z)= π (0,1,3,5,6,7,10,14,15)

16 . Reduce the following boolean expression using K-Map

F(A,B,C,D) = Σ(5,6,7,8,9,12,13,14,15)

UNIT 5 : COMMUNICATION AND NETWORK CONCEPTS

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

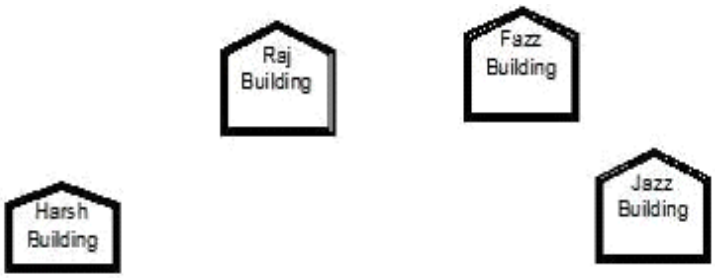
Block A to Block B	50 m
Block B to Block C	150 m
Block C to Block D	25 m
Block A to Block D	170 m
Block B to Block D	125 m
Block A to Block C	90 m

Number of Computers

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

- Suggest a cable layout of connections between the blocks.
- Suggest the most suitable place (i.e. block) to house the server of organisation with a suitable reason.
- Suggest the placement of the following devices with justification
    - Repeater
    - Hub/Switch
- 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:

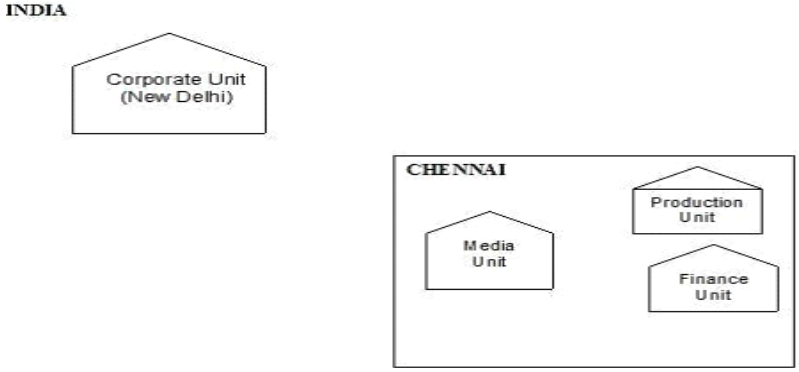
(i) Internet Connecting Device/Modem

(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:



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

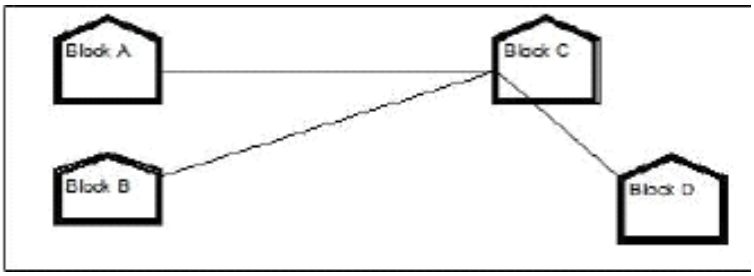
• Telephone cable

(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.

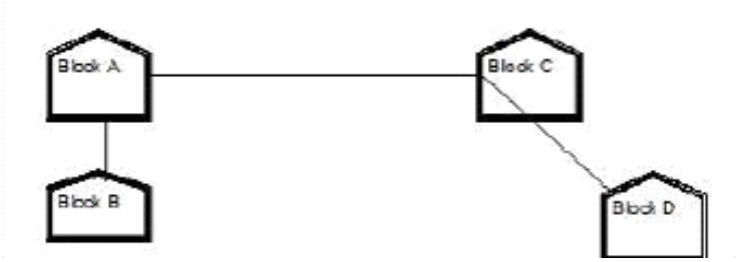
Answers: 4 Marks (Communication and Network Concepts)

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

Layout Option 1



Layout Option 2



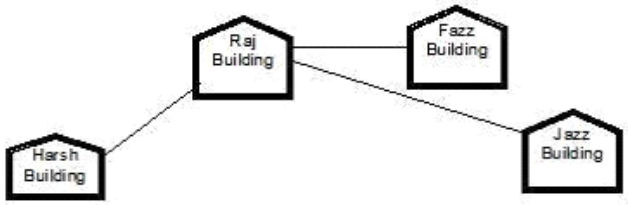
(e2) The most suitable place / block to house the server of this organisation would be Block C, as this block contains the maximum number of computers, thus decreasing the cabling cost for most of the computers as well as increasing the efficiency of the maximum computers in the network.

(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.

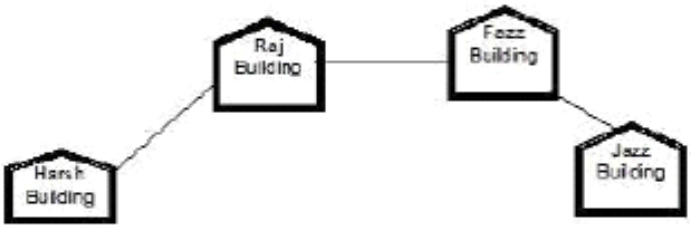
(e4) The most economic way to connect it with a reasonable high speed would be to use radio wave transmission, as they are easy to install, can travel long distances, and penetrate buildings easily, so they are widely used for communication, both indoors and outdoors. Radio waves also have the advantage 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 option1

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

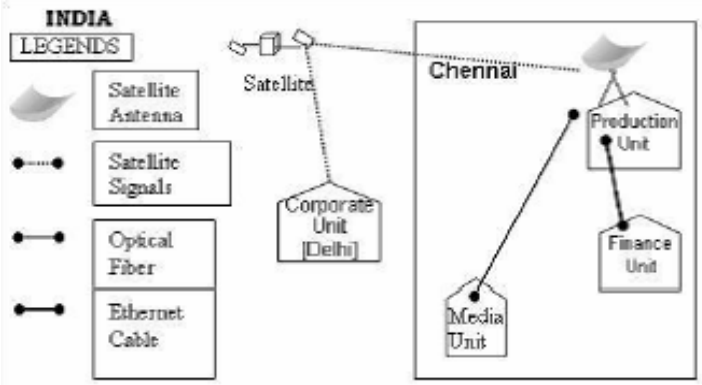
(ii) In both the layouts, a hub/switch each would be needed in all the buildings, to interconnect the group of cables from the different computers in each block e4) MAN, because MAN (Metropolitan Area Networks) are the networks that link computer facilities within a city.

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



1 and 2 Marks Questions

Q(1) What do you mean by a computer network?

Ans:- Computer network is an interconnection of autonomous computers connected together using transmission media.

Q(2) What is the need for networking the computers?

Ans:- 1. Sharing of Information, 2. Reliability, 3. Reduces cost
4. Time saving

Q(3) What is the full form of ARPANET?

Ans:- Advanced Research Projects Agency Network

Q(4) What are various data transmission modes?

Ans:- There are three modes of data transmission

- Simplex
- Half-duplex
- Full-duplex

Q(5) What is the difference between Simplex and half duplex transmission?

Ans:- In simples transmission mode, the data can be transferred in only one direction where as in half duplex transmission mode, the data can be transmitted in both directions but one at a time.

Q(6) What do you mean by MODEM?

Ans:- MODEM stands for MODulatorDEModuator. It is a device that can convert an analog signal into digital signal and vice versa.

Q(7) Define the terms Bandwidth.

Ans:- Bandwidth is the range of frequencies that is available for the transmission of data. Wider the bandwidth of a communication channel, the more data it can transmit in a given period of time.

Q(8) What are various types of transmission media?

Ans:- There are two broad categories of transmission media

- Guided media
- Unguided Media

Q(9) Explain in brief the advantages and disadvantages of Twisted pair Cable.

Ans:- Advantages

- Inexpensive

- Often available in existing phone system
- Well tested and east to get

Disadvantages

- Susceptible to noise (sound, energy etc.)
- Not as durable as coaxial cable
- Does not support high speed

Q(10) What do you mean by communication protocol?

Ans:- A protocol is a set of rules to enable computers to connect with one another and to exchange information with minimum possible error.

Q(11) List various functions of Communication protocol.

Ans:- Data sequencing, Data Formatting, Flow control, Error Control,Connection Establishment and termination,Data Security

Q(12) List commonly used protocols.

Ans:- HTTP, TCT/IP, FTP, SLIP, PPP, SMTP, POP, ICMP

Q(13) What are the main functions of TCP

Ans:- The TCP does the following activities

- It breaks the data into packets that the network
- Verifies that all the packets arrived at the destination
- Reassembles the data

Q(14) What do you mean by network topology?

Ans:- Topology is how the nodes/computers are interconnected together.

Q(15) List various types of Networks.

Ans:- LAN, MAN, WAN

Q(16) Give names of various networking topologies in LAN.

Ans:- 1.Star Topology, 2.Ring topology, 3.Bus topology 4.Mesh Topology

Q(17) Write two advantages and two disadvantages of STAR topology.

Ans:- Advantages of STAR topology

- It is easy to modify and add new computers to a star network without disturbing the rest of the network.
- Troubleshooting a star topology network is easy

Disadvantages

- All the nodes are dependent on the central system. Hub. Failure of hub result in shutting down of whole of the system
- Long cable length is required

Q(18) What is NFS?

Ans:- NFS stands for Network File System. NFS is a protocol that allows a set of computers to access each others files.

OTHER IMPORTANT QUESTIONS

Q.1 What is protocol? How many types of protocols are there?

Ans. When computers communicate each other, there needs to be a common set of rules and instructions that each computer follows. A specific set of communication rules is called a protocol. Some protocol: PPP, HTTP, SLIP, FTP, TCP/IP

Q.2 What is the difference between Networking and Remote Networking?

Ans. The main difference between Networking and Remote Networking, is the network which we use in offices or other places locally such LAN or INTERNET and remote networking is one which we use TERMINAL Services to communicate with the remote users such WAN.

Q.3 What is point-to-point protocol?

Ans. A communication protocol used to connect computer to remote networking services include Internet Service Providers. In networking, the Point-to-Point protocol is commonly used to establish a direct connection between two nodes. Its primary use has been to connect computers using a phone line.

Q.4 How gateway is different from router?

Ans. A gateway operates at the upper levels of the OSI model and translates information between two completely different network architectures. Routers allow different networks to communicate with each other. They forward packets from one network to another based on network layer information. A gateway can interpret and translate the different protocols that are used on two distinct networks. Unlike routers that successfully connect networks with protocols that are similar, a gateway perform an application layer conversion of information from one protocol stack to another.

Q.5 What is the difference between baseband and broadband transmission?

Ans. Baseband is a bi-directional transmission while broadband is a unidirectional transmission.

No Frequency division multiplexing possible in base band but possible in broadband.

SNo	Baseband	Broadband
1	Entire bandwidth of the cable is consumed by a signal	broadband transmission, signals are sent on multiple frequencies, allowing multiple signals to be sent simultaneously.
2	Digital signals	Analog signals
3	bi-directional transmission	unidirectional transmission
4	No Frequency division multiplexing possible	Frequency division multiplexing possible
5	Uses for short distance	Uses for long distance

Q6 What are the difference between domain and workgroup?

Ans.

SNo	Domain	Workgroup
1.	One or more computers are servers	All Computers are peers.
2.	If you have a user account on the domain, you can logon to any computer on the domain.	Each computer has a set of accounts.
3.	There can be 100+ computers	Typically not more then 20-30 computers
4.	The computers can be on different local	All computers must be on the same local

	network	netork.

Q.7 What is the differences between POP3 and IMAP Mail Server?

Ans. IMAP is a standard protocol for accessing e-mail from a local server. A simpler e-mail protocol is Post Office Protocol 3 (POP3), which download mail to the computer and does not maintain the mail on the server. IMAP, e-mails are stored on the server, while in POP3, the messages are transferred to the client's computer when they are read.

Q.10 What is client server architecture?

Ans. To designated a particular node which is well known and fixed address, to provide a service to the network as a whole. The node providing the service is known as the server and the nodes that use that services are called clients of that server. This type of network is called Client-Server Architecture.

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