XII COMPUTER
2019 MODEL PAPER BASED SAMPLE PAPER

1A) Write the type of C++ Lexical Units from the following:
(i) {   (ii) ++   (iii) Int   (iv) "How are you?"   (2)
A) (i) Separator/Punctuator (ii) Operator (Increment)
(iii) Identifier   (iv) Literal (String)

1B) Observe the following program very carefully and write the name of those header file(s), which are essentially needed to compile and execute the following program successfully: (1)
```
void main()
{ char String[20];
   gets(String);
   for(int i=0;String[i]!='\0';i++) ;
   cout<<"String Length = "<<i
}
```

A) stdio.h, iostream.h

1C) Rewrite the following C++ code after removing any/all Syntactical Error(s) with each correction underlined.   Note: Assume all required header files are already being included in the program.   (2)
```
#define NAME(A)=A*A;
void main( )
{ float SQ=10.0;
   Area=NAME[SQ];
   cout<<'Area=' AREA;
   return 0;
}
```
A)
```
#define NAME(A)  A*A          //Error 1 and 2
void main( )
{ float SQ=10.0;
   float Area=NAME(SQ);       //Error 3 and 4
   cout<<"Area=" << Area;     //Error 5,6 and 7
                              // Error 8 -  return 0 is removed
}
```

1D) Find and write the output of the following C++ program code: Note: Assume all required header files are already being included in the program.   (3)
```
void main( )
{ int Ar[ ] = {10,11,12,13,14,15,16,17} ;
   int *Ptr = Ar+2 , I ;
   cout<<++*Ptr++ << '@' ;
   I = Ar[6] - Ar[2] ;
   cout<<++*(Ptr+I+1)<<'@'<<"\n" ;
   cout<<++I + *Ptr++ << '@' ;
   cout<<*Ptr++ <<'@'<< '\n' ;
   for( ; I >=0 ; I -=2)
           cout<<Ar[I] << '@' ;
}
```
A)   **13@18@**
     17@14@
     14@13@10@

1E) Find and write the output of the following C++ program code: (2)
```
typedef char STRING[80];
void MIXNOW(STRING S)
{ int Size=strlen(S);
   for(int I=0;I<Size-1;I+=3)
   {   char WS=S[I];
            S[I]=S[I+2];
            S[I+2]=WS;
   }
   for (I=1;I<Size;I+=2)
     if (S[I]>='A' && S[I]<='J')
            S[I]='*';
     else if (S[I]>='M' && S[I]<='n')
            S[I]='@';
   cout<<S<<endl;
   for(I=0;I<Size-1;I++)
     if(isupper(S[I]))
            tolower(S[I]);
     else if (islower(S[I]))
            S[I]=S[I]+1;
     else
            S[I]=S[I-1];
}
```

```
void main()
{ STRING Word="WgDt@2019#AP";
   MIXNOW(Word);
   cout<<Word<<endl;
}
```
Output:
        D@W2@t910@A#
        DDWWWuuuuuA#

1F) Observe the following program and find out, which output(s) out of (i) to (iv) will be expected from the program? What will be the minimum and the maximum value assigned to the variable N?   (2)
Note: Assume all required header files are already being included in the program.
```
void main( )
{ randomize();
   int Ar[ ]={3,6,9,12,15}, N;
   int Alter;
   for (int C=0;C<2;C++)
   { N=random(2)+2 ;
      Alter=random(2) + 7 ;
      cout<<Ar[N+1] +Alter<<"@"<<endl;
   }
}
```
(i) 23@   (ii) 19@   (iii) 18@   (iv) 20@
    24@   19@   19@   23@

A)The output expected from the program is
    (ii) 19@   (iv) 20@
        19@   23@
Minimum Value of N = 2
Maximum Value of N = 3

C	N	Alter	Ar[N+1]	Possible Values
0	0+2=2	0+7=7	Ar[3]=12	19#/20#/22#/23#
	1+2=3	1+7=8	Ar[4]=15	
1	0+2=2	0+7=7	Ar[3]=12	19#/20#/22#/23#
	1+2=3	1+7=8	Ar[4]=15	

Possible Output:
19#/20#/22#/23#
19#/20#/22#/23#

2A) Differentiate between Constructor and Destructor function in context of Classes and Objects Using C++?
Ans: Constructor: A constructor is used to intitialize the objects of that class type with a legal initial value.If a class has a constructor, each object of that class will be initialized before any use is made of the object.
(A member function with the same name as its class is called Constructor and it is used to initialize the objects of that class type with a legal initial value.)
Destructor: A destructor is used to destroy the objects that have been created by a constructor. A destructor destroys the values of the object being destroyed.

Constructor	Destructor
Purpose: Is used to intitialize the objects of that class type with a legal initial value	Purpose: Is used to destroy the objects that have been created by a constructor
Name: The name of the class	Name:The name of the class preceded by a ~.
Calling: It will be called automatically at the time of creation or declaration of the object. Ie Implicite calling	Calling: It is automatically called and executed when scope of an object gets over. Ie Implicite calling
Return Type: No return type not even void ------------------------	Return Type: No return type not even void ------------------------
Constructor can be overloaded ------------------------	Destructors cannot be overloaded ------------------------
It is defined in public visibility mode	It is defined in public visibility mode
Pointers and references cannot be used on constrctors and destructors because their addresses cannot be taken.	Pointers and references cannot be used on constrctors and destructors because their addresses cannot be taken.

Example:	Example:

class Area
{ float l,b,a;
  public:
   Area( )
   { l=b=a=0.0; }
   ----------- 	
   ----------- 	
};
	class Area
	{ float l,b,a;
	  public:
	   ------------- 	
	   ------------- 	
	  ~Area( )
	   { cout<<"One Object
	      destroyed";
	   }
	   ----------- 	
	   ----------- 	
	};

2B) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the Function 1 to Function 4.   (2)

```
#include<iostream.h>
#include<conio.h>
void My_fun (int N=5)              // Function 1
{ for (int I=1 ; I<=N ; I++) cout<<"#" ;
        cout<<endl ;
}
void My_fun (int A, int B)          // Function 2
{ for (int I=A ;I<=B ;I++) cout <<char(I);
        cout<<endl ;
}
void My_fun (char T, int N)          // Function 3
{ for (int I=1 ; I<=N ; I++) cout<<T+2 ;
        cout<<endl;
}
void main ( )
{ int X=2, Y=5, M=100,N=105;
  clrscr();
  My_fun('b',Y);
  My_fun();
  My_fun (M-97) ;
  My_fun (N,M+7) ;
  My_fun(X);
  getch();
}
```

A)   **100100100100100**
        #####
        ###
        ijk
        ##

OR

Differentiate between public and private visibility modes.

(**Access Specifiers:** It is used to define the behaviour of the variable and function in a class. It tells which object can access the variable and function. It is public, private and protected. It is therefore used in class.

Visibility Mode: It is used in C++ to show the relationship between the base and the derived class. It specifies what the derived class can derive from the base class. It is therefore used in inheritance.)

(**Important Note: For** Visibility modes differences. in the marking schemes answers were given for access specifier differences. So Student is adviced to differentiate in context of access specifiers as well as visibility modes)

Public Visibility	Private visibility
Members in public visibility mode of the class are accessible from within the class as well as outside of the class ie (member functions of the class & objects of the class.)	Members in private visibility mode of the class are accessible from within the class only (member functions of the class only). They cannot access from objects of the class.
Must keep keyword "**public**" to make a member as public. (explicit visibility mode)	It is default visibility mode. (implicit visibility mode)

The concept of data hiding is implemented through the private access specifier only.
Eg:
```
class student
{  private:
        int rno;
        char name[21];
   public:
```

int age;
        void input( );
        void display( );
}

Here, since rno and name are declared in private, they can be accessed only inside the class.   Since age,input( ) and display() are declared in public, they can be accessed from outside class also.

Public and private visibility modes in context of INHERITANCE:
Public visibility mode: With publicly derived class, the public members of the base class become the public members of the derived class, the protected members of the base class become the protected members of the derived class and the private members of the base class are not accessible in the derived class.

Private visibility mode: With privately derived class, the public and protected members of the base class become private members of the derived class and the private members of the base class are not accessible in the derived class.

Visibility Mode	Inheritable **public** member becomes (in derived class)	Inheritable **protected** member becomes (in derived class)	Private member of base class are not directly accessible to derived class.
public	Public	protected	
privatee	Private	private	

2C) Define a class Student in C++ with the following descriptions: **(4)**

Private members:
SName   of type character array
RNo   of type long
M1,M2,M3,Total,Avg   of type float
Division   of type character array
Message   of type character array
Calc( )   This member function should calculate
              Total as M1+M2+M3;
              Avg as Total/3;

Avg	Division
>=75	DISTINCTION
>=60	FIRST
>=50	SECOND
>=40	THIRD
<40	FAIL

Division	Message
DISTINCTION	VERY GOOD
FIRST	GOOD
SECOND	CONGRATS
THIRD	MUST GET GOOD MARKS
FAIL	YOU MUST PASS

Public members:
* A function Accept( ) which allows user to enter SName, RNo,M1,M2,M3 and invoke function Calc().
* A function Display( ) to display the values of all the data members on the screen.

A)
```
class Student
{ char Sname[20],Division[20],Message[20];
   long RNo;
   float M1,M2,M3,Total,Avg;
   void Calc( );
public:
   void Accept();
   void Display();
};
void Student : : Calc( )
{  if (Avg>=75)
        strcpy(Division,"DISTINCTON");
   else if (Avg>=60)
        strcpy(Division,"FIRST");
   else if (Avg>=50)
        strcpy(Division,"SECOND");
   else if (Avg>=40)
        strcpy(Division,"THIRD");
   else
```

strcpy(Division,"FAIL");
```
   if(strcmp(Division,"DISTINCTION")= =0)
       strcpy(Message,"VERY GOOD");
   else if(strcmp(Division,"FIRST")= =0)
       strcpy(Message,"GOOD");
   else if(strcmp(Division,"SECOND")= =0)
       strcpy(Message,"CONGRATS");
   else if(strcmp(Division,"THIRD")= =0)
       strcpy(Message,"MUST GET GOOD MARKS");
   else
       strcpy(Message,"YOU MUST PASS");
}
void Student::Accept( )
{ cout<<"\nEnter Student name, Roll number, 3 subject marks:";
  gets(SName);
  cin>>RNo>>M1>>M2>>M3;
  Calc( );
}
void Student::Display( )
{ cout<<"\nStudent Name: "<<SName;
  cout<<"\nRoll Number : "<<RNo;
  cout<<"\nSubject Marks: "<<M1<<M2<<M3;
  cout<<"\nTotal and Average: "<<Total<<Avg;
  cout<<"\nDivision : "<<Division;
  cout<<"\nMessage: "<<Message;
}
```

2D) Answer the questions (i) to (iv) based on the following: **(4)**
```
class FA
{ int FArno;
protected:
  char Names[40[20];
  int retmarks( );
public: FA( );
  void FAR( );
  void FAD( );
  ~FA( );
};
class SA: protected FA
{ float SArno;
  char MyName[10];
protected: int Rank;
  void SAR( );
  void SAD( );
public: SA( );
  float SAMarks;
  void Test( );
  ~SA( );
};
class Annual: public SA
{  double Annualrno;
    long AnnualMarks;
protected: float AnnualRank;
public: Annual( );
   void AnnualR( );
   void AnnualD( );
   void Test( );
   ~Annual( );
};
void main( )
{ Annual A;
  SA S;

  _____ //Statement 1
}
```
(i) Write the names of all the members, which are directly accessible by the object A of class Annual as declared in main() function.
A)Member Variables : SAMarks
   Member Functions : AnnualR( ), AnnualD( )
(ii) Write the names of all the members, which are directly accessible by the memberfunction AnnualR( ) of class Annual.
A)Member Variables : AnnualRno, AnnualMarks,
             AnnualRank, Rank, SAMarks, Names
   Member Functions : AnnualD( ), SAR( ), SAD( ),
             retmarks( ), FAR( ), FAD( ).
(iii) Write Statement 1 to call function Test( ) of class SA from the object A of class Annual.
A) A.SA::Test( );
(iv) What will be the order of execution of the Constructors & destructors when the object A of class Annual is declared inside main()?
A) FA( ),SA( ), Annual( ), ~Annual( ),~SA( ),~FA( ).

OR
Consider the following class State :
```
class Son
{  int No;
protected:
    char SName[20];
    int retNo( );
public:
    void SonTake( )
  {  No = 1;
     strcpy(SName, "Raju");
  }
   void SonDisp( )
  {  cout<<No<<endl<<SName;
  }
};
```
Write a code in C++ to **protectedly** derive another class **'Father'** with the following additional members.
Data Members :
FName   string
FNo   int
Public Member functions :
FTAKE( ) : To enter FName and FNo
FDISP( ) :   To display FName and FNo on the screen.

Further, write a code in C++ to **publicly** derive another class **'GrandFather'** from class 'Father' with the following additional members.
Data Members :
GName   string
GNo   int
Public Member functions :
GTAKE( ) : To enter GName and GNo
GDISP( ) :   To display GName and GNo on the screen.
A)
```
class Son
{  int No;
protected:
    char SName[20];
    int retNo( );
public:
    void SonTake( )
  {  No = 1;
     strcpy(SName, "Raju");
  }
   void SonDisp( )
  {  cout<<No<<endl<<SName;
  }
};
class Father : protected Son
{ public :
    char FNname[20];
    int FNo;
  public:
    void FTAKE( )
    { cout<<"\nEnter Father Name and Father No: "
      gets(FName);
      cin>>FNo;
    }
    void FDISPLAY( )
    { cout<<"\nFather Name: "<<FName;
      cout<<"\nFather No: "<<FNo;
    }
};
class GrandFather : public Father
{ public :
    char GNname[20];
    int GNo;
  public:
    void GTAKE( )
    { cout<<"\nEnter Father Name and Father No: "
      gets(GName);
      cin>>GNo;
    }
    void GDISPLAY( )
    { cout<<"\nFather Name: "<<GName;
      cout<<"\nFather No: "<<GNo;
    }
};
```

3A) Write a user-defined function AddEnd4(int A[][4],int R,int C) in C++ to find and display the total of all the elements in alternate columns, which are ending with 4 (i.e., unit place is 4). (2)
For example if the content of array is:

1	2	3	4
5	6	7	8
9	10	11	12

The output should be (1+3+5+7+9+11 =) **36**
A)void AddEnd4(int A[ ][4], int R, int C)
  { int i,i,sum=0;
    for(i=0;i<R;i++)
    { for(j=0;j<C;j+=2)
       if(A[i][j]%10 = =4)
          sum=sum+A[i][j];
    }
    cout<<sum;
 }   **OR**
Write a user defined function in C++ to find the Total of elements displayed in Bold (Z shape) from a two dimensional array.
For example if the content of array is:

10	11	12	13	14
20	21	22	23	24
30	31	32	33	34
40	41	42	43	44
50	51	52	53	54

The output should be (10+11+12+13+14+23+32+41+50+
                       51+52+53+54)) **416**
A) void ZTotal(int A[ ][], int n)
  { int Total=0;
    for(int i=0;i<n;i++)
      for(j=0;j<n;j++)
         if((i==0)||(i==(n-1))||(i=j)==(n-1)))
             Total +=A[i][j];
     cout<<Total;
 }
 3B) Write a user-defined function EXTRA_ELE (int A[ ], int B[ ], int N) in C++ to remove extra element from array A. Array A contains all the elements of array B but one more element extra. (Restriction: array elements are not in order) (3)
Example If the elements of Array A is 14, 21, 5, 19, 8, 4, 23, 11
and the elements of Array B is 23, 8, 19, 4, 14, 11, 5
Then output will be 21
A)void EXTRA_ELE(int A[ ], int B[ ],int N)
  { int i,j,k, flag=0;
    for(i=0;i<N;i++)
    { for(j=0;j<N;j++)
      { if(A[i]==B[j])
         { flag=1;
           break;
         }
      }
      if(flag==0)
      { cout<<"Extra element"<<A[i];
        while(i<N-1)
          A[i]=A[i+1];
        cout<<"\nArray A after removing extra element: ";
        for(int k=0;k<N-1;k++)
           cout<<A[k]<<"\t ";
      }
    }
 }   **OR**
Write a user defined function Cubed(int A[],int n)
which accepts an integer array and its size as
arguments(parameters) and **last digits in every location must be cubed and added to the total;**
Example : if the array is 23,31,5322,-32201.
It should play (3*3*3+1*1*1+2*2*2+1*1*1)=37
then reversed array is 50,40,30,20,10
A)void Cubed(int A[ ] , int n)
  { int Total=0,i,Temp;
    for(int i=0;i<n;i++)
    { Temp=0;
      Temp = A[i]%10;
      Total +=Temp*Temp*Temp;
    }
  }

3C) An array S[15] [25] is stored in the memory along the column with each of its element occupying 8 bytes. Find out the memory location of S[5][10], if element S[2][7] is stored at the location 8200. (3)
A)
OPTION 1:
ASSUMING LBR=LBC=0   W=2 BYTES,
NUMBER OF ROWS(R)=10,
NUMBER OF COLUMNS(C)=30
LOC(S[I][J]) = B +W *[(I-Lr) + R*(J-Lc)]
LOC(S[2][7]) = B +8 * (2+7*15)
8200 = B + 8*(2+105)
B = 8200 - 856
B = 7344
LOC(S[5][10]) = 7344 +8*(5+10*15)
= 7344 +8* (155)
= 7344 +1240
= 8584
OPTION 2:
ASSUMING LBR=2,LBC=7 AND B = 8200 W=2 BYTES
NUMBER OF ROWS(R)=15,
NUMBER OF COLUMNS(C)=25
LOC(S[I][J]) = B +W*((I-LBR) + R*(J-LBC))
LOC(S[5][10])= 8200 + 8* ((5-2) + 15 * (10-7))
= 8200 + 8 * (3 + 15*3)
= 8200 + 8 *48   = 8200 + 384   = 8584
                              OR
An array A[10][20] is stored in the memory with each element requiring 4 bytes of storage ,if the base address of A is 4500 ,Find out memory locations of A[5][7], if the content is stored along the row.
A) ASSUMING LBR=LBC=0   W=4 BYTES,
NUMBER OF ROWS(R)=10,
NUMBER OF COLUMNS(C)=20
LOC(A[I][J]) = B +W *[C*(I-Lr) + (J-Lc)]
LOC(A[5][7]) = 4500 +4 * (20*(5-0)+(7-0)
B = 4500 + 4*107 = 4500 + 428 = 4928

3D)Write the definition of a member function Del_Student() for a class CQUEUE in C++, to delete a Player in a statically allocated circular queue of PLAYERs considering the following code is already written as a part of the program: (4)
struct Student
{ long RNo;
   char Sname[20];
};
const int size=5;
class CQUEUE
{ Student Ar[size];
   int Front, Rear;
public:
   CQUEUE( )
   { Front = -1;
    Rear=-1;
   }
void Ins_Student();   // To add player in a static circular queue
void Del_Student();   // To remove player from a static circular queue
void Show_Student(); // To display static circular queue
};
A)void CQUEUE : : Del_Player( )
{ if((Front==-1)||(Front>Rear))
    cout<< "Queue Underflow"
 else
 { cout<<"\nElement to be deleted: "<<CQ(Front);
    if(Front= =Rear)
         Front = Rear = -1;
    else if(Front = = (size -1))
       Front = 0;
    else
       Front ++;
  }
}   **OR**
Write a function in C++ to insert a node containing Employee information ,from a dynamically allocated stack of Employees implemented with the help of the following structure:
struct Emp
{ int ENo;
   char EName[20];

```
    float ESalary;
    Emp *Next;
};
```
A)
```
struct Emp
{ int ENo;
    char EName[20];
    float ESalary;
    Emp *Next;
};
class EmpSal
{ Emp *Top;
 public:
    Stack( ){Top = NULL; }
    void Push( );
    void Pop( );
    void Display( );
};
void EmpSal::Push()
{ Emp *temp=new Emp ;
    if(temp= =NULL)
    {   cout<<"No Memory…….";
        exit(0);
    }
    cout<<"Enter the employee no, name and salary: ";
    cin>>temp→ENo;
    gets(temp→EName);
    cin>>temp→ESalary;
    temp→Next = Top;
    temp=Top;
}
```

3E) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion.
MN – D/F + K (2)
Ans)((M*N) – (D/F) + K)

Element	Stack	Postfix
(	(	
(	((	
M	((	M
*	((*	M
N	((*	M N
)	(	M N *
-	(-	M N *
(	(- (	M N *
D	(- (	M N * D
/	(- (/	M N * D
F	(- (/	M N * D F
)	(-	M N * D F /
+	(- +	M N * D F /
K	(- +	M N * D F / K
)	(-	M N * D F / K +
		M N * D F / K+ -

(Checking – Postfix to Infix Conversion
M, N, *, D, F, /, K, +, - = **M * N**, D, F, /, K, +, -
                            =M * N, **D/F**, K, +, -
                            =M * N, **D/F + K**, -
                            =M * N – **D/F + K**
                                      OR
Evaluate the following Postfix expression :
                20,10,6,3,/,*,-
A) **0**

Element Scanned	STACK	
20	20	
10	20,10	
6	20,10,6	
3	20,10,6,3	
/	20,10,**2**	**(6/3)**
*	20,20	**(10*2)**
-	0	**(left 20 – right 20)**

4A) Write a function Counts() to read a text file " Input.txt " and Print alphabet statistics as follows:
Sample Output: (2)
Total alphabets = 10
Total vowels   = 3
Total consonents = 7
Upper alphabets = 6

Lower alphabets = 4
Total digits = 5
Total special symbols (other than alphabets and digits.
Including spaces)
Total Words = 2
 A)
```
void Counts( )
{ ifstream Fin("Input.txt");
    int Alphabets = 0, Lower = 0, Upper = 0, Vowels = 0,
        Conso = 0;Digits = 0; Special = 0; Words = 1;Total=0;
    char ch;
    while(!Fin.eof())
    { fin.get(ch);
        if (isalpha (ch))
            Alphabets++;
        if(islower(ch))
            Lower++;
        if (isupper(ch))
            Upper++;
        if(isdigit(ch))
            Digits++;
        Total++;
        if (ch= =' ')
            Words++;
        switch(ch)
        { case 'A': case 'a': case 'E': case 'e':
          case 'I': case 'i': case 'o': case 'O':
          case 'u': case 'U': Vowels ++; break;
        }
    }
cout<<"\nTotal Alphabets: "<<Alphabets;
cout<<"\nTotal Vowels : "<<Vowels;
cout<<"\nTotal Consonents: "<<Alphabets – Vowels;
cout<<"\nUpper Alphabets: "<<Upper;
cout<<"\nLower Alphabets: "<<Lower;
cout<<"\nTotal Digits: "<<Digits;
cout<<"\nSpecial Symbols : "<<Total-Alphabets-Digits;
cout<<"\nTotal Words: "<<Total;
Fin.close( );
}
```
                            OR
Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords( ), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with start with a lowercase vowel (i.e. with 'a', 'e', 'I', 'o', 'u').
For example if the file FIRST.TXT contains
Carry umbrella and overcoat when it rains
Then the file SECOND.TXT shall contain:
    umbrella and overcoat it
Ans)
```
void Vowelwords( )
{ ifstream fin("FIRST.TEXT");
    ofstream fout("SECOND.TXT");
    char Word[20];
    while(fin)
    { fin>>Word;
        if((Word[0]= ='a')||(Word[0]= ='e')||
          (Word[0]= ='i')||(Word[0]= ='o') ||
          (Word[0]= ='u'))
            fout<<Word<<"  ";
    }
    fin.close( );
    fout.close( );
}
```

4B) Write a function in C++ to search and display details, whose BlockName is "JRG", MandalName is "Kukkunur" from binary file "JNVST.Dat". Assuming the binary file is containing the objects of the following class: (3)
```
class JNVST
{   long  RegNo;          //Registered Number
    char SName[20];       //Student Number
    char BName[20];       //Block Name
    char MName[20];       // Mandal Name
public:
    char * RetSName( )
    { return SName;
    }
```

```
char * RetBName( )
{ return BName;
}
char * RetMName( )
{ return MName;
}
 void input( )
{ cout<<"\nEnter Student RegNo, Name,
        Block Name and Mandal Name: "
 cin>>RegNo;
 gets(SName);
 gets(BName);
 gets(MName);
}
void show( )
{ cout<<"\nStudents Details: "
  cout<<RegNo<< ":"<<SName << ":"
     <<SName<<":"<<BName<endl;
 }
};
```
Ans)
```
void Display( )
{ ifstream fin("JNVST.DAT", ios::binary);
   JNVST J;
   while(fin)
   { fin.read((char *) &J, sizeof(J));
      if( (strcmp(J.RetBName( ),"JRG")= = 0) &&
         (strcmp(J.RetmName( ),"Kukkunur")= = 0)
         J.show( );
   }
   fin.close( );
}
```
OR

Write a function in C++ to read 5 new objects from user and to store in a binary file "NewStu.dat". After storing these 5 new objects in the file "NewStu.dat", all the objects of file "Student.dat" must be added at bottom of file "NewStu.dat" containing the objects of the following class:
```
class STU
{ int Rno;
  char Sname[20];
public:
  void Enter()
  { cin>>Rno;gets(Sname);
  }
  void show()
  { count << Rno<<sname<<endl;
  }
};
```
A)
```
void Addrecord()
{ ifstream fin("STUDENT.dat", ios ::in|ios::binary);
 ofstream fout("NewStu.dat",ios::out|ios::binary);
  STU S;
  for(int i=1;i<=5;i++)
  { S.Enter( );
     fout.write((char *)&S, sizeof(S));
  }
  while (fin)
  { fin.read((char *)&S,sizeof(S));
    fout.write((char *)&S,sizeof(S));
  }
  fin.close();
  fout.close( );
}
```

4C) Find the output of the following C++ code considering that the binary file PRODUCT.DAT exists on the hard disk with a list of data of 500 products. (1)
```
class City
{ char CName[30];
   long Pop;
public:
  void CEntry( );
  void Disp( );
};
void main()
{ fstream In;
  In.open("PRODUCT.DAT",ios::binary|ios::in);
```

```
   PRODUCT P;
   In.seekg(2*sizeof(P),ios::cur);
   cout<<"Present Record: "<<In.tellg( )/sizeof(P);
   In.seekg(-sizeof(P),ios::cur);
   cout<<In.tellg( )/sizeof(P);
   In.seekg(-2*sizeof(P),ios::end);
   cout<<In.tellg( )/sizeof(P) + 1;
   In.seekg(68,ios::beg);
   cout<<"\nFinal Position: "<<In.tellg( )/sizeof(P);
   In.read((char *)&P,sizeof(P));
   cout<<"\n"<<In.tellg( );

}
```
A)
Present Record: 21499
Final Position:2
102

OR
Fill in the blanks marked as Statement 1 and Statement 2, in the program segment given below with appropriate functions for the required task.
```
class Club
{long int MNo;           //Member Number
 char MName[20];         //Member Name
 char Email[30];         //Email of Member
public:
  void Register( );       //Function to register member
  void Disp( );           //Function to display details
  void ChangeEmail( )  //Function to change Email
  { cout<<"Enter Changed Email: ";
    cin>>Email;
  }
  long int GetMno( )
  {      return MNo;
  }
};
void ModifyData( )
{ fstream File;
 File.open("CLUB.DAT", ios::binary | ios::in|ios::out);
int Modify=0, Position;
long int ModiMno;
cout<<"Mno – Whose email required to be modified: ";
cin>>ModiMno;
Club CL;
while(!Modify && File.read((char *)&CL.sizeof(CL)))
{ if(CL.GetMno( )==ModiMno)
   { CL.ChangeEmail( );
      Position=File.tellg( )-sizeof(CL);
   //Statement 1: To place file pointer to the required position
   _____
   //Statement:To write the object CL on to the binary file

   _____
   Modify++;
  }
}
if(Modify)
  cout<<"Email changed….."<<endl;
else
cout<<"Member not found…."<<endl;
File.close( );
}
```
Ans)
Statement 1: File.seekp(Position);
OR   File.seekp(File.tellp( ) – sizeof(CL));
OR   File.seekp(-sizeof(CL),ios::cur);
 Statement 2: File.write((char *)&CL,sizeof(CL));

5A)Observe the following table and answer the parts (i) and(ii) accordingly   (2)
Table: STUDENT

AdmNo	RollNo	FirstName	LastName	SurName	Adhaar

Assume 10 students details are stored in the above table.
(i) Write the names of most appropriate columns, which can be considered as candidate keys.
Write Primary Key and alternate keys also.
A) Candidate Key: AdmNo, Adhaar,
                {FirstName,LastName,SurName}
    Primary Key: AdmNo

Alternate Keys:Adhaar, {FirstName,LastName,SurName}
 (ii) What is the degree and cardinality of the above table?
A) Degree:6   Cardinality:10

5B) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables.   DVD   (4+2)

DCODE	DTITLE	DTYPE
F101	Henry Martin	Folk
C102	Dhrupad	Classical
C101	The Planets	Classical
F102	Universal Soldier	Folk
R102	A day in life	Rock

MEMBER

MID	NAME	DCODE	ISSUEDATE
101	AGAM SINGH	R102	2017-11-30
103	ARTH JOSEPH	F102	2016-12-13
102	NISHA HANS	C101	2017-07-24

(i) To display all details from the table MEMBER in descending order of ISSUEDATE.
Ans) SELECT * FROM MEMBER ORDER BY
     ISSUEDATE DESC;
(ii) To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD
Ans) SELECT DCODE,DTITLE FROM DVD
     WHERE DTYPE='Folk';
(iii) To display the DTYPE and number of DVDs in each DTYPE from the table DVD
Ans) SELECT COUNT(*),DTYPE FROM DVD
     GROUP BY DTYPE;
(iv) To display all NAME and ISSUEDATE of those members from the table MEMBER who have DVDs issued (i.e ISSUEDATE) in the year 2017
Ans) SELECT NAME, ISSUEDATE FROM
     MEMBER WHERE
     ISSUEDATE>='2017-01-01' AND
     ISSUEDATE<='2017-12-31';
                    OR
SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE
BETWEEN '2017-01-01' AND '2017-12-31';
                    OR
SELECT NAME, ISSUEDATE FROM MEMBER WHERE ISSUEDATE
LIKE '2017%';
(v) SELECT MIN(ISSUEDATE) FROM MEMBER;
Ans)   MIN(ISSUEDATE)
          2016-12-13
(vi) SELECT DISTINCT DTYPE FROM DVD;
Ans)   DISTINCT DTYPE
          Folk
          Classical
          Rock

6A) State any one Demorgan's Law of Boolean Algebra and Verify it using truth table.   (2)
A) (i) (X+Y)'= X'.Y'   (ii) (X.Y)'= X'+Y'
Verification
    P + P' = 1 (Complementary Law)
   Let P = (X+Y)
   Then (X+Y)+(X+Y)' = 1
   Let us assume (X+Y)'=X'Y',
   Then by substituting this in complementary law,
   the result Must be 1.
   (X+Y)+(X+Y)'=1
   (X+Y)+X'Y' = (X+Y+X')(X+Y+Y')   (A+BC=(A+B)(A+C))
           = (X+X'+Y)(X+1)
             = (1+Y)(X+1)   (1+X = 1, Property of 1)
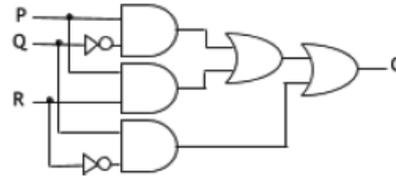   = 1.1 = 1
As the result is 1,
        (X+Y)'= X'.Y'
By Duality principle, second law is also proved.

6B) Draw the Logic Circuit of the following Boolean Expression: P.Q' + P.R + Q.R'   (2)
A)

6C) Derive a Canonical SOP expression for a Boolean function G(P,Q,R) represented by the following truth table: (1)

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

A) G(P,Q,R) = P'.Q.R'+P.Q'.R'+P.Q.R'+P.Q.R

6D) Reduce the following Boolean Expression to its simplest form using K-Map:
          F(X,Y,Z,W) = Σ(0,1,4,5,6,7,8,9,11,15)

Ans) Simplified Expression: Y'Z' + X'Y + XZW

7A) Mr.Raju has used his knowledge to unauthorized login into a bank's server and did some modifications.
Mr Nani has unauthorized login into a website and mailed Website Loopholes to the website management team.
Then Raju is a _____ and Nani is a _____   (2)
A) Raju is a Cracker and Nani is a Hacker.

7B) When Suresh is creating a mail id, when he is filling details as he kept only 4 characters password, immediately it showed password must be 8 characters. Which type of scripting language is useful. And name any example of such scripting language. (1)
A) Client side scripting language.
Examples: Java Script, VB Script, PHP

7c) Write two advantages of using open source Software over proprietary software. Name one example of each.   (2)
A) Two advantages of using open source software over proprietary software are:
Open Source Software is software whose source code is available to customer and it can be modified and redistributed without any limitations whereas source code of proprietary software is not available.
Open Source software may come free of cost or with payment of normal charges whereas proprietary software is neither open nor freely available.
Ex.ofOpen Source S/W: OpenOrg, Linux
Proprietary Software: MS Office, Windows, Photoshop

7D) Write the expanded names for the following abbreviated terms used in Networking and Communications:
(i) GSM (ii) NCP (iii) WiFi (iv) VoIP   (2)
A)(i) Global System for Mobile
   (ii) Network Control Protocol
   (iii) Wireless Fidelity
   (iv) Voice Over Internet Protocol

7E) JNV, Hyderabad is Setting up the network between its Different Wings of school campus.
There are 5 wings along with their number of systems named as MESS(7), SCHOOL(40), DORMETORY(10), GATE(5) and ADMIN(10).   **(4)**
**Main office is located in Noida.**

JNV HYDERABAD
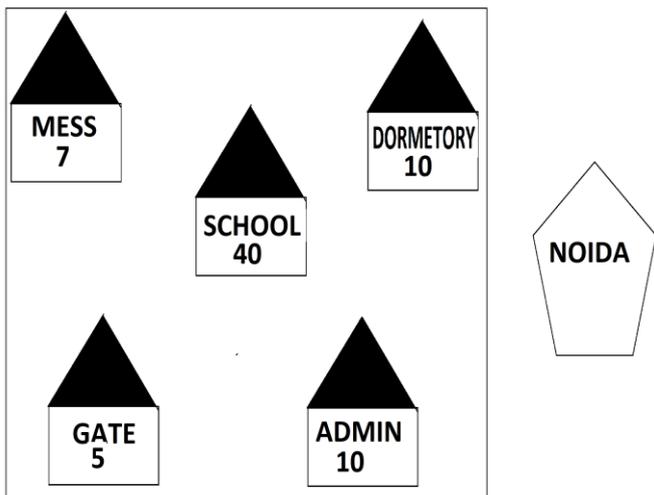
Distance between various wings are given below:

Between Wings	Distance (meters)
MESS to SCHOOL	60
MESS to DORMETORY	110
MESS to GATE	65
MESS to ADMIN	130
SCHOOL to DORMETORY	40
SCHOOL to GATE	50
SCHOOL to ADMIN	68
DORMETORY to GATE	115
DORMETORY to ADMIN	100
GATE to ADMIN	65

(i) Suggest the best wired medium, topology and draw the cable layout to efficiently connect various wings JNV, HYDERABAD.
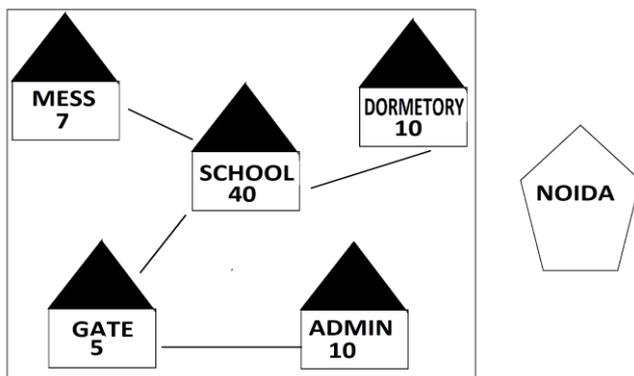
A)**Best wired medium:** Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable
(CAT5 OR CAT6 OR CAT7 OR CAT8 are categories of twisted pair cables)
Topology: Star topology

Best Layout 1 (Server to all other wings):
JNV HYDERABAD
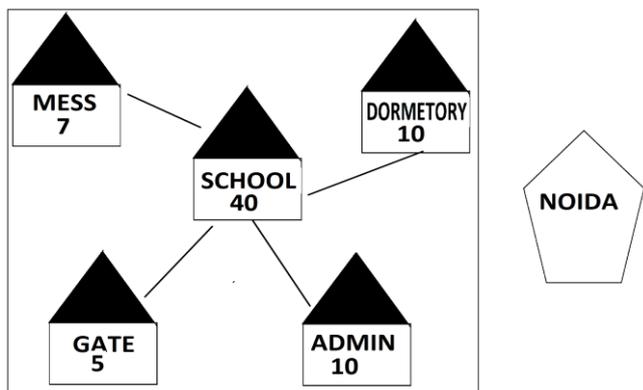
Best Layout 2 (Less cable length):

JNV HYDERABAD

(ii) Name the most suitable wing where the Server should be installed. Justify your answer.
A) SCHOOL- Because it has maximum number of computers.

(iii) Suggest a device/software and its placement that would provide data security for the entire network of the School.
A) Firewall - Placed with the server at SCHOOL.

(iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the campus of JNV, Hyderabad
A) **Device Name:** WiFi Router OR WiMax OR RF Router OR
                Wireless Modem OR RFTransmitter
Protocol: WAP OR 802.16 OR TCP/IP OR VOIP
                OR MACP OR 802.11

(v) Suggest the placement of the following device with justification: a) Repeater b) Hub/Switch
A)a) Wherever distance between two wings is more than 70meter, there Repeater must be installed.
For Layout1, and Layout2, since the cabling distance Between any two wings is lesser distance, so no need to install any repeater.
For example is Mess and Dormetory has to connect, between them repeater must be installed as distance is 110 meters.
b) 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 building.

(vi) Which type of network out of the following is formed by connecting the computers of Hyderabad and Noida?
    LAN   MAN   WAN
A)WAN

(vii) Which wireless channel out of the following should be opted by JNV students from all over the world?
    Infrared   Microwave   Satellite
A) Satellite.
(viii) JNV, Hyderabad is planning to connect its Office located in Secunderabad, which is 25 KM away from Hyderabad Campus. Which out of the following wired Communication links, will you suggest for a very high speed connectivity ?
(i) Telephone Analog Line(ii) Optical Fiber
(iii) Ethernet Cable
Ans. (ii) Optical Fibre

"The fear of the
LORD
is the beginning of Wisdom"