CBSE AISSCE 2010 Marking Scheme for Computer Science

(Sub Code: 083 Paper Code 91 Outside Delhi)

General Instructions:

- The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions/Answers conveying the similar meaning
- All programming questions have to be answered with respect to C++ Language only
- In C++, ignore case sensitivity for identifiers (Variable/Functions/Structures/Class Names)
- In SQL related questions - both ways of text/character entries should be acceptable for Example: "AMAR" and 'amar' both are acceptable.
- In SQL related questions - all date entries should be acceptable for Example: 'DD-Mon-YY', "DD/MM/YY", 'DD/MM/YY', "MM/DD/YY", 'MM/DD/YY' and {MM/DD/YY} are correct.
- In SQL related questions - semicolon should be ignored for terminating the SQL statements
- In SQL related questions, ignore case sensitivity.

1	(a)	What is the difference between call by value and call by reference? Also, give a suitable C++ code to illustrate both.	2

	Ans	**Call by value: The formal parameter makes a copy of actual parameter. It does not make the changes in actual parameter if the changes are done in formal parameters.**
		
		Call by reference: The formal parameter is an alias of actual parameter. The changes made in the formal parameter are reflected in actual parameter. It is preceded by &.
		
		`void Calculate(int A,int &B )// A is call by value,`
		`{ // B is call by reference`
		`  A++;`
		`  B+=A;`
		`}`
		
		(½ Mark for each correct explanation of Call by value and Call by reference)
		(½ Mark for each correct example of Call by value and Call by reference)
		OR
		(Full 2 Marks for correct examples demonstrating the difference between Call by value and Call by reference)
		OR
		(Only 1 Mark to be awarded for Explanation given without supporting examples)	

	(b)	Which C++ header file(s) will be essentially required to be included to run/execute the following C++ code :
		
		`void main()`
		`{`
		`  int Rno=24; char Name[]="Amen Singhania";`
		`  cout<<setw(10)<<Rno<<setw(20)<<Name<<endl;`
		`}`
			1

Ans

```
iostream.h
iomanip.h
```

OR

```
iomanip.h - (As iostream.h is included in iomanip.h)
```

(½ Mark for writing each correct header file)
OR
(Full 1 Mark for mentioning only iomanip.h)
Note: Ignore any other header files, if mentioned.

(c) Rewrite the following C++ program code after removing the syntax errors(s) (if any). Underline each correction. 2

```
include <iostream.h>
class FLIGHT
{
  long FlightCode;
  char Description[25];
public
  void AddInfo()
  {
     cin>>FlightCode; gets(Description);
  }
  void ShowInfo()
  {
     cout<<FlightCode<<":"<<Description<<endl;
  }
};
void main()
{
  FLIGHT F;
  AddInfo.F(); ShowInfo.F();
}
```

Ans

```
#include <iostream.h>          // Error 1
#include <stdio.h>             // Error 2
class FLIGHT
{
  long FlightCode;
  char Description[25];
public :                       // Error 3
  void AddInfo()
  {
     cin>>FlightCode; gets(Description);
  }
  void ShowInfo()
  {
     cout<<FlightCode<<":"<<Description<<endl;
  }
};
void main()
{
  FLIGHT F;
  F.AddInfo(); F.ShowInfo();     // Error 4
}
```

not required if gets() is replaced with cin.getline() or cin

		(½ Mark for each correction) *OR* ***(1 mark for identifying at least three errors, without suggesting correction)***	
	(d)	Find the output of the following program:	3

		`#include<iostream.h>`
		`struct THREE_D`
		`{ int X,Y,Z;};`
		`void MoveIn(THREE_D &T,int Step=1)`
		`{`
		`  T.X+=Step;`
		`  T.Y-=Step;`
		`  T.Z+=Step;`
		`}`
		`void MoveOut(THREE_D &T,int Step=1)`
		`{`
		`  T.X-=Step;`
		`  T.Y+=Step;`
		`  T.Z-=Step;`
		`}`
		`void main()`
		`{`
		`  THREE_D T1={10,20,5},T2={30,10,40};`
		`  MoveIn(T1);`
		`  MoveOut(T2,5);`
		`  cout<<T1.X<<","<<T1.Y<<","<<T1.Z<<endl;`
		`  cout<<T2.X<<","<<T2.Y<<","<<T2.Z<<endl;`
		`  MoveIn(T2,10);`
		`  cout<<T2.X<<","<<T2.Y<<","<<T2.Z<<endl;`
		`}`	

	Ans	`11, 19, 6`
		`25, 15, 35`
		`35, 5, 45`
		
		(1 Mark for each line with correct values)
		OR
		(½ Mark for any two correct values in each line)
		Note:
		Deduct ½ Mark if any/all ',' missing
		Deduct ½ Mark if endl is not considered at the right positions	

	(e)	Find the output of the following program:	2

		`#include <iostream.h>`
		`#include <ctype.h>`
		`void MyCode(char Msg[],char CH)`
		`{`
		`  for (int Cnt=0;Msg[Cnt]!='\0';Cnt++)`
		`  {`
		`  if(Msg[Cnt]>='B' && Msg[Cnt]<='G')`
		`  Msg[Cnt]=tolower(Msg[Cnt]);`
		`  else`
		`  if(Msg[Cnt]=='A' || Msg[Cnt]=='a')`
		`  Msg[Cnt]=CH;`	

```
        else
        if(Cnt%2==0)
          Msg[Cnt]=toupper(Msg[Cnt]);
        else
          Msg[Cnt]=Msg[Cnt-1];
    }
}
void main()
{
    char MyText[]="ApEACeDriVE";
    MyCode(MyText,'@');
    cout<<"NEW TEXT:"<<MyText<<endl;
}
```

Ans

```
NEW TEXT :@@e@ccddIIe
```

(½ Mark for writing @,@,e as the first three characters)
(½ Mark for writing @,c,c as the next three characters)
(½ Mark for writing d,d,I as the next three characters)
(½ Mark for writing I,e as the next two characters)
Note:Deduct ½ Mark for not mentioning ***NEW TEXT :***

(f) The following code is from a game, which generates a set of 4 random numbers. Praful is playing this game, help him to identify the correct option(s) out of the four choices given below as the possible set of such members generated from the program code so that he wins the game. Justify your answer. **2**

```
#include <iostream.h>
#include <stdlib.h>
const int LOW=25;
void main()
{
  randomize();
  int POINT=5,Number;
  for (int I=1;I<=4;I++)
     {
       Number=LOW+random(POINT) ;
       cout<<Number<<":";
       POINT-- ;
     }
}
```

```
(i)   29:26:25:28:
(ii)  24:28:25:26:
(iii) 29:26:24:28:
(iv)  29:26:25:26:
```

Ans

```
(iv)  29:26:25:26:
```

Justification is as follows:

I	POINT	Number	
		Minimum	Maximum
1	5	25	29
2	4	25	28
3	3	25	27
4	2	25	26

The only option that satisfies these values is option (iv).

		(1 Mark for mentioning correct option) ***(1 Mark for any valid justification)*** ***Note: Only ½ Mark to be given if only options (i) & (iv) are mentioned as correct options; no other combination of options is acceptable;***	
2.	(a)	What do you understand by Data Encapsulation and Data Hiding? Also, give an example in C++ to illustrate both.	2

	Ans	**Data Encapsulation: Wrapping up of data and functions together in a single unit is known as Data Encapsulation. In a class, we wrap up the data and functions together in a single unit.**
		
		Data Hiding: Keeping the data in private/protected visibility mode of the class to prevent it from accidental change is known as Data Hiding.
		
		`class Computer`
		`{`
		`  char CPU[10] ;int RAM;  //Data Hiding`
		
		`public:  //Data Encapsulation`
		`  void STOCK();`
		`  void SHOW();`
		`};`
		
		(½ Mark for each correct explanation of Data Encapsulation and Data Hiding)
		(½ Mark for each correct example of Data Encapsulation and Data Hiding)
		
		OR
		(2 Marks for explaining the concept of the terms through suitable examples)
		
		OR
		(Only 1 Mark to be awarded for Explanation given without any example)	

	(b)	Answer the questions (i) and (ii) after going through the following class:	2

		`class Exam`
		`{`
		`  int Rno,MaxMarks,MinMarks,Marks;`
		`public:`
		`  Exam()  //Module 1`
		`  {`
		`  Rno=101; MaxMarks=100; MinMarks=40; Marks=75;`
		`  }`
		`  Exam(int Prno, int Pmarks)  //Module 2`
		`  {`
		`  Rno=Prno; MaxMarks=100; MinMarks=40; Marks=Pmarks;`
		`  }`
		`  ~Exam()  //Module 3`
		`  {`
		`  cout<<""Exam Over"<<endl;`
		`  }`
		`  void show()  //module 4`
		`  {`
		`  cout<<Rno<<":"<<Maxmarks<<":"<<MinMarks<<endl;`
		`  cout<<"[Marks Got]"<<Marks<<endl;`
		`  }`
		`};`	

	(i)	As per Object Oriented Programming, which concept is illustrated by Module 1 and Module 2 together?	
	Ans	**Polymorphism** **OR** **Constructor Overloading** **OR** **Function Overloading** ***(1Mark for mentioning the correct concept)***	
	(ii)	What is Module 3 referred as? When do you think, Module 3 will be invoked/called?	
	Ans	**Destructor. It is invoked as soon as the scope of the object gets over.** ***(½ Mark for identifying it as Destructor)*** ***(½ Mark for mentioning correctly when it be called/invoked)***	
	(c)	Define a class STOCK in C++ with following description: Private Member • ICode of type integer(Item Code) • Item of type string (Item Name) • Price of type float (Price of each item) • Qty of type integer (Quantity in stock) • Discount of type float (Discount percentage on the item) • A member function FindDisc() to calculate discount as per the following rule: If Qty<=50 Discount is 0 If 50<Qty<=100 Discount is 5 If Qty>100 Discount is 10 Public Members • A function Buy() to allow user to enter values for ICode,Item,Price,Qty and call function FindDisc() to calculate the Discount. • A function ShowAll() to allow user to view the content of all the data members.	4

	Ans	`class STOCK`
		`{`
		`  int ICode,Qty;`
		`  char Item[20];`
		`  float Price,Discount;`
		`  void FindDisc();`
		`public:`
		`  void Buy();`
		`  void ShowAll();`
		`};`
		`void STOCK::Buy()`
		`{`
		`  cin>>ICode;`
		`  gets(Item);`
		`  cin>>Price;`	

```
        cin>>Qty;
        FindDisc();
}
void STOCK:: FindDisc()
{
   if(Qty<=50)
      Discount=0;
   else if (Qty<=100)
      Discount=5;        // =0.05;
   else
      Discount=10;          // =0.1;
}
void STOCK:: ShowAll()
{
   cout<<ICode<<'\t'<<Item<<'\t'<<Price<<'\t'<<Qty
        <<'\t'<<Discount<<endl;
}
```

(½ Mark for correct syntax for class header)
(½ Mark for correct declaration of data members)
(1 Mark for correct definition of FindDisc())
(1 Mark for correct definition of Buy() with proper invocation of FindDisc() function)
(1 Mark for correct definition of ShowAll())
NOTE:
Deduct ½ Mark if FindDisc() is not invoked properly inside Buy() function

(d) Answer the questions (i) to (iv) based on the following: 4

```
class Director
{
    long DID;       // Director Identification Number
    char Name[20];
protected:
    char Description[40];
    void Allocate();
public:
    Director();
    void Assign();
    void Show();
};

class Factory:public Director
{
    int FID;        //Factory ID
    char Address[20];
protected:
    int NOE;        //No. of Employees
public:
    Factory();
    void Input();
    void Output();
};
```

		`class ShowRoom:private Factory`
		`{`
		`  int SID;  // Showroom ID`
		`  char City[20];`
		`public:`
		`  ShowRoom();`
		`  void Enter();`
		`  void Display();`
		`};`	

	i)	Which type of Inheritance out of the following is illustrated in the above C++ code ? (a) Single Level Inheritence (b) Multi Level Inheritence (c) Multiple Inheritence	
	Ans	**(b) Multilevel Inheritance** ***(1 Mark for mentioning correct option)***	
	ii)	Write the names of data members, which are accessible by objects of class type ShowRoom.	
	Ans	`None` ***(1 Mark for correct answer)*** ***Note: No marks to be awarded for any partial /alternative answer***	
	iii)	Write the names of all member functions which are accessible by objects of class type ShowRoom.	
	Ans	`Enter(), Display()` ***(1 Mark for correct answer)*** ***Note:*** ***No marks to be awarded for any partial / alternative answer*** ***Ignore mention of Constructor(s)***	
	iv)	Write the names of all members, which are accessible from member functions of class Factory.	

	Ans	`FID, Address, NOE, Description,`
		`Input(),Output(), Assign(),Show(), Allocate()`
		(1 Mark for correct answer)
		Note:
		No marks to be awarded for any partial / alternative answer
		Ignore mention of Constructor(s)	

3	(a)	Write a function REASSIGN() in C++, which accepts an array of integers and its size as parameters and divide all those array elements by 5 which are divisible by 5 and multiply other array elements by 2.	3

Sample Input Data of the array

A[0]	A[1]	A[2]	A[3]	A[4]
20	12	15	60	32

Content of the array after calling REASSIGN() function

A[0]	A[1]	A[2]	A[3]	A[4]
4	24	3	12	64

Ans

```
void REASSIGN(int Arr[ ],int Size)
{
   for (int i=0;i<Size;i++)
      if(Arr[i]%5==0)
         Arr[i]/=5;
      else
         Arr[i]*=2;
}
```

OR

```
void REASSIGN(int Arr[ ],int Size)
{
   for (int i=0;i<Size;i++)
      Arr[i]%5 ? Arr[i]/=5 : Arr[i]*=2;
}
```

OR

Any other correct equivalent function definition

(½ Mark for correct Function Header)
(½ Mark for correct loop)
(½ Mark for correct checking of divisibility of array elements by 5)
(½ Mark for correct placing of else OR correct checking of non divisibility of array elements by 5)
(½ Mark for each correct assignment)

(b) An array T[90][100] is stored in the memory along the column with each of the elements occupying 4 bytes. Find out the memory location for the element T[10][40], if the Base Address of the array is 7200. **3**

Ans

```
Loc(T[I][J])    = Base(T)+W(I+J*N)
                (where N is the number of rows, LBR = LBC = 0)
                = 7200 + 4[10 + 40 x 90]
                = 7200 + 4[10+3600]
                = 7200 + 4 x 3610
                = 7200 + 14440
                = 21640
```

OR

```
Address of T[I][J] along the column
                =BaseAddress + W [( I - LBR)  + (J - LBC) * N]
                 (where N is the number of rows, LBR = LBC = 1)
Address of T[10][40]=BaseAddress + 4[ (10 - 1) +(40 - 1)x 90]
                =7200+4[9 + 39 x 90]
                =7200+4[9 + 3510]
                =7200+4 x 3519
                =7200+14076
                =21276
```

		(1 Mark for writing correct formula (for column major) OR substituting formula with correct values for calculating Address) ***(2 marks for calculating correct address)***	
	(c)	Write a complete program in C++ to implement a dynamically allocated Queue containing names of Cities.	4

	Ans	`#include <iostream.h>`
		`#include <conio.h>`
		`struct NODE`
		`{`
		`  char City[20];`
		`  NODE *Next;`
		`};`
		`class Queue`
		`{`
		`  NODE *Rear,*Front;`
		`public:`
		`  Queue(){Rear=NULL;Front=NULL;}`
		`  void Qinsert();`
		`  void Qdelete();`
		`  void Qdisplay();`
		`  ~Queue();`
		`};`
		
		`void Queue::Qinsert()`
		`{`
		`  NODE *Temp;`
		`  Temp=new NODE;`
		`  cout<<"Data:";`
		`  gets(Temp->City);`
		`  Temp->Next=NULL;`
		`  if (Rear==NULL)`
		`  {`
		`  Rear=Temp;`
		`  Front=Temp;`
		`  }`
		`  else`
		`  {`
		`  Rear->Next=Temp;`
		`  Rear=Temp;`
		`  }`
		`}`
		
		`void Queue::Qdelete()`
		`{`
		`  if (Front!=NULL)`
		`  {`
		`  NODE *Temp=Front;`
		`  cout<<Front->City<<"Deleted \n";`
		`  Front=Front->Next;`
		`  delete Temp;`
		`  if (Front==NULL) Rear=NULL;`
		`  }`
		`  else`
		`  cout<<"Queue Empty..";`
		`}`	

```
Queue::Qdisplay()
{
  NODE *Temp=Front;
  while(Temp!=NULL)
  {
    cout<<Temp->City<<endl;
    Temp=Temp->Next;
  }
}

Queue::~Queue()//Destructor Function
{
  while (Front!=NULL)
  {
    NODE *Temp=Front;
    Front=Front->Next; delete Temp;
  }
}

void main()
{
  Queue QU; char Ch;
  do
  {
    :
    :
  }while (Ch!='Q');
}
```

(4 Marks for correct program)

OR
(Full 4 Marks for correct logic of <u>either</u> Insertion OR Deletion functions for Dynamically Allocated Queue.)

OR
(2 Marks for defining class with Constructor, function prototypes for Insertion & deletion and Destructor or equivalent using Structures.)

(d) Write a function int ALTERSUM (int B[][5], int N, int M) in C++ to find and return the sum elements from all alternate elements of a two-dimensional array starting from B[0][0]. **2**

Hint : If the following is the content of the array:

B[0][0]	B[0][1]	**B[0][2]**
4	5	**1**
B[1][0]	**B[1][1]**	B[1][2]
2	**8**	7
B[2][0]	B[2][1]	**B[2][2]**
9	6	**3**

The function should add elements B[0][0],B[0][2],B[1][1],B[2][0] and B[2][2].

Ans

```
//Sample Code 1
int ALTERSUM(int B[][5],int N,int M)
{
  int Sum=0;
  for (int I=0;I<N;I++)
    for (int J=(I%2==0)?0:1;J<M;J+=2)
      Sum+=B[I][J];
  return Sum;
}

OR
//Sample Code 2
int ALTERSUM(int B[][5],int N,int M)
{
  int Sum=0,J=0;
  for (int I=0;I<N;I++)
  {
    for (;J<M;J+=2)
      Sum+=B[I][J];
    J-=M;
  }
  return Sum;
}

OR
//Sample Code 3
int ALTERSUM(int B[][5],int N,int M)
{
  int *P=&B[0][0],Sum=0;
  for (int I=0;I<M*N;I+=2)
  {
    Sum+=(*P);
    P+=2;
  }
  return Sum;
}

OR
//Sample Code 4
int ALTERSUM (int B[][5], int N, int M)
{
   int S=0, C=0;
   for(int I = 0; I< N; I++)
      for (int J = 0; J<M; J++ )
      {
         if (C%2 == 0)
            S = S + B[I][J];
         C++;
      }
   return S;
}
```

OR

```
//Sample Code 5
int ALTERSUM(int B[][5],int N,int M)
{
  int Sum=0;
  for (int I=0;I<N;I++)
    for (int J=0;J<M;J++)
      if ((I+J)%2==0)
        Sum+=B[I][J];
  return Sum;
}
```

OR

```
//Sample Code 6
int ALTERSUM(int B[][5],int N,int M)
{
  int Sum=0;
  for (int I=0;I<N;I++)
    for (int J=0;J<M;J++)
    {
      if ((I%2==0 && J%2==0) ||  (I%2!=0 && J%2!=0))
        Sum+=B[I][J];
    }
  return Sum;
}
```

Note: Kindly note Sample Code 5 and 6 will not work in case of Even Dimensional Arrays, but keeping in view of the Sample given for 3x3 array - the solution is acceptable.

(½ Mark for correct loops)
(1 Mark for finding Sum of alternate cells)
(½ Mark for returning the Sum)

(e) Evaluate the following postfix notation of expression : (Show status of Stack after each operation) — 2

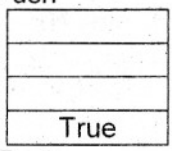
`True, False, NOT, OR, False, True, OR, AND`

Ans

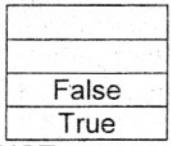
Element Scanned	Stack Content
True	True
False	True, False
NOT	True, True
OR	True
False	True, False
True	True, False, True
OR	True, True
AND	True

OR

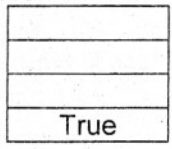
Step 1: Push



Step 2: Push

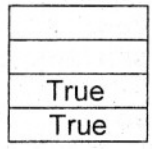


Step 3: NOT

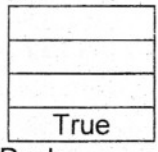


Pop
Op2=False

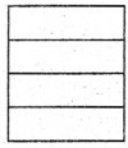
Push



Step 4: OR

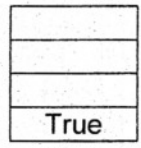


Pop
Op2=True

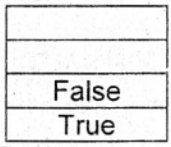


Pop
Op1=True
Op2=True

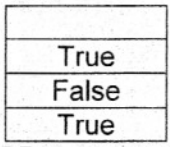
Push



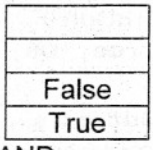
Step 5: Push



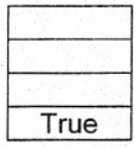
Step 6: Push



Step 7: OR

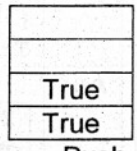


Pop
Op2=True

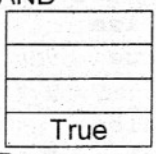


Pop
Op1=False
Op2=True

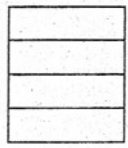
Push



Step 8: AND

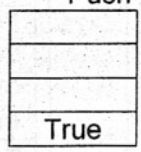


Pop
Op2=True

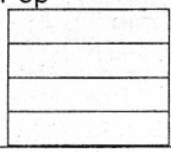


Pop
Op1=True
Op2=True

Push



Step 9: Pop



Result
True

OR
Any other method for evaluating the given postfix expression showing the Stack Status.

(½ Mark for correctly evaluating expression up to each operator)
OR
(1 Mark only to be given for writing correct answer without showing the Stack Status)

4 (a) Observe the program segment given below carefully and fill the blanks marked as Statement 1 and Statement 2 using tellg() and seekp() functions for performing the required task. 1

```
#include <fstream.h>
class Customer
{
  long Cno; char Name[20],Mobile[12];
public:
    //Function to allow user to enter the Cno,Name,Mobile
    void Enter();
    //Function to allow user to enter (modify) mobile number
    void Modify();
    //Function to return value of Cno
    long GetCno()    {return Cno;}
};
void ChangeMobile()
{
   Customer C;
   fstream F;
   F.open("CONTACT.DAT",ios::binary|ios::in|ios::out);
   long Cnoc;//Customer no. whose mobile number needs to be changed
   cin>>Cnoc;
   while(F.read((char*)&C,sizeof(C)))
   {
      if(Cnoc==C.GetCno())
       {
         C.Modify();
                          //Statement 1
        int Pos=_____//To find the current position of file pointer
                          //Statement 2
                _________//To move the file pointer to write the
                          //modified record back onto the file
                          //for the desired Cnoc
        F.write((char*)&C,sizeof(C));
       }
     }
   F.close();
}
```

Ans

```
Statement 1:
File.tellg();
Statement 2:
File.seekp(Pos-sizeof(C));
```

OR

```
File.seekp(-1*sizeof(C),ios::cur);
```

(½ Mark for each correct Statement)

	(b)	Write a function in C++ to count the words "to" and "the" present in a text file "POEM.TXT". [Note that the words "to" and "the" are complete words]	2

Ans

```
void COUNT()
{
      ifstream Fil;
      Fil.open("POEM.TXT");
      char Word[80];
      int C1 = 0, C2 = 0;
      while(!Fil.eof())
      {
            Fil>>Word;
            if(strcmp(Word, "to")==0)
                  C1++;
            else if(strcmp(Word, "the")==0)
                  C2++;
      }
      cout<<"Count of -to- in file:"<<C1;
      cout<<"Count of -the- in file:"<<C2;
```

OR `ifstream Fil("POEM.TXT");`

OR `cout<<"Count of -to- and -the- in file:"<<C1+C2;`

```
      Fil.close(); //Ignore
}
```

OR

```
void COUNT()
{
   ifstream Fil("POEM.TXT");

   //OR fstream Fil;
   //   Fil.open("POEM.TXT",ios::in);
   char STR[10];
   int C1=0, C2=0;
   while(Fil.getline(STR,10, ' '))
   {
      if(strcmp(STR, "to")==0)
          C1++;
      else if(strcmp(STR, "the")==0)
           C2++;
   }
      cout<<"Count of -to- in file:"<<C1;
      cout<<"Count of -the- in file:"<<C2;
```

OR `cout<<"Count of -to- and -the- in file:"<<C1+C2;`

```
   Fil.close();//Ignore
}
```

OR

```
void COUNT()
{
      ifstream Fil;
      Fil.open("POEM.TXT");
      char Word[80],Ch;
      int C1 =0, C2=0, I=0;
      while(Fil.get(Ch))
      {
            if(Ch!= ' ')
               Word[I++] = Ch;
            else
            {
               Word[I] = '\0';
               if(strcmp(Word, "to")==0)
                  C1++;
               else if(strcmp(Word, "the")==0)
                  C2++;
               I=0;
            }
      }
      cout<<"Count of -to- in file:"<<C1;
      cout<<"Count of -the- in file:"<<C2;
      Fil.close();  //Ignore
}
```

OR ifstream Fil("POEM.TXT");

OR cout<<"Count of -to- and -the- in file:"<<C1+C2;

OR

Any other correct function definition

(½ Mark for opening POEM.TXT correctly)
(½ Mark for reading each word (using any method) from the file)
(½ Mark for comparing the word with 'to' and 'the')
(½ Mark for incrementing counter(s))

(c) Write a function in C++ to search and display details of all trains, whose destination is "Delhi" from a binary file "TRAIN.DAT". Assuming the binary file is containing the objects of the following class. **3**

```
class TRAIN
{
  int  Tno;            //Train Number
  char From[20];       //Train Starting Point
  char To[20];         //Train Destination
public:
   char* GetFrom(){return From;}
   char* GetTo()  {return To;}
   void  Input()  {cin>>Tno;gets(From);gets(To);}
   void  Show()   {cout<<Tno<<":"<<From<<":"<<To<<endl;}
};
```

Ans

```
void Read()
{
   TRAIN T;
   ifstream fin;
   fin.open("TRAIN.DAT", ios::binary);
                    OR  ifstream fin("TRAIN.DAT", ios::binary);
   while(fin.read((char*)&T, sizeof(T)))
   {
      if(strcmp(T.GetTo(),"Delhi")==0)
         T.Show();
   }
   fin.close(); //Ignore
}
```

OR
Any other correct function definition

(½ Mark for opening TRAIN .DAT correctly)
(½ Mark for reading each record from TRAIN.DAT)
(½ Mark for correct loop / checking end of file)
(1 Mark for comparing value returned by GetTo() with "Delhi")
(½ Mark for displaying the matching record)

5 (a) What do you understand by Primary Key? Give a suitable example of Primary key from a table containing some meaningful data. 2

Ans

An attribute or set of attributes which are used to identify a tuple uniquely is known as Primary Key

Table:Item

Ino	Item	Qty
I01	Pen	[illegible]
I02	Pencil	780
I04	CD	450
I09	Floppy	700

PRIMARY KEY

(1 Mark for writing correct definition/purpose of valid Primary Key)
(1 Mark for giving suitable example)
OR
(2 Marks for illustrating the purpose of Key with/without showing it as a part of a Table)

(b) Consider the following tables STOCK and DEALERS and answer (b1) and (b2) parts of this question: 6

Table:STOCK

ItemNO	Item	Dcode	Qty	UnitPrice	StockDate
5005	Ball Pen 0.5	102	100	16	31-Mar-10
5003	Ball Pen 0.25	102	150	20	01-Jan-10
5002	Gel Pen Premium	101	125	14	14-Feb-10
5006	Gel Pen Classic	101	200	22	01-jan-09
5001	Eraser Small	102	210	5	19-Mar-09
5004	Eraser Big	102	60	10	12-Dec-09
5009	Sharpener Classic	103	160	8	23-Jan-09

Table: DEALERS

Dcode	Dname
101	Reliable Stationers
103	Classic Plastics
102	Clear Deals

(b1) Write SQL commands for the following statements :

(i) To display details of all Items in the Stock table in ascending order of StockDate.

Ans
```
SELECT * FROM STOCK ORDER BY StockDate;
```
(1 Mark for correct query)
(½ Mark for partially correct answer)

(ii) To display ItemNo and Item name of those items from Stock table whose UnitPrice is more than Rupees 10.

Ans
```
SELECT ItemNo,Item FROM STOCK WHERE UnitPrice >10;
```
(1 Mark for correct query)
(½ Mark for partially correct answer)

(iii) To display the details of those items whose dealer code (Dcode) is 102 or Quantity in Stock(Qty) is more than 100 from the table Stock.

Ans
```
SELECT * FROM STOCK WHERE Dcode=102 OR Qty >100;
```
(1 Mark for correct query)
(½ Mark for partially correct answer)

(iv) To display maximum UnitPrice of items for each dealer individually as per Dcode from the table Stock.

Ans
```
SELECT Dcode, MAX(UnitPrice) FROM STOCK GROUP BY Dcode;

OR
Any other query that will give an equivalent output
```
(1 Mark for correct query)
(½ Mark for partially correct answer)

(b2) Give the output of the following SQL queries:

Note: In all output questions ignore Column Headings

(i)
```
SELECT COUNT(DISTINCT Dcode) FROM Stock;
```

Ans

Count(DISTINCT Dcode)
3

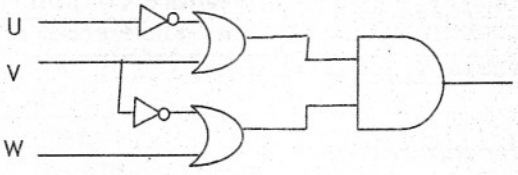
(½ Mark for correct output)

(ii)
```
SELECT Qty*UnitPrice FROM Stock WHERE ItemNo=5006;
```

Ans

Qty*UnitPrice
4400

(½ Mark for correct output)

		(iii)	SELECT Item,Dname FROM Stock S, Dealers D WHERE S.Dcode=D.Dcode AND ItemNo=5004;	
		Ans	Item Dname Eraser Big Clear Deals *(½ Mark for correct output)*	
		(iv)	SELECT MIN(StockDate) FROM Stock;	
		Ans	MIN(StockDate) 01-Jan-09 *(½ Mark for correct output)*	
6	(a)	Verify the following algebraically: X'Y+X.Y'=(X'+Y').(X+Y)		2
	Ans	R.H.S (X'+Y').(X+Y) = X'.(X+Y)+Y'.(X+Y) = X.X'+X'.Y+Y'.X+Y'.Y = X'.Y+Y'.X = X'.Y+X.Y' So L.H.S=R.H.S OR L.H.S. X'.Y + X.Y' = (X'.Y+X)(X'.Y+Y') = (X'+X).(Y+X).(X'+Y').(Y+Y') = 1.(X+Y).(X'+Y').1 = (X+Y).(X'+Y') = R.H.S.		
		(2 Marks for correct verification)		
	(b)	Write the equivalent Boolean Expression for the following Logic Circuit :  		2
	Ans	(U'+V).(V'+W) *(2 Marks for the final expression (U'+V).(V'+W))* *OR* *(1 Mark for any one of the correct terms out of (U'+V) or (V'+W))*		

(c) Write the SOP form of a Boolean function G, which is represented in a truth table as follows : 1

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

Ans $G(P,Q,R)=P'.Q.R'+P'.Q.R+P.Q'.R'+P.Q.R'+P.Q.R$

OR

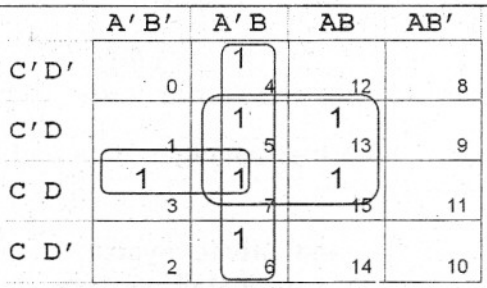
$G(P,Q,R) = \Sigma(2,3,4,6,7)$

(1 Mark for the correct SOP form)
Note: Deduct ½ mark if wrong variable names are used

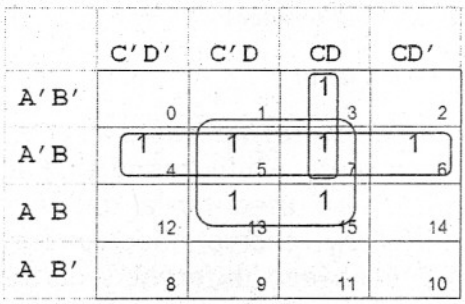
(d) Reduce the following Boolean Expression using K-Map: 3

$F(A,B,C,D) = \Sigma(3,4,5,6,7,13,15)$

Ans



OR



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

		(½ Mark for drawing K-Map with correct variable names) *(½ Mark for placing all 1s at correct positions in K-Map)* *(½ Mark for each grouping)* *(½ Mark for writing final expression in reduced/minimal form)*	
7.	(a)	What was the role of ARPANET in the Computer Network?	1
	Ans	**The first computer network was jointly designed by The Advanced Research Projects Agency (ARPA) and Department of Defence (DoD) of United States in 1969 and was called ARPANET. It was an experimental project, which connected a few computers from some of the reputed universities of USA and DoD. ARPANET allowed access to computer resource sharing projects. This ARPANET was handed over to Defence Communication Agency (DCA) for further development.**	
		(1 Mark for mentioning that ARPANET was the first computer network) *OR* *(½ Mark if only the expansion of ARPANET is mentioned)*	
	(b)	Which of the following is not a unit for data transfer rate ?	1
		(i) mbps (ii) kbps (iii) sbps (iv) gbps	
	Ans	**(iii) sbps** *(1Mark for the correct option/answer)*	
	(c)	What is the difference between Virus and Worms in the computers?	1
	Ans	**Virus: Virus is a malicious program that damages data and files and causes harm to computer system.** **Worms: Worms disrupt services and create system management problems. In some cases worms can install viruses that cause damage to system.** *(1 Mark for mentioning any one valid difference)* *OR* *(½ Mark for correct definition of each term)*	
	(d)	What term do we use for a software/hardware device, which is used to block unauthorized access while permitting authorized communications? This term is also used for a device or set of devices configured to permit, deny, encrypt, decrypt, or proxy all (in and out) computer traffic between different security domains based upon a set of rules and other criteria.	1
	Ans	**Firewall** *(1 Mark for writing correct term)*	

(e) "Vidya for All" is an educational NGO. It is setting up its new campus at Jaipur for its web-based activities. The campus has four buildings as shown in the diagram below :

Center to center distances between various buildings as per architechtural drawings(in meters) is as follows :

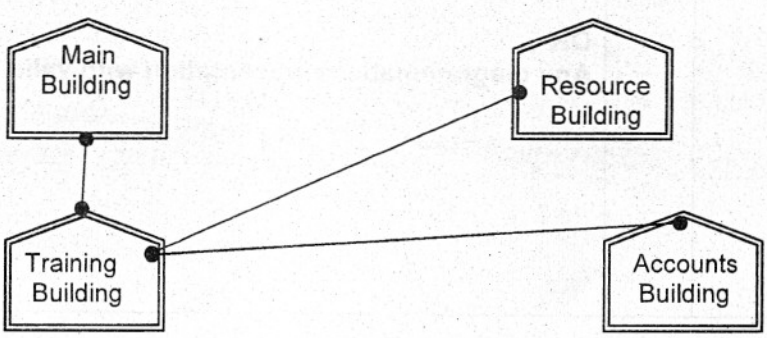
Main Building to Resource Building	120 m
Main Building to Training Building	40 m
Main Building to Accounts Building	135 m
Resource Building to Training Building	125 m
Resource Building to Accounts Building	45 m
Training Building to Accounts Building	110 m

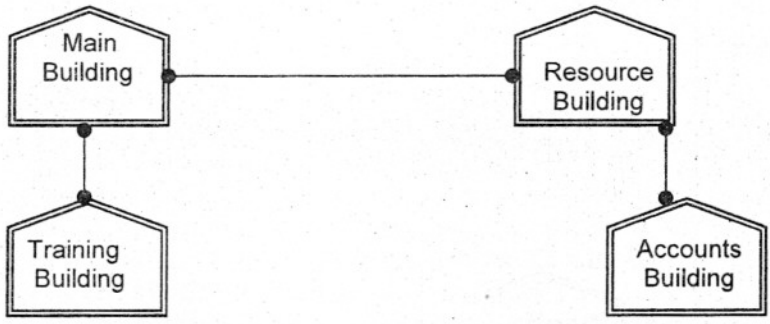
Expected number of Computers in each Building is as follows :

Main Building	15
Resource Building	25
Training Building	250
Accounts Building	10

(e1) Suggest a cable layout of connections between the buildings. 1

Ans



			OR  ***(1 Mark for mentioning any valid connectivity or topology or diagram connecting various buildings inside the campus)***	
		(e2)	Suggest the most suitable place (i.e. building) to house the server of this NGO. Also, provide a suitable reason for your suggestion.	1
		Ans	**Training Building as it contains maximum number of computers.** ***(½ Mark for mentioning the building)*** ***(½ Mark for correct justification)*** ***OR*** ***(1 Mark for any other location with a valid justification)***	
		(e3)	Suggest the placement of the following devices with justification : (i) Repeater (ii) Hub/Switch	1
		Ans	**(i) A Repeater should be placed when the distance between any two connecting buildings exceeds 70 m.** **(ii) Every building will need one Hub / Switch, to send signals to all of the workstations connected to it** **OR** **Any diagrammatic representation with valid justification**	

			(½ Mark for correct placement of Repeater with justification) ***(½ Mark for correct placement of Hub/Switch with justification)***	
		(e4)	The NGO is planning to connect its International office situated in Delhi. Which out of the following wired communication links, will you suggest for very high speed connectivity? (i) Telephone Analog Line (ii) Optical Fibre (iii) Ethernet Cable	1
		Ans	**(ii) Optical Fibre** ***(1 Mark for correct Option / Answer)***	
		(f)	**Write the full forms of the following:** **(f1) FTP** **(f2) FSF**	1
		Ans	**(f1) FILE TRANSFER PROTOCOL** **(f2) FREE SOFTWARE FOUNDATION** ***(½ Mark for each full form)***	
		(g)	**Name any two common Web browsers.**	1
		Ans	**Internet explorer** **Firefox** **Netscape** **Chrome** **Opera** **Safari** **OR any other Web Browser** ***(½ Mark each for any two web browsers)***	