Computer Science

Class XII

Open Teaching & Learning Material

Question Bank (2014-2017) With Solution

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Question-wise & Year-wise Collection of Questions from CBSE's AISSCE Question Papers with solutions based on Marking Scheme (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.

Ans In call by value, the values are passed to called function and fresh memory is allocated for the parameters by the called function. Thus, two copies of same variables is maintained- one for calling function and another for called function. Any change made in parameter in called function does not reflected back in calling function.

In call by Reference, the references (address) of the arguments are passed to the called function and called function works with original argument without allocating a fresh memory. So, any changes made in parameter in called function reflected back in calling function.

Call by Value (Example)	Call by Reference (Example)

void swap (int a, int b)
{int tmp=a;
a=b;
b=temp;
}
void main()
{ int x=5, y=8;
Swap (x,y);
}
	void swap (int &a, int &b)
	{int tmp=a;
	a=b;
	b=temp;
	}
	void main()
	{ int x=5, y=8;
	Swap (x,y);
	}

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`

Ans `For, INT, NeW, 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`

Ans `Total*Tax ,double, My Name ,switch`

2017 Write the type of C++ tokens (keywords and user defined identifiers) from the following:

(i) new

(ii) While

(iii) case

(iv) Num_2

Ans

(i) `new` - Keyword

(ii) `While` - User defined Identifier

(iii) `case` - Keyword

(iv) `Num_2` - User defined Identifier

(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; }
Ans	iostream.h , ctype.h

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);
	}

Ans	ctype.h, stdio.h
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; }
Ans	iostream.h OR iomanip.h , math.h
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;** **}**
Ans	**string.h , iostream.h OR fstream.h OR iomanip.h**
(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;
}
```

Ans

```
typedef char[80] STR;
void main()
{ STR Txt;
  gets(Txt);
  cout<<Txt[0]<<'\t' <<Txt[2];
  cout<<Txt<<endl;
}
```

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;
}
```

Ans

```
#define MaxSpeed 60.5    //Error 1(define),2(=),3 (;)
void main()
{
int MySpeed ;            //Error 4
char Alert='N';
cin>>MySpeed;
if (MySpeed>MaxSpeed)    //Error 5
     Alert='Y';
cout<<Alert<< endl;      //Error 6
}
```

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;
}
```

Ans

```
#define Formula(a,b) 2*a+b void
main()
{ float X=3.2 , Y=4.1; float 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;
}
```

Ans

```
void main()
{
  cout<<"Enter an Alphabet:";
  char CH;                                  // Error 1
  cin>>CH; switch(CH)
  {                                         // Error 2(i)
      case 'A' :                            // Error 3(i)
                 cout<<"Ant";  break;       // Error 4(i)
      case 'B' :                            // Error 3(ii)
                 cout<<"Bear"; break;       // Error 4(ii)
  }                                         // Error 2(ii)
}
```

(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;
}
```

Ans

1AJANTA

5JANTA

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 ;
}
```

10, 8

20, 8

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;
}
```

Ans AHM@N@OIS@

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)<<'#';
      }
}
```

Ans **22#40#9#13#**

(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;
}
```

Ans

```
P@1
0
P@1
11
P@2
25
```

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();
}
```

Ans

```
B#0
I#1
G#1
```

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();
}
```

Ans

Date:28 1324#400
Date:1 1435#250
Date:26 1000#75

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]<<"*";
}
```

Ans

12*63*73*15*93*10*

(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

Ans

```
(iii) 100#50#200#
Minimum value of taker: 2
Maximum value of taker: 3
```

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=1;I<=VAL;I++)
  { for(int J=VAL;J<=7;J++)
       cout«GUESS[J];
    cout«endl;
  }
}
```

(i) (ii) (iii) (iv)

```
BCDEFGH   CDEFGH   EFGH   FGHI
BCDEFGH   CDEFGH   EFGH   FGHI
                   EFGH   FGHI
                   EFGH   FGHI
```

Ans

Possible Output (ii) and (iii)
Min Value of VAL = 2
Max Value of VAL = 4

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

Ans

Possible Output may be (ii) & (iv)
Minimum value of Picker =1
Maximum value of Picker= 3

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

Ans

Correct Options : (ii) and (iii)

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.

Ans	Function overloading is an example of polymorphism, where the function having same name with different set of parameters perform different operations.
	`Void Disp( )`
	`{cout<<"Hello"<< endl;`
	`}`
	`Void Disp(int n )`
	`{ for (int i=1 ; i<=n; i++ )`
	`  cout<< i << endl;`
	`}`
	`void main ( )`
	`{ int x=5;`
	`  Disp();`
	`  Disp(x);`
	`}`

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.

Ans	A copy constructor is an overloaded constructor in which an object of the same class is passed as reference parameter.
	`class Point`
	`{ int x;`
	` public:`
	`  Point(){x=0;}`
	`  Point(Point &p) // Copy constructor`
	`  {x = p.x;}`
	`  :`
	`};`
	`void main()`
	`{Point p1;`
	` Point p2(p1);//Copy constructor is called here`
	`  //OR`
	` Point p3=p1;//Copy constructor is called here`
	`}`

2016	Write any four important characteristics of Object Oriented Programming? Give example of any one of the characteristics using C++.

Ans	Four characteristics of OOPS are:
	Encapsulation , Data Hiding ,Polymorphism ,Inheritance
	Example of Encapsulation
	`class student`
	`{  int rno;`
	`  char name[20];`
	`  public:`
	`  void input()`
	`  { cin>>rno;`
	`  gets(name);`
	`  }`
	`  void output()`
	`  {cout<<rno<<"  "<<name<<endl;`

```
    }
};
```

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++.

Ans

Private	Protected
Implicit Visibility Mode	Explicit Visibility Mode
Not accessible to member functions of derived class	Accessible to member functions of derived class

Example:

```
class A
{ int X;
  protected:
     int Y; public:
     void Z();
};
```

(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.

Ans

(i) Function 1

(ii)Hospital G(H)

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 ?

Ans	**(i)** `P.Book(1234567,"Ravi"); //Line 1`
	`P.Print(); //Line 2`
	(ii) `Function 4` OR `~Passenger()` is a Destructor function.

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!"

Ans

(i) Polymorphism
(ii) 2 times Line 9

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.

Ans

(i) Polymorphism OR Constructor overloading OR Function Overloading

(ii)
```
TEST T1;        //Statement 1
TEST T2(T1);    //Statement 2
```
OR
```
TEST T2=T1;     //Statement 2
```

(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.

Ans	class Tourist
	{ char CNo[5];
	char CType;
	float PerKm;
	float Distance;
	void CityCharges()
	{if (CType==’A’)
	PerKm=20;
	else if (CType==’B’)
	PerKm=18;
	else if (CType==’C’)
	PerKm=15;
	}
	public:
	Touris ()
	{CType=’A’;
	Strcpy(CNo,”0000”);
	}
	void RegisterCab()
	{cout<< “Enter cab No.”;
	cin>>CNo;
	cout<<”Enter City Type (A/B/C)”;
	cin>>CType;
	CityCharges();
	}
	void Display()
	{cout<<”Enter Distance”;
	cin>> Distance;
	cout<<”Cab No.:”<<CNo <<endl;
	cout<<”City Type:”<<CType << endl;
	cout << “Per KM charges :”<< PerKm <<endl;
	cout <<”Amount :”<< (PerKm *Distance)<<endl;
	}
	};

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`

Ans	`class Photo`
	`{ int Pno;`
	`  char Category[20];`
	`  char Exhibit[20];`
	`  void FixExhibit();`
	`  public:`
	`  void Register();`
	`  void ViewAll();`
	`};`
	`void Photo::FixExhibit()`
	`{if(strcmpi(Category,”Antique”)==0)`
	`  strcpy(Exhibit,”Zaveri”);`
	`  else if(strcmpi(Category,”Modern”)==0)`
	`  strcpy(Exhibit,”Johnsen”);`
	`  else if strcmpi(Category,”Classic”)==0)`
	`  strcpy(Exhibit,”Terenida”);`
	`}`
	`void Photo::Register()`
	`{ cin>>Pno;`
	`  gets(Category);`
	`  FixExhibit();`
	`}`
	`void Photo:: ViewAll()`
	`{ cout<<Pno<<Category<<Exhibit<<endl;`
	`}`

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`

Ans	`class CITY`
	`{ int Ccode;`
	`  char CName[20];`
	`  long int Pop;`
	`  float KM;`
	`  float Density;`
	`  void DenCal();`
	`public:`
	`  void Record();`
	`  void View();`

```
};
void CITY::Record()
{ cin>>Ccode;
  gets(CName);  //OR cin>>CName;
  cin>>Pop;
  cin>>KM; DenCal();
}
void CITY::View()
  { cout<<Ccode<<CName<<Pop<<KM<<Density; //Ignore endl
  if(Density>10000)
    cout<<"Highly Populated City";      //Ignore endl
  }
void CITY::DenCal()
{ Density= Pop/KM;
 }
```

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**

Ans

```
class BOX
{
  int BoxNumber ; float
  Side ; float Area ;
  void ExecArea(){ Area=Side*Side;} public:
  void GetBox(); void
  ShowBox();
};
void BOX::GetBox()
{
   cin>>BoxNumber>>Side; ExecArea();
}
void BOX::ShowBox()
{
    cout<<BoxNumber<<" "<<Side<<" "<<Area<<endl;
}
```

(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 ?

Ans	(i) Multilevel Inheritence (ii) Student(), Enroll(), View(), Enter(), Show() (iii) Rollno, Name, Budget (iv) No

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?

Ans

(i) Multi Level Inheritance

(ii) WallArea, ColorCode,Type, Advance

(iii) Bill(), BillPrint(), PBook(), PView(), Book(), View()

(iv) Interior, Painting, Billing

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?
Ans	(i) Multiple Inheritance (ii) Name, Location, Manager, Qty (iii) EnterAll(), ViewAll(), Enter(), View() **(iv)** ITEM(), TRADER(), SALEPOINT()

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()?
Ans	(i)	Multilevel Inheritance
	(ii)	Enter2(), Display() of class Second Enter3(), Display() of class Third OR Enter2() Second::Display() Enter3() Display() OR Third::Display()
	(iii)	T.Second::Display();
	(iv)	First, Second, Third

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

Ans

```
void EvenOdd(int T[ ],int C)
{ for (int i=0;i<C;i++)
  if(T[i]%2==0)
     T[i]= T[i]+2;
  else
     T[i]=T[i]+1;
}
```

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

Ans

```
void Change(int P[ ],int N)
{ for (int i=0;i<N;i++)
  if(P[i]%10==0)
     P[i]=10;
  else
     P[i]=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	Required Modification in
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

Ans

```
void FixSalary(float Salary[ ], int N)
{ for (int i=0;i<N;i++)
  if(Salary[i]<100000)
       Salary[i]+= 0.35 *Salary[i];
     else if (Salary[i]>=100000 && Salary[i]<20000) Salary[i]+=
       0.3 * Salary[i];
      else if(Salary[i]>=200000) Salary[i]+=
       0.20 * Salary[i];
}
```

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

Ans

```
void SUMMIDCOL(int MATRIX[][10],int N,int M)
{ int mid=M/2; int sum=0;
  for(int i=0; i<N; i++)
  {sum=sum+MATRIX[i][mid];
  }
  cout<<" Sum of Middle Column"<<sum;
}
```

(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.

Ans

```
Loc(A[I][J]) =BaseAddress + W [( I - LBR)*C + (J - LBC)]
(where C is the number of columns, LBR = LBC = 0)
LOC(A[15][10]) = BaseAddress + W [ I*C + J]
               = 32000 + 4[15*30 + 10]
               = 32000 + 4[450 + 10]
               = 32000 + 4 x 455
               = 32000 + 1820
               = 33820
Total Element in the Array = Row x Col = 20 x 30
                           = 600
```

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.

Ans

```
Loc(ARR[I][J]) =BaseAddress + W [( I - LBR)*C + (J - LBC)]
(where C is the number of columns, LBR = LBC = 0
LOC(ARR[10][5])= BaseAddress + W [ I*C + J]
         15000 = BaseAddress + 4[10*20 + 5]
               = BaseAddress + 4[200 + 5]
               = BaseAddress + 4 x 205
               = BaseAddress + 820
   BaseAddress = 15000-820
               = 14180
   LOC(ARR[30][10])= 14180 + 4[30 * 20 + 10]
                   = 14180 + 4 * 610
                   = 14180 + 2440
                   = 16620
```

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.
Ans	Loc(R[I][J]) = BaseAddress + W [(I – LBR)*C + (J – LBC)] (where W=size of each element = 8 bytes,R=Number of Rows=10, C=Number of Columns=50) Assuming LBR = LBC = 0 LOC(R[8][10]) 45000 = BaseAddress + W[I*C + J] 45000 = BaseAddress + 8[8*50 + 10] BaseAddress = 45000 - 3280 = 41720 LOC(R[5][15])= BaseAddress + W[I*C + J] = 41720 + 8[5*50 + 15] = 43840
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.
Ans	ROW MAJOR: Loc(ARR[I][J]) =BaseAddress + W [(I – LBR)*C + (J – LBC)] where W=size of each element = 4 bytes, R=Number of Rows=15, C=Number of Columns=20) Assuming LBR = LBC = 0 LOC(ARR[10][5]) 35000 = BaseAddress + W(I*C + J) 35000 = BaseAddress + 4(10*20 + 5) 35000 = BaseAddress + 4(205) 35000 = BaseAddress + 820 BaseAddress = 35000 - 820 = 34180 LOC(ARR[5][15])= BaseAddress + W(I*C + J) = 34180 + 4(5*20 + 15) = 34180 + 4(100 + 15) = 34180 + 4 x 115 = 34180 + 460 = **34640**
(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; };

Ans	//Assumed that top is global Node type pointer.
	void PUSHBOOK( )
	{ NODE *ptr;
	ptr= new NODE;
	cout<< "Enter Book Number:";
	cin>> ptr->Book_No;
	cout<< "Enter Book Name:";
	gets(ptr->Book_Title);
	if (top==NULL)
	top=ptr;
	else
	{ ptr->next=top;
	top=ptr;

	} }

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();`
	`};`

Ans	`void STACK::PUSH()`
	`{ BOOKS *Temp;`
	`Temp=new BOOKS;`
	`gets(Temp->ISBN);`
	`gets(Temp->TITLE);`
	`Temp->Link=Top;`
	`Top=Temp;`
	`}`

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();`
	`};`

Ans	`void QUEUE::DELETE()`
	`{ if(F!=NULL)`
	`{ PRODUCT *T = F;`
	`cout<<T->PID<<T->PNAME;`
	`F=F->Next;`
	`delete T;`
	`if(F==NULL)`
	`{R=NULL; }`
	`}`
	`else`
	`cout<<"Queue Empty";`
	`}`

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();
};
```

Ans

```
void STACK::PUSHGIFT()
{
  GIFT *T = new GIFT; cin>>T->GCODE;
  gets(T->GDESC);
  T->Link = TOP; TOP = T;
}
```

(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

Ans

```
void AddEnd2(int A[][4],int N,int M)
{ int sum=0;
  for(int I=0; I<N; I++)
   for(int J=0;J<4; J++)
       If (A[i][j]%10 ==2)
           Sum=sum+ A[i][j];
    cout<<"Sum of values ending with 2:"<<sum;
}
```

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
```

Ans

```
void REVROW(int P[][5],int N,int M)
{ for(int I=0; I<N; I++)
  { for(int J=M-1;J>=0; J--)
       cout<<P[I][J]<<"  ";
    cout<<endl;
  }
}
```

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
```

Ans

```
void DISPMID(int A[][5],int R,int C)
{ for (int J=0;J<C;J++)
   cout<<A[R/2][J]<< " ";
   cout<<endl;
  for (int I=0;I<R;I++)
   cout<<A[I][C/2]<< " ";
}
```

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.

Ans

```
void AddUp(int Arr[], int N)
{ for(int i=0; i<N; i++)
   {  if(i%2==0)
         Arr[i]=Arr[i]+Arr[i+1];
      else
         Arr[i]=Arr[i]+10;
   }
}
```

(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

Ans Answer = F

Element	Stack of Operators	Action
T	T	
F	T F	
NOT	T T	NOT F= T
AND	T	T AND T = T
T	T T	
OR	T	T OR T = T
F	T F	
AND	F	T AND F
End of Exp.	F	**Answer is F**

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)

Ans U * V + R/(S-T) = (U * V + R/(S-T))

Element	Stack of Operators	Postfix Expression
(	(	
U	(	U
*****	(*	U
V	(*	UV
+	(+	UV*
R	(+	UV*R
/	(+/	UV*R
(	(+/(	UV*R
S	(+/(	UV*RS
-	(+/(-	UV*RS
T	(+/(-	UV*RST
)	(+/	UV*RST-
)	Empty	**UV*RST-/+**

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

Ans

P/(Q-R)*S+T = (P / (Q-R) * S + T)

Element	Stack of Operators	Postfix Expression
(	(	
P	(	P
/	(/	P
(	(/(	P
Q	(/(	PQ
-	(/(-	PQ
R	(/(-	PQR
)	(/	PQR-
*	(*	PQR-/
S	(*	PQR-/S
+	(+	PQR-/S*
T	(+	PQR-/S*T
)		PQR-/S*T+

= PQR-/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

Ans

ELEMENT	Stack	POSTFIX
X		X
-	-	X
(	-(	X
Y	-(	XY
+	-(+	XY
Z	-(+	XYZ
)	-	XYZ+
/	-/	XYZ+
U	-/	XYZ+U
*	-*	XYZ+U/
V	-*	XYZ+U/V
		XYZ+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();
 }
```

Ans

Statement 1: A.UpdateMobile();

Statement 2: F.seekg (-1*sizeof(A), ios::cur);

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

Ans	`void TOWER()`
	`{int count=0;`
	`ifstream f("WRITEUP.TXT");`
	`char s[20];`
	`while (!f.eof())`
	`{ f>>s;`
	`if (strcmpi(s,"TOWER")==0)`
	`count++;`
	`}`
	`cout<<count;`
	`f.close();`
	`}`

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

Ans	`void DISP3CHAR()`
	`{ ifstream Fil;`
	`Fil.open("KIDINME.TXT");`
	`char W[20];`
	`Fil>>W;`
	`while(!Fil.eof())  // OR while(Fil)`
	`{ if (strlen(W)) == 3)`
	`cout<<W<< " ";`
	`Fil>>W;`
	`}`
	`Fil.close();`
	`}`

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

Ans

```
void PURETEXT()
{
 char ch;
 ifstream F("MYNOTES.TXT" );
 while(F.get(ch))
 {
   if(ch=='K')
       ch='C';
      cout<<ch;
 }
 F.close();
}
```

(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
```

Ans

```
void AECount()
{ ifstream fin("NOTES.TXT");
  Char ch; int account=0; ecount =0;
  While (!fin.eof())
   {ch=fin.get();
    if (ch=='A' || ch=='a')
      account++;
    else if (ch=='E' || ch=='e')
      ecount++;
   }
  cout<< "A: <<account<<endl;
  cout<< "E: <<ecount<<endl;
  fin.close();
};
```

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;}
};
```

Ans

```
void COSTLY()
{ GIFTS G;
  ifstream fin("GIFTS.DAT",ios::binary);
  while(fin.read((char *)&G,sizeof(G)))
```

	{ if(G.GetPrice()>2000)
	G.View();
	}
	fin.close();
	}

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;}
	};

Ans	void ONOFFER()
	{ TOYS T;
	ifstream fin;
	fin.open("TOYS.DAT", ios::binary); while(fin.read((char*)&T,
	sizeof(T)))
	{ if(strcmp(T.SeeOffer(),"ON OFFER")==0) T.View();
	}
	fin.close(); //Ignore
	}

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;}
	};

Ans	void COUNTPICS() { ifstream F; F.open("PHOTOS.DAT",ios::binary);

```
   int count=0;
   PHOTOS obj;
   while(F.read((char*)&obj,sizeof(obj)))
   { if(strcmp(obj.GETPTYPE(),"PORTRAIT")==0)
        count++;
   }
   cout<<"Number of PORTRAIT photos :"<<count;
   F.close();
}
```

(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;}
};
```

Ans

```
void display()
{ ifstream F; F.open("TOYS.DAT",ios::binary|ios::in);
  TOYS T;
  While (F.eof())
  {F.read((char*)&T, sizeof(T));
   If(strcmp(T.WhatAge(),"5 to 8")==0)
      T.Display();
  }
  F.close();
}
```

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();
}
```

Ans

```
PRESENT RECORD: 3
```

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();
}
```

Ans

```
Rec:1
Rec:3
```

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();
}
```

Ans

```
Client Number 8 of 200
```

Question 5: (8 Marks)

(a) **2 Marks**

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

Ans The Cartesian product of two relations A and B (A x B) yields a relation with all possible combinations of the tuples of the two relations operated upon.

Example: Suppose two relation STUDENT and TEACHER as given below. The Cartesian product STUDENT x TEACHER will contain all combinations.

STUDENT	
SCODE	**SNAME**
S1	Amit Kumar
S2	Anubhuti
S3	John

TEACHER	
TCODE	**TNAME**
1001	Raman Kumar
1002	Mohan Chandra

STUDENT x TEACHER

SCODE	SNAME	TCODE	TNAME
S1	Amit Kumar	1001	Raman Kumar
S1	Amit Kumar	1002	Mohan Chandra
S2	Anubhuti	1001	Raman Kumar
S2	Anubhuti	1002	Mohan Chandra
S3	John	1001	Raman Kumar
S3	John	1002	Mohan Chandra

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

Ans Candidate keys : Code, Item

Primary keys : Code

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

Ans

Cartesian Product
Degree = 4
Cardinality = 6

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

Ans

(i) SELECTION
Degree=3 Cardinality=1

(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.
Ans	`SELECT Name,Price FROM ACCESSORIES ORDER BY Price;`
(ii)	To display Id and SName of all Shoppe located in Nehru Place
Ans	`SELECT Id,SName FROM SHOPPE WHERE Area="Nehru Place";`
(iii)	To display Minimum and Maximum Price of each Name of Accessories.
Ans	`SELECT Name,Min(Price), Max(Price) FROM ACCESSORIES GROUP BY Name;`
(iv)	To display Name, Price of all Accessories and their respective SName where they are available.
Ans	`SELECT Name,Price,SName FROM ACCESSORIES, SHOPPE WHERE ACCESSORIES.Id =SHOPPE.Id ;`
(v)	SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE >= 5000;
Ans	Name Mother Board Hard Disk LCD
(vi)	SELECT AREA, COUNT(*) FROM SHOPPE GROUP BY AREA;
Ans	Area Count(*) CP 2 GK II 1 Nehru Place 2
(vii)	SELECT COUNT(DISTINCT AREA) FROM SHOPPE;
Ans	3
(viii)	SELECT NAME, PRICE*0.05 DISCOUNT FROM ACCESSORIES WHERE SNO IN ('S02', 'S03');
Ans	Name DISCOUNT Keyboard 25 Mother Board 650 Keyboard 20 Hard Disk 225
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.

Ans
```
SELECT Eno,Name,Gender FROM Employee ORDER BY Eno;
```

(ii) To display the Name of all the MALE employees from the table EMPLOYEE.

Ans
```
SELECT Name FROM Employee WHERE Gender='MALE';
```

(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'.

Ans
```
SELECT Eno,Name FROM Employee WHERE DOB BETWEEN '1987-01-01'
AND '1991-12-01';
```
OR
```
SELECT Eno,Name FROM Employee WHERE DOB >='1987-01-01'
AND DOB <='1991-12-01' ;
```

(iv) To count and display FEMALE employees who have joined after '1986-01-01'.

Ans
```
SELECT count(*) FROM Employee
WHERE GENDER='FEMALE' AND DOJ > '19860101';
```

(v)
```
SELECT COUNT(*),DCODE FROM EMPLOYEE
GROUP BY DCODE HAVING COUNT(*)>1;
```

Ans

COUNT	DCODE
2	D01
2	D05

(vi)
```
SELECT DISTINCT DEPARTMENT FROM DEPT;
```

Ans

Department
INFRASTRUCTURE
MARKETING
MEDIA
FINANCE
HUMAN RESOURCE

(vii)
```
SELECT NAME, DEPARTMENT FROM EMPLOYEE E, DEPT
D WHERE E.DCODE=D.DCODE AND EN0<1003;
```

Ans

NAME	DEPARTMENT
George K	INFRASTRUCTURE
Ryma Sen	MEDIA

(viii)
```
SELECT MAX(DOJ), MIN(DOB) FROM EMPLOYEE;
```

Ans

MAX(DOJ)	MIN(DOB)
2014-06-09	1984-10-19

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.

Ans
```
SELECT CNO,CNAME,TRAVELDATE FROM TRAVEL ORDER BY CNO DESC;
```

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

Ans
```
SELECT CNAME FROM TRAVEL WHERE VCODE='V01' OR VCODE='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'.

Ans
```
SELECT CNO, CNAME from TRAVEL WHERE TRAVELDATE >=
'2015-05-01' AND TRAVELDATE <= '2015-12-31';
```

(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.

Ans
```
SELECT * FROM TRAVEL
WHERE KM > 120 ORDER BY NOP;
```

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

Ans

COUNT(*)	VCODE
2	V01
2	V02

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

Ans

DISTINCT VCODE
V01
V02
V03
V04
V05

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

Ans

VCODE	CNAME	VEHICLETYPE
V02	Ravi Anish	AC DELUXE BUS
V04	John Malina	CAR

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

Ans

CNAME	KM*PERKM
Sahanubhuti	2700

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.

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';
```

(v)
```
SELECT MIN(ISSUEDATE) FROM MEMBER;
```

Ans

MIN(ISSUEDATE)
2016-12-13

(vi)
```
SELECT DISTINCT DTYPE FROM DVD;
```

Ans

DISTINCT DTYPE
Folk
Classical
Rock

(vii)
```
SELECT D.DCODE,NAME,DTITLE
FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE ;
```

Ans

DCODE	NAME	DTITLE
R102	AGAM SINGH	A day in life
F102	ARTH JOSEPH	Universal Soldier
C101	NISHA HANS	The Planets

(viii)
```
SELECT DTITLE FROM DVD WHERE DTYPE NOT IN ("Folk", "Classical");
```

Ans

DTITLE
A day in life

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

Ans X+X′.Y=X+Y is Absorption Law.

X	Y	X′	X′.Y	X+Y	X+X′.Y
0	0	1	0	0	0
0	1	1	1	1	1
1	0	0	0	1	1
1	1	0	0	1	1

Comparing column of X+Y and X+X′.Y, we find that both are identical. Hence verified.

2015 Verify the following using Boolean Laws.

U′+ V= U′V′+U′.V +U.V

Ans
R.H.S
=U′V′+U′.V +U.V
=U′.(V′+ V)+ U.V
=U′.1 + U.V
=U′+ U.V
=U′+ V
=L.H.S

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

Ans **RHS**
X′.Y′.Z′ + X′.Y.Z′ + X′.Y.Z + X′.Y′.Z + X.Y′.Z
= X′.Y′.Z + X′.Y′.Z′ + X′.Y.Z + X′.Y.Z′ + X.Y′.Z
= X′.Y′.(Z+Z′) + X′.Y.(Z+Z′) + X.Y′.Z
= X′.Y′ + X′.Y + X.Y′.Z
= X′.(Y′+Y) +X.Y′.Z
= X′ + X.Y′.Z
= (X′ + X).(X′ + Y′.Z)
= X′ + Y′.Z
= LHS

2017 State DeMorgan's Laws of Boolean Algebra and verify them using truth table.

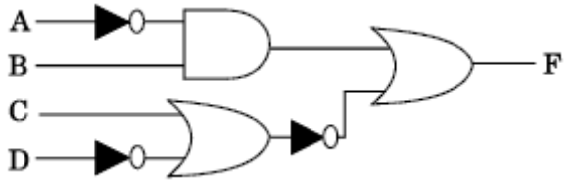
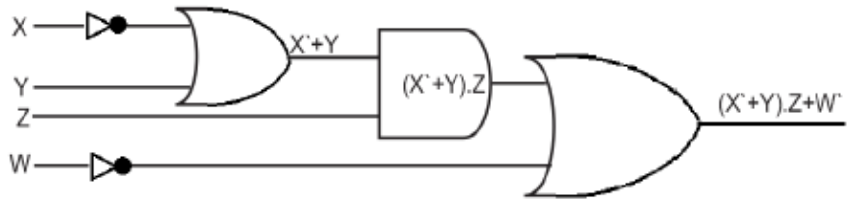
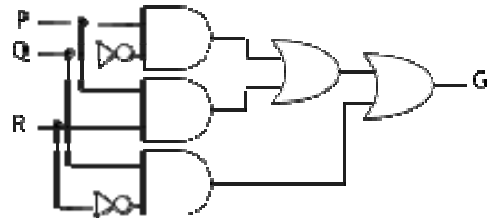
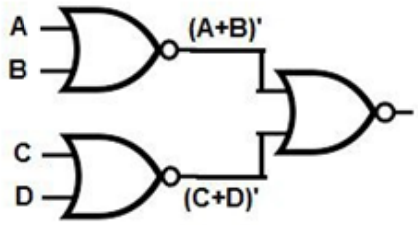
Ans (i) (A.B)'=A'+B'
(ii) (A+B)'=A'.B'
Truth Table Verification:
(i)

A	B	A.B	(A.B)′	A′	B′	A′+B′
0	0	0	1	1	1	1
0	1	0	1	1	0	1
1	0	0	1	0	1	1
1	1	1	0	0	0	0

(ii)

A	B	A+B	(A+B)′	A′	B′	A′.B′
0	0	0	1	1	1	1
0	1	1	0	1	0	0
1	0	1	0	0	1	0
1	1	1	0	0	0	0

(b) **2 Marks**

2014	Obtain the Boolean Expression for the logic circuit shown below : 
Ans	**A′.B +(C+D′)′**
2015	Draw the Logic Circuit for the following Boolean Expression : (X′+Y).Z+W′
Ans	
2016	Write the Boolean Expression for the result of the Logic Circuit as shown below: 
Ans	**P.Q′ + P.R + Q.R′**
2017	Draw the Logic Circuit of the following Boolean Expression using only NOR Gates: **(A+B).(C+D)**
Ans	
(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

Ans	**F=(X+Y+Z′)(X+Y′+Z)(X′+Y+Z)(X′+Y+Z′)** **OR F(X,Y,Z)= π(1,2,4,5)**

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

Ans $F(P,Q,R) = (P+Q+R')(P+Q'+R)(P'+Q+R')(P'+Q'+R)$

OR $F(P,Q,R) = \pi(1,2,5,6)$

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

Ans $G(A,B,C) = A'.B'.C' + A'.B.C' + A.B.C' + A.B.C$

OR $G(A,B,C) = \Sigma(0,2,6,7)$

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

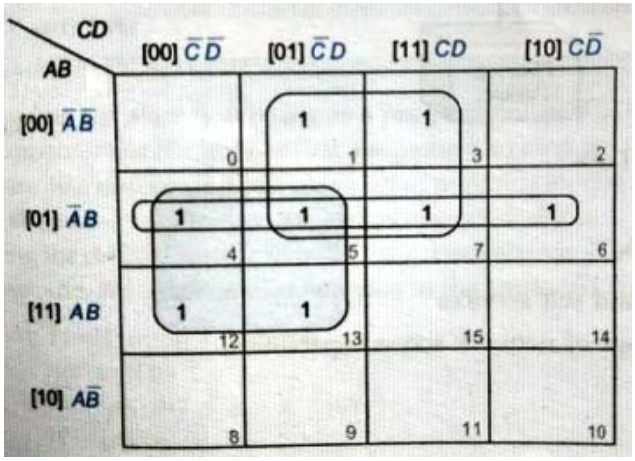
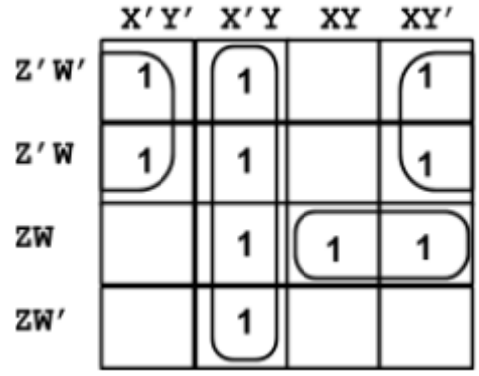
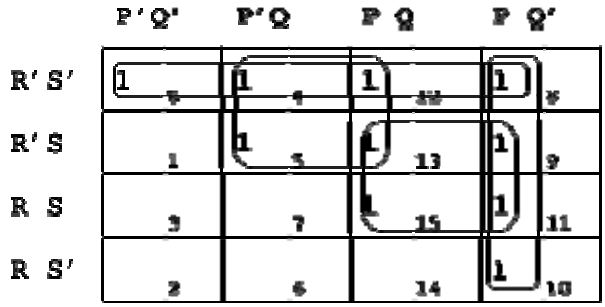
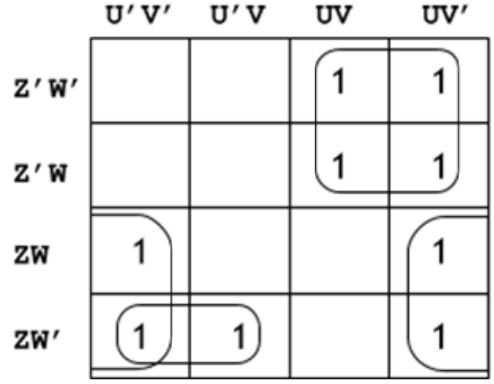
Ans $G(X,Y,Z) = (X+Y+Z).(X+Y+Z').(X+Y'+Z').(X'+Y'+Z)$

OR

$G(X,Y,Z) = \prod(0,1,3,6)$

(d) **3 Marks**

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

Ans	 Simplified Expression: F(A,B,C,D) = A'D + A'B + BC'
2015	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: F(X,Y,Z,W) = Y'Z' + X'Y + XZW
2016	Reduce the following Boolean Expression to its simplest form using K-Map: F(P,Q,R,S)= Σ (0,4,5,8,9,10,11,12,13,15)
Ans	 **F(P,Q,R,S) = R'S'+ PQ' + QR'+ PS**
2017	Reduce the following Boolean expression to its simplest form using K-Map: E(U,V,Z,W)=Σ(2,3,6,8,9,10,11,12,13)
Ans	 **E(U,V,Z,W)=UZ'+V'Z+U'ZW'**

QUESTION NO.7: (10 MARKS)

(a) **1 Mark**

2014 Write two characteristics of Wi-Fi.

Ans Wi-Fi is wireless network based on broadcast technology which is used to provide Network or Internet Access in a home, building or campus wirelessly.

1. It works within 50m to 100m.
2. It is convenient to use and supports secure communication network.

2015 Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks.

Ans

2016 Differentiate between PAN and LAN types of networks.

Ans

PAN	LAN
A personal area network - PAN - is a computer network organized around an individual person.	LAN interconnects a high number of access or node points or stations within a confined physical area upto a kilometer.

2017 Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies.

Ans

Optical Fibre

- Very Fast
- Expensive
- Immune to electromagnetic interference

Ethernet Cable -

- Slower as compared to Optical Fiber
- Less Expensive as compared to Optical Fiber
- prone to electromagnetic interference

(b) **1 Mark**

2014 What is the difference between E-mail and Chat ?

Ans The e-mail (Electronic mail) refers the sending and receiving message by computer in a Network or Internet. Chat or Internet chat refers to the instant broadcast of textual messages over the internet between the sender and receiver.

2015 What kind of data gets stored in cookies and how is it useful?

Ans When a Website with cookie capabilities is visited , its server sends certain information about the browser, which is stored in the hard drive as a text file. It's a way for the server to remember things about the visited sites.

2016 Which protocol helps us to transfer files to and from a remote computer?

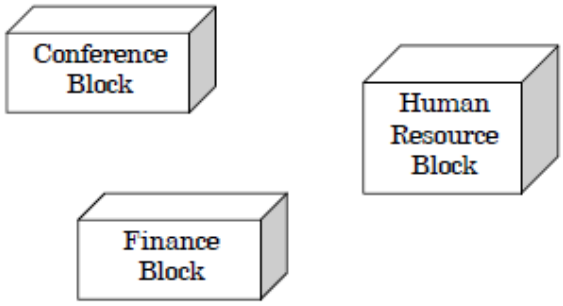
Ans **FTP OR Telnet OR TCP**

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
Ans	**(i) Computer Virus OR** **(iv) Trojan Horse** **Justification:** • Pen drive containing Computer Virus / Trojan Horse was used before the abnormal functioning started, which might have corrupted the system files. • Computer Virus/ Trojan Horse affects the system files and start abnormal functioning in the computer
(C)	**1 Mark**
2014	Expand the following : ◆GSM ◆ GPRS
Ans	**GSM** : Global System for Mobile Communications. **GPRS**: General Packet Radio Service
2015	Differentiate between packet switching over message switching?
Ans	**Packet Switching** – follows store and forward principle for fixed packets. Fixes an upper limit for packet size. **Message Switching**- follows store and forward principle for complete message. No limit on block size.
2016	Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services?
Ans	Speed - ● Faster web browsing ● Faster file transfer Service - ● Better video clarity ● Better security
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
Ans	**(i) Hacker** A Hacker is a person who breaks into the network of an organization without any malicious intent.
(d)	**1 Mark / (2 Mark-2017)**
2014	Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a video?
Ans	PAN
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
Ans	(i) Wired – Optical Fiber (ii) Wireless - Microwave
2016	Write two characteristics of Web 2.0.
Ans	● Makes web more interactive through online social medias ● Supports easy online information exchange ● Interoperability on the internet ● Video sharing possible in the websites
2017	--
(e)	**1 Mark / (2 Mark-2017)**
2014	Write names of any two popular Open Source Software, which are used as Operating Systems.
Ans	Linux, Free DOS
2015	What is Trojan Horse?
Ans	A Trojan Horse is a code hidden in a program, that looks safe but has hidden side effects typically causing loss or theft of data, and possible system harm.
2016	What is the basic difference between Computer Worm and Trojan Horse?
	<table><tr><td>Trojan Horse</td><td>Computer Worm</td></tr><tr><td>It is a "Malware" computer program presented as useful or harmless in order to induce the user to install and run them.</td><td>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.</td></tr></table>
2017	--
(f)	**1 Mark /(2 Mark)**
2014	Write any two important characteristics of Cloud Computing.
Ans	(i)On demand access of Software/Applications Services (ii) Wide range of network access and storage.
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.
Ans	(ii) & (iii)
2016	Categories the following under Client side and Server Side script category? (1) Java Script (2) ASP (3) VB Sript (4) JSP
Ans	Client Side Script : Java Script, VB Script Server Side Script : ASP, 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

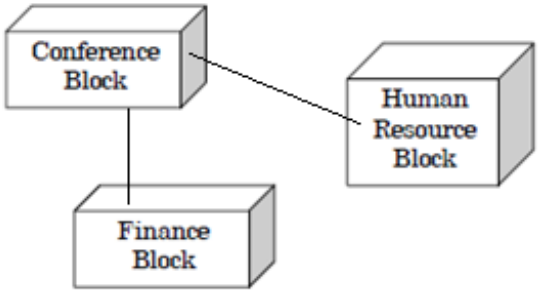
(i) What will most appropriate block, where TUC should plan to install their server ?

Ans Human Resources Block

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

Ans

Physical Locations of the blocks of TUC



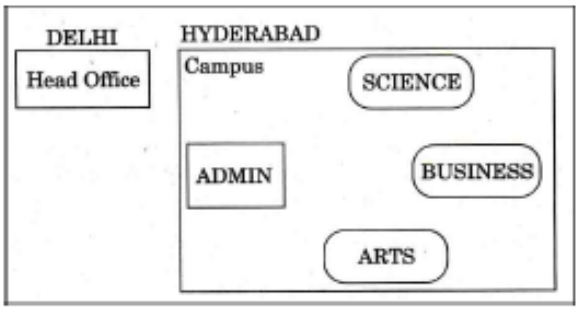
(iii) What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office ?
- Infrared
- Satellite Link
- Ethernet Cable

Ans Satellite Link

(iv) Which of the following devices will be suggested by you to connect each computer in each of the buildings?
- Gateway
- Switch
- Modem

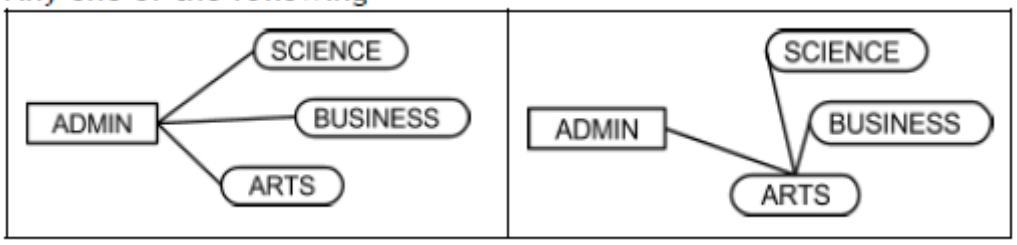
Ans Switch

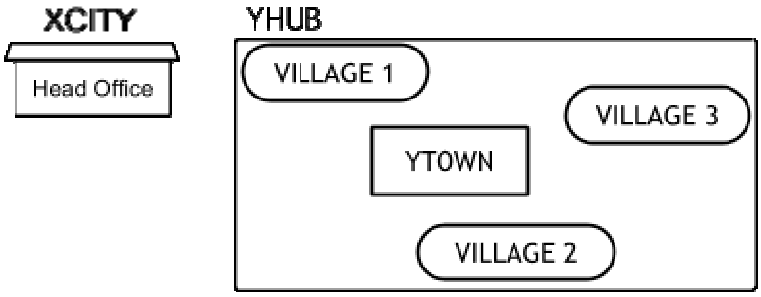
2015 Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and MEDIA.
You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.



Shortest distances between various locations:	
ADMIN to SCIENCE	65 M
ADMIN to BUSINESS	100M
ADMIN to ARTS	60M
SCIENCE to BUSINESS	75M
SCIENCE to ARTS	60M
BUSINESS to ARTS	50M
DELHI Head Office to HYDERABAD Campus	1600KM

Number of Computers installed	
ADMIN	100
SCIENCE	85
BUSINESS	40
ARTS	12
DELHI HEAD OFFICE	20

(i)	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.
Ans	ADMIN (due to maximum number of computers) OR ARTS (due to shorter distance from the other buildings)
(ii)	Suggest and draw the cable layout to efficiently connect various buildings 'within the HYDERABAD campus for connecting the computers.
Ans	Any one of the following 
(iii)	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?
Ans	Firewall OR Router
(iv)	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
Ans	Video Conferencing
2016	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.



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

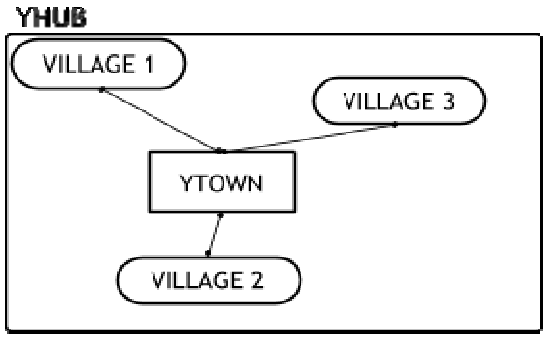
Note: In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.
The organization has got financial support from the government and top IT companies.

(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.

Ans Best location of the server is YTOWN . Justification:
- Since it has the maximum number of computers.
- It is closest to all other locations.

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

Ans Optical Fiber



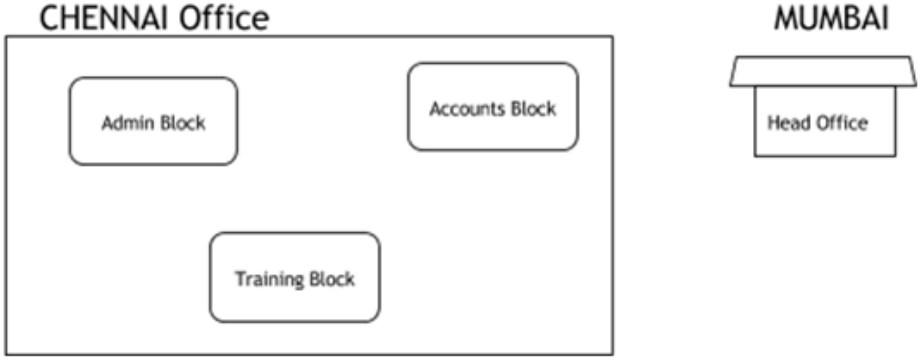
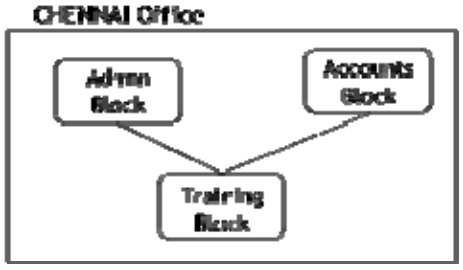
(iii) Which hardware device will you suggest to connect all the computers within each location of YHUB?

Ans Switch OR Hub

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

Ans Videoconferencing OR VoIP OR any other correct service/protocol

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: Admin Block to Account Block — 300 Metres Accounts Block to Training Block — 150 Metres Admin Block to Training Block — 200 Metres MUMBAI Head Office to CHENNAI Office — 1300 KM Number of computers installed at various blocks are as follows: Training Block — 150 Accounts Block — 30 Admin Block — 40
(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