Computer Science

Class XII

Open Teaching & Learning Material

Question Bank (2014-2017)

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Question-wise & Year-wise Collection of Questions from CBSE's AISSCE Question Papers (2014 to 2017)

CLASS XII- Computer Sc. (083)
CBSE QUESTION BANK

[Question-wise & Year-wise Collection of Questions from CBSE's AISSCE Question Paper (2014-2017)]

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QUESTION NO.1 (12 MARKS)

(a)	**2 Marks**
2014	What is the difference between call by reference and call by value with respect to memory allocation? Give a suitable example to illustrate using C++ code.
2015	Find the correct identifiers out of the following, which can be used for naming Variable, Constants or Functions in a C++ program: `For, while, INT, NeW, delete, 1stName, Add+Subtract, name1`
2016	Out of the following, find those identifiers, which cannot be used for naming Variable, Constants or Functions in a C++ program: `Total*Tax,double, Case, My Name,New,switch,Column31, _Amount`
2017	Write the type of C++ tokens (keywords and user defined identifiers) from the following: (i) new (ii) While (iii) case (iv) Num_2
(b)	**1 Mark**
2014	Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run it in a C++ compiler : `void main()` `{` `char CH,STR[20];` `cin>>STR;` `CH=toupper(STR[0]);` `cout<<STR<<"starts with"<<CH<<endl;` `}`
2015	Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully: `typedef char STRING[80];` `void main ()` `{` `STRING Txt [] = "We love Peace";` `int Count=0;` `while (Txt[Count]!='\0') if(isalpha(Txt[Count]))` `  Txt[Count++]='@' ;` `else` `  Txt[Count++]='#' ;` `puts(Txt);` `}`
2016	Ronica Jose has started learning C++ and has typed the following program. When she compiled the following code written by her, she discovered that she needs to include some header files to successfully compile and execute it. Write the names of those header files, which are required to be included in the code. `void main()` `{double X,Times,Result;` `cin>>X>>Times;` `Result=pow(X,Times);` `cout<<Result<<endl;`

	} **2017** Anil typed the following C++ code and during compilation he found three errors as follows: (i) Function strlen should have prototype (ii) Undefined symbol cout (iii) Undefined symbol endl On asking, his teacher told him to include necessary header files in the code. Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code **void main()** **{** **char Txt[] = "Welcome";** **for(int C= 0; C<strlen(Txt); C++) Txt[C]** **= Txt[C]+1;** **cout<<Txt<<endl;** **}**
(C)	**2 Marks**
2014	Rewrite the following C++ code after removing all the syntax error(s), if present in the code. Make sure that you underline each correction done by you in the code. Important Note : - Assume that all the required header files are already included. - The corrections made by you do not change the logic of the program. `typedef char[80] STR;` `void main()` `{ Txt STR;` `gets(Txt);` `cout<<Txt[0]<<'\t<<Txt[2];` `cout<<Txt<<endline;` `}`
2015	Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. Note: Assume all required header files are already being included in the program. `#Define float MaxSpeed =60.5;` `void main()` `{int MySpeed` `char Alert='N';` `cin>> MySpeed;` `if MySpeed > MaxSpeed` `Alert='Y';` `cout<<Alert<<endline;` `}`
2016	Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. Note: Assume all required header files are already being included in the program. `#define Formula(a,b) = 2*a+b void` `main()` `{ float X=3.2;Y=4.1;` `Z=Formula(X,Y); cout<<'Result='<<Z<<endl;` `}`
2017	Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. Note: Assume all required header files are already being included in the program. **void main()** **{ cout<<"Enter an Alphabet:";** **cin>>CH;**

```
   switch(CH)

      case 'A' cout<<"Ant";    Break;
      case 'B' cout<<"Bear" ;  Break;
}
```

(d) **2 Marks**

2014 Obtain the output from the following C++ program as expected to appear on the screen after its execution.

Note :- All the desired header files are already included in the code, which are required to run the code.

```
void main()
{ char *Text="AJANTA";
  int *P, Num[]={1,5,7,9};
  P=Num;
  cout<<*P<<Text<<endl;
  Text++;
  P++;
  cout<<*P<<Text<<endl;
}
```

2015 Write the output of the following C++ program code:

Note: Assume all required header files are already being included in the program.

```
void Location(int &X,int Y=4)
{ Y+=2;
  X+=Y;
}
void main()
{ int PX=10,PY=2;
  Location(PY) ;
  cout<<PX<<" , "<<PY<<endl ;
  Location(PX,PY);
  cout<<PX<<" , "<<PY<<endl ;
}
```

2016 Find and write the output of the following C++ program code:

Note: Assume all required header files are already included in the program.

```
typedef char TEXT[80]; void
JumbleUp(TEXT T)
{ int L=strlen(T);
  for (int C=0;C<L-1;C+=2)
  { char CT=T[C]; T[C]=T[C+1];
    T[C+1]=CT;
  }
  for (C=1;C<L;C+=2)
    if (T[C]>='M' && T[C]<='U')
      T[C]='@';
}
void main()
{ TEXT Str="HARMONIOUS";
  JumbleUp(Str);
  cout<<Str<<endl;
}
```

2017 Find and write the output of the following C++ program code:

Note: Assume all required header files are already included in the program.

```
#define Diff(N1,N2) ((N1>N2)?N1-N2:N2-N1)
```

```
void main()
{
   int A,B,NUM[] = {10,23,14,54,32};
   for(int CNT =4; CNT>0; CNT--)
      { A=NUM[CNT];
        B=NUM[CNT-1];
        cout<<Diff(A,B)<<'#';
      }
}
```

(e) **3 Marks**

2014

Obtain the output of the following C++ program, which will appear on the screen after its execution.
Note : All the desired header files are already included in the code, which are required to run the code.

```
class Game
{ int Level, Score;
  char Type;
  public:
  Game(char GType='P')
  {Level=1;Score=0;Type=GType;}
  void Play(int GS);
  void Change();
  void Show()
  {cout<<Type<<"@"<<Level<<endl;
   cout<<Score<<endl;
  }
};
void main()
{ Game A('G'),B;
  B.Show();
  A.Play(11);
  A.Change();
  B.Play(25);
  A.Show();
  B.Show();
}
void Game::Change()
{
 Type=(Type=='P')?'G':'P';
}
void Game::Play(int GS)
{ Score+=GS;
  if(Score>=30)
     Level=3;
  else if(Score>=20)
     Level=2;
  else
     Level=1;
}
```

2015

Write the output of the following C++ program code:
Note: Assume all required header files are already being included in the program.

```
class Eval
{
char Level;
```

```
int Point;
public:
  Eval() {Level='E'; Point=0;}
void Sink(int L)
{ Level-= L;
}
void Float(int L)
{ Level += L;
  Point++;
}
void Show()
{ cout<<Level<<"#"<<Point<<endl;
}
};
void main()
{ Eval E;
  E.Sink(3);
  E.Show();
  E.Float(7);
  E.Show();
  E.Sink(2);
  E.Show();
}
```

2016

Find and write the output of the following C++ program code:
Note: Assume all required header files are already being included in the program.

```
class Share
{
  long int Code; float
  Rate; int DD;
  public:
  Share()
  {Code=1000;Rate=100;DD=1;}
  void GetCode(long int C,float R)
  {Code=C; Rate=R;
  }
  void Update(int Change,int D)
  { Rate+=Change;
    DD=D;
  }
  void Status()
  {
    cout<<"Date:"<<DD<<endl;
    cout<<Code<<"#"<<Rate<<endl;
  }
};
void main()
{
  Share S,T,U;
  S.GetCode(1324,350);
  T.GetCode(1435,250);
  S.Update(50,28);
  U.Update(-25,26);
  S.Status();
```

```
  T.Status();
  U.Status();
}
```

2017

Find and write the output of the following C++ program code: Note: Assume all required header files are already being included in the program.

```
void main()
{
  int *Point, Score[]={100,95,150,75,65,120};
  Point = Score;
  for(int L = 0; L<6; L++)
  {
        if((*Point)%10==0)
       *Point /= 2; else
       *Point -= 2;
    if((*Point)%5==0)
       *Point /= 5; Point++;
  }
  for(int L = 5; L>=0; L--)
    cout<<Score[L]<<"*";
}
```

(f) **2 Marks**

2014

Read the following C++ code carefully and find out, which out of the given options (i) to (iv) are the expected correct output(s) of it. Also, write the maximum and minimum value that can be assigned to the variable Taker used in the code :

```
void main()
{
int GuessMe[4]={100,50,200,20};
int Taker=random(2)+2;
for (int Chance=0;Chance<Taker;Chance++)
cout<<GuessMe[Chance]<<"#";
}
```

(i) 100#
(ii) 50#200#
(iii) 100#50#200#
(iv) 100#50

2015

Study the following program and select the possible output(s) from the option (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable VAL.
Note:
-Assume all required header files are already being included in the program.
-random(n) function generates an integer between 0 and n-1.

```
void main()
{ randomize();
  int VAL;
  VAL=random(3)+2;
  char GUESS[]="ABCDEFGHIJK";
  for (int I=l;I<=VAL;I++)
  { for(int J=VAL;J<=7;J++)
       cout«GUESS[J];
    cout«endl;
  }
```

```
}
```

(i)
BCDEFGH
BCDEFGH

(ii)
CDEFGH
CDEFGH

(iii)
EFGH
EFGH
EFGH
EFGH

(iv)
FGHI
FGHI
FGHI
FGHI

2016

Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable PICKER.

```
void main()
{
  randomize();
  int PICKER;
  PICKER=1+random(3);
  char COLOR[][5]={"BLUE","PINK","GREEN","RED"};
  for(int I=0;I<=PICKER; I++)
  {
    for(int J=0; J<=I;J++)
      cout<<COLOR[J];
    cout<<endl;
  }
}
```

(i)	(ii)	(iii)	(iv)
PINK **PINKGREEN** **PINKGREENRED**	**BLUE** **BLUEPINK** **BLUEPINKGREEN** **BLUEPINKGREENRED**	**GREEN** **GREENRED**	**BLUE** **BLUEPINK** **BLUEPINKGREEN**

2017

Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables N and M.

Note:

- Assume all the required header files are already being included in the code.
- The function random(n) generates an integer between 0 and n-1

```
void main()
{ randomize();
  int N=random(3),M=random(4);
  int DOCK[3][3] = {{1,2,3},{2,3,4},{3,4,5}};
  for(int R=0; R<N; R++)
  {
     for(int C=0; C<M; C++)
        cout<<DOCK[R][C]<<"  ";
     cout<<endl;
  }
}
```

(i) 1 2 3 2 3 4 3 4 5	(ii) 1 2 3 2 3 4
(iii) 1 2 2 3	(iv) 1 2 2 3 3 4

QUESTION NO.2 (12 MARKS)

(a)	**2 Marks**
2014	What is function overloading? Write an example using C++ to illustrate the concept of function overloading.
2015	What is a copy constructor? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.
2016	Write any four important characteristics of Object Oriented Programming? Give example of any one of the characteristics using C++.
2017	Differentiate between protected and private members of a class in context of Object Oriented Programming. Also give a suitable example illustrating accessibility/non-accessibility of each using a class and an object in C++.
(b)	**2 Marks**
2014	Answer the questions (i) and (ii) after going through the following class : `class Hospital` `{int Pno, Dno;` `public:` `Hospital(int PN);  //Function 1` `Hospital();  //Function 2` `Hospital(Hospital &H);  //Function 3` `void In();  //Function 4` `void Disp();  //Function 5` `};` `void main()` `{Hospital H(20);  //Statement 1` `}` (i) Which of the functions out of Function 1, 2, 3, 4 or 5 will get executed when the Statement 1 is executed in the above code? (ii) Write a statement to declare a new object G with reference to already existing object H using Function 3.
2015	Observe the following C++ code and answer the questions (i) and (ii) : `class Passenger` `{ long PNR;` `char Name [20] ;` `public:` `Passenger()  //Function 1` `{cout<<"Ready"<<endl; }` `void Book(long P,char N[])  //Function 2` `{ PNR = P; strcpy(Name, N); }` `void Print()  //Function 3` `{ cout«PNR << Name <<endl; }` `~Passenger()  //Function 4` `{ cout<<"Booking cancelled!"<<endl; }` `};`

(i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code:

```
void main()
{ Passenger P;
___________ //Line 1
___________ //Line 2
}//Ends here
```

(ii) Which function will be executed at }//Ends here? What is this function referred as ?

2016

Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files are included:

```
class BOOK
{ long Code ;
  char Title[20];
  float Price;
   public:
   BOOK()                          //Member Function 1
   { cout<<"Bought"<<endl;
     Code=10;
     strcpy(Title,"NoTitle");
     Price=100;
   }
   BOOK(int C,char T[],float P)     //Member Function 2
   { Code=C; strcpy(Title,T); Price=P;
   }
   void Update(float P)            //Member Function 3
   { Price+=P;
   }
   void Display()                  //Member Function 4
   {cout<<Code<<":"<<Title<<":"<<Price<<endl;
   }
   ~BOOK()                         //Member Function 5
   {cout<<"Book Discarded!"<<end1;
   }
 };
void main()                        //Line 1
{                                  //Line 2
  BOOK B,C(101,"Truth",350};       //Line 3
  for (int I=0;I<4;I++)            //Line 4
  {                                //Line 5
    B.Update(50);C.Update(20);     //Line 6
    B.Display();C.Display();       //Line 7
  }                                //Line 8
}                                   //Line 9
```

(I) Which specific concept of object oriented programming out of the following is illustrated by Member Function 1 and Member Function 2 combined together?

- Data Encapsulation
- Polymorphism
- Inheritance
- Data Hiding

(II) How many times the message "Book Discarded!" will be displayed after executing the

	above C++ code? Out of Line 1 to Line 9, which line is responsible to display the message "Book Discarded!"
2017	Observe the following C++ code and answer the questions (i) and (ii). Note: Assume all necessary files are included. **class TEST** **{** **long TCode;** **char TTitle[20]; float** **Score;** **public:** **TEST() //Member Function 1** **{** **TCode=100;strcpy(TTitle,"FIRST Test");Score=0;** **}** **TEST(TEST &T) //Member Function 2** **{** **TCode=E.TCode+1; strcpy(TTitle,T.TTitle);** **Score=T.Score;** **}** **};** **void main()** **{** **//Statement 1** **//Statement 2** **}** (i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and Member Function 2 together in the class TEST? **(ii)** Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively.
(C)	**4 Marks**
2014	Define a class Tourist in C++ with the following specification : **Data Members** • CNo - to store Cab No • CType - to store a character 'A', 'B', or 'C' as City Type • PerKM - to store per Kilo Meter charges • Distance - to store Distance travelled (in KM) **Member Functions** • A constructor function to initialize CType as 'A' and CNo as '0000' • A function CityCharges( ) to assign PerKM as per the following table : CType PerKM A 20 B 18 C 15 • A function RegisterCab() to allow administrator to enter the values for CNo and CType. Also, this function should call CityCharges() to assign PerKM Charges. • A function Display() to allow user to enter the value of Distance and display CNo, CType, PerKM, PerKM*Distance (as Amount) on screen.
2015	Write the definition of a class Photo in C++ with following description: **Private Members**

```
Pno          //Data member for Photo Number (an integer)
Category     //Data member for Photo Category (a string)
Exhibit      //Data member for Exhibition Gallery (a string)
FixExhibit   // A member function to assign Exhibition Gallery
             // as per Category as shown in the following table
```

Category	Exhibit
Antique	Zaveri
Modern	Johnsen
Classic	Terenida

Public Members

```
Register()     //A function to allow user to enter values
               //Pno,Category and call FixExhibit() function
ViewAll()      //A function to display all the data members
```

2016

Write the definition of a class CITY in C++ with following description:

Private Members

```
- Ccode    //Data member for City Code (an integer)
- CName    //Data member for City Name (a string)
- Pop      //Data member for Population (a long int)
- KM       //Data member for Area Coverage (a float)
- Density  //Data member for Population Density (a float)
- DenCal() //A member function to calculate ---
           //Density as Pop/KM
```

Public Members

```
- Record() //A function to allow user to enter values of
             //Acode,Name,Pop,KM and call DenCal() function
- View()   //A function to display all the data members
           //also display a message "Highly Populated City"
           //if the Density is more than 10000
```

2017

Write the definition of a class BOX in C++ with following description:

Private Members

```
- BoxNumber  // data member of integer type
- Side       // data member of float type
- Area       // data member of float type
- ExecArea() // Member function to calculate and assign
                // Area as Side * Side
```

Public Members

```
- GetBox() // A function to allow user to enter values of
           // BoxNumber and Side. Also, this
           // function should call ExecArea() to calculate
           // Area
- ShowBox() // A function     to display BoxNumber, Side
            // and Area
```

(d)

4 Marks

2014

Consider the following C++ code and answer the questions from (i) to (iv) :

```
class University
{ long Id;
  char City[20];
 protected:
  char Country[20];
 public:
```

```
  University();
  void Register( );
  void Display( );
};
class Department: private University
{ long DCode[10];
  char HOD[20];
 protected:
  double Budget;
 public:
  Department();
  void Enter();
  void Show();
};
class Student: public Department
{ long RollNo;
  char Name[20];
 public:
  Student();
  void Enroll();
  void View();
};
```

(i) Which type of Inheritance is shown in the above example ?
(ii) Write the names of those member functions, which are directly accessed from the objects of class Student.
(iii) Write the names of those data members, which can be directly accessible from the member functions of class Student.
(iv) Is it possible to directly call function Display( ) of class University from an object of class Department ?

2015

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

```
class Interior
{ int OrderId;
  char Address[20];
  protected:
    float Advance;
  public:
    Interior();
   void Book();
   void View();
};
class Painting: public Interior
{ int WallArea,ColorCode;
  protected:
    char Type;
  public:
    Painting();
    void PBook();
    void PView();
};
class Billing: public Painting
{ float Charges;
  void Calculate();
  public:
```

```
   Billing();
   void Bill();
   void BillPrint();
};
```

(i) Which type of Inheritance out of the following is illustrated in the above example?
-Single Level Inheritance
-Multi Level Inheritance
-Multiple Inheritance

(ii) Write the names of all the data members, which are directly accessible from the member functions of class Painting.

(iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.

(iv) What will be the order of execution of the constructors,when an object of class Billing is declared?

2016

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

```
class ITEM
{ int Id;
  char IName[20]; protected:
  float Qty; public:
  ITEM();
  void Enter(); void View();
};
class TRADER
{ int DCode;
protected:
  char Manager[20]; public:
  TRADER();
  void Enter(); void
  View();
};
class SALEPOINT : public ITEM,private TRADER
{  char Name[20],Location[20];
   public :
  SALEPOINT();
  void EnterAll(); void
  ViewAll();
};
```

(i) Which type of Inheritance out of the following is illustrated in the above example?
- Single Level Inheritance
- Multi Level Inheritance
- Multiple Inheritance

(ii) Write the names of all the data members, which are directly accessible from the member functions of class SALEPOINT.

(iii) Write the names of all the member functions, which are directly accessible by an object of class SALEPOINT.

(iv) What will be the order of execution of the constructors, when an object of class SALEPOINT is declared?

2017

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

```
class First
{
  int  X1;
protected:
  float X2; public:
  First();
  void Enter1(); void Display1();
};
class Second : private First
{
  int Y1; protected:
  float Y2; public:
  Second();
  void Enter2(); void
  Display();
};
class Third : public Second
{
  int Z1; public:
  Third();
  void Enter3(); void
  Display();
};
void main()
{
   Third T;          //Statement 1
   ____________________;//Statement 2
}
```

(i) Which type of Inheritance out of the following is illustrated in the above example? Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance

(ii) Write the names of all the member functions, which are directly accessible by the object T of class Third as declared in main() function.

(iii) Write Statement 2 to call function Display() of class Second from the object T of class Third.

(iv) What will be the order of execution of the constructors, when the object T of class Third is declared inside main()?

QUESTION 3: (14 MARKS)

(a) **2 Marks**

2014

Write code for a function **void EvenOdd(int T[], int C)** in C++, to add 1 in all the odd values and 2 in all the even values of the array T.
Example : If the original content of the array T is

T[0]	T[1]	T[2]	T[3]	T[4]
35	12	16	69	26

The modified content will be :

T[0]	T[1]	T[2]	T[3]	T[4]
36	14	18	70	28

2015

Write the definition of a function **Change(int P[], int N)** in C++,which should change all the multiples of 10 in the array to 10 and rest of the elements as 1. For example, if an array of 10 integers is as follows:

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
100	43	20	56	32	91	80	40	45	21

After executing the function, the array content should be changed as follows:

P[0]	P[1]	P[2]	P[3]	P[4]	P[5]	P[6]	P[7]	P[8]	P[9]
10	1	10	1	1	1	10	10	1	1

2016

Write the definition of a function FixSalary(float Salary[], int N) in C++, which should modify each element of the array Salary having N elements, as per the following rules:

Existing Salary Values	Required Modification in Value
If less than 100000	Add 35% in the existing value
If >=100000 and <20000	Add 30% in the existing value
If >=200000	Add 20% in the existing value

2017

Write a definition for a function SUMMIDCOL(int MATRIX[][10],int N,int M) in C++, which finds the sum of the middle column's elements of the MATRIX (Assuming N represents number of rows and M represents number of columns, which is an odd integer).

Example: if the content of array MATRIX having N as 5 and M as 3 is as follows:

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

The function should calculate the sum and display the following: Sum of Middle Column: 15

(b) **3 Marks**

2014

An array A[20][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the base address of array A is 32000, find out the location of A[15][10]. Also, find the total number of elements present in this array.

2015

A two dimensional array ARR[50][20] is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element RR[30][10], if the element ARR[10] [5] is stored at the memory location 15000.

2016

R[10][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 8 bytes, find the address of the element R[5][15], if the element R[8][10] is stored at the memory location 45000.

2017

ARR[15][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[5][15], if the element ARR[10][5] is stored at the memory location 35000.

(C) **4 Marks**

2014

Write a function PUSHBOOK( ) in C++ to perform insert operation on a Dynamic Stack, which contains Book_no and Book_Title. Consider the following definition of NODE, while writing your C++ code.

```
struct NODE
```

	`{ int Book_No;` `  char Book_Title[20];` `  NODE *Next;` `};`
2015	Write the definition of a member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program: `struct BOOKS` `{ char ISBN[20], TITLE[80];` `  BOOKS *Link;` `};` `class STACK` `{ BOOKS *Top;` `  public:` `  STACK()` `  {Top=NULL;}` `  void PUSH();` `  void POP();` `  ~STACK();` `};`
2016	Write the definition of a member function DELETE() for a class QUEUE in C++, to remove a product from a dynamically allocated Queue of products considering the following code is already written as a part of the program. `struct PRODUCT` `{int PID; char PNAME[20];` `PRODUCT *Next;` `};` `class QUEUE` `{PRODUCT *R,*F;` `public:` `QUEUE(){R=NULL;F=NULL;}` `void INSERT();` `void DELETE();` `~QUEUE();` `};`
2017	Write the definition of a member function PUSHGIFT() for a class STACK in C++, to add a GIFT in a dynamically allocated stack of GIFTs considering the following code is already written as a part of the program: `struct GIFT` `{ int GCODE;  //Gift Code` `  char GDESC[20];  //Gift Description GIFT` `  *Link;` `};` `class STACK` `{` `  Gift *TOP; public:` `  STACK(){TOP=NULL;} void` `  PUSHGIFT(); void` `  POPGIFT();`

```
    ~STACK();
};
```

(d) **3 Marks**

2014

Write a user-defined function AddEnd2(int A[][4],int N,int M) in C++ to find and display the sum of all the values, which are ending with 2 (i.e., units place is 2).
For example if the content of array is :

22	16	12
19	5	2

The output should be 36

2015

Write a function REVROW(int P[][5],int N, int M) in C++ to display the content of a two dimensional array, with each row content in reverse order.

For example, if the content of array is as follows:

15	12	56	45	51
13	91	92	87	63
11	23	61	46	81

The function should display output as:

```
51  45  56  12  15
63  87  92  91  13
81  46  61  23  81
```

2016

Write definition for a function **DISPMID(int A[][5],int R,int C)** in C++ to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns.

For example, if the content of array is as follows:

215	912	516	401	515
103	901	921	802	601
285	209	609	360	172

The function should display the following as output

103 901 921 802 601
516 921 609

2017

Write the definition of a function AddUp(int Arr[], int N) in C++, in which all even positions (i.e. 0,2,4,...) of the array should be added with the content of the element in the next position and odd positions (i.e. 1,3,5,...) elements should be incremented by 10.

Example: if the array Arr contains

23	30	45	10	15	25

Then the array should become

53	40	55	20	40	35

NOTE:

- The function should only alter the content in the same array.
- The function should not copy the altered content in another array.
- The function should not display the altered content of the array.
- Assuming, the Number of elements in the array are Even.

(e) **2 Marks**

2014

Evaluate the following postfix expression. Show the status of stack after execution of each operation separately :

T, F, NOT, AND, T, OR, F, AND

2015	Convert the following infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. `U * V + R/(S-T)`
2016	Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. **P/(Q-R)*S+T**
2017	Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion: **X - (Y + Z) / U * V**

QUESTION NO. 4: (6 MARKS)

(a)	**2 Marks**
2014	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 Agency
{int ANo;            //Agent Code
 char AName[20];     //Agent Name
 char Mobile[12];    //Agent Mobile
public:
 void Enter();      //Function to enter details of agent
 void Disp();       //Function to display details of agent
 int RAno(){return ANo;}
 void UpdateMobile() //Function to update Mobile
 {cout<<"Updated Mobile:";
  gets(Mobile);
 }
};
void AgentUpdate()
{ fstream F;
  F.open("AGENT.DAT",ios::binary|ios::in|ios::out);
  int Updt=0;
  int UAno;
  cout<<"Ano (Agent No - to update Mobile):";
  cin>>UAno;
  Agency A;
  while (!Updt && F.read((char*)&A,sizeof(A)))
  { if (A.RAno()==UAno)
    { //Statement 1: To call the function to Update Mobile No.
      _____;
      //Statement 2:To reposition file pointer to re-write
        the updated object back in the file
      _____;
      F.write((char*)&A,sizeof(A));
      Updt++;
    }
  }
  if (Updt)
    cout<<"Mobile Updated for Agent"<<UAno<<endl;
  else
    cout<<"Agent not in the Agency"<<endl;
  F.close();
 }
```

2015	Write function definition for TOWER() in C++ to read the content of a text file WRITEUP.TXT, count the presence of word TOWER and display the number of occurrences of this word. Note : - The word TOWER should be an independent word - Ignore type cases (i.e. lower/upper case) Example: If the content of the file WRITEUP.TXT is as follows: `Tower of hanoi is an interesting problem.Mobile phone tower is away from here. Views from EIFFEL TOWER are amazing.` The function TOWER () should display the following: 3
2016	Write function definition for DISP3CHAR() in C++ to read the content of a text file KIDINME.TXT, and display all those words, which have three characters in it. Example: If the content of the file KIDINME.TXT is as follows: `When I was a small child, I used to play in the garden with my grand mom. Those days were amazingly fun ful and I remember all the moments of that time.` The function DISP3CHAR() should display the following: `was the mom and all the`
2017	Polina Raj has used a text editing software to type some text in an article. After saving the article as MYNOTES.TXT, she realised that she has wrongly typed alphabet K in place of alphabet C everywhere in the article. Write a function definition for PURETEXT() in C++ that would display the corrected version of the entire article of the file MYNOTES.TXT with all the alphabets "K" to be displayed as an alphabet "C" on screen. Note: Assuming that MYNOTES.TXT does not contain any C alphabet otherwise. Example: If Polina has stored the following content in the file MYNOTES.TXT: `I OWN A KUTE LITTLE KAR.` `I KARE FOR IT AS MY KHILD.` **The function PURETEXT() should display the following content:** `I OWN A CUTE LITTLE CAR.` `I CARE FOR IT AS MY CHILD`
(b)	**3 Marks**
2014	Write a function AECount() in C++, which should read each character of a text file NOTES.TXT, should count and display the occurrence of alphabets A and E (including small cases a and e too). Example : If the file content is as follows : `CBSE enhanced its CCE guidelines further.` The AECount() function should display the output as `A:1` `E:7`
2015	Write a definition for function COSTLY() in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below: `class GIFTS`

	{ int CODE;char ITEM[20]; float PRICE; public: void Procure() {cin>>CODE; gets(ITEM);cin>>PRICE; } void View() { cout<<CODE<<":"<<ITEM<<":"<<PRICE<<endl; } float GetPrice() {return PRICE;} };
2016	Write a definition for function ONOFFER( ) in C++ to read each object of a binary file TOYS.DAT, find and display details of those toys, which has status as "ÖN OFFER". Assume that the file TOYS.DAT is created with the help of objects of class TOYS, which is defined below: class TOYS {int TID;char Toy[20],Status[20]; float MRP; public: void Getinstock() {cin>>TID;gets(Toy);gets(Status);cin>>MRP; } void View() {cout<<TID<<":"<<Toy<<":"<<MRP<<"":"<<Status<<endl; } char *SeeOffer() {return Status;} };
2017	Write a definition for function COUNTPICS ( ) in C++ to read each object of a binary file PHOTOS.DAT, find and display the total number of PHOTOS of type PORTRAIT. Assume that the file PHOTOS.DAT is created with the help of objects of class PHOTOS, which is defined below: class PHOTOS { int PCODE; char PTYPE[20];//Photo Type as "PORTRAIT","NATURE" public: void ENTER() { cin>>PCODE;gets(PTYPE); } void SHOWCASE() { cout<<PCODE<<":"<<PTYPE<<endl; } char *GETPTYPE(){return PTYPE;} };
(C)	**1 Mark**
2014	Assuming the class TOYS as declared below, write a function in C++ to read the objects of TOYS from binary file TOYS.DAT and display those details of those TOYS, which are meant for children of AgeRange ''5 to 8''. class TOYS {int ToyCode; char ToyName[10]; char AgeRange; public:

	void Enter() { cin>>ToyCode; gets(ToyName); gets(AgeRange); } void Display() { cout<<ToyCode<<":"<<ToyName<<endl; cout<<AgeRange<<endl; } char* WhatAge(){return AgeRange;} };
2015	Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members: class MEMBER {int Mno; char Name[20]; public: void In(); void Out(); }; void main() { fstream MF; MF.open("MEMBER.DAT",ios::binary|ios::in); MEMBER M; MF.read((char*)&M,sizeof(M)); MF.read((char*)&M,sizeof(M)); MF.read((char*)&M,sizeof(M)); int POSITION=MF.tellg()/sizeof(M); cout<<"PRESENT RECORD:"<<POSITION<<endl; MF.close(); }
2016	Find the output of the following C++ code considering that the binary file CLIENT.DAT exists on the hard disk with a data of 1000 clients. class CLIENT { int Ccode; char CName[20]; public: void Register(); void Display(); }; void main() { fstream CFile; CFile.open("CLIENT.DAT",ios::binary|ios::in); CLIENT C; CFile.read((char*)&C, sizeof(C)); cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl; CFile.read((char*)&C, sizeof(C)); CFile.read((char*)&C, sizeof(C)); cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl; CFile.close**();** **}**
2017	Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with a data of 200 clients.

```
class CLIENTS
{int CCode;char CName[20];
 public:
   void REGISTER();
   void DISPLAY();
};

void main()
{
   fstream File; File.open("CLIENTS.DAT",ios::binary|ios::in);
   CLIENTS C;
   File.seekg(6*sizeof(C));
   File.read((char*)&C, sizeof(C));
   cout<<"Client Number:"<<File.tellg()/sizeof(C) + 1;
   File.seekg(0,ios::end);
   cout<<" of "<<File.tellg()/sizeof(C)<<endl;
   File.close();
}
```

Question 5: (8 Marks)

(a) **2 Marks**

2014 Explain the concept of Cartesian Product between two tables, with the help of appropriate example.

2015 Observe the following table carefully and write the names of the most appropriate columns, which can be considered as

(i) candidate keys and (ii) primary key.

Code	Item	Qty	Price	Transaction Date
1001	Plastic Folder 14"	100	3400	2014-12-14
1004	Pen Stand Standard	200	4500	2015-01-31
1005	Stapler Mini	250	1200	2015-02-28
1009	Punching Machine Small	200	1400	2015-03-12
1003	Stapler Big	100	1500	2015-02-02

2016 Observe the following PARTICIPANTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in RESULT ? Also, find the Degree and Cardinality of the result.

PARTICIPANTS

PNO	NAME
1	Aruanabha Tariban
2	John Fedricks
3	Kanti Desai

EVENTS

EVENTCODE	EVENTNAME
1001	IT Quiz
1002	Group Debate

RESULT

PNO	NAME	EVENTCODE	EVENTNAME
1	Aruanabha Tariban	1001	IT Quiz
1	Aruanabha Tariban	1002	Group Debate
2	John Fedricks	1001	IT Quiz
2	John Fedricks	1002	Group Debate
3	Kanti Desai	1001	IT Quiz
3	Kanti Desai	1002	Group Debate

2017

Observe the following table MEMBER carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in RESULT. Also, find the Degree and Cardinality of the RESULT.

MEMBER

NO	MNAME	STREAM
M001	JAYA	SCIENCE
M002	ADIYTA	HUMANITIES
M003	HANSRAJ	SCIENCE
M004	SHIVAK	COMMERCE

RESULT

NO	MNAME	STREAM
M002	ADITYA	HUMANITIES

(b) **6 Marks (1x4 + 1/2x4)**

2014

Answer the questions on the basis of the following tables SHOPPE and ACCESSORIES.

Table : SHOPPE

Id	SName	Area
S001	ABC Computronics	CP
S002	All Infotech Media	GK II
S003	Tech Shoppe	CP
S004	Geeks Tecno Soft	Nehru Place
S005	Hitech Tech Store	Nehru Place

Table : ACCESSORIES

No	Name	Price	Id
A01	Mother Board	12000	S01
A02	Hard Disk	5000	S01
A03	Keyboard	500	S02
A04	Mouse	300	S01
A05	Mother Board	13000	S02
A06	Keyboard	400	S03
A07	LCD	6000	S04
T08	LCD	5500	S05
T09	Mouse	350	S05
T10	Hard Disk	4500	S03

Write the SQL queries for (i) to (iv) and output for (v) to (viii)

(i) To display Name and Price of all the Accessories in ascending order of their Price.

(ii) To display Id and SName of all Shoppe located in Nehru Place

(iii) To display Minimum and Maximum Price of each Name of Accessories.

(iv) To display Name, Price of all Accessories and their respective SName where they are

	available.
(v)	SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE >= 5000;
(vi)	SELECT AREA, COUNT(*) FROM SHOPPE GROUP BY AREA;
(vii)	SELECT COUNT(DISTINCT AREA) FROM SHOPPE;
(viii)	SELECT NAME, PRICE*0.05 DISCOUNT FROM ACCESSORIES WHERE SNO IN ('S02', 'S03');
2015	Consider the following DEPT and EMPLOYEE tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii). **Table: DEPT** DCODE | DEPARTMENT | LOCATION D01 | INFRASTRUCTURE | DELHI D02 | MARKETING | DELHI D03 | MEDIA | MUMBAI D05 | FINANCE | KOLKATA D04 | HUMAN RESOURCE | MUMBAI **Table: EMPLOYEE** ENO | NAME | DOJ | DOB | GENDER | DCODE 1001 | George K | 2013-09-02 | 1991-09-01 | MALE | D01 1002 | Ryma Sen | 2012-12-11 | 1990-12-15 | FEMALE | D03 1003 | Mohitesh | 2013-02-03 | 1987-09-04 | MALE | D05 1007 | Anil Jha | 2014-01-17 | 1984-10-19 | MALE | D04 1004 | Manila Sahai | 2012-12-09 | 1986-11-14 | FEMALE | D01 1005 | R SAHAY | 2013-11-18 | 1987-03-31 | MALE | D02 1006 | Jaya Priya | 2014-06-09 | 1985-06-23 | FEMALE | D05 Note: DOJ refers to date of joining and DOB refers to date of Birth of employees.
(i)	To display Eno, Name, Gender from the table EMPLOYEE in ascending order of Eno.
(ii)	To display the Name of all the MALE employees from the table EMPLOYEE.
(iii)	To display the Eno and Name of those employees from the table EMPLOYEE w ho are born between '1987-01-01' and '1991-12-01'.
(iv)	To count and display FEMALE employees who have joined after '1986-01-01'.
(v)	`SELECT COUNT(*),DCODE FROM EMPLOYEE` `GROUP BY DCODE HAVING COUNT(*)>1;`
(vi)	`SELECT DISTINCT DEPARTMENT FROM DEPT;`
(vii)	`SELECT NAME, DEPARTMENT FROM EMPLOYEE E, DEPT` `D WHERE E.DCODE=D.DCODE AND EN0<1003;`
(viii)	`SELECT MAX(DOJ), MIN(DOB) FROM EMPLOYEE;`
2016	Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables **Table: VEHICLE** VCODE | VEHICLETYPE | PERKM V01 | VOLVO BUS | 150 V02 | AC DELUXE BUS | 125 V03 | ORDINARY BUS | 80 V05 | SUV | 30 V04 | CAR | 18 Note: PERKM is Freight Charges per kilometer

Table: TRAVEL

CNO	CNAME	TRAVELDATE	KM	VCODE	NOP
101	K.Niwal	2015-12-13	200	V01	32
103	Fredrick Sym	2016-03-21	120	V03	45
105	Hitesh Jain	2016-04-23	450	V02	42
102	Ravi Anish	2016-01-13	80	V02	40
107	John Malina	2015-02-10	65	V04	2
104	Sahanubhuti	2016-01-28	90	V05	4
106	Ramesh Jaya	2016-04-06	100	V01	25

- Km is Kilometers travelled
- NOP is number of passengers travelled in vehicle

(i) To display CNO, CNAME, TRAVELDATE from the table TRAVEL in descending order of CNO.

(ii) To display the CNAME of all the customers from the table TRAVEL who are traveling by vehicle with code V01 or V02.

(iii) To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'.

(iv) To display all the details from table TRAVEL for the customers, who have travel distance more than 120 KM in ascending order of NOP.

(v)
```
SELECT COUNT(*),VCODE FROM TRAVEL GROUP
BY VCODE HAVING COUNT(*)>1;
```

(vi)
```
SELECT DISTINCT VCODE FROM TRAVEL;
```

(vii)
```
SELECT A.VCODE,CNAME,VEHICLETYPE FROM TRAVEL A,VEHICLE B
WHERE A.VCODE=B.VCODE AND KM<90;
```

(viii)
```
SELECT CNAME,KM*PERKM FROM
TRAVEL A,VEHICLE B
WHERE A.VCODE=B.VCODE AND A.VCODE='V05';
```

2017 Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables

DVD

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.

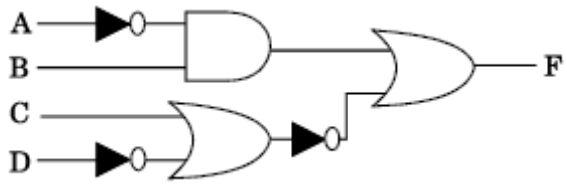
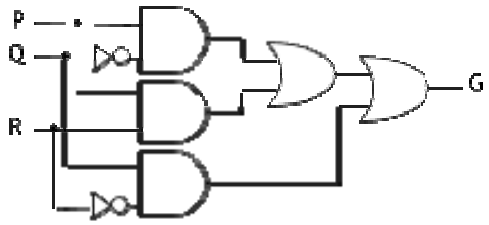
(ii) To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD

(iii) To display the DTYPE and number of DVDs in each DTYPE from the table DVD

(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
(v)	**SELECT MIN(ISSUEDATE) FROM MEMBER;**
(vi)	**SELECT DISTINCT DTYPE FROM DVD;**
(vii)	**SELECT D.DCODE,NAME,DTITLE** **FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE ;**
(viii)	**SELECT DTITLE FROM DVD WHERE DTYPE NOT IN ("Folk", "Classical");**

QUESTION NO.6: (8 MARKS)

(a)	**2 Marks**
2014	Name the law shown below and verify it using a truth table. X+X'.Y=X+Y
2015	Verify the following using Boolean Laws. U'+ V= U'V'+U'.V +U.V
2016	Verify the following using Boolean Laws. **X'+ Y'Z = X'.Y'.Z'+ X'.Y.Z'+ X'Y.Z+ X'.Y'.Z+ X.Y'.Z**
2017	State DeMorgan's Laws of Boolean Algebra and verify them using truth table.
(b)	**2 Marks**
2014	Obtain the Boolean Expression for the logic circuit shown below : 
2015	Draw the Logic Circuit for the following Boolean Expression : (X'+Y).Z+W'
2016	Write the Boolean Expression for the result of the Logic Circuit as shown below: 
2017	Draw the Logic Circuit of the following Boolean Expression using only NOR Gates: **(A+B).(C+D)**
(C)	**1 Marks**
2014	Write the Product of Sum form of the function F(X, Y, Z) for the following truth table representation of F :

X	Y	Z	F(X,Y,Z)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

2015 Derive a Canonical POS expression for a Boolean function F,represented by the following truth table:

A	B	C	F(P,Q,R)
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

2016 Derive a Canonical SOP expression for a Boolean function G, represented by the following truth table:

A	B	C	G(A,B,C)
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

2017 Derive a Canonical POS expression for a Boolean function G, represented by the following truth table:

X	Y	Z	G(X,Y,Z)
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

(d) **3 Marks**

2014 Obtain the minimal form for the following Boolean expression using Karnaugh's Map :
$F(A,B,C,D) = \sum(1,3,4,5,6,7,12,13)$

2015 Reduce the following Boolean Expression to its simplest form using K-Map :
$F(X,Y,Z,W) = \Sigma(0,1,4,5,6,7,8,9,11,15)$

2016 Reduce the following Boolean Expression to its simplest form using K-Map:
$F(P,Q,R,S) = \Sigma (0,4,5,8,9,10,11,12,13,15)$

2017 Reduce the following Boolean expression to its simplest form using K-Map: $E(U,V,Z,W) = \Sigma(2,3,6,8,9,10,11,12,13)$

QUESTION NO.7: (10 MARKS)

(a)	**1 Mark / (2 Mark -2017)**
2014	Write two characteristics of Wi-Fi.
2015	Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.
2016	Differentiate between PAN and LAN types of networks.
2017	Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies.
(b)	**1 Mark /(2 Mark-2017)**
2014	What is the difference between E-mail and Chat ?
2015	What kind of data gets stored in cookies and how is it useful?
2016	Which protocol helps us to transfer files to and from a remote computer?
2017	Janish Khanna used a pen drive to copy files from his friend's laptop to his office computer. Soon his office computer started abnormal functioning. Sometimes it would restart by itself and sometimes it would stop different applications running on it. Which of the following options out of (i) to (iv), would have caused the malfunctioning of the computer? Justify the reason for your chosen option: (i) Computer Virus (ii) Spam Mail **(iii)** Computer Bacteria **(iv)** Trojan Horse
(C)	**1 Mark /(2 Mark-2017)**
2014	Expand the following : ◆GSM ◆ GPRS
2015	Differentiate between packet switching over message switching?
2016	Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services?
2017	Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Ms.Sen? Justify the reason for your chosen option: (i) Hacker (ii) Cracker **(iii)** Operator **(iv)** Network Admin
(d)	**1 Mark**
2014	Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a video?
2015	Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication? Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber
2016	Write two characteristics of Web 2.0.
2017	--
(e)	**1 Mark**

2014 Write names of any two popular Open Source Software, which are used as Operating Systems.

2015 What is Trojan Horse?

2016 What is the basic difference between Computer Worm and Trojan Horse?

Trojan Horse	Computer Worm
It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them.	It is a self-replicating computer program which uses a network to send copies of itself to other computers on the network and it may do so without any user intervention.

2017 --

(f) **1 Mark**

2014 Write any two important characteristics of Cloud Computing.

2015 Out of the following, which all comes under cyber crime?

(i) Stealing away a brand new hard disk from a showroom.

(ii) Getting in someone's social networking account without his consent and posting on his behalf.

(iii) Secretly copying data from server of a organization and selling it to the other organization.

(iv) Looking at online activities of a friends blog.

2016 Categories the following under Client side and Server Side script category?

(1) Java Script (2) ASP

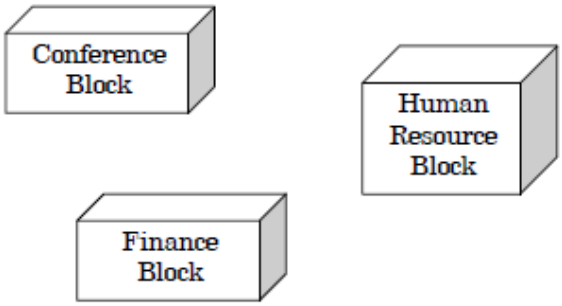
(3) VB Sript (4) JSP

2017 --

(g) **(4 Marks)**

2014 Tech Up Corporation (TUC) is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Hyderabad.
As a network adviser, you have to understand their requirement and suggest to them the best available solutions. Their queries are mentioned as (i) to (iv) below.

Physical Locations of the blocks of TUC



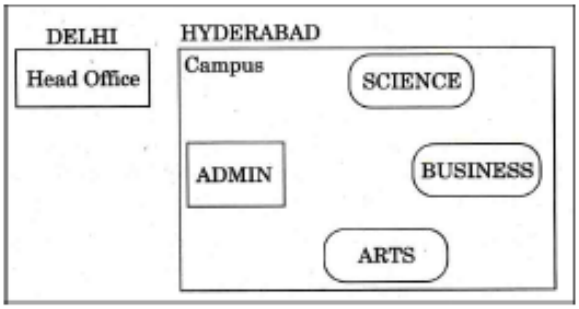
Block to Block Distance: (Mtrs)	
Human Resource to Conference	60
Human Resource to Finance	120
Conference to Finance	80

Number of Computers to be installed	
Human Resource	125
Finance	25
Conference	60

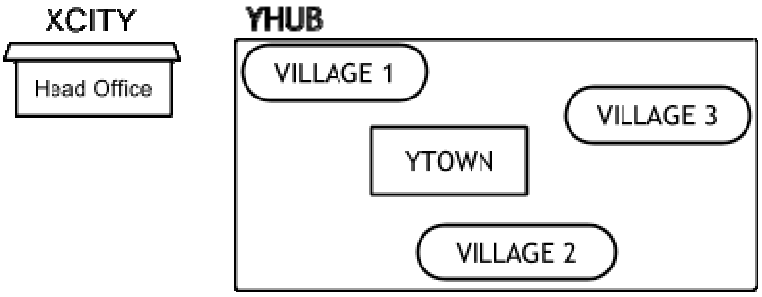
(i) What will most appropriate block, where TUC should plan to install their server ?

(ii) Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication.

(iii) What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office ?

<table>
<tr><td></td><td>▫ Infrared
▫ Satellite Link
▫ Ethernet Cable</td></tr>
<tr><td>(iv)</td><td>Which of the following devices will be suggested by you to connect each computer in each of the buildings?
▫ Gateway
▫ Switch
▫ Modem</td></tr>
<tr><td>2015</td><td>Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and MEDIA.
You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.
 

<table>
<tr><td colspan="2">Shortest distances between various locations:</td></tr>
<tr><td>ADMIN to SCIENCE</td><td>65 M</td></tr>
<tr><td>ADMIN to BUSINESS</td><td>100M</td></tr>
<tr><td>ADMIN to ARTS</td><td>60M</td></tr>
<tr><td>SCIENCE to BUSINESS</td><td>75M</td></tr>
<tr><td>SCIENCE to ARTS</td><td>60M</td></tr>
<tr><td>BUSINESS to ARTS</td><td>50M</td></tr>
<tr><td>DELHI Head Office to HYDERABAD Campus</td><td>1600KM</td></tr>
</table>
<table>
<tr><td colspan="2">Number of Computers installed</td></tr>
<tr><td>ADMIN</td><td>100</td></tr>
<tr><td>SCIENCE</td><td>85</td></tr>
<tr><td>BUSINESS</td><td>40</td></tr>
<tr><td>ARTS</td><td>12</td></tr>
<tr><td>DELHI HEAD OFFICE</td><td>20</td></tr>
</table></td></tr>
<tr><td>(i)</td><td>Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.</td></tr>
<tr><td>(ii)</td><td>Suggest and draw the cable layout to efficiently connect various buildings 'within the HYDERABAD campus for connecting the computers.</td></tr>
<tr><td>(iii)</td><td>Which hardware device will you suggest to be procured by the company to be installed to protect and control the Internet uses within the campus?</td></tr>
<tr><td>(iv)</td><td>Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of HYDERABAD campus and DELHI Head Office?
(a) E-mail (b) Text Chat (c) Video Conferencing (d) Cable TV</td></tr>
<tr><td>2016</td><td>Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge in the society. It is planning to setup its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows.
As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (iv), keeping in mind the distances between various locations and other given parameters.</td></tr>
</table>



Shortest distances between various locations:	
VILLAGE 1 to YTOWN	2 KM
VILLAGE 2 to YTOWN	1.5 KM
VILLAGE 3 to YTOWN	3 KM
VILLAGE 1 to VILLAGE 2	3.5 KM
VILLAGE 1 to VILLAGE 3	4.5 KM
VILLAGE 2 to VILLAGE 3	3.5 KM
CITY Head Office to YHUB	30 Km

Number of Computers installed	
YTOWN	100
VILLAGE 1	10
VILLAGE 2	15
VILLAGE 3	15
CITY OFFICE	5

Note: In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.

The organization has got financial support from the government and top IT companies.

(i) Suggest the most appropriate location of the SERVER in the YHUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer.

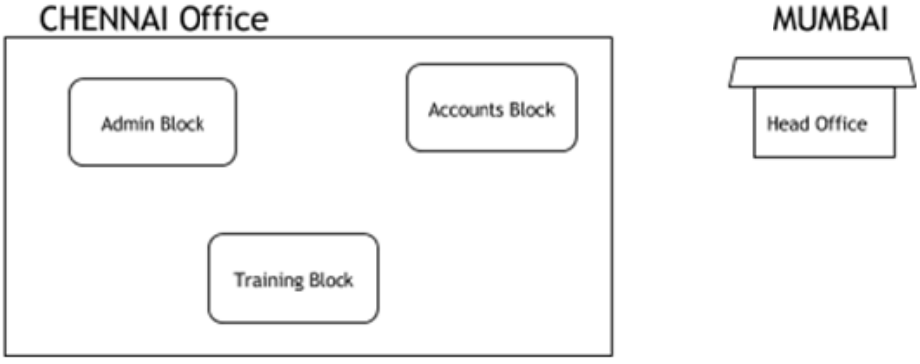
(ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.

(iii) Which hardware device will you suggest to connect all the computers within each location of YHUB?

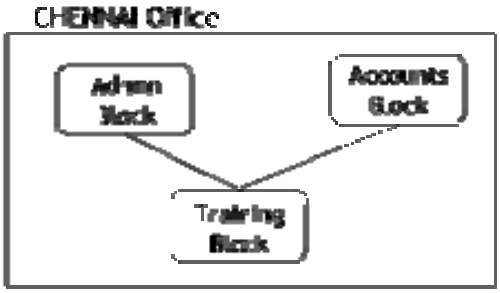
(iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at YHUB locations?

2017 Hi Standard Tech Training Ltd is a Mumbai based organization which is expanding its office set-up to Chennai. At Chennai office compound, they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has a number of computers, which are required to be connected in a network for communication, data and resource sharing.

As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised by them in (i) to (iv), as per the distances between various blocks/locations and other given parameters.



Shortest distances between various blocks/locations:

	<table><tr><td>Admin Block to Account Block</td><td>300 Metres</td></tr><tr><td>Accounts Block to Training Block</td><td>150 Metres</td></tr><tr><td>Admin Block to Training Block</td><td>200 Metres</td></tr><tr><td>MUMBAI Head Office to CHENNAI Office</td><td>1300 KM</td></tr></table>Number of computers installed at various blocks are as follows:<table><tr><td>Training Block</td><td>150</td></tr><tr><td>Accounts Block</td><td>30</td></tr><tr><td>Admin Block</td><td>40</td></tr></table>
(i)	Suggest the most appropriate block/location to house the SERVER in the CHENNAI Office (out of the 3 blocks) to get the best and effective connectivity. Justify your answer.
Ans	Training Block - Because it has maximum number of computers.
(ii)	Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various blocks within the CHENNAI office compound.
Ans	Best wired medium: Optical Fibre OR CAT5 OR CAT6 OR CAT7 OR CAT8 OR Ethernet Cable 
(iii)	Suggest a device/software and its placement that would provide data security for the entire network of the CHENNAI office.
Ans	Firewall - Placed with the server at the Training Block OR Any other valid device/software name
(iv)	Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the CHENNAI office
Ans	Device Name: WiFi Router OR WiMax OR RF Router OR Wireless Modem OR RF Transmitter Protocol : WAP OR 802.16 OR TCP/IP OR VOIP OR MACP OR 802.11