COMPUTER SCIENCE

Time allowed : 3 hours   *Maximum Marks : 70*

> *Instructions:*
>
> *(i)* **All** *questions are compulsory.*
>
> *(ii)* *Programming Language: C++*

QUESTION PAPER CODE 91/1

1. (a) What is the difference between Local Variable and Global Variable?
         Also, give a suitable C++ code to illustrate both.   2

    (b) Write the names of the header files, which is/are essentially required to run/
         execute the following C++ code:

         void main ( )

         {

                 char C, String [ ] = "Excellence Overload";

                 for (int I=0; String [I] ! = '\ 0'; I ++)

                 if (String [I] ==' ')

                         cout<<end1;

                 else

                 {

                         C=toupper(String[I]);

                         cout<<C ;

                 }

         }

    (c) Rewrite the following program after removing the syntactical errors (if any).
         Underline each correction.   2

         #include[iostream.h]

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```
typedef char Text(80) ;

void main ( )

{
        Text T= "Indian";

        int Count=strlen(T) ;

        cout<<T<<'has'<<Count<< 'characters' <<end1;

}
```

(d)   Find the output of the following program: 3

```
#inc1ude<iostream.h>

void ChangeArray(int Number, int ARR[ ], int Size)

{
        for (int L =0; L<Size; L++)

        if (L<Number)

                ARR [L] +=L;

        e1se

                ARR [L] *=L;

}

void Show (int ARR [ ], int Size)

{
        for (int L=0; L<Size; L++)

                (L%2!=0) ?cout<<ARR[L] <<"#": cout<<ARR[L]<<end1 ;

}

void main ( )

{
        int Array [ ] = {30, 20, 40, 10, 60, 50};

        ChangeArray (3, Array, 6) ;

        Show (Array, 6) ;

}
```

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

```
#include<iostream.h>
void main ( )
{
        int Track [ ] = {10, 20, 30, 40}, *Striker ;
        Stxiker=Track :
        Track [1] += 30 ;
        cout<<"Striker>"<<*Striker<<end1 ;
        Striker – =10 ;
        Striker++ ;
        cout<<"Next@"<<*Striker<<end1 ;
        Striker+=2 ;
        cout<<"Last@"<<*Striker<<end1 ;
        cout<< "Reset To" <<Track[0] <<end1 ;
}
```

(f) Go through the C++ code shown below, and find out the possible output or
     outputs from the suggested Output Options (i) to (iv). Also, write the least
     value and highest value, which can be assigned to the variable Guess.   2

```
#include <iostream.h>
#include <stdlib.h>
void main ( )
{
        randomize ( );
        int Guess, High=4;
        Guess=random{High)+ 50 ;
        for{int C=Guess ; C<=55 ; C++)
        cout<<C<<"#" ;
```

```
}
```

(i)   50 # 51 # 52 # 53 # 54 # 55 #

(ii)   52 # 53 # 54 # 55

(iii)   53 # 54 #

(iv)   51 # 52 # 53 # 54 # 55

2. (a) Differentiate between members, which are present within the private visibility
         mode with those which are present within the public visibility modes.   2

    (b) Write the output of the following C++ code. Also. write the name of feature
         of Object Oriented Programming used in the following program jointly
         illustrated by the function [I] to [IV].   2

```
#include<iostream.h>

void Print ( )              // Function [I]

{
        for (int K=1 ; K<=60 ; K++) cout<< "-" ;

                cout<<end1 ;

}
void Print (int N)          // Function [II]

{
        for (int K=1 ; K<=N ; L++) cout<<"*" ;

                cout<<end1 ;

}
void Print (int A, int.B)    // Function [III]

{
        for (int K=1. ;K<=B ;K++) cout <<A*K ;

                cout<<end1 ;

}
void Print (char T, int N)   // Function [IV]
```

```
{
        for (int K=1 ; K<=N ; K++) cout<<T ;

                cout<<end1;

}

void main ( )

{

                int U=9, V=4, W=3;

                char C='@' ;

                Print (C,V) ;

                Print (U,W) ;

}
```

(c) Define a class Candidate in C++ with following description: 4

Private Members

- A data member RNo (Registration Number) of type long

- A data member Name of type string

- A data member Score of type float

- A data member Remarks of type string

- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score	Remarks
>=50	Selected
less than 50	Not selected

Public Members

- A function ENTER ( ) to allow user to enter values for RNo, Name, Score & call function AssignRem( ) to assign the remarks.

- A function DISPLAY ( ) to allow user to view the content of all the data members.

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

class Strident

(

        int Rno;

        char Name [20] ;

        float Marks;

protected:

        void Result( ) ;

public:

        Student( ) ;

        void Register( ); void Display( ) ;

} ;

class Faculty

{

        long FCode;

        char FName[20];

protected:

        float Pay;

public :

        Faculty ( ) ;

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course : public Student, private Faculty

{

        long CCode [10]; char CourseName [50] ;

        char StartDate[8], EndDate[8] ;

public :

    Course ( ) ;

    void Commence ( ) ;

    void CDetail ( ) ;

} ;

(i)   Which type of inheritance is illustrated in the above C++ code?

(ii)   Write the names of the all data members, which is/are accessible from member function Commence of class Course.

(iii)   Write the names of member functions, which are accessible from objects of class Course.

(iv)   Write the name of all the members, which are accessible from objects of class Faculty.

3   (a)   Write a Get1From2 ( ) function in C++ to transfer the content from two arrays FIRST[ ] and SECOND[ ] to array ALL[ ]. The even places (0, 2, 4, ...) of array ALL[ ] should get the content from the array FIRST[ ] and odd places (1, 3, 5,   ) of the array ALL[] should get the content from the array SECOND[ ].   3

Example:

If the FIRST[ ] array contains

30, 60, 90

And the SECOND[ ] array contains

10, 50, 80

The ALL[ ] array should contain

30, 10, 60, 50, 90, 80

(b)   An array P[20] [50] is stored in the memory along the column with each of its element occupying 4 bytes, find out the location of P[15][10], if P[0][0] is stored at 5200.   3

(c)   Write a function in C++ to perform Insert: operation on a dynamically allocated Queue containing Passenger details as given in the following definition of NODE.   4

struct NODE

{

    long Pno;   //passenger Number

    char Pname[20] ; //passenger Name

    NODE *Link.;

} ;

(d)   Write a COLSUM( ) function in C++ to find sum of each column of a NxM Matrix.   2

(e)   Evaluate the following postfix notation of expression: 2

    50, 60, + , 20, 10, -, *

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

#include<fstream.h>

class PRODUCT

{

    int Pno; char Pname[20]); int Qty;

public :

    void ModifyQty( ) ;

    // The function is to modify quantity of a PRODUCT

} ;

void PRODUCT: :ModifyQty ( )

{

    fstream File ;

    Fil.open ("PRODUCT.DAT", ios::binary |ios : : in| ios: :out) ;

    int MPno;

```
        cout<<"Product No to modify quantity : "; cin>>MPNo;

        While (Fil.read ((char*) this, sizeof (PRODUCT))

        {

                if (MPno == Pno)

                {

                Cout<<"Present Quantity:"<<Qty<<end1 ;

                cout<<"Changed Quantity:";cin>>Qty ;

                int Position = _____;  //Statement 1

                _____; // Statement 2

                Fil.write ((char*) this, sizeof (PRODUCT)) ;

                                        //Re-writing the record

                }

        }

        Fil.close ( ) ;

}
```

(b)   Write a function in C++ to count the no. of "Me" or "My" words present in a
      text file "DIARY. TXT".   2

      If the file "DIARY.TXT" content is as follows:
      My first book was Me and My
      family. It gave me chance to be
      known to the world.

      The output of the function should be
      Count of Me/My in file : 4

(c)   Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT"
      containing the objects of class LAPTOP (as defined below). The user should
      enter the Model No and the function should search and
      display the details of the laptop.   3

      class LAPTOP

      {

```
        long ModelNo ;

        float RAM, HDD ;

        char Details [120] ;

public:

        void StockEnter ( )

        {cin>>ModelNo>>RAM>>HDD; gets (Details);}

        void StockDisplay ( )

        {cout<<ModelNo<<RAM<<HDD<<Details<<endl;}

        long ReturnModelNo ( ) {return ModelNo ;}

};
```

5   (a)   What do you understand by Union & Cartesian Product operations in relational algebra?   2

Consider the following tables WORKER and PAYYLEVEL and answer (b) and (c) parts of this question: 4

Table: WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13- Sep- 2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-0ct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table: PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

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(b)   Write SQL commands for the following statements:

    (i)   To display the details of all WORKERs in descending order of DOB.

    (ii)   To display NAME and DE;SIG of those WORKERs, whose PLEVEL is either P001 or P002.

    (iii) To display the content of all the WORKERs table, whose DOB is in between '19-JAN-1984' and '18-JAN-1987'.

    (iv)   To add a new row with the following:

        19, 'Daya Kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jun-1984'

(c)   Give the output of the following SQL queries: 2

    (i)   SELECT COUNT (PLEVEL), PLEVEL FROM WORKER GROUP BY PLEVEL;

    (ii)   SELECT MAX (DOB), MIN (DOJ) FROM WORKER;

    (iii) SELECT Name, Pay FROM WORKER W, PAYLEVEL P

        WHERE W. PLEVEL = S. PLEVEL AND P.ECODE<13 ;

    (iv)   SELECT PLEVEL, PAY+ALLOWANCE FROM PAYLEVEL

        WHERE PLEVEL= 'P003' ;

6   (a)   Verify the following using Truth Table.   2

    $U. (U' +V) = (U + V)$

(b)   Write the equivalent Boolean Expression for the following logic Circuit.   2
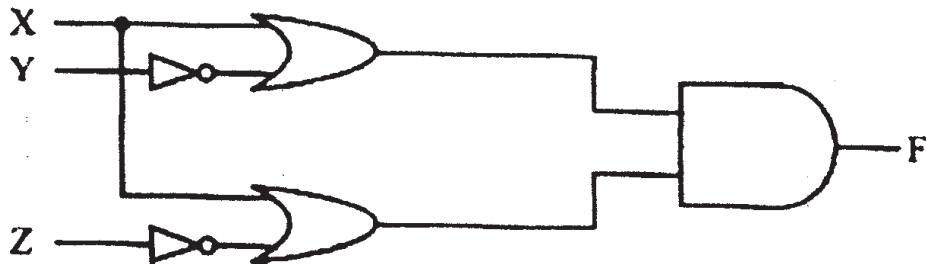
(c)   Write the POS form of a Boolean function F, which is represented in a truth table as follows: 1

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

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

$F(P, Q, R, S) = \Sigma (0,1,2,4,5,6,8, 12)$

7. (a) Differentiate between packet switching and message switching technique in network communication. 1

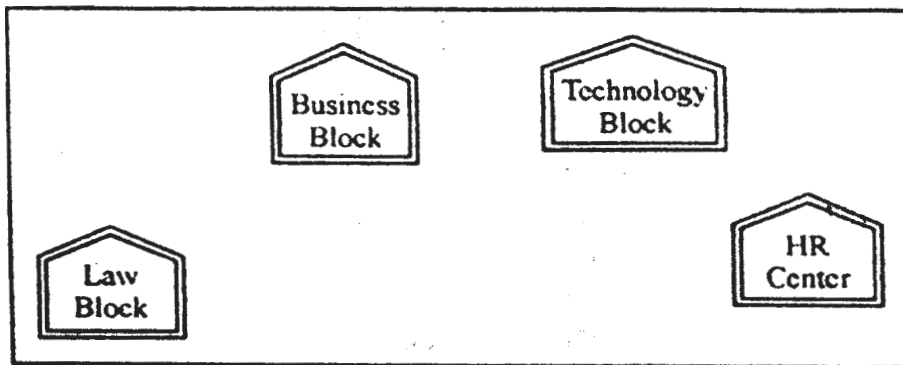(b) Differentiate between BUS and STAR topology of networks. 1

(c) What is VoIP? 1

(d) Out of the following, identify client side script (s) and server side script(s). 1

(a) ASP   (b) Javascript

(c) VBScript   (d) JSP

(e) Quick learn University is setting up its Academic blocks at Prayag Nagar and planning to set up a network. The university has 3 academic blocks and one Human Resource Center as shown in the diagram below. 4

Center to center distance between various block/center is as follows:

Law Block to Business Block	40m
Law Block to Technology Block	80m
Law Block to HR Center	105m
Business Block to Technology Block	30m
Business Block to HR Center	35m
Technology Block to HR Center	15m

Number of Computers in each of the Blocks/Centre is follows:

Law Block	15
Technology Block	40
HR Center	115
Business Block	25

(e1) Suggest the most suitable place (i.e. Block/Center) to install the server of this university with a suitable reason.

(e2) Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.

(e3) Which device you will suggest to be placed/installed in each of these blocks/ center to efficiently connect all the computers with in these blocks/center.

(e4) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

(f) Which of the following will come under Cyber Crime?   1

    (i)   Theft of a brand new sealed pack Laptop

    (ii)   Access to a bank account for getting unauthorized Money Transaction

    (iii)   Modification in a company data with unauthorized access

    (iv)   Photocopying a printed report

(g) Compare open source software and proprietary software.   1

COMPUTER SCIENCE
QUESTION PAPER CODE 91

1. (a) What is the difference between Type Casting and Automatic Type conversion? Also, give a suitable C++ code to illustrate both.   2

   (b) Write the names of the header files, which is/are essentially required to run/execute the following c++ code: 1

```
void main ( )
{
        char CH,Text[ ] ="+ve Attitude";
        for (int I=0 ; Text[I] ! ='\0' ;I++)
            if (Text[I]==' ')
                    cout<<end1;
            else
            {
                    CH=toupper (Text [I]) ;
                    cout<<CH;
            }
}
```

   (c) Rewrite the following program after removing the syntactical errors (if any). Underline each correction.   2

```
include<iostream.h>
typedef char [80] String;
void main ( )
{
    String S= "Peace";
    int L=strlen(S) ;
    cout<<S<< 'has'<<L<< 'characters'<<end1;
}
```

(d) Find the output of the following program: 3

```
#include <iostream.h>
void SwitchOver(int A [ ], int N, int Split)
{
        for (int K=0 ; K<N; K++)
                if (K<Split)
                        A(K]+ =K;
                else
                        A [K]*=K;
}
void Display (int A [ ], int N)
{
        for (int K=0 ; K<N ; K++)
                (K%2==0)? cout<<A[K]<<"%":cout<<A(K]<<end1;
}
void main ( )
{
        int H[ ]= {30,40,50,20,10,5};
        SwitchOver (H, 6, 3);
        Display (H, 6);
}
```

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

```
#include<iostream.h>
void main ( )
{
        int *Queen, Moves [ ] = {11, 22, 33, 44};
```

```
Queen = Moves;

Moves [2] + = 22;

Cout<< "Queen @"<<*Queen<<end1;

*Queen - = 11;

Queen + = 2;

cout<< "Now @"<<*Queen<<end1;

Queen++;

cout<< "Finally@"<<*Queen«end1;

cout<< "New Origin @"<<Moves[0]<<end1;
}
```

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum.　　2

```
#include<iostream.h>

#include <stdlib.h>

void main ( )

{

randomize ( ) ;

int MyNum, Max=5;

MyNum = 20 + random (Max) ;

for (int N=MyNum; N<=25;N++)

cout<N<"*";

}
```

(i)   20*21*22*23*24*25

(ii)   22*23*24*25*

(iii) 23*24*

(iv)   21*22*23*24*25

2. (a) Differentiate between Constructor and Destructor function with respect to Object Oriented Programming. 2

(b) Write the output of the following C++ code. Also, write the .name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV] 2

```cpp
#include<iostream.h>
void Line ( )                                        //Function [I]
{
     for (int L=1;L<=80;L++)     cout<<"-";
     cout<<end1;
}
void Line (int N)                                    //Function[II]
{
     for (int L=l;L<=N;L++)      Cout<<"*";
     cout<<endl;
}
void Line (char C, int N)                            //Function [III]
{
     for (int L=l;L<=N;L++)      cout<<C;
     cout<<end1;
}
void Line (int M, int, N)                            //Function [IV]
{
     for (int L=1;L<=N;L++)      cout<<M*L;
     cout<<end1;
}
void main ( )
```

```
{
        int A=9, B=4, C=3;

        char K= '#' ;

        Line (K,B);

        Line (A,C);

}
```

(c) Define a class Applicant in C++ with following description: 4

Private Members

- A data member ANo (Admission Number) of type long

- A data member Name of type string

- A data member Agg (Aggregate Marks) of type float

- A data member Grade of type char

- A member function GradeMe() to find the Grade as per the Aggregate Marks obtained by a student. Equivalent Aggregate Marks range and the respective Grades are shown as follows:

Aggregate Marks	Grade
>=80	A
less than 80 and >=65	B
less than 65 and >=50	C
less than 50	D

Public Members

- A function ENTER() to allow user to enter values for ANo, Name, Agg & call function GradeMe() to find the Grade.

- A function_RESULT( ) to allow user to view the content of all the data members.

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

class Student

{

```cpp
        int Rollno:

        char SName[20];

        float Marksl;

protected:

        void Result ( ) ;

public:

        Student ( ) ;

        void Enroll ( ) ;void Display ( ) ;

} ;

class Teacher

{

        long TCode;

        char TName [20];

protected:

        float Salary;

public:

        Teacher ( );

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course: public Student, private Teacher

}

        long CCode [10]; char CourseName [50];

        char StartDate [8] , EndDate [8];

public:

        Course ( ) ;

        void Commence ( );

        void CDetail ( ) ;

} ;
```

(i)   Write the names of member functions, which are accessible from objects of class Course

(ii)   Write the names of all the data members, which is/are accessible from member function Commence of class Course

(iii)   Write the names of all the-members, which are accessible from objects of class Teacher.

(iv)   Which type of Inheritance is illustrated in the above C++ code?

3. (a)   Write a Get2From1() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,...) of ALL[] and Even [] array should contain the values from even positions (0, 2, 4,…..) of ALL [].   3

Example

If the ALL[] array contains

12, 34, 56, 67, 89, 90

The Odd[] array should contain

34, 67, 90

And the Even [] array should contain

12, 56, 89

(b)   An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes. Find out the location of G[10][15], if G[0][0] is stored at 4200.   3

(c)   Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE: 4

struct NODE

{

    long Mno   //Member Number

    char Mname[20];   //Member Name

    NODE *Link;

};

(d) Write a DSUMO function in C++ to find sum of Diagonal Elements from a
NxN Matrix. 2

(Assuming that the N is a odd number)

(e) Evaluate the following postfix notation of expression: 2

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

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

#include <fstream.h>

class ITEM

{

    int Ino;char Iname[20]; float Price;

    public:

    void ModifyPrice() ;//The function is to modify

       price of a particular ITEM

} ;

void item: :ModiyPrice()

{

    fstream File;

    File.open ("ITEM.DAT", ios::binary|ios::in|ios: :out)|| ;

    int CIno;

    cout<<"Item No to modify price:";cin>>CIno;

    while (file.read ((char*) this, sizeof (ITEM)))

    {

       if (CIno==Ino)

       {

          cout<<"Present Price:"<<Price<<end1;

          cout<<"Changed price:"; cin>>Price;

```
            int FilePos = _____ ; //Statement 1,

            _____; //Statement 2

        File.write((char*)this,sizeof(ITEM)) ;

                                    // Re-writing the record

        }

    }

    File.close ( ) ;

}
```

(b) Write a function in C++ to count the no. of "He" or "She" words present in a text file "STORY. TXT".   2

If the file "STORY. TXT" content is as follows:

He is playing in the ground. She is

Playing with her dolls.

The output of the function should be
Count of He/She in file: 2

(c) Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class" CAMERA (as defined below). The user should enter the Model No and the function should search display the details of the camera.   3

```
class CAMERA

    {

        long ModelNo;

        float MegaPixel;

        int Zoom;

        char Details[120];

public:

    void Enter ( ) {cin>>ModelNo>>MegaPixel>>Zoom;gets(Details);}

    void Display ( )

        {cout<<ModelNo<<MegaPixel<<Zoom<<Details<<endl;}

    long GetModelNo ( ) {return ModelNo;}

};
```

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5. (a) What do you understand by Selection & Projection operations in relational algebra?   2

    Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question:

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmad	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Rav:i. Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-June-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S0l	56000	18000
S02	32000	12000
S03	24000	8000

(b) Write SQL commands for the following statements: 4

(i)   To display the details of all EMPLOYEEs, in descending order of DOJ

(ii) To display NAME and DE51G of those EMPLOYEEs, whose SALGRADE is either 502 or 503

(iii) To display the content of all the EMPLOYEEs table, whose DOJ is in between '09-Feb-2006' and '08-Aug-2009'.

(iv) To add a new row with the following:

109, 'Harish Roy', 'HEAD-IT', 'S02', '09-Sep-2007, '21-Apr-1983'

(c) Give :the output of the following SQL queries: 2

(i)   SELECT COUNT (SGRADE), SGRADE FROM EMPLOYEE GROUP BY SGRADE;

(ii) SELECT MIN(DOB), MAX (DOJ) FROM EMPLOYEE;

(iii)   SELECT NAME , SALARY FROM EMPLOYEE E, SALGRADE
         S WHERE E.SGRADE= S.SGRADE AND E.ECODE<103;

(iv)   SELECT SGRADE, SALARY+HRA ET:)M SALGRADE WHERE
         SGRADE='S02';

6   (a)   Yerify the following using Truth Table: 2

          X+Y. Z=(X+Y).(X+Z)

     (b)   Write the equivalent Boolean Expression for the following Logic Circuit: 2
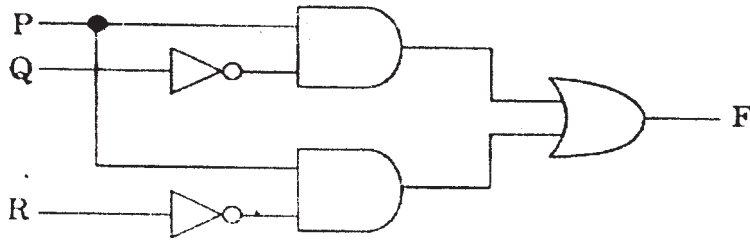
     (c)   Write the SOP form of a Boolean function F, which is represented in a truth
            table as follows: 1

U	V	W	F
0	0	0	1
0	0	1	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

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

          $F(A, B,C, D) = \Sigma (0,1, 2, 4, 5, 6, 7, 8, 10)$

7.   (a)   In networking, what-is WAN? How is it different from LAN?   1

     (b)   Differentiate between XML and HTML.   1

     (c)   What is WEB2.0?   1

(d) Out of the following, identify client side script (s) and server side script (s).   1

  (i)   Javascript

  (ii) ASP

  (iii) vbscript

  (iv) JSP

(e) Great Studies University is setting up its Academic schools at Sunder Nagar
     and planning to set up a network. The university has 3 academic schools and
     one administration center as shown in the diagram below: 4

Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

(i)   Suggest the most suitable place (i.e. School/Center) to install the server of this university with a suitable reason.

(ii)   Suggest an ideal layout for connecting these schools/ center for a wired connectivity.

(iii)   Which device will you suggest to be placed/installed in each of these schools / center to efficiently connect all the computers within these schools / center?

(iv)   The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

(f)   Compare Open Source Software and Proprietary Software.   1

(g)   What are cookies?   1

Marking Scheme – Computer Science

QUESTION PAPER CODE 91/1

EXPECTED ANSWERS

1. (a) What is the difference between Local Variable and Global Variable?

    Also, give a suitable C++ code to illustrate both.   2

    Ans **Local Variables:** Local variables are those variables which are declared within a function or a compound statement and these variables can only be used within that function/scope.

    Global Variables: Global variables are those variables which are not declared within any function or scope. So, these variables can be accessed by any function of the program.

    Example

    #include<iostream.h>

    #include<conio.h.>

    int G;   // Global variable declared

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```
void Fun ( )

{

        int  L = 25;  // Local variable of function Fun ( ) assigned value 25

        G=5;        // Global Variable is accessed and assigned value 5

        Cout<<G<<endl;   // Value of global variable is displayed as 5

        Cout<<L<<endl;   // Value of local variable is displayed as 25

}

void main ( )

{

        Fun ( ) ;            // Function call

        G = G + 5;        // Global variable is incremented by 5

        cout<<G<<endl;   // Global variable is displayed as 10

}
```

(½ Mark for each correct explanation of Local Variable and Global Variable)

(½ Mark for each correct example of Local variable and Global Variable)

OR

(Full 2 Maries for correct example(s) demonstrating the meaning of / difference between Local Variable and Global Variable)

OR

(Only 1 Mark to be awarded if Explanation without supporting examples)

(b)   Write the names of the header files, which is/are essentially required to run/ execute the following C++ code:

```
void main ( )

{

        char C, String [ ] = "Excellence Overload";

        for (int I=0; String [ I ] ! = '\ 0'; I ++ )

        if (String [I] ==' ')
```

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```
            cout<<end1;

        else

        {

            C=toupper(String[I]);

            cout<<C ;

        }

    }
```

Ans   iostream.h

ctype.h

(½ Mark for writing each correct header file)

(c)   Rewrite the following program after removing the syntactical errors (if any).
Underline each correction.   2

```
#include[iostream.h]

typedef char Text(80) ;

void main ( )

{

    Text T= "Indian";

    int Count=strlen(T) ;

    cout<<T<<'has'<<Count<< 'characters' <<end1;

}
```

Ans   #include<<u>iostream.h</u>>

#include<<u>string.h</u>>

typedef char Text [80];

void main ( )

{

    Text T= "Indian";

    int Count=str1en(T);

    cout<<T<< "<u>has</u>" <<Count<< "<u>cbaracters</u>"<<end1 ;

}

(½ Mark for writing # include<iostream.h>

(½ Mark for writing # include<string.h>

(½ Mark for writing typedef char Text(80];

(½ Mark for writing "has" and "characters")

(d)   Find the output of the following program: 3

#inc1ude<iostream.h>

void ChangeArray(int Number, int ARR[ ], int Size)

{

     for (int L =0; L<Size; L++)

     if (L<Number)

        ARR [L] +=L;

     e1se

        ARR [L] *=L;

}

void Show (int ARR [ ], int Size)

{

     for (int L=0; L<Size; L++)

        (L%2!=0) ?cout<<ARR[L] <<"#": cout<<ARR[L]<<end1 ;

}

void main ( )

{

     int Array [ ] = {30, 20, 40, 10, 60, 50};

     ChangeArray (3, Array, 6) ;

     Show (Array, 6) ;

}

343

Ans   30

21#42

30#240

250#

(½ Mark for each correct value)

Note:

Deduct ½ Mark for not writing # at proper places

Deduct ½ Mark for not considering endl at proaer places

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

#include<iostream.h>

void main ( )

{

    int Track [ ] = {10, 20, 30, 40}, *Striker ;

    Stxiker=Track :

    Track [1] += 30 ;

    cout<<"Striker>"<<*Striker<<end1 ;

    Striker – =10 ;

    Striker++ ;

    cout<<"Next@"<<*Striker<<end1 ;

    Striker+=2 ;

    cout<<"Last@"<<*Striker<<end1 ;

    cout<< "Reset To" <<Track[0] <<end1 ;

}

Ans   Striker>10

Next@50

Last@40

Reset to 0

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(½ for writing each line of output correctly)

Note:

Deduct ½ Mark if any/all special characters are missing

Deduct ½ Mark if endl is not considered at the right positions

(f)   Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the least value and highest value, which can be assigned to the variable Guess.   2

```
#include <iostream.h>
#include <stdlib.h>
void main ( )
{
        randomize ( ) ;
        int Guess, High=4;
        Guess=random{High)+ 50 ;
        for{int C=Guess ; C<=55 ; C++)
        cout<<C<<"#" ;
}
```

(i)   50 # 51 # 52 # 53 # 54 # 55 #

(ii)   52 # 53 # 54 # 55

(iii)   53 # 54 #

(iv)   51 # 52 # 53 # 54 # 55

Ans   (i)   50 # 51 # 52 # 53 # 54 # 55 #

Least value 50

Highest value 53

(1 Mark for mentioning correct option (i))

(½ Mark for mentioning correct Least value of Guess)

(½ Mark for mentioning correct Highest value of Guess)

2. (a) Differentiate between members, which are present within the private visibility mode with those which are present within the public visibility modes. 2

Ans Private members of a class are accessible only to the member functions of the same class.

Public members of a class are accessible to the member functions of the same class as well as member functions of its derived class(es) and also to an object of the class.

Example:

```
class Base
{
       int N;
public:
       void Assign ()
       {
              N=10;
       }
};
class Derived: public Base
{
       int X;
public:
       void DisplayBase()
       {
              cout<<N;    //Not Accessible
              Assign ( ) ;  //Accessible
       }
} ;
void main ( )
```

```
{
      Base B;

      B.Assign( ) ;         //Accessible

}
```

(1 Mark for correct explanation OR example illustrating non accessibility of Private Members inside Derived class)

(1 Marie for correct explanation OR example illustrating accessibility of Public Members inside Derived Class and to object of the class)

(b) Write the output of the following C++ code. Also. write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV].   2

```
#include<iostream.h>

void Print ( )              // Function [I]

{
      for (int K=1 ; K<=60 ; K++) cout<< "-" ;

            cout<<end1 ;

}
void Print (int N)         // Function [II]

{
      for (int K=1 ; K<=N ; L++) cout<<"*" ;

            cout<<end1 ;

}
void Print (int A, int.B)

{
      for (int K=1. ;K<=B ;K++) cout <<A*K ;

            cout<<end1 ;

}
void Print (char T, int N)   // Function [IV]
```

```
        {
                for (int K=1 ; K<=N ; K++) cout<<T ;

                        cout<<end1;

        }

        void main ( )

        {

                        int U=9, V=4, W=3;

                        char C='@' ;

                        Print (C,V) ;

                        Print (U,W) ;

        }
```

Ans. @ @ @ @

91827

OR

No Output as L is not declared in void Print (int N)

Polymorphism

OR

Function Overloading

(½ Mark for writing each correct line of output)

(1 Mark for writing the feature name correctly)

(c) Define a class Candidate in C++ with following description: 4

Private Members

- A data member RNo (Registration Number) of type long

- A data member Name of type string

- A data member Score of type float

- A data member Remarks of type string

- A member function AssignRem( ) to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows:

Score	Remarks
>=50	Selected
less than 50	Not selected

Public Members

- A function ENTER ( ) to allow user to enter values for RNo, Name, Score & call function AssignRem( ) to assign the remarks.

- A function DISPLAY ( ) to allow user to view the content of all the data members.

Ans class Candidate

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

```
void Candidate: : Enter ( )

{

      cin>>RNo ;

      gets (Name) ; cin>>Score;

      AssignRem( ) ;

}

void Candidate: :Display()

{

      cout<<RNo<<Name<<Score<<Remarks<<end1;

}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of AssignRem())

(1 Mark for correct definition of Enter() with proper invocation of AssignRem() function)

(1 Mark for correct definition of Display())

NOTE:

- *Deduct ½ Mark to be deducted if Assignrem() is not invoked properly inside Enter( ) function*

- *No marks to be deducted if member function definitions are written inside the class*

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

class Strident

(

      int Rno;

      char Name [20] ;

      float Marks;

```cpp
protected:

        void Result( ) ;

public:

        Student( ) ;

        void Register( ); void Display( ) ;

} ;

class Faculty

{

        long FCode;

        char FName[20];

protected:

        float Pay;

public :

        Faculty ( ) ;

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course : public Student, private Faculty

{

        long CCode [10]; char CourseName [50] ;

        char StartDate[8], EndDate[8] ;

public :

        Course ( ) ;

        void Commence ( ) ;

        void CDetail ( ) ;

} ;
```

(i)   Which type of inheritance is illustrated in the above C++ code?

Ans   Multiple Inheritance

(1 Mark for correct answer)

(ii)   Write the names of the all data members, which is/are accessible from member function Commence of class Course.

Ans   CCode, CourseName, StartDate, EndDate, Pay

(1 Mark for correct answer)

Note:

No marks to be awarded for any other alternative answer

(iii)   Write the names of member functions, which are accessible from objects of class Course.

Ans   Commence( ), CDetail( ), Register( ), Display( )

(1 Mark for correct answer)

Note:

● *No marks to be awarded for any other alternative answer*

● *Constructor functions to be ignored*

(iv)   Write the name of all the members, which are accessible from objects of class Faculty.

Ans   Enter( ), Show( )

(1 Mark for correct answer)

Note:

● *No marks to be awarded for any other alternative answer*

● *Constructor functions to be iqnored*

3   (a)   Write a Get1From2 ( ) function in C++ to transfer the content from two arrays FIRST[ ] and SECOND[ ] to array ALL[ ]. The even places (0, 2, 4, ...) of array ALL[ ] should get the content from the array FIRST[ ] and odd places (1, 3, 5,   ) of the array ALL[] should get the content from the array SECOND[ ].

Example:

If the FIRST[ ] array contains

30, 60, 90

And the SECOND[ ] array contains

10, 50, 80

The ALL[ ] array should contain

30, 10, 60, 50, 90, 80

Ans   void Get1From2 (int ALL[],int FIRST[],int SECOND[],

                int N,int M)

{

    for(int I=0,J=0,K=0;i<N+M; I++)

        if (I%2==0)

            ALL[I]=FIRST[J++];

        else

            ALL[I]=SECOND[K++];

}

OR

void Get1From2(int ALL[],int FIRST[],int SECOND[],

                int N, int M)

{

    int J=0,K=0;

    for(int I=0;i<N+M; I++)

    {

        if (I%2==0)

        {

            ALL [I] =FIRST [J] ;

            J++;

        }

else

{

    ALL[I]=SECOND[K];

    K++;

}

   }

}

(1 Mark for correct loop)

(½ Mark for checking even locations)

(½ Mark for checking even locations or writing else for odd locations)

(1 Mark for incrementing FIRST and SECOND Array Locations)

(b)   An array P[20] [50] is stored in the memory along the column with each of its element occupying 4 bytes, find out the location of P[15][10], if P[0][0] is stored at 5200.   3

Ans   Assuminq LBR=LBC=0

B=5200

W=4 bytes

Number of Rows(N)=20

Number of Columns(M)=50

LOC(Arr[I] [J])   = B +(I + J*N)*W

LOC(Arr[15][10]) = 5200+(15+10*20)*4

               = 5200 + (215*4)

               = 5200 + 860

               = 6060

(1 Mark for writing correct formula (for row major) OR substituting formula with correct values for calculating Address)

(2 marks for calculating correct address)

Note:

1 Mark to be awarded for writing only the correct answer (i.e. 6060)

(c) Write a function in C++ to perform Insert: operation on a dynamically allocated Queue containing Passenger details as given in the following definition of NODE.   4

struct NODE

{

    long Pno;   //passenger Number

    char Pname[20] ; //passenger Name

    NODE *Link.;

} ;

Ans   class Queue

{

    NODE *Front, *Rear;

public:

    Queue ( ) {Front = NULL; Rear = NULL; }

    void QueInsert ( ) ;

    void QueDel ( ) ;

    void QueDis ( ) ;

    ~Queue ( ) ;

} ;

void Queue: : QueInsert ( )

{

    NODE*Temp=new NODE;

    cin>>Temp->Pno; gets (Temp->Pname) ;

    Temp->Link = NULL;

    Rear->Li.nk = Temp;

    Rear = Temp ;

}

(1 Mark for creating a new NODE dynamically)

(1 Mark for assigning NULL to Link of new NODE)

(1 Mark for linking the Rearmost NODE to the new NODE)

(1 Mark for making the new NODE as the Rearmost NODE)

(d)   Write a COLSUM( ) function in C++ to find sum of each column of a NxM Matrix.   2

Ans   void COLSUM(int A[] [100], int N, int M)

```
{
        int SUMC;
        for (int j=0; j<M; j++)
        {
                SUMC = 0;
                for (int i=0; i<N; i++)
                        SUMC = SUMC + A[i] [j] ;
                Cout<< "Sum of Column "<<j<<" = "<<SUMC ;
        }
}
```

(½ Mark for writing correct outer loop)

(½ Mark for initializing SUMC with 0 for each column)

(½ Mark tor writing correct inner loop)

(½ Mark for finding sum of each column)

(e)   Evaluate the following postfix notation of expression: 2

50, 60, + , 20, 10, -, *

Element Scanned	STACK
50	50
60	50, 60
+	110

20	110, 20
10	110, 20, 10
–	110, 10
*	1100

(2 Mark for evaluating 1100 as the final answer)

Note:

(½ Mark for writing only the final answer as 1100 without showing the operations or Stack)

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

```
#include<fstream.h>

class PRODUCT

{
        int Pno; char Pname[20); int Qty;

public :

        :

        void ModifyQty( ) ;

        // The function is to modify quantity of a PRODUCT

} ;

void PRODUCT: :ModifyQty ( )

{
        fstream File ;

        Fil.open ("PRODUCT.DAT", ios::binary |ios : : in| ios: :out) ;

        int MPno;

        cout<<"Product No to modify quantity : "; cin>>MPNo;

        While (Fil.read ((char*) this, sizeof (PRODUCT))
```

```
                {

                        if (MPno == Pno)

                        {

                        Cout<<"Present Quantity:"<<Qty<<end1 ;

                        cout<<"Changed Quantity:";cin>>Qty ;

                        int Position = _____;  //Statement 1

                        _____; // Statement 2

                        Fil.write ((char*) this, sizeof (PRODUCT)) ;

                                                //Re-writing the record

                        }

                }

        Fil.close ( ) ;

        }
```

Ans   Option 1

Statement 1:   File. tellp ( ) ;

OR   File.tellg ( ) ;

Statement 2:   File.seekp (FilePos - sizeof (PRODUCT)) ;

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

OR   File.seekg (FilePos - sizeof (PRODUCT));

OR   File.seekg (-sizeof (PRODUCT), ios: :cur));

Option 2

Statement 1:   File.tellp ( ) - sizeof (PRODUCT) ;

OR   File.tellg ( ) - sizeof (PRODUCT) ;

Statement 2:   File. seekp (FilePos) ;

OR   File.seekg (FilePos) ;

(½ Mark for writing Statement 1 correctly)

(½ Mark for writing Statement 2 correctly)

Note:

File / Fil both are acceptable as the name of the File object

(b)   Write a function in C++ to count the no. of "Me" or "My" words present in a
text file "DIARY. TXT".   2

If the file "DIARY.TXT" content is as follows:

My first book was Me and My

family. It gave me chance to be

known to the world.

The output of the function should be

Count of Me/My in file : 4

Ans   void COUNT ( )

{

    ifstream Fil ("DIARY. TXT") ;

    char STR [10] ;

    int count = 0 ;

    while (!Fil.eof ( ))

    {

        Fil>>STR;

        if (strcmp (STR, "Me")==0 || strcmp (STR, "My") ==0)

            count++;

    }

    Cout<<"Count of Me/My in file : "<<count<<end1;

    Fil.close( ) ; //Ignore

}

OR

Any other correct function definition performing the desired operation

(½ Mark for opening DIARY. TXT correctly)

(½ Mark for reading each word (Whichever method adopted) from, the file)

(½ Mark for comparing the word with 'Me' and 'My' and incrementing counter)

(½ Mark for displaying the number of 'Me/My' with/without the Text Message)

NOTE:

Ignore case sensitivity check for Me/My

(c) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and display the details of the laptop. 3

class LAPTOP

{

       long ModelNo ;

       float RAM, HDD ;

       char Details [120] ;

public:

       void StockEnter ( )

       {cin>>ModelNo>>RAM>>HDD; gets (Details);}

       void StockDisplay ( )

       {cout<<ModelNo<<RAM<<HDD<<Details<<endl;}

       long ReturnModelNo ( ) {return ModelNo ;}

} ;

Ans   void Search( )

{

       LAPTOP L;

       long modelnum;

       cin>>modelnum;

       ifstream fin;

       fin.open ("LAPTOP.DAT", ios: :binary|ios: :in);

       while(fin.read ((char*) &L,sizeof (L)))

       {

           if (L.ReturnModelNo ( ) == modelnum)

               L.StockDisplay ( ) ;

```
        }

        Fin.close() ; //Ignore

}

OR

void Search (long modelnum)

{

        LAPTOP L;

        ifstream fin;

        fin.open ("LAPTOP.DAT", ios: :binary|ios: :in) ;

        while (fin.read ((char*) &L,sizeof (L)))

        {

                if (L.ReturnModelNo ( ) == modelnum)

                        L.StockDisplay ( ) ;

        }

        fin.close ( ) ; //Ignore

}
```

(½ Mark for declaring and entering a model number for a LAPTOP to search OR passing it as a parameter to the function)

(½ Mark for opening LAPTOP.DA T correctly)

(½ Mark for reading each record from LAPTOP.DA T)

(½ Mark for correct loop / checking end of file)

(½ Mark for comparing value returned by ReturnModelNo() with model number entered)

(½ Mark for displaying the matching record)

5   (a)   What do you understand by Union & Cartesian Product operations in relational algebra?   2

Ans   Cartesian Product (binary operator): It operates on two relations and is denoted by X. For example Cartesian product of two relations R1 and R2 is

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represented by R = R1 X R2. The degree of R is equal to sum of degrees of R1 and R2. The cardinality of R is product of cardinality of R1 and cardinality of R2.

Example:

Relation: R1

Roll No	Student Name	Class
1	Akash	XII
4	Debakar	X
10	Rishi	XI

Relation: R2

Teacher Code	Teacher Name
102	Ms Rinee
309	Mr Tanmoy

Resultant: R = R1 × R2

Col1	Col2	Col3	Col4	Col5
1	Akash	XII	102	Ms Rinee
1	Akash	XII	309	Mr Tanmoy
4	Debakar	X	102	Ms Rinee
4	Debakar	X	309	Mr Tanmoy
10	Rishi	XI	102	Ms Rinee
10	Rishi	XI	309	Mr Tanmoy

Union (binary operator): It operates on two relations and is indicated by U. For example, R=R1 U R2 represents union operation between two relations R1 and R2. The degree of R is equal to degree of R1. The cardinality of R is sum of cardinality of R1 and cardinality of R2.

Following have to be considered for the operation R1 U R2.

● Degree of R1 = Degree of R2

● jth attribute of R1 and jth attribute of R2 must have a common domain.

Example:

Relation: R1

Student_ID	Name
R490	Fatima
R876	Faraz
R342	Gauri

Relation: R2

Student_Code	Student_Name
S123	Rekha
S456	Tushi

Resultant Relation: R = R1 U R2

Column 1	Column2
R490	Fatima
R876	Faraz
R342	Gauri
S123	Rekha
S456	Tushi

(1 Marie for explaining Union correctly)

(1 Marie for explaining Cartesian Product correctly)

Consider the following tables WORKER and PAYYLEVEL and answer
(b) and (c) parts of this question: 4

Table: WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13- Sep- 2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-0ct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table: PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

(b)   Write SQL commands for the following statements:

(i)   To display the details of all WORKERs in descending order of DOB.

SELECT FROM WORKER ORDER BY DOB DESC;

(1 Mark for correct query)

(½ Mark for partially correct answer)

(ii)   To display NAME and DE;SIG of those WORKERs, whose PLEVEL is either P001 or P002.

SELECT NAME, DESIG FROM WORKER

WHERE PLEVEL IN ('P001', 'P002') ;

OR

SELECT NAME, DESIG FROM WORKER

WHERE PLEVEL = 'P001' OR PLEVEL= 'P002';

(1 Marie for correct query)

(½ Marie for partially correct answer)

(iii)   To display the content of all the WORKERs table, whose DOB is in between '19-JAN-1984' and '18-JAN-1987'.

SELECT * FROM WORKER

WHERE DOB BETWEEN '19-JAN-1984' AND '18-JAN-1987' ;

OR

SELECT * FROM WORKER

WHERE DOB >= '19-JAN-1984' AND DOB<='18-JAN-1987';

OR

SELECT * FROM WORKER

WHERE DOB > '19-JAN-1984' AND DOB<'18-JAN-1987' ;

(1 Mark for correct query)

(½ Mark for partially correct answer)

(iv)　To add a new row with the following:

19, 'Daya Kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jun-1984'

INSERT INTO WORKER

VALUES (19, 'Daya Kishore', 'Operator' , 'P003' , '11-Jun-1984');

(1 Mark for correct query)

(½ Mark for partially correct answer)

(c)　Give the output of the following SQL queries:　　　　　　　　　2

(i)　SELECT COUNT (PLEVEL), PLEVEL FROM WORKER GROUP BY PLEVEL;

Ans.

COUNT (PLEVEL)	PLEVEL
1	P001
2	P002
2	P003

(½ Mark for correct output)

(ii)　SELECT MAX (DOB), MIN (DOJ) FROM WORKER;

MAX (DOB)	MIN (DOJ)
12-Jul-1987	13-Sep-2004

(Mark for correct output)

(iii)　SELECT Name, Pay FROM WORKER W, PAYLEVEL P

WHERE W. PLEVEL = S. PLEVEL AND P.ECODE<13 ;

Name	Pay
Radhe Shyam	26000
Chander Nath	12000

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OR

P.ECode does not exist

(½ Mark for correct output)

OR

(Mark for writing No Output)

(iv)   SELECT PLEVEL, PAY+ALLOWANCE FROM PAYLEVEL

WHERE PLEVEL= 'P003' ;

PLEVEL	PAY+ALLOWANCE
P003	118000

(½ Mark for correct output)

6   (a)   Verify the following using Truth Table.   2

U. (U' +V) = (U + V)

U	V	U'	U'+V	U.(U'+V)	U+V
0	0	1	1	0	0
0	1	1	1	0	1
1	0	0	0	0	1
1	1	0	1	1	1

VERIFIED FALSE

(2 Marks to be awarded if Truth Table is made OR any equivalent term
conveying the same meaning)

(b)   Write the equivalent Boolean Expression for the following logic Circuit.   2

Ans   F=(X+Y').(X+Z')

(2 Marks for the final expression (X+Y').(X+Z')

OR

(1 Mark for anyone of the correct terms out of (X+Y') or (X+ Z')

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

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Ans   F(A,B,C) = (A+B+C).(A+B'+C').(A'+B+C').(A'+B'+C)

(1 Mark for the correct POS form)

Note: Deduct ½ mark if wrong variable names are used

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

F(P, Q, R, S) = E (0,1,2,4,5,6,8, 12)

	P' Q'	P' Q	P Q	P Q'
R' S'	1	1	1	1
R' S	1	1		
R S				
R S'	1	1		

OR

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	R' S'	R' S	R S	R S'
P' Q'	1	1		1
P' Q	1	1		1
P Q	1			
P Q'	1			

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

(½ Mark for placing all 1s at correct positions in K-Map)

(½ Mark for each grouping)

(1 Mark for writing final expression in reduced/minimal form)

Note: Deduct ½ mark if wrong variable names are used

7.   (a)   Differentiate between packet switching and message switching technique in network communication.   1

Ans   Packet switching: In packet switching, a fixed size of data packet that can be transmitted across the network is specified and then the data packets are sent through switching stations to the final destination. All the packets are stored in the main memory instead of disk. As a result accessing time of packets is reduced.

Message switching: The source computer sends data (message) to the switching station, which stores data in a buffer. It then looks for a free link to another switching station and sends data to that station. This process continues until data is delivered to the destination computer. This type of switching technique is also known as "store and forward" switching.

(½ Marks for written OR diagrammatic explanation of correct Packet Switching)

(½ Marks for written OR diagrammatic explanation of correct Message Switching)

(b)   Differentiate between BUS and STAR topology of networks.   1

Ans	Bus Topology	Star Topology
	● Slower as compared to star topologies of network	● Expensive as compared to Bus topology

- Breakage of wire at any point disturbs the entire network
- Long wire length

(½ Marks for written or diagrammatic explanation of correct Bus Topology)

(½ Marks for written or diagrammatic explanation of correct Star Topology)

(c) What is VoIP?   1

Ans Voice over Internet Protocol (Voice over IP, VoIP) is communication protocols and transmission technologies for delivery of voice communications and multimedia sessions over Internet Protocol (IP) networks, such as the Internet. Also, we can say, VoIP are IP telephony, Internet telephony and broadband telephony.

(1 Mark for explaining VoIP)

Note: 1 Mark for writing full form of VoIP

(d) Out of the following, identify client side script (s) and server side script(s).   1

    (a)   ASP   (b)   Javascript

    (c)   VBScript   (d)   JSP

Ans Java script & VB script are client side scripts

JSP & ASP are server side scripts

(½ Mark for writing correct Client Side Scripts)

(½ Mark for writing correct Server Side Scripts)

(e) Quick learn University is setting up its Academic blocks at Prayag Nagar and planning to set up a network. The university has 3 academic blocks and one Human Resource Center as shown in the diagram below.   4

Center to center distance between various block/center is as follows"

Law Block to Business Block	40m
Law Block to Technology Block	80m
Law Block to HR Center	105m
Business Block to Technology Block	30m
Business Block to HR Center	35m
Technology Block to HR Center	15m

Number of Computers in each of the Blocks/Centre is follows:

Law Block	15
Technology Block	40
HR Center	115
Business Block	25

(e1) Suggest the most suitable place (i.e. Block/Center) to install the server of this university with a suitable reason.

Ans   HR center:

Reason as it has the maximum number of computers

OR

Business Block

Reason as it is closest to all other Centers (minimum cable length required)

(½ Mark for mentioning any correct place)

(½ Mark for correct reason)

OR

(1 Mark for any other location with a valid reason)

(e2)   Suggest an ideal layout for connecting these blocks/centers for a wired connectivity.

Ans. Option 1:
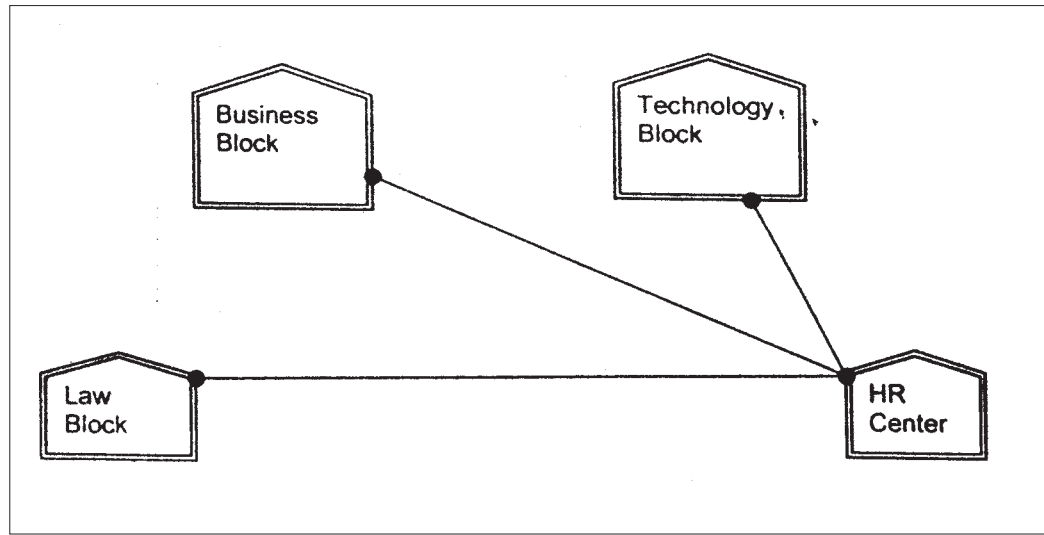
Option 2:
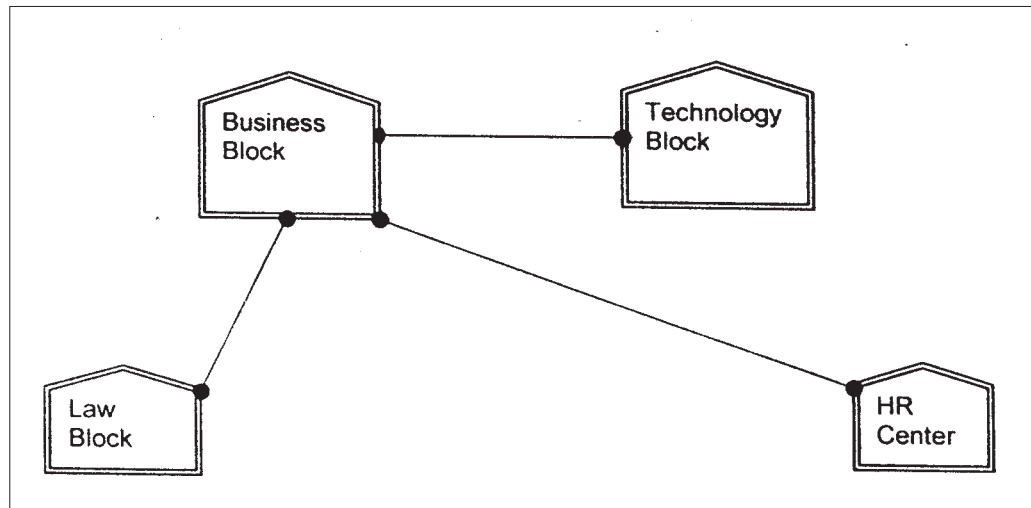
(1 Mark for mentioning any valid connectivity or topology or diagram connecting various compounds inside the campus)

(e3) Which device you will suggest to be placed/installed in each of these blocks/center to efficiently connect all the computers with in these blocks/center.

Ans Switch

(1 Mark for mentioning correct device)

Note:

(1 mark to be awarded if Switch / Hub is mentioned)

(e4) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed? Justify your answer.

Ans WAN as the given distance is more than the range of LAN and MAN.

(1 Mark for correct network type)

(f) Which of the following will come under Cyber Crime?   1

    (i)   Theft of a brand new sealed pack Laptop

    (ii)   Access to a bank account for getting unauthorized Money Transaction

    (iii)   Modification in a company data with unauthorized access

    (iv)   Photocopying a printed report

Ans. (ii)   and   (iii)

Note:

No marks to be awarded for any other alternative answer

(½ Mark for each correct option)

(g) Compare open source software and proprietary software.   1

Ans. Open source software refers to a program or software in which the source code (the form of the program when a programmer writes a program in a particular programming language) is available to the general public for use and/or modification from its original design free of charge.

Proprietary software is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret.

(½ Mark for each correct explanation/comparison)

MARKING SCHEME COMPUTER SCIENCE
QUESTION PAPER CODE 91
EXPECTED ANSWERS

1. (a) What is the difference between Type Casting and Automatic Type conversion? Also, give a suitable C++ code to illustrate both.

Ans Automatic Type Conversion: It is an implicit process of conversion of a data from one type to another. For example:

int N = 65;

char C = N; // Automatic type conversion ; conversion

cout<<C;

Type Casting: It is an explicit process of conversion of a data from one type to another. For example

int A=1, B=2;

float C = (float) A/B; //Type Casting

cout<<C;

(½ Mark for each correct explanation of Automatic Type Conversion and Type Casting)

(½ Mark for each correct example of Automatic Type Conversion and Type Casting)

OR

(Full 2 Marks for correct example(s) demonstrating the meaning of / difference between Automatic Type Conversion and Type Casting)

OR

(Only 1 Mark to be awarded if Explanation is given without supporting example)

(b)   Write the names of the header files, which is/are essentially required to run/ execute the following c++ code:

void main ( )

{

     char CH,Text[ ] ="+ve Attitude";

     for (int I=0 ; Text[I] ! ='\0' ;I++)

         if (Text[I]==' ')

            cout<<end1;

         else

         {

```
                    CH=toupper (Text [I]) ;

                    cout<<CH;

            }

    }
```

Ans   iostream.h

ctype.h

(½ Mark for writing each correct header file)

(c)   Rewrite the following program after removing the syntactical errors (if any).
Underline each correction.   2

```
include<iostream.h>

typedef char [80] String;

void main ( )

{
        String S= "Peace";

        int L=strlen(S) ;

        cout<<S<< 'has'<<L<< 'characters'<<end1;

}
```

Ans   #include<string.h>

#include<iostream.h>

typedef char String [80];

void main ( )

{
        String S = "Peace";

        int L= strlen(S) ;

        cout<<S<< "has" << L << "characters"<<end1;

}

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(½ Mark for writing # include<string.h>

(½ Mark for adding # before include<iostream.h>

(½ Mark for writing typedef char string[80];)

(½ Mark for writing "has" and "characters")

(d)   Find the output of the following program: 3

```
#include<iostream.h>
void SwitchOver(int A [ ], int N, int Split)
{
        for (int K=0 ; K<N; K++)
                if (K<Split)
                        A(K]+ =K;

                else
                        A [K]*=K;
}
void Display (int A [ ], int N)
{
        for (int K=0 ; K<N ; K++)
                (K%2==0)? cout<<A[K]<<"%":cout<<A(K]<<end1;
}
void main ( )
{
        int H[ ]= {30,40,50,20,10,5};
        SwitchOver (H, 6, 3);
        Display (H, 6);
}
```

Ans 30%41

52%60

40%25

(1 Mark for each line with correct values)

Note:

Deduct ½ Mark if any/all '% t 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>

void main ( )

{
        int *Queen, Moves [ ] = {11, 22, 33, 44};

        Queen = Moves;

        Moves [2] + = 22;

        Cout<< "Queen @"<<*Queen<<end1;

        *Queen - = 11;

        Queen + = 2;

        cout<< "Now @"<<*Queen<<end1;

        Queen++;

        cout<< "Finally@"<<*Queen«end1;

        cout<< "New Origin @"<<Moves[0]<<end1;

}
```

Ans Queen @11

Now @55

Finally @44

New origin @0

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(½ Mark for writing each line of output correctly)

Note:

Deduct ½ Mark if any/all '@' missing or/and endl is not considered at the right positions

(f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum. 2

```
#include<iostream.h>

#include <stdlib.h>

void main ( )

{

randomize ( ) ;

int MyNum, Max=5;

MyNum = 20 + random (Max) ;

for (int N=MyNum; N<=25;N++)

cout<N<"*";

}
```

(i)   20*21*22*23*24*25

(ii)   22*23*24*25*

(iii) 23*24*

(iv)   21*22*23*24*25

Ans   ii)   22*23*24*25*

Minimum value 20

Maximum value 24

(1 Marie for mentioning correct option)

(½ Mark for mentioning correct minimum value of MyNum)

(½ Marie for mentioning correct maximum value of MyNum)

2. (a) Differentiate between Constructor and Destructor function with respect to Object Oriented Programming. 2

Ans

Constructor	Destructor
It is a special member function of class with the following unique features:	It is a special member function of class with the following unique features:
● It has same name as the name of the class they belong to.	● It has same name as the name of the class preceded by a symbol ~ (tilde).
● It has no return type.	● It has no return type.
● It is defined in public visibility mode	● It is defined in public visibility mode
● It is automatically called and executed at the time of creation/declaration of the object	● It is automatically called and executed when scope of an object gets over
● Constructor can be overloaded.	● Moreover, destructor functions can NOT be overloaded.
class Trial	class Item
}	{
int a,b;	public:
public:	Item ( )
Trial ( ) {a=0;b=0;}//Constructor	{cout<<"Item Manufactured.."<<endl}
void Disp ( )	void Working ( )
{	{cout<<"Item is Working"<<endl;}
cout<<a<<b<<endl;	~Item( )//Destructor
}	{cout<<"Item destroyed..."«end1}
} ;	} ;
void main ( )	void main ( )
{	{
Trial T; //Constructor invoked	Item I;
T . Disp ( ) ;	I . Working ( ) ;

}	for (int C=0; C<2; C++)
	
	{
	
	Item J;
	
	J.Working ( ) ;
	
	}// Call of Destructor for J
	
	}// Call of Destructor for I

(1 Marie for correct explanation OR example illustrating a Constructor)

(1 Marie for correct explanation OR example illustrating a Destructor)

(b) Write the output of the following C++ code. Also, write the .name of feature of Object Oriented Programming used in the following program jointly illustrated by the function [I] to [IV]   2

```
#include<iostream.h>

void Line ( )                                              //Function [I]
{
      for (int L=1;L<=80;L++)     cout<<"-";
      cout<<end1;
}

void Line (int N)                                          //Function[II]
{
      for (int L=l;L<=N;L++)     Cout<<"*";
      cout<<endl;
}

void Line (char C, int N)                                 //Function [III]
{
      for (int L=l;L<=N;L++)     cout<<C;
      cout<<end1;
}
```

```
void Line (int M, int, N)                          //Function [IV]

{

        for (int L=1;L<=N;L++)      cout<<M*L;

        cout<<end1;

}

void main ( )

{

        int A=9, B=4, C=3;

        char K= '#' ;

        Line (K,B);

        Line (A,C);

}
```

Ans   ####

      91827

      Polymorphism OR Function Overloading

      (½ Mark for writing each correct line of output)

      (1 Mark for writing the feature. name correctly)

(c)   Define a class Applicant in C++ with following description: 4

      Private Members

      • A data member ANo (Admission Number) of type long

      • A data member Name of type string

      • A data member Agg (Aggregate Marks) of type float

      • A data member Grade of type char

      • A member function GradeMe() to find the Grade as per the Aggregate Marks obtained by a student. Equivalent Aggregate Marks range and the respective Grades are shown as follows:

Aggregate Marks	Grade
>=80	A
less than 80 and >=65	B
less than 65 and >=50	C
less than 50	D

Public Members

- A function ENTER() to allow user to enter values for ANo, Name, Agg & call function GradeMe() to find the Grade.

- A function_RESULT( ) to allow user to view the content of all the data members.

Ans class Applicant

{

    long ANo;

    char Name [20] ;

    float Agg;

    char Grade;

void Grademe ( ) ;

public:

    void Enter ( ) ;

    void Result ( ) ;

} ;

void Applicant: :GradeMe( )

{

    if (Agg>=80)

        Grade=' A' ;

    else if(Agg>=65)

        Grade=' B' ;

```cpp
        else if(Agg>=50)

                Grade=' C' ;

        else

                Grade=' D' ;

}
void Applicant: :Enter ( )

{

        cin>>ANo;

        gets (Name) ;

        cin>>Agg;

        GradeMe() ;

}
void Applicant: :Result ( )

{

        cout<<ANo<<Name<<Agg<<Grade<<end1;

}
```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(1 Mark for correct definition of GradeMe( ))

(1 Mark for correct definition of Enter() with proper invocation of GradeMe( ) function)

(1 Mark for correct definition of Result())

NOTE:

½ mark to be deducted if Grademe() is not invoked within Enter()

No marks to be deducted if member function definitions are inside the Class

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

class Student

{

        int Rollno:

        char SName[20];

        float Marksl;

protected:

        void Result ( ) ;

public:

        Student ( ) ;

        void Enroll ( ) ;void Display ( ) ;

} ;

class Teacher

{

        long TCode;

        char TName [20];

protected:

        float Salary;

public:

        Teacher ( );

        void Enter ( ) ;

        void Show ( ) ;

} ;

class Course: public Student, private Teacher

}

        long CCode [10]; char CourseName [50];

        char StartDate [8] , EndDate [8];

public:

      Course ( ) ;

      void Commence ( );

      void CDetail ( ) ;

} ;

(i)   Write the names of member functions, which are accessible from objects of class Course

Ans   Commence( )

      CDetail( )

      Enroll( )

      Display( )

      (1 Mark for correct answer)

      Note:

      No marks to be awarded for a partially correct answer

      Constructor functions to be ignored

ii)   Write the names of all the data members, which is/are accessible from member function Commence of class Course

Ans   CCode

      CourseName

      StartDate

      EndDate

      Salary

      (1 Mark for correct answer)

      Note:

      No marks to be awarded for a partially correct answer

iii)   Write the names of all the-members, which are accessible from objects of class Teacher.

Ans   Enter( ), Show( )

(1 Mark for correct answer)

Note:

No marks to be awarded for a partially correct answer

Constructor functions to be ignored

iv)   Which type of Inheritance is illustrated in the above C++ code?

Ans   Multiple Inheritance

(1 Mark for correct answer)

Note:

No marks to be awarded for a partially correct answer

3.   (a)   Write a Get2From1() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,...) of ALL[] and Even [] array should contain the values from even positions (0, 2, 4,…..) of ALL []. 3

Example

If the ALL[] array contains

12, 34, 56, 67, 89, 90

The Odd[] array should contain

34, 67, 90

And the Even [] array should contain

12,56,89

Ans   voil Get2From1 (int All [],int Even [], int Odd [], int Size)

```
{
        int J=0,K=0;
        for (int I=0 ;I<Size; 1++)
        {
                if (I%2==0)
                {
```

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Even [J]=All[I] ;

J++;

}

else

{

Odd[K]=All[I];

K++;

}

}

}

(1 Mark for correct loop)

(½ Mark for checking even locations)

(½ Mark for checking odd locations or writing else for even locations)

(½ Mark for assigning elements to the corresponding Even and Odd Array)

(½ Mark for incrementing Even and Odd Array Locations)

(b) An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes. Find out the location of G[10][15], if G[0][0] is stored at 4200.   3

Ans   Assuming LBR=LBC=0

B=4200

W=8 bytes

Number of Rows(N)=50

Number of Columns (M)=20

LOC(Arr[I] [J])   = B +(I*M + J) *W

LOC (Arr [10] [15])   = 4200+ (10*20+15)*8

= 4200 + (215*8)

= 4200+1720

= 5920

(1 Mark for writing correct formula (for row major)

OR substituting formula with correct values for calculating Address)

(2 marks for calculating correct address)

Note:

1 mark to be awarded for writing only the correct answer i.e. 5920, without showing any formula/calculation.

(c) Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE: 4

```
struct NODE
{
        long Mno                        //Member Number
        char Mname[20];                 //Member Name
        NODE *Link;
};
```

Ans   class Queue

```
{
        NODE *Front, *Rear;
public:
        Queue ( ) {Front = NULL; Rear = NULL; }
        void QueAdd ( );
        void QueDel ( );
        void QueDis ( );
        ~Queue();
} ;
void Queue: :QueDel ( )
{
        if (Front!=NULL)
```

```
{
        NODE *Temp=Front;

        cout<<Front->Mno<< " " ;

        cout<<Front->Mname<< "Deleted";

        Front=Front->Link;

        delete Temp;

        if (Front==NULL) Rear=NULL;

}
else
        cout<<"Underflow ! Queue is empty. .";

}
```

(1 Mark for checking Empty Queue)

(½ Mark for assigning Front to Temp)

(1 Mark for reassigning Front with Front->Link)

(1 Mark for deleting Temp)

(½ Mark for assigning Rear with NULL if Queue becomes Empty)

(d)   Write a DSUMO function in C++ to find sum of Diagonal Elements from a NxN Matrix.   2

(Assuming that the N is a odd number)

Ans   void DSUM (int A [ ] [100] ,int N)

```
{
        int SUMR =0, SUML=0;

        for (int i=0; i<N;i++}

        {
                SUMR=SUMR + A[i] [i] ;

                SUML = SUML + A[i] [N-1-i] ;

        }
```

```cpp
        cout<< " Sum of Diagonal Elements = "<<SUMR + SUML −

A[N/2] [N/2] ;

}

OR

void DSUM (int A[] [100], int N)

{

      int SUMR =0, SUML=0;

      for (int i=0; i<N; i++)

      {

            SUMR = SUMR + A[i] [i] ;

            SUML = SUML + A[i] [N-1-i] ;

      }

      cout<< "Sum of Right Diagonal Elements = "<<SUMR<<end1;

      cout<< "Sum of Left Diagonal Elements = "<<SUML<<end1;

}

OR

void DSUM (int A[] [100] , int N)

{

      int SUMR =0, SUML=0;

      for (int i = 0; i<N; i++)

      {

            for (int j = 0; j<N; j++)

            {

                  if (i==j)

                        SUMR=SUMR + A[i] [j] ;

                  else if (i+j == N-1)

                        SUML = SUML + A[i] [j];
```

```
            }
         }
            cout<< "Sum of Diagonal Elements ="<< SUMR + SUML - A[N/2] [N/2];
      }
```

(½ Mark for writing correct Function Header)

(½ Mark for writing correct loop)

(1 Mark for finding sum of Right Diagonal Elements and/or Left Diagonal Elements)

(e)   Evaluate the following postfix notation of expression: 2

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

Ans   Element Scanned   STACK Status

        True   TRUE

        False   TRUE, FALSE

        NOT   TRUE, TRUE

        AND   TRUE

        True   TRUE, TRUE

        True   TRUE, TRUE, TRUE

        AND   TRUE, TRUE

        OR   TRUE

                                     Final Result: TRUE

(½ Mark for evaluating each operator correctly)

OR

(½ Mark only for writing TRUE as the final answer without showing any calculation/Stack)

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

```cpp
#include <fstream.h>
class ITEM
{
        int Ino;char Iname[20]; float Price;
        public:
        void ModifyPrice() ;//The function is to modify
                price of a particular ITEM
} ;
void item: :ModiyPrice()
{
        fstream File;
        File.open ("ITEM.DAT", ios::binary|ios::in|ios: :out)|| ;
        int CIno;
        cout<<"Item No to modify price:";cin>>CIno;
        while (file.read ((char*) this, sizeof (ITEM)))
        {
                if (CIno==Ino)
                {
                        cout<<"Present Price:"<<Price<<end1;
                        cout<<"Changed price:"; cin>>Price;
                        int FilePos = _____ ; //Statement 1,
                        _____; //Statement 2
                        File.write((char*)this,sizeof(ITEM)) ;
                                        // Re-writing the record
                }
        }
        File.close( ) ;
}
```

Ans   Option 1

Statement 1: File.tellp ( ) ; OR File. tellg ( ) ;

Statement 2: File.seekp (FilePos - sizeof (ITEM)) ;

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

OR   File.seekg(FilePos - sizeof (ITEM));

OR.   File.seekg(-sizeof (ITEM), ios: :cur));

Ogtion 2

Statement 1: File. tellp ( ) – sizeof (ITEM) ;

OR   File.tellg()- sizeof (ITEM) ;

Statement 2: File.seekp (FilePos) ;

OR   File.seekg (FilePos) ;

(½ Mark for writing Statement 1 correctly)

(½ Mark for writing Statement 2 correctly)

(b)   Write a function in C++ to count the no. of "He" or "She" words present in a text file "STORY. TXT".   2

If the file "STORY. TXT" content is as follows:

He is playing in the ground. She is

Playing with her dolls.

The output of the function should be
Count of He/She in file: 2

Ans   void COUNT ( )

```
{
       ifstream Fil ("STORY.TXT");
       char STR [10];
       int count = 0;
       while (!Fil.eof ( ))
       {
```

Fil>>STR ;

if (strcmp (STR, "He") ==0 || strcmp (STR, "She") ==0)

count++;

}

Cout<<"Count of He/She in file : "<<count<<end1;

Fil.close( ); //Ignore

}

OR

Any other correct function definition performing the desired operation

(½ Mark for opening STORY. TXT correctly)

(½ Mark for reading each word (Whichever method adopted) from the file)

(½ Mark for comparing the word with 'He' and 'She' and incrementing counter)

(½ Mark for displaying the count of 'He/She' with/without the Text Message)

Note: Ignore case sensitivity for He/She

(c) Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class" CAMERA (as defined below). The user should enter the Model No and the function should search display the details of the camera. 3

class CAMERA

{

long ModelNo;

float MegaPixel;

int Zoom;

char Details[120];

public:

void Enter ( ) {cin>>ModelNo>>MegaPixel>>Zoom;gets(Details);}

void Display ( )

{cout<<ModelNo<<MegaPixel<<Zoom<<Details<<endl;}

long GetModelNo ( ) {return ModelNo;}

};

Ans   void Search ( )

{

       CAMERA C;

       long modelnum;

       cin>>modelnum;

       ifstream fin;

       fin.open ("CAMERA.DAT", ios: :binary|ios: :in) ;

       while (fin.read((char*) &C,sizeof (C)))

       {

              if (C. GetModelNo ( )   modelnum)

                     C.Display() ;

       }

       Fin.close( ) ; //Ignore

}

OR

void Search (long modelnum)

{

     CAMERA C;

     ifstream fin;

     fin.open ("CAMERA.DAT", ios: :binary|ios: :in);

     while(fin.read((char*)&C,sizeof(C)))

     {

           if (C.GetModelNo() == modelnum)

                C. Display ();

     }

     Fin.close( );//Ignore

}

(½ Mark for declaring and entering a model number for a camera to search

OR passing it as a parameter to the function)

(½ Marie for opening CAMERA.DAT in correct mode)

(½ Marie for reading each record from CAMERA.DAT)

(½ Marie for correct loop / checking end of file)

(½ Marie for comparing value returned by GetModelNo() with model number entered)

(½ Marie for displaying the matching record)

5. (a) What do you understand by Selection & Projection operations in relational algebra? 2

Ans Projection for selecting the columns of table

Selection for selecting the rows of table

(1 Marie for correct explanation of Projection)

(1 Marie for correct explanation of Selection correctly)

OR

(Full 2 Marks for correct example(s) demonstrating the meaning of Projection & Selection)

Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question:

Table: EMPLOYEE

ECODE	NAME	DESIG	SGRADE	DOJ	DOB
101	Abdul Ahmad	EXECUTIVE	S03	23-Mar-2003	13-Jan-1980
102	Rav:i. Chander	HEAD-IT	S02	12-Feb-2010	22-Jul-1987
103	John Ken	RECEPTIONIST	S03	24-June-2009	24-Feb-1983
105	Nazar Ameen	GM	S02	11-Aug-2006	03-Mar-1984
108	Priyam Sen	CEO	S01	29-Dec-2004	19-Jan-1982

Table: SALGRADE

SGRADE	SALARY	HRA
S0l	56000	18000
S02	32000	12000
S03	24000	8000

(b) Write SQL commands for the following statements:

(i) To display the details of all EMPLOYEEs, in descending order of DOJ

Ans SELECT * FROM EMPLOYEE ORDER BY DOJ DESC;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(ii) To display NAME and DE51G of those EMPLOYEEs, whose 5ALGRADE is either 502 or 503

Ans SELECT NAME, DESIG FROM EMPLOYEE

WHERE SGRADE = 'S02' OR SGRADE= 'S03';

OR

SELECT NAME, DESIG FROM EMPLOYEE

WHERE SALGRADE ='S02' OR SALGRADE='S03';

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(iii) To display the content of all the EMPLOYEEs table, whose DOJ is in between'09-Feb-2006' and '08-Aug-2009'.

Ans SELECT * FROM EMPLOYEE

WHERE DOJ BETWEEN '09-Feb-2006'and '08-Aug-2009';

OR

SELECT * FROM EMPLOYEE

WHERE DOJ > = '09-Fab-2006' and DOJ <='08-Aug-2009';

OR

SELECT * FROM EMPLOYEE

WHERE DOJ > '09-Feb-2006' and DOJ <' 08-Aug-2009" ;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(iv)   To add a new row with the following:

109, 'Harish Roy', 'HEAD-IT', 'S02', '09-Sep-2007, '21-Apr-1983'

Ans   INSERT INTO EMPLOYEE

VALUES(109,'Harish Roy' ,'HEAD-IT' ,'S02' ,'09-Sep-2007' ,'21-Apr-1983') ;

(1 Mark for correct query)

OR

(½ Mark for partially correct answer)

(c)   Give :the output of the following SQL queries: 2

(i)   SELECT COUNT (SGRADE),SGRADE FROM EMPLOYEE GROUP BY SGRADE;

Ans

COUNT (SGRADE)	SGRADE
1	S01
2	S02
2	S03

(½ Mark. for correct output)

(ii)   SELECT MIN(DOB), MAX (DOJ) FROM EMPLOYEE;

Ans

MIN (DOB)	MAX (DOJ)
13-Jan-1980	12-Feb-2010

(½ Mark for correct output)

(iii)   SELECT NAME , SALARYFROM EMPLOYEE E, SALGRADE S WHERE
         E.SGRADE= S.SGRADE AND E.ECODE<103;

Ans

Name	Salary
Abdul Ahmad	24000
Ravi Chander	32000

(½ Mark for correct output)

(iv)   SELECT SGRADE, SALARY+HRA ET:)M SALGRADE WHERE SGRADE=
        'S02';

Ans

SGRADE	SALARY+HRA
S02	44000

(½ Mark for correct output)

6   (a)   Yerify the following using Truth Table: 2

            X+Y. Z=(X+Y).(X+Z)

Ans

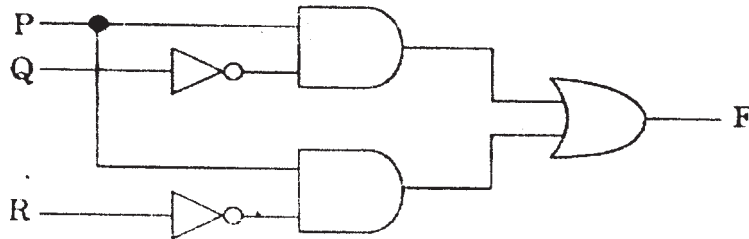| X	Y	Z	Y.Z	X+Y.Z	X+Y	X+Z	(X+Y).(X+Z)
0	0	0	0	0	0	0	0
0	0	1	0	0	0	1	0
0	1	0	0	0	1	0	0
0	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1
1	0	1	0	1	1	1	1
1	1	0	0	1	1	1	1
1	1	1	1	1	1	1	1

VERIFIED

(2 Mark for correct verification using Truth Table)

NOTE: No marks are to be awarded if only algebraic proof is given.

(b)   Write the equivalent Boolean Expression for the following Logic Circuit: 2

Ans   F = P.Q' + P.R'

(2 Marks for the final expression P.Q'+P.R')

OR

(1 Mark for anyone of the correct terms out of P .Q' or P .R'

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

U	V	W	F
0	0	0	1
0	0	1	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Ans   F(U, V, W) = U'.V'.W'+ U'.V.W + U.V.W'+ U.V.W

(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) = Σ (0,1, 2, 4, 5, 6, 7, 8, 10)

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	A' B'	A' B	AB	AB'
C' D'	1	1		1
C' D	1	1		
C D				
C D'	1	1		1

OR

	C'D'	C'D	CD	CD'
A' B'	1	1		1
A' B	1	1		1
A B				
A B'	1			1

Ans   F (A,B,C,D) = A'C' + A'D' + B'D'

(½ Mark for placing all 1s at correct positions in K-Map)

(½ Mark for each grouping)

(1 Mark for writing final expression in reduced/minimal form)

Note : Deduct ½ mark if wrong variable names are used

7.   (a)   In networking, what-is WAN? How is it different from LAN?   1

Ans   A WAN (wide area network), is not restricted to a geographical location, although it might be confined within the bounds of a state or country. A WAN connects several LANs, and may be limited to an enterprise (a corporation or an organization) or accessible to the public. The technology is high speed and relatively expensive. The Internet is an example of a worldwide public WAN.

A LAN (local area network) is a group of computers and network devices connected together, usually within the same building or campus.

(½ Marks for writing WAN correctly)

(½ Marks for writing LAN correctly)

(b)   Differentiate between XML and HTML.   1

Ans   The Extensible Markup Language (XML) was initially visualized as a language for defining new document formats for the World Wide Web. XML is text-based formats that provide mechanisms for describing document structures with the help of user defined Tags.

HTML - short for Hypertext Markup Language is the predominant markup language for the creation of web pages. It provides a means to describe the structure of text-based information in a document by denoting certain text as headings, paragraphs, lists, and to supplement that text with interactive forms, embedded images, and other objects using predefined Tags.

(½ Marks for explaining XML correctly)

(½ Marks for explaining HTML correctly)

OR

(½ Mark Only if correct expansion of both the terms XML and HTML are given)

(c)   What is WEB2.0?   1

Ans   The term Web 2.0 is associated with **web applications that facilitate participatory information sharing,** interoperability, **user-centered design, and collaboration on the World Wide Web.** Web 2.0 is also used for social networking. Example: **Social Networking Sites, Blogs, Facebook,** Video Sharing Sites, Video Conferencing Applications etc.

(1 Mark for correctly explaining Web 2.0 - anyone of the highlighted text to be consider appropriate)

Note: Only ½ Mark for mentioning an example or an improved Web Application of WWW

(d)   Out of the following, identify client side script (s) and server side script (s).   1

(i)   Javascript

(ii)   ASP

(iii) vbscript

(iv)   JSP

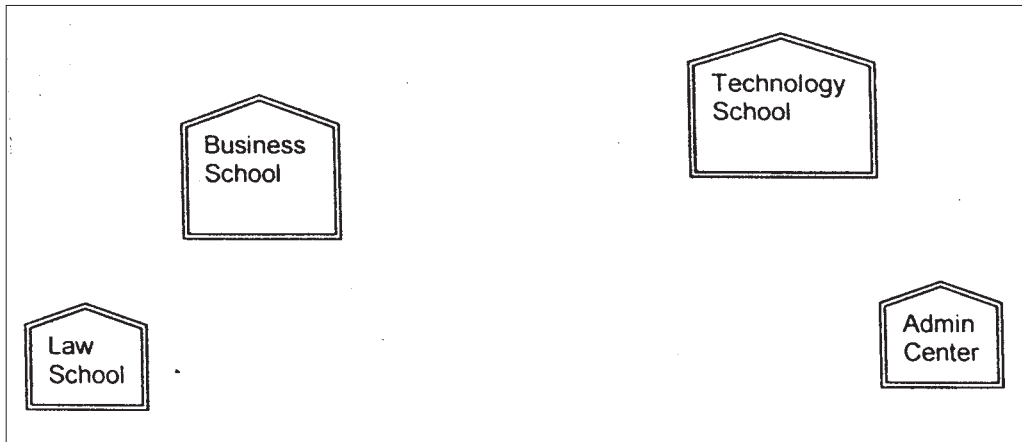Ans   Javascript & vbscript are client side scripts

JSP & ASP are server side scripts

(½ Mark for writing correct 'Client Side Scripts)

(½ Mark for writing correct Server Side Scripts)

(e)   Great Studies University is setting up its Academic schools at Sunder Nagar and planning to set up a network. The university has 3 academic schools and one administration center as shown in the diagram below: 4

Center to center distances between various buildings is as follows :

Law School to Business School	60m
Law School to Technology School	90m
Law School to Admin Center	115m
Business School to Technology School	40m
Business School to. Admin Center	45m
Technology School to Admin Center	25m

Number of Computers in each of the Schools/Center is follows:

Law School	25
Technology School	50
Admin Center	125
Business School	35

(i) Suggest the most suitable place (i.e. School/Center) to install the server of this university with a suitable reason. 1

Ans Option 1 :

Admin center as it has the most number of computers

Option 2.

Business School as it will require minimum cable length to connect other blocks

(½ Mark for mentioning the correct place)
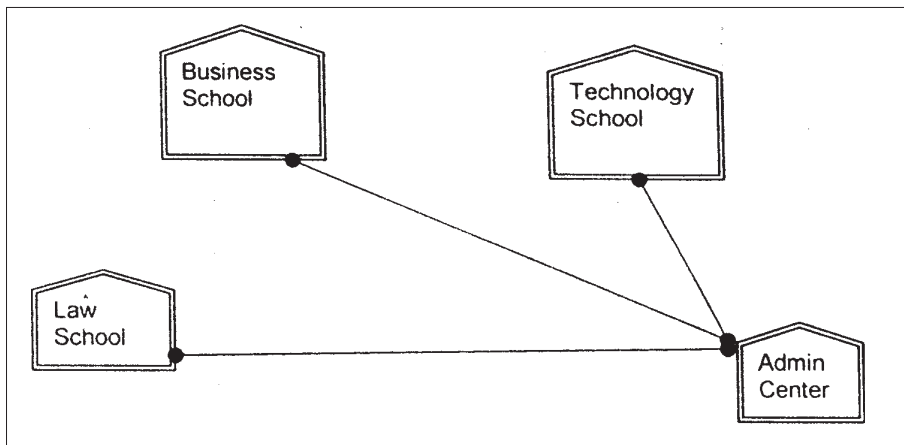
(½ Mark for mentioning a valid reason)

OR
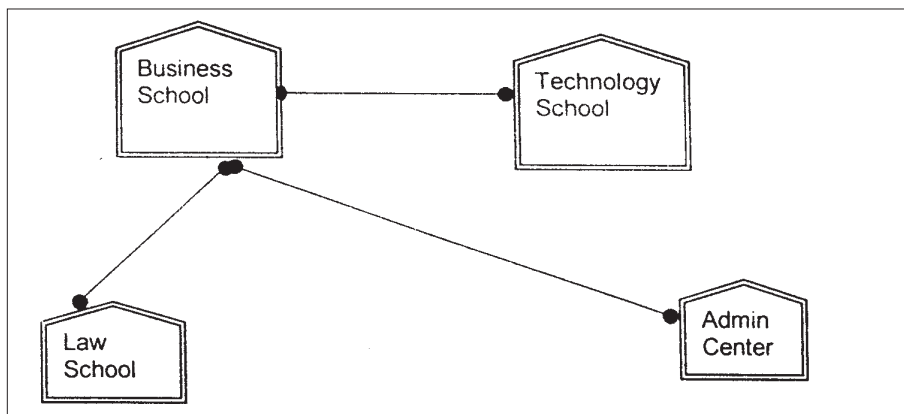
(1 Mark for any other location with a valid reason)

(ii) Suggest an ideal layout for connecting these schools/ center for a wired connectivity. 1

Ans Option 1:

Option 2:

(1 Mark for mentioning any valid connectivity or topology or diagram connecting various compounds inside the campus)

(iii)   Which device will you suggest to be placed/installed in each of these schools / center to efficiently connect all the computers within these schools / center?   1

Ans   Switch

(1 Mark for mentioning correct device)

NOTE: Award 1 full mark if Hub/Switch is mentioned.

(iv)   The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed? Justify your answer.   1

Ans   WAN as the distance is more than the range of LAN or MAN.   1

(1 Mark for correct network type)

(f)   Compare Open Source Software and Proprietary Software.   1

Ans   Open source software refers to a program or software in which the source code (the form of the program when a programmer writes a program in a particular programming language) is available to the general public for use and/or modification from its original design free of charge.

Proprietary software is software that is owned by an individual or a company (usually the one that developed it). There are almost always major restrictions on its use, and its source code is almost always kept secret.

(1 Mark for correct/valid comparison)

OR

(Mark for defining each term correctly)

(g)   What are cookies?   1

Ans   A small piece of information that a server sends to a client. When a person visits a Web site with cookie capabilities, its server sends certain information about him/her to the browser, which is stored on his/her hard drive as a text file. At some later time (such as returning to the site the next day), the server retrieves the cookie.

(1 Mark for correct definition)