

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) Name the header file to which the following belong 1
(i) **abs()** (ii) **isupper()**
- (b) Illustrate the use of **#define** in C++ to define a macro. 2
- (c) Rewrite the following program after removing the syntactical error(s), if any. Underline each correction. 2

```
#include<iostream.h>
void main()
{   struct STUDENT
    {   char stu_name[20];
        char stu_sex;
        int stu_age=17;
    } student;
    gets(stu_name);
    gets(stu_sex);
}
```

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

```
#include<iostream.h>
#include<string.h>
class state
{   char *state_name;
    int size;
public:
    state(); { size=0; state_name=new char[size+1]; }
    state(char *s)
```

```

    {   size = strlen(s); state_name = new char[size+1];
        strcpy(state_name,s);
    }
void display() {cout<<state_name<<endl;}
void Replace (state & a, state & b)
{   size = a.size + b.size;
    delete state_name;
    state_name = new char[size+1];
    strcpy(state_name, a.state_name);
    strcat(state_name, b.state_name);
}
};
void main()
{   char * temp = "Delhi";
    state state1 (temp), state2("Mumbai"), state3("Nagpur"), S1, S2;
    S1.Replace(state1, state2);
    S2. Replace(S1, state3);
    S1.display();
    S2.display();
}

```

(e) Find the output of the following program :

2

```

#include<iostream.h>
void main()
{   long NUM= 1234543;
    int F=0, S=0;
    do
    {   int Rem = NUM% 10;
        if(Rem % 2 !=0)
            F+=R;
        else
            S+=R;
        NUM /=10;
    }while(NUM>0);
    cout<<F-S;
}

```

(f) What are Nested Structures ? Give an example.

2

2. (a) Define Multilevel and Multiple inheritance in context of Object Oriented Programming. Give suitable example to illustrate the same. 2

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

```
class Interview
{
    int month;
    public:
        Interview(int y)          {month=y;}    //Constructor 1
        Interview(Interview&t);    //Constructor 2
};
```

(i) Create an object, such that it invokes Constructor 1 1

(ii) Write complete definition for Constructor 2 1

(c) Define a class named ADMISSION in C++ with the following descriptions : 4

Private members :

AD_NO integer (Ranges 10 - 2000)

NAME Array of characters(String)

CLASS Character

FEES Float

Public Members :

- Function Read_Data() to read an object of ADMISSION type
- Function Display() to display the details of an object
- Function Draw-Nos() to choose 2 students randomly.

And display the details. Use random function to generate admission nos. to match with AD_NO.

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

```
class stationary
{
    char Type;
    char Manufacturer[10];
    public:
        stationary();
        void Read_sta_details();
        void Disp_sta_details();
};
class office : public stationary
{
```

```

    int no_of_types;
    float cost_of_sta;
    public:
    void Read_off_details();
    void Disp_off_details();
};
class printer : private office
{
    int no_of_users;
    char delivery_date [10];
    public:
    void Read_pri_details();
    void Disp_pri_details();
};
void main()
{    printer MyPrinter;    }

```

- (i) Mention the member names which are accessible by MyPrinter declared in main() function 1
- (ii) What is the size of MyPrinter in bytes ? 1
- (iii) Mention the names of functions accessible from the member function Read_pri_details() of class printer. 2

3. (a) Write a function in C++ which accepts an integer array and its size as arguments/parameters and assign the elements into a two dimensional array of integers in the following format

If the array is **1, 2, 3, 4, 5, 6**

The resultant 2 D array is given below

```

1  2  3  4  5  6
1  2  3  4  5  0
1  2  3  4  0  0
1  2  3  0  0  0
1  2  0  0  0  0
1  0  0  0  0  0

```

If the array is **1, 2, 3**

The resultant 2 D array is given below

```

1  2  3
1  2  0
1  0  0

```

3

(b) An array MAT[30][10] is stored in the memory column wise with each element occupying 8 bytes of memory. Find out the base address and the address of element MAT[20][5], if the location of MAT[5][7] is stored at the address 1000. 4

(c) class queue 4

```
{ int data[10];
    int front, rear;
    public:
    queue() {front = -1; rear=-1;}
    void add();           // to add an element into the queue
    void remove();      // to remove an element from the queue
    void Delete(int ITEM); // To delete all elements which are equal
                          // to ITEM
};
```

Complete the class with all function definitions for a circular array Queue. Use another queue to transfer data temporarily

(d) Write a function in C++ to perform Push operation on a dynamically allocated stack containing real number. 3

(e) Write the equivalent infix expression for
a, b, AND, a, c, AND, OR 2

4. (a) void main()

```
{ char ch='A';
  ofstream fileout("data.dat",ios::out);
  fileout<<ch;
  int p= fileout.tellg();
  cout<<p;
```

What is the output if the file content before the execution of the program is the string "ABC" (Note that " " are not part of the file)

(b) Write a function to count the number of words present in a text file named "PARA.TXT". Assume that each word is separated by a single blank/space character and no blanks/spaces in the beginning and end of the file. 2

- (c) Following is the structure of each record in a data file named “COLONY.DAT”.

3

```
struct COLONY
{
    char Colony_Code[10];
    char Colony_Name[10];
    int No_of_People;
};
```

Write a function in C++ to update the file with a new value of No_of_People. The value of Colony_Code and No_of_People are read during the execution of the program.

5. (a) What is an Alternate Key ?

2

- (b) Study the following tables DOCTOR and SALARY and write SQL commands for the questions (i) to (iv) and give outputs for SQL queries (v) to (vi):

6

TABLE : DOCTOR

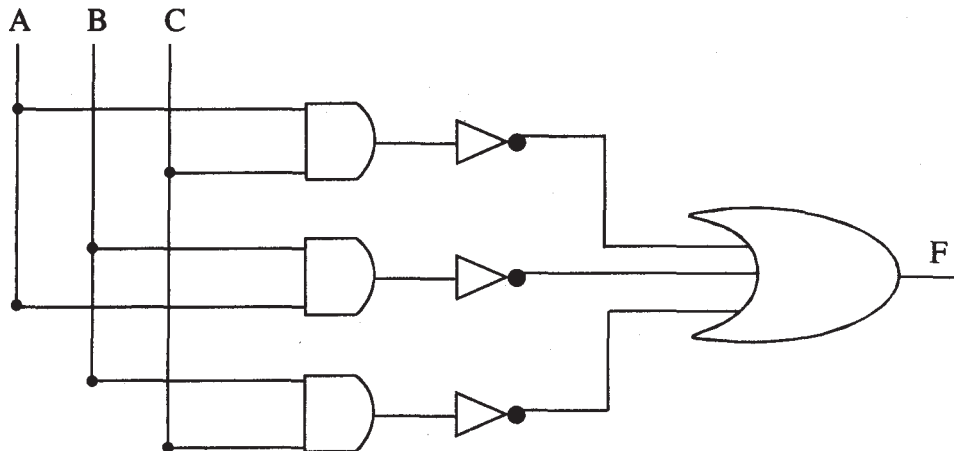
ID	NAME	DEPT	SEX	EXPERIENCE
101	John	ENT	M	12
104	Smith	ORTHOPEdic	M	5
107	George	CARDIOLOGY	M	10
114	Lara	SKIN	F	3
109	K George	MEDICINE	F	9
105	Johnson	ORTHOPEdic	M	10
117	Lucy	ENT	F	3
111	Bill	MEDICINE	F	12
130	Morphy	ORTHOPEdic	M	15

TABLE : SALARY

ID	BASIC	ALLOWANCE	CONSULTATION
101	12000	1000	300
104	23000	2300	500
107	32000	4000	500
114	12000	5200	100
109	42000	1700	200
105	18900	1690	300
130	21700	2600	300

- (i) Display NAME of all doctors who are in “MEDICINE” having more than 10 years experience from the table DOCTOR.
- (ii) Display the average salary of all doctors working in “ENT” department using the tables DOCTOR and SALARY. Salary = BASIC + ALLOWANCE
- (iii) Display the minimum ALLOWANCE of female doctors,
- (iv) Display the highest consultation fee among all male doctors,
- (v) SELECT count(*) from DOCTOR where SEX = “F”
- (vi) SELECT NAME, DEPT, BASIC from DOCTOR, SALARY where DEPT = “ENT” and DOCTOR.ID = SALARY.ID

6. (a) State and verify Distributive Law. 2
- (b) Write the equivalent expression for the following Logical Circuit : 2



- (c) Express $P + Q'R$ in canonical SOP form. 1
- (d) Reduce the following Boolean expression using K-Map.
 $F(P, Q, R, S) = \sum (0, 3, 5, 6, 7, 11, 12, 15)$ 3
7. (a) Differentiate between Internet and Intranet. 1
- (b) Expand the following terms
 (i) CDMA (ii) URL (iii) HTTP (iv) WAN 2
- (c) Write one advantage of STAR topology as compared to TBUS topology. 1
- (d) UNIVERSITY OF CORRESPONDENCE in Allahabad is setting up the network between its different wings. There are 4 wings named as Science (S), Journalism (J), ARTS (A) and Home Science(H). 1

Distance between various wings are given below

Wing A to Wing S	100 m
Wing A to Wing J	200 m
Wing A to Wing H	400 m
Wing S to Wing J	300 m
Wing S to Wing H	100 m
Wing J to Wing H	450 m

Number of Computers

Wing A	150
Wing S	10
Wing J	5
Wing H	50

- (i) Suggest a suitable Topology for networking the computer of all wings 1
- (ii) Name the wing where the Server to be installed. Justify your answer, 1
- (iii) Suggest the placement of Hub/Switch in the network. 1
- (iv) Mention an economic technology to provide internet accessibility to all wings. 1

QUESTION PAPER CODE 91

- 1. (a) **Name the** header file to which the following belong : 1
 - (i) pow()
 - (ii) random()
- (b) Illustrate the use of inline function in C++ with the help of an example. 2
- (c) Rewrite the following program after removing the syntactical error(s), if any. Underline each correction. 2

```
#include <idstream.h>
void main()
{
    struct movie
    {
        char movie_name[20];
        char movie_type;
        int ticket_cost = 100;
    }
}
```



```

    }MOVIE;
    gets(movie_name);
    gets(movie_type);
}

```

(d) Find the output of the following program :

3

```

#include<iostream.h>
#include<string.h>
class student
{
    char *name;
    int l;
public:
    student() { l=0; name=new char[l+1]; }
    student(char *s)
    {
        l=strlen(s); name=new char[l+1];
        strcpy (name,s);
    }
    void display() { cout<<name<<endl;}
    void manipulate(student & a, student & b)
    {
        l=a.l + b.l;
        delete name;
        name=new char[l+1];
        strcpy(name, a.name);
        strcat(name, b.name);
    }
};
void main()
{
    char * temp ="Jack";
    student name1(temp), name2(" Jill"), name3(" John" ),S1,S2;
    S1.manipulate(name1,name2);
    S2.manipulate(S1,name3);
    S1.display();
    S2.display();
}

```

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

```
#include<iostream.h>
void main()
{   long Number = 7583241;
    int First=0, Second=0;
    do
    {   int R = Number%10;
        if(R%2==0)
            First+=R;
        else
            Second+=R;
        Number /=10;
    }while(Number>0);
    cout<<First-Second;
}
```

- (f) What is a default constructor ? How does it differ from destructor ? 2

2. (a) What is “this” pointer ? Give an example to illustrate the use of it in C++. 2

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

```
class Exam
{   int year;
    public:
        Exam(int y) { year=y;} //Constructor 1
        Exam(Exam & t); //Constructor 2
};
```

- (i) Create an object, such that it invokes Constructor 1. 1

- (ii) Write complete definition for Constructor 2. 1

- (c) Define a class named HOUSING in C++ with the following descriptions : 4

Private members

REG_NO	integer(Ranges 10 - 1000)
NAME	Array of characters(String)
TYPE	Character
COST	Float

Public Members

- Function Read_Data() to read an object of HOUSING type
- Function Display() to display the details of an object
- Function Draw_Nos() to choose and display the details of 2 houses selected randomly from an array of 10 objects of type HOUSING. Use random function to generate the registration nos. to match with REG_NO from the array.

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

```
class furniture
{
    char Type;
    char Model[10];
    public:
    furniture();
    void Read_fur_details();
    void Disp_fur_details();
};

class sofa : public furniture
{
    int no_of_seats;
    float cost_of_sofa;
    public:
    void Read_sofa_details();
    void Disp_sofa_details();
};

class office : private sofa
{
    int no_of_pieces;
    char delivery_date[10];
    public:
    void Read_office_details();
    void Disp_office_details();
};

void main()
{
    office MyFurniture; }
```

- (i) Mention the member names which are accessible by MyFurniture declared in main() function. 1
- (ii) What is the size of MyFurniture in bytes ? 1
- (iii) Mention the names of functions accessible from the member function Read_office_details() of class office. 2
3. (a) Write a function in C++ which accepts an integer array and its size as arguments/parameters and assign the elements into a two dimensional array of integers in the following format : 3
- If the array is **1, 2, 3, 4, 5, 6** If the array is **1, 2, 3**
- The resultant 2 D array is given below The resultant 2 D array is given below
- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 1 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| 1 | 2 | 3 | 0 | 0 | 0 | 1 | 2 | 3 |
| 1 | 2 | 3 | 4 | 0 | 0 | | | |
| 1 | 2 | 3 | 4 | 5 | 0 | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | | | |
- (b) An array MAT[20][10] is stored in the memory along the row with each element occupying 4 bytes of memory. Find out the base address and the address of element MAT[10][5], if the location of MAT[3][7] is stored at the address 1000. 4
- (c) Introduction class stack
- ```

{ int data[10];
 int top;
 public:
 stack() {top=-1}
 void push(); // to push an element into the stack
 void pop(); // to pop an element from the stack
 void Delete(int ITEM); // To delete all elements which are equal to ITEM
};

```
- Complete the class with all function definitions. Use another stack to transfer data temporarily. 4
- (d) Write a function in C++ to perform Insert operation in dynamically allocated Queue containing names of students. 3
- (e) Write the equivalent infix expression for 2
- 10, 3, \*, 7, 1, -, \*, 23, +**

```

4. (a) void main()
 { char ch='A';
 ofstream fileout(" data.dat", ios::app);
 fileout<<ch;
 int p=fileout.tellg();
 cout<<p;
 }

```

What is the output if the file content before the execution of the program is the string?  
**“ABC” (Note that “”are not part of the file)**

1

(b) Write a function to count the number of blanks present in a text file named  
 “PARA.TXT.

2

(c) Following is the structure of each record in a data file named PRODUCT.DAT”.  
 struct PRODUCT

```

{ char Product_Code[10];
 char Product_Description[10];
 int Stock;
};

```

Write a function in C++ to update the file with a new value of Stock. The Stock and  
 the Product\_Code, whose Stock to be updated, are read during the execution of the  
 program.

3

5. (a) What are DDL and DML ?

2

(b) Study the following tables FLIGHTS and FARES and write SQL commands for the  
 questions (i) to (iv) and give outputs for SQL queries (v) to (vi).

**TABLE : FLIGHTS**

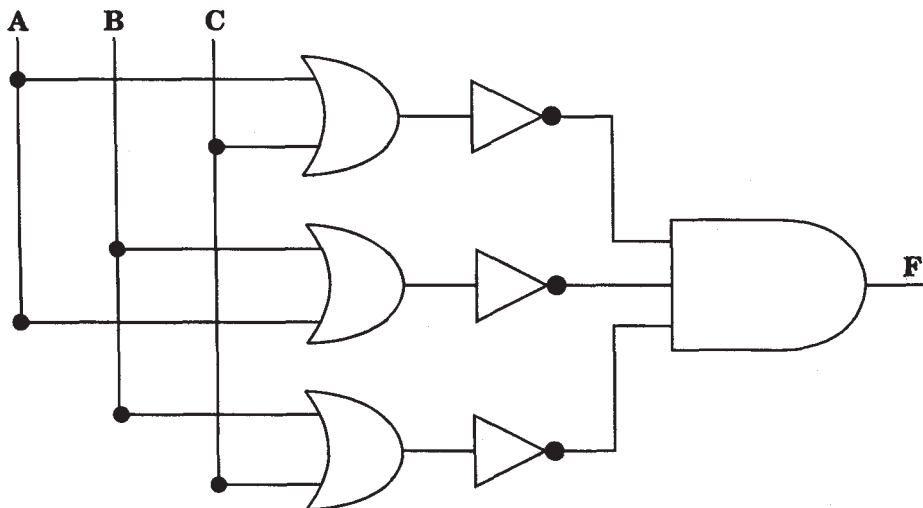
| FL_NO | STARTING  | ENDING     | NO_FLIGHTS | NO_STOPS |
|-------|-----------|------------|------------|----------|
| IC301 | MUMBAI    | DELHI      | 8          | 0        |
| IC799 | BANGALORE | DELHI      | 2          | 1        |
| MC101 | INDORE    | MUMBAI     | 3          | 0        |
| IC302 | DELHI     | MUMBAI     | 8          | 0        |
| AM812 | KANPUR    | BANGALORE  | 3          | 1        |
| IC899 | MUMBAI    | KOCHI      | 1          | 4        |
| AM501 | DELHI     | TRIVANDRUM | 1          | 5        |
| MU499 | MUMBAI    | MADRAS     | 3          | 3        |
| IC701 | DELHI     | AHMEDABAD  | 4          | 0        |

**TABLE : FARES**

| FL_NO | AIRLINES        | FARE  | TAX% |
|-------|-----------------|-------|------|
| IC701 | Indian Airlines | 6500  | 10   |
| MU499 | Sahara          | 9400  | 5    |
| AM501 | Jet Airways     | 13450 | 8    |
| IC899 | Indian Airlines | 8300  | 4    |
| IC302 | Indian Airlines | 4300  | 10   |
| IC799 | Indian Airlines | 10500 | 10   |
| MC101 | Deccan Airlines | 3500  | 4    |

- (i) Display FL\_NO and NO\_FLIGHTS from “KANPUR” to “BANGALORE” from the table FLIGHTS.
- (ii) Arrange the contents of the table FLIGHTS in the ascending order of FL\_NO.
- (iii) Display the FL\_NO and fare to be paid for the flights from DELHI to MUMBAI using the tables FLIGHTS and FARES, where the fare to be paid= $FARE+FARE*TAX\%/100$ .
- (iv) Display the minimum fare “Indian Airlines” is offering from the table FARES.
- (v) SELECT FL\_NO, NO\_FLIGHTS, AIRLINES from FLIGHTS, FARES where STARTING=“DELHI” and FLIGHTS.FL\_NO=FARES.FL\_NO.
- (vi) SELECT count(distinct ENDING) from FLIGHTS.

6. (a) State and verify Associative Law. 2
- (b) Write the equivalent expression for the following logical circuit : 2



- (c) Express  $P + Q'R$  in POS form. 1
- (d) Reduce the following Boolean expression using K-Map : 3  
 $F(P, Q, R, S) = (0, 3, 5, 6, 7, 11, 12, 15)$

7. (a) Name two transmission media for networking. 1
- (b) Expand the following terms : 1
- (i) XML
  - (ii) GSM
  - (iii) SMS
  - (iv) MAN
- (c) Differentiate between Hackers and Crackers.
- (d) INDIAN PUBLIC SCHOOL in Darjeeling is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTELCH).

Distance between various wings are given below :

|                  |       |
|------------------|-------|
| Wing A to Wing S | 100 m |
| Wing A to Wing J | 200 m |
| Wing A to Wing H | 400 m |
| Wing S to Wing J | 300 m |
| Wing S to Wing H | 100 m |
| Wing J to Wing H | 450 m |

Number of Computers

|        |     |
|--------|-----|
| Wing A | 10  |
| Wing S | 200 |
| Wing J | 100 |
| Wing H | 50  |

- (i) Suggest a suitable Topology for networking the computer of all wings. 1
- (ii) Name the wing where the Server is to be installed. Justify your answer. 1
- (iii) Suggest the placement of Hub/Switch in the network. 1
- (iv) Mention an economic technology to provide internet accessibility to all wings. 1

# Marking Scheme – Computer Science

## **General Instruction :**

1. The answers given in the marking scheme are merely suggestive;  
Examiners are requested to consider all alternative correct answers conveying the similar meaning.
2. All programming questions - have to be answered with respect to C++ language only.
3. In SQL related questions - both ways text i.e. character entries should be acceptable.  
(For example: 'Amar' or "Amar")
4. In SQL related questions - ignore semicolon / termination for queries.
5. In SQL related questions - ignore case sensitivity.
6. In C++ questions — Ignore case sensitivity for function names and variable names.

QUESTION PAPER CODE 91/1

## **EXPECTED ANSWERS/VALUE POINTS**

1. (a) (i) math.h                      (ii) ctype.h  
( $\frac{1}{2}$  Marks for each correct Header File)
- (b) #define is a preprocessor directive that is used to define a symbolic constant.  
The symbolic constant defined, replaces the word / statement wherever it appears in the program as a macro substitution.  
Syntax:        #define symbolic\_name value  
Example:       #define Pi 3.14  
                  #define WELCOME cout<<"Hello World!\n";  
(Full 2 marks for illustrating the concept of #define using example)  
**OR**  
(1 mark if only definition is written)
- (c) Corrected Program:  

```
#include<iostream.h>
#include<stdio.h> // Error 1
void main()
{ struct STUDENT
 { char stu_name[20];
 char stu_sex;
 int stu_age; //Error 2
```



```

 } student;
 gets(student.stu_name); //Error 3
 cin>>student.stu_sex; //Error 4
 student.stu_age = 17; //Ignored
}

```

*( ½ mark each for removing four errors)*

**OR**

*(1 Mark to be given for only identification of all the errors without rectification)*

**Note:** If student replaces gets by cin>> or cin.getline( )and does not mention <stdio.h> then full marks to be given if other errors are corrected.

(d) DelhiMumbai

DelhiMumbaiNagpur

*(3 full marks for identifying error in definition of the constructor state() in Line 7)*

**OR**

*(3 marks for the correct lines of output)*

**OR**

*(2 marks for any one correct line of output)*

**OR**

*(1 Mark for showing the output starting with Delhi)*

(e) 2 (assuming R as Rem)

*(2 marks for correct output as 2)*

**OR**

*(2 marks for identifying error as R is not declared)*

**OR**

*(Full 2 marks to be awarded to the students who have scored at least 1 mark in the entire Q. No. 1 i.e. from 1(a) to 1(f))*

(f) —

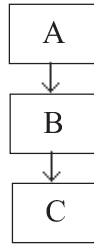
**Note:** Students are exposed to the concept of “Structures” and “Nested Loops”, but not exposed specifically to the concept of “Nested structures”. So benefit of doubt should be given to the students.

*(2 marks for correct definition or example)*

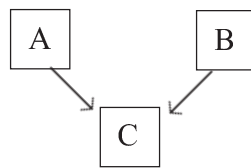
**OR**

*(Full 2 marks to be awarded to the students who have scored at least 1 mark in the entire Q. No. 1 i.e. from 1(a) to 1(f))*

2. (a) In Multilevel inheritance, a class inherits its properties from another derived class transitively.



In **Multiple inheritance**, a derived class inherits from multiple base classes.



*(1/2 mark each for any correct definition)*

*(1/2 mark each for any correct example – diagrammatic/C++ representation)*

**OR**

*(Full 2 marks for explaining the 2 types of inheritance with the help of suitable examples or diagram)*

- (b) Interview Ob1(5);

OR

```
int N=5; Interview Ob1(N);
```

*(1 mark for proper declaration of Object)*

```
Interview(Interview &t)
{
 month = t.month;
}
```

*(1 mark for writing proper statements inside definition of Constructor 2)*

**OR**

*(1 mark for writing the conceptual definition of the copy constructor)*

**OR**

*(Only ½ mark for mentioning the term: copy constructor)*

**Note: Any valid statement in C++ working with t as an object of Interview must be accepted while defining the constructor.**

```

(c) class ADMISSION
{
 int AD_NO;
 char NAME[20]; //or any constant size
 char CLASS;
 float FEES;

 public:
 void Read_Data()
 {
 do
 {
 cin>>AD_NO;
 }while (AD_NO<10 || AD_NO>2000);
 gets(NAME);
 cin>>CLASS;
 cin>>FEES;
 }
 void Display()
 {
 cout<<AD_NO;
 cout<<NAME;
 cout<<CLASS;
 cout<<FEES;
 }
 void Draw_Nos();
};

```

***(1 mark for proper syntax of class definition with correct class name and a semicolon to end the class definition)***

***(1 mark for proper declaration of private members)***

***(1 mark for proper definition of Read\_Data())***

***(1 mark for proper definition of Display())***

***Note: No marks should be deducted for***

- ***Not checking the range for AD\_NO***
- ***Not declaring or defining Draw\_Nos(). (Mentioned as Draw-Nos() in the question paper)***

(d) (i) Read\_pri\_details(), Disp\_pri\_details()  
*(1 mark for correct function names)*

(ii) 29 bytes

OR

33 bytes

*(1 mark for correct answer)*

(iii) Disp\_pri\_details(), Read\_off\_details(), Disp\_off\_details(),  
Read\_sta\_details(), Disp\_sta\_details()

*(2 marks for all correct member functions)*

**Note:**

- ▣ *No partial marks to be given for any of the parts.*
- ▣ *Ignore the constructor and function itself*

3. (a) 

```
const int R = 100, C = 100;
void Arrayconvert(int A1D[], int N)
{
 int A2D[R][C]={0};
 for(int I = 0; I<N; I++)
 for (int J = 0; J <N-I; J++)
 A2D[I][J] = A1D[J];
}
```

OR

```
const int R = 100, C = 100;
void Arrayconvert(int A1D[], int N)
{
 int A2D[R][C];
 for(int I = 0; I<N; I++)
 for (int J = 0; J <N; J++)
 if (J<N-I)
 A2D[I][J] = A1D[J];
 else
 A2D[I][J] = 0;
}
```

OR

```
const int R = 100, C = 100;
void Arrayconvert(int A1D[], int N)
{
 int A2D[R][C], I, J;
 for(I = 0; I<N; I++)
 for (J = 0; J <N; J++)
 A2D[I][J] = 0;
 for(I = 0; I<N; I++)
 for (J = 0; J <N-I; J++)
 A2D[I][J] = A1D[J];
}
```

OR

**Any other equivalent code**

*(1 mark for function header)*

*(1 mark for correct use of nested loops)*

*(½ mark for correctly assigning the values from 1D array to 2D array)*

*(½ mark for assigning 0 to the rest of the elements)*

**Note: Ignore declaration of the 2D array.**

(b) For Column wise allocation

Address of A[I][J] = BA + W[(J-LBC) x M + (I - LBR)]

Where

BA = Base Address

W = Size of each element in bytes = 8 bytes (given)

M = No. of rows in the 2D Array = 30 (given)

Address of MAT[5][7] given is 1000.

**Assumption 1 : LBR=LBC=0**

Therefore

$$\begin{aligned} 1000 &= BA + 8(7 \times 30 + 5) \\ &= BA + 8 \times 215 \\ &= BA + 1720 \\ BA &= 1000 - 1720 \\ &= -720 \end{aligned}$$

Therefore,

Base Address = - 720

$$\begin{aligned} \text{Thus, Address of MAT[20][5]} &= -720 + 8(5 \times 30 + 20) \\ &= -720 + 8 \times 170 \\ &= -720 + 1360 \\ &= 640 \end{aligned}$$

**Assumption 2 : LBR=LBC=1**

Therefore

$$\begin{aligned}1000 &= BA + 8 [(7-1) \times 30 + (5-1)] \\ &= BA + 8[6 \times 30 + 4] \\ &= BA + 8 \times 184 \\ &= BA + 1472 \\ BA &= 1000 - 1472 \\ &= -472\end{aligned}$$

Therefore,

$$\begin{aligned}\text{Base Address} &= -472 \\ \text{Thus, Address of MAT}[20][5] &= -472 + 8 (4 \times 30 + 19) \\ &= -472 + 8 \times 139 \\ &= -472 + 1112 \\ &= 640\end{aligned}$$

*(2 marks for writing the correct column major formula or substitution of values in the correct formula)*

*(1 mark for calculating Base Address)*

*(1 mark for calculating final address of MAT[20][5])*

```
(c) void queue::add()
{
 if ((rear + 1) % 10 != front)
 {
 if (rear == -1)
 front = rear = 0 ;
 else
 rear = (rear + 1) %10;
 cin>>data[rear];
 }
 else
 cout<<"Queue full !! Overflow Error !!\n";
}
void queue::remove()
{
 if (front != -1)
 {
 cout<< data[front]<<" deleted ";
 if(front==rear)
 front=rear=-1;
 else
 front = (front+1)%10;
 }
 else
 cout<<"Queue empty ! Underflow Error!!\n";
}
```

**OR**

```
void queue::add()
{
 if ((rear + 1) % 10 != front)//Ignoring -1
initial values
 {
 rear = (rear + 1) %10;
 cin>>data[rear];
 }
 else
 cout<<"Queue full !! Overflow Error !!\n";
}
void queue::remove()
{
 if (front != rear) //Ignoring -1 initial values
 {
 front = (front+1)%10;
 cout<< data[front]<<" deleted...";
 }
 else
 cout<<"Queue empty ! Underflow Error!!\n";
}
```

**OR**

```
void queue::add()
{ int item;
 if((front==0 && rear==9) || front==rear+1)
 cout<<"\nQueue overflow error";
 else
 {
 cout<<"\nEnter an item to add : ";
 cin>>item;
 if(front==-1)
 { front=0;rear=0; }
 else
 rear=rear+1;
 if(rear==10)
 rear=0;
 data[rear]=item;
 }
}
```

```

void queue::remove()
{
 if((front== -1)
 cout<<"\nQueue Underflow Error";
 else
 {
 int item=data[front];
 if(front==rear)
 front=rear=-1;
 else if(front==9)
 front=0;
 else
 front=front+1;
 cout<<"\nDeleted item is : "<<item;
 }
}

```

**OR**

Any other equivalent code

*(2 marks for any correct add()function code)*

*( ½ mark for checking Overflow condition)*

*(1 mark for changing the values of rear counter )*

*( ½ mark for assigning the new value at the correct position)*

*(2 marks for any correct remove()function code)*

*(1 mark for checking Underflow condition)*

*(1 mark for changing the values of front counter)*

**Note: There is a conceptual contradiction for the function void Delete(int ITEM) , thus the benefit of doubt is given to the student and therefore the definition of the function is to be ignored .**

```

(d) struct Node
{
 float Data;Node *Link;
};
class Stack
{
 Node *Top;
public:
 Stack() { Top = NULL ; }
 void Push();void Pop ();void Display ();
};

```



```

void Stack::Push()
{
 Node *Temp = new Node;
 cin>>Temp->Data;
 Temp->Link = Top;
 Top = Temp;
}

```

OR

Any other code demonstrating proper Push() for a dynamic stack.

*( ½ mark for creating new node dynamically)*

*( ½ mark for assigning a real number to the info part)*

*( 1 mark for linking new node to the Top of the Stack)*

*( 1 mark for assigning the new value to the Top)*

(e)

| S.No. | Element scanned | Operation                       | Infix Expression         |
|-------|-----------------|---------------------------------|--------------------------|
| 1     | A               | Push a                          | a                        |
| 2     | B               | Push b                          | a, b                     |
| 3     | AND             | Pop, Pop, Push (a AND b)        | a AND b                  |
| 4     | A               | Push a                          | a AND b, a               |
| 5     | C               | Push c                          | a AND b, a, c            |
| 6     | AND             | Pop, Pop, Push(aANDc)           | a AND b, a AND c         |
| 7     | OR              | Pop, Pop,<br>a AND b OR a AND c | Push (a AND b OR a AND c |

Ans: a AND b OR a AND c

*(2 marks for writing correct expression)*

OR

*(2 full marks if any other part of Q3 is correctly attempted as students are familiar with infix to postfix conversion only)*

4. (a) 1

*(1 mark for correct output)*

OR

*(Full 1 mark if error is mentioned due to usage of tellg( ) with out mode as the students generally associate tellg( ) with only ios::in mode)*

OR

*(Full 1 mark if student gets at least 1 Mark in any part of question 4)*

```
(b) void countwords()
{
 ifstream fin;
 fin.open("Para.txt");
 char ch ;
 int count = 1;
 while(!fin.eof())
 {
 ch = fin.get();
 if (ch == ' ')
 count ++;
 }
 cout<<"\nNumber of words = "<<count; // Optional
 fin.close(); //Optional
}

```

OR

```
void countwords()
{
 ifstream fin("Para.txt");
 char str[30] ;
 int count = 0;
 while(fin)
 {
 fin>>str;
 count++;
 }
 cout<<"\nNumber of words = "<<count; // Optional
 fin.close(); //Optional
}

```

OR

```
void countwords()
{
 fstream fin;
 fin.open("Para.txt", ios::in);
 char ch[80] ;
 int count = 1;
 while(fin)
 {

```

```

 fin.getline(str,80);
 for(int i=0;str[i]!='\0';i++)
 if (ch == ' ')
 count++;
 }
 cout<<"\nNumber of words = "<<count; // Optional
 fin.close(); //Optional
}

```

OR

```

void countwords()
{
 fstream fin("Para.txt", ios::in);
 char ch[80] ;
 int count = 0;
 while(fin)
 {
 fin.getline(str,80, ' ');
 count++;
 }
 cout<<"\nNumber of words = "<<count; // Optional
 fin.close(); //Optional
}

```

OR

Any other equivalent code

***(1/2 mark for opening file in correct mode either using ifstream or ios::in)***

***(1/2 mark for correct loop)***

***(1/2 mark for checking for blank space/equivalent code)***

***(1/2 mark for counting number of words)***

```

(c) void update()
{
 fstream f;
 COLONY c;
 char C_Code[10];
 cout<<"\nEnter the Colony Code : ";
 cin>>C_Code; // OR gets(C_Code);
 f.open("COLONY.DAT",ios::binary|ios::in|ios::out);
 while(f.read((char*)&c,sizeof(COLONY)))
 {
 if(strcmp(c.Colony_Code, C_Code)==0)

```

```

 {
 cout<<"\nEnter the new Number of people : ";
 cin>>c.No_of_People;
 f.seekp(f.tellg()- sizeof(c));
 //OR f.seekp(f.tellg()- sizeof(c), ios::beg);
 //OR f.seekp(- sizeof(c), ios::curr);
 f.write((char*)&c, sizeof(COLONY));
 }
 }
 f.close();
}

```

**OR**

Any other equivalent code

*( ½ mark for reading Colony\_ Code and No\_of\_People )*

*(1 mark for opening the file(s) in correct mode)*

*(½ mark for correct loop)*

*(1 mark for read function)*

**Note: Since search condition is not clearly mentioned in the question, search and updation to be ignored**

5. (a) Candidate key(s), which is not selected as Primary Key, is known as Alternate key(s).

*(2 marks for any equivalent correct definition)*

- (b) (i) SELECT NAME FROM DOCTOR  
WHERE DEPT = 'MEDICINE' AND EXPERIENCE >10;

*(½ mark for correct Select statement)*

*(½ mark for correct Where clause)*

- (ii) SELECT AVERAGE(S.BASIC + S.ALLOWANCE)  
FROM DOCTOR D, SALARY S  
WHERE D.DEPT = 'ENT' AND D.ID = S.ID;

OR

SELECT AVERAGE(BASIC + ALLOWANCE)  
FROM DOCTOR, SALARY  
WHERE DEPT = 'ENT' AND DOCTOR.ID = SALARY.ID;

*(1/2 mark for correct Select statement)*

*(1/2 mark for correct Where clause)*

**OR**

*(1 mark for students who have correctly attempted any two parts of Q5b)*

(iii) SELECT MIN(S.ALLOWANCE)  
 FROM DOCTOR D, SALARY S  
 WHERE D.SEX = 'F' AND D.ID = S.ID;

OR

SELECT MIN(ALLOWANCE)  
 FROM DOCTOR, SALARY  
 WHERE SEX = 'F' AND DOCTOR.ID = SALARY.ID;

*(½ mark for correct Select statement)*

*(½ mark for correct Where clause)*

(iv) SELECT MAX(S.CONSULTATION)  
 FROM DOCTOR D, SALARY S  
 WHERE D.SEX = 'M' AND D.ID = S.ID;

OR

SELECT MAX(CONSULTATION)  
 FROM DOCTOR , SALARY  
 WHERE SEX = 'M' AND DOCTOR.ID = SALARY.ID;

*(1/2 mark for correct Select statement)*

*(1/2 mark for correct Where clause)*

(v) 4

*(1 mark for correct answer)*

| (vi) <u>NAME</u> | <u>DEPT</u> | <u>BASIC</u> |
|------------------|-------------|--------------|
| John             | ENT         | 12000        |

*(1 mark for correct answer)*

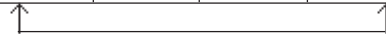
6. (a) Distributive Laws are :

(a)  $A(B + C) = AB + AC$

(b)  $A + (BC) = (A + B)(A + C)$

Verification of first distributive law using truth table:

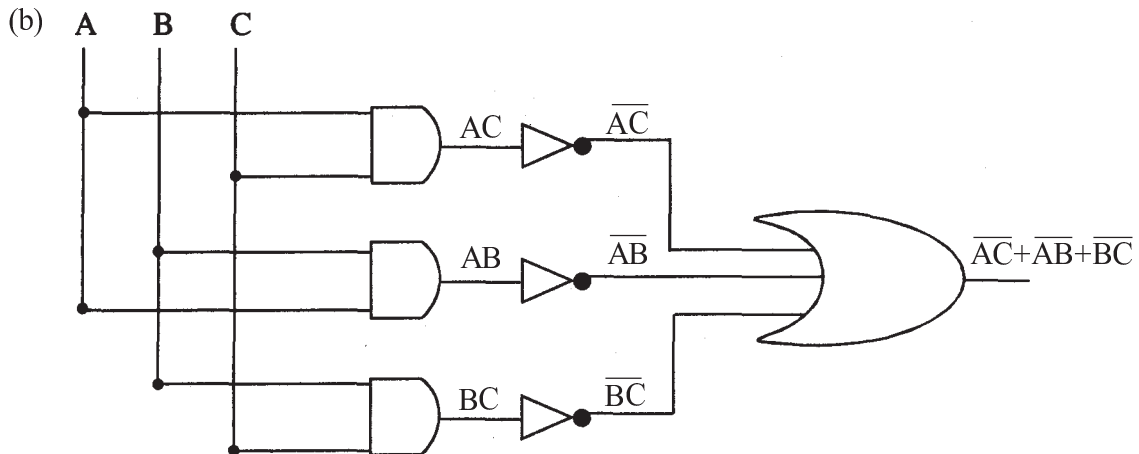
| A | B | C | B+C | A(B+C) | AB | AC | AB+AC |
|---|---|---|-----|--------|----|----|-------|
| 0 | 0 | 0 | 0   | 0      | 0  | 0  | 0     |
| 0 | 0 | 1 | 1   | 0      | 0  | 0  | 0     |
| 0 | 1 | 0 | 1   | 0      | 0  | 0  | 0     |
| 0 | 1 | 1 | 1   | 0      | 0  | 0  | 0     |
| 1 | 0 | 0 | 0   | 0      | 0  | 0  | 0     |
| 1 | 0 | 1 | 1   | 1      | 0  | 1  | 1     |
| 1 | 1 | 0 | 1   | 1      | 1  | 0  | 1     |
| 1 | 1 | 1 | 1   | 1      | 1  | 1  | 1     |



Comparing Column Numbers 5 and 8, Distributive law is verified.

*(1 Mark for writing either of the distributive law)*

*(1 Mark for verification using truth table)*



*(2 Marks for correct expression)*

**OR**

*(½ Mark each for  $(AC)'$ ,  $(AB)'$ ,  $(BC)'$  and the final expression)*

(c)  $(P + Q'R)$

$$= P(Q + Q')(R + R') + Q'R(P + P')$$

$$= (PQ + PQ')(R + R') + PQ'R + P'Q'R$$

$$= PQR + PQ'R + PQR' + PQ'R' + PQ'R + P'Q'R$$

$$= PQR + PQ'R + PQR' + PQ'R' + P'Q'R$$

*(1 mark for the canonical expression)*

(d)

|      |      |     |    |     |
|------|------|-----|----|-----|
|      | P'O' | P'O | PO | PO' |
| R'S' | 1    |     | 1  |     |
| R'S  |      | 1   |    |     |
| RS   | 1    | 1   | 1  | 1   |
| RS'  |      | 1   |    |     |

OR

|      |      |     |    |     |
|------|------|-----|----|-----|
|      | R'S' | R'S | RS | RS' |
| P'O' | 1    |     | 1  |     |
| P'O  |      | 1   | 1  | 1   |
| PO   | 1    |     | 1  |     |
| PO'  |      |     | 1  |     |

$$F = RS + P'QS + P'QR + P'Q'R'S' + PQR'S'$$

*(1 Mark for correct placing of 1s)*

*(1 Mark for correct grouping)*

*(1 Mark for final reduced expression)*

7. (a) Internet is a network of computer networks which operates world-wide using a common set of communications protocols.

Intranet is an inter-connected network within one organization that uses Web technologies for the sharing of information internally.

*(Full 1 Mark for correctly defining internet only as Intranet is not directly specified in the syllabus)*

- (b) (i) Code Divison Multiple Access  
(ii) Uniform Resource Locator (Location) / Universal Resource Locator (Location)  
(iii) Hype Text Transfer (Transmission) Protocol  
(iv) Wide Area Network  
*( 1/2 mark for each term)*

- (c) Fault detection is easy.  
Fault isolation is easy.

OR

Any other valid advantage.

*(1 mark for any one correct advantage)*

- (d) (i) Star or Bus or any other valid topology or diagram.  
*(1 mark for mentioning any of the above topologies)*  
*(1 mark for diagrammatic representation of any of the above topologies)*
- (ii) Wing A, because maximum number of computers are located at Wing A.  
*(1 mark for the correct answer)*  
**OR**  
*( ½ mark if only Wing A is mentioned without justification)*
- (ii) Hub/Switch in all the wings.  
 OR  
 Correct diagram depicting placement of Hub/Switch in all the wings.  
*(1 mark for correct placement)*
- (iv) Coaxial cable / Modem / LAN / TCP-IP / Dialup/ DSL/ Leased Line  
 OR any other valid technology (any one).  
**Note: Optical fiber, Satellite link and Microwave NOT to be considered as valid answers.**  
*(1 Mark for any valid technology)*

QUESTION PAPER CODE 91

EXPECTED ANSWERS/VALUE POINTS

1. (a) (i) math.h / complex.h           (ii) stdlib.h  
*(1/2 Marks for each correct Header File)*
- (b) —  
 Note: As the term inline function is not mentioned in the curriculum, benefit of doubt should be given to the students.  
*(Full 2 marks to be awarded to the students who have scored at least 1 mark in the entire Q. No. 1 i.e. from 1(a) to 1(f))*
- (c) 

```
#include<iostream.h>
#include<stdio.h> // Error 1 - needed for gets()
void main()
{
 struct movie
 {
 char movie_name[20];
 char movie_type;
 int ticket_cost = 100; //Error 2 - assignment not
 //possible inside structure definition
 }MOVIE;
```



```

 gets(MOVIE.movie_name); //Error 3 -members must be
 //accessed using object
 cin>>MOVIE.movie_type; //Error 4 -cant use gets for
 //char variable and member must
 //be accessed using object.
}
#include<iostream.h>
void main()
{
 struct movie
 {
 char movie_name[20];
 char movie_type;
 int ticket_cost =100; //Error 1 - initialization' not
 //possible inside structure definition
 }MOVIE;
 cin.getline(MOVIE.movie_name,20); //Error 2 -members must
 //be accessed using object
 cin>>MOVIE.movie_type; //Error 3 -cant use gets for
 //char variable and member must
 //be accessed using object.
}

```

*(1 mark for identifying and correcting any one Error)*

*(1 ½ mark for identifying and correcting any two errors)*

*(2 marks for identifying and correcting more than two errors)*

**OR**

*(1 mark for only identifying all errors)*

(d) JackJill

JackJillJohn

*(2 marks for any one correct line)*

*(Full 3 marks for both lines correct)*

*(½ mark to be deducted from full 3 marks, if endl is not considered)*

(e) -2

*(Full 2 marks for correct output)*

**OR**

*(Full 2 marks for mentioning values of First as 14 and Second as 16, as representation of minus sign is not very prominent)*

**OR**

*(Full 2 marks for mentioning syntax error with justification as insertion operator << expected in between First and Second)*

- (f) A constructor that accepts no parameters is called the default constructor. The compiler supplies a default constructor, if a class has no explicit constructor defined. It initializes the data members by a dummy value. It is also used to create objects with default values.

Destructor is used to destroy the objects and deallocate the memory resources that have been allocated by a constructor. It has same name as the class preceded by tilde (~). It takes no arguments and no return types can be specified.

*(1 mark for each correct definition / example of default constructor)  
(1 mark for any difference / correct definition / correct example for destructor)*

2. (a) Students are exposed to the concept of pointers, but not exposed specifically to the concept of “this” pointer. So benefit of doubt should be given to the students.

*(Full 2 marks to be given to students who have correctly attempted for at least 1 mark in the entire Q. No. 2 (a) to 2 (d))*

- (b) (i) Exam E(5) ;

*(1 mark for proper declaration of Object)*

- (ii) Exam (Exam &t)  
{year = t.year;}

OR

Copy constructor: It is an overloaded constructor, in which object of the same class is passed as parameter.

*(1 mark for writing proper statements inside definition of Constructor 2)*

OR

*(1 mark for any valid statement in C++ working with t as an object of Exam)*

OR

*(1 mark for writing the definition/explanation of the concept of copy constructor)*

OR

*(1/2 mark for mentioning only the term copy constructor)*

```

(c) class HOUSING
{
 int REG_NO;
 char NAME[20];
 char TYPE;
 float COST;
public:
 void Read_Data();
 void Display();
 void Draw_Nos(HOUSING S);
};
void HOUSING::Read_Data()
{
 cin>>REG_NO; //Validation not required
 cin>>NAME; //OR gets(NAME);
 cin>>TYPE; cin>>COST;
}
void HOUSING::Display()
{
 cout<<REG_NO<<NAME<<TYPE<<COST<<endl;
}
void HOUSING::Draw_Nos(); //Ignore

```

*(1/2 mark for proper syntax of class definition with correct class name and a semicolon to end the class definition)*

*(1/2 mark for mentioning the proper visibility modes (private/public))*

*(1 mark for proper declaration of private data members)*

*(1 mark for proper definition of Read\_Data() with user entry for data members OR declaring a local object and entering the values of data members of this object )*

*(1 mark for proper definition of Display())*

**Note:** As language of Third part of this question has ambiguity, it is required to be ignored. Moreover, if anyone has partially attempted the third part (i.e., Draw\_nos function) and not attempted/not correctly attempted Read/Display function, he/she should be given 2 Marks for Third part taking into consideration the marks for this question should not exceed the max. marks allocated (i.e. 4 marks) to this question 2 (c).

- (d) (i) Read\_office\_details  
Disp\_office\_details.  
*(1 mark for correct names)*
- (ii) 29 bytes  
OR  
33 Bytes  
*(1 mark for correct answer)*
- (iii) Read\_fur\_details(),  
Disp\_fur\_details,  
Read\_sofa\_details(),  
Disp\_sofa\_details(),  
Disp\_office\_details()  
Read\_office\_details() **(Optional)**  
*(2 marks for correct answer)*

3. (a) `const int R = 100, C = 100;`  
`void Arrayconvert(int A1D[ ], int N)`  
`{`  
`int A2D[R][C] = {0};`  
`for(int I = 0; I < N; I++)`  
`for (int J = 0; J <= I; J++)`  
`A2D[I][J] = A1D[J];`  
`}`

*(1 mark for proper function header)*

*(1 mark for proper use of loops)*

*(1 mark for proper assignment of values)*

- (b) For Row wise allocation  
Address of A[I][J] = BA + W((I-LBR) x N + (J-LBC))

Where

BA = Base Address

W = Size of each element in bytes = 4 bytes (given)

N = No. of columns in the 2D Array = 10 (given)

Address of MAT[3][7] given is 1000.

Therefore

**(Assumption 1: LBR = LBC = 0)**

$$\text{MAT}[3][7] = 1000 = \text{BA} + 4(10(3-0) + (7-0))$$

$$= \text{BA} + 148$$

$$\text{BA} = 1000 - 148$$

$$= 852$$

Therefore,

$$\text{Base Address} = 852$$

$$\begin{aligned}\text{Thus, Address of MAT}[10][5] &= 852 + 4 ( 10 (10-0) + (5-0)) \\ &= 852+420 \\ &= 1272\end{aligned}$$

OR

**(Assumption 2: LBR = LBC = 1)**

$$\begin{aligned}\text{MAT}[3][7]=1000 &= \text{BA} + 4 (10 (3-1) + (7-1)) \\ &= \text{BA} + 104\end{aligned}$$

$$\begin{aligned}\text{BA} &= 1000 - 104 \\ &= 896\end{aligned}$$

Therefore,

$$\text{Base Address} = 896$$

$$\begin{aligned}\text{Thus, Address of MAT}[10][5] &= 896 + 4 ( 10 (10-1) + (5-1)) \\ &= 896+376 \\ &= 1272\end{aligned}$$

*(1 mark for writing the correct formula / correct substituted values, for row major properly, for calculating Base Address)*

*(1 mark for calculating correct Base Address)*

*(1 mark for writing the correct formula / correct substituted values, for row major properly, for calculating Address of MAT [10][5] )*

*(1 mark for calculating correct address of MAT [10][5])*

```
(c) void stack::push()
{
 int n;
 cout<<"Enter a value";cin>>n;
 if (top==10)
 cout<<"Stack Overflow";
 else
 data[++top]=n;
}
void stack::pop()
{
 if (top== -1)
 cout<<"Stack Underflow";
 else
 cout<<data[top--];
}
void stack::Delete(int ITEM); //Ignore this part
```

**[Push Operation]**

*(1/2 mark for checking overflow condition)*

*(1/2 mark for using increment in Top variable)*

*(1 mark for correct assignment of data in stack)*

**[Pop Operation]**

*(1/2 mark for checking underflow condition)*

*(1/2 mark for using decrement in Top variable)*

*(1 mark for displaying or returning value of the popped element from the stack)*

**Note:** As language of Third part of this question has ambiguity with respect to Stack Operation, it is required to be ignored. Moreover, if anyone has partially attempted the third part (i.e. Delete function) and not attempted/not correctly attempted Push/Pop should be given 2 Marks for Third part taking into consideration the marks for this question should not exceed the max. marks allocated (i.e. 4 marks) to this question 3 (c).

```
(d) struct Student
{
 char Name[20]; Student *Link;
};
class Queue
{
 Student *FRONT, *REAR;
public:
 Queue() { FRONT = NULL ; REAR = NULL}
 void Insert();
};
void Queue::Insert()
{
 Student *Temp = new Student;
 gets(Temp->Name);
 Temp->Link = NULL;
 if (REAR==NULL)
 { FRONT=Temp; REAR = Temp; }
 else
 {
 REAR->Link = Temp;
 REAR=Temp;
 }
}
```

**OR**

**Any other code demonstrating proper Insert() for a dynamic Queue.**

*(1 mark for creating a dynamic Node and entering / assigning the value for Name)*

*(1 mark for creating a Link with the previous Node)*

*(1 mark for assigning new value of Rear.)*

**Note:**

- 1. Ignore the struct and class implementation while awarding marks in this question**
- 2. Equivalent code with Dynamic Array should also be considered as correct solution**

(e)  $10 \cdot 3 \cdot (7-1) + 23$

*(Full 2 marks to be given to students who have correctly attempted for at least 1 mark in the entire Q. No. 3 (a) to 3 (e))*

**Note: As students are exposed to Conversion from INFIX to POSTFIX and Evaluation of POSTFIX only, he/she may not be able to comprehend the conversion from POSTFIX to INFIX.**

4. (a) 4

*(1 mark for correct output)*

**OR**

*(1 mark if error mentioned due to usage of tellg() with app mode)*

(b) 

```
void CountSpace()
{
 fstream fin;
 fin.open("PARA.TXT", ios::in);
 OR
 ifstream fin("PARA.TXT");
 char ch ;
 int count = 0;
 while(!fin.eof())
 {
 ch = fin.get();
 if (ch == ' ') // (ch==32) OR (ch==255)
 count ++;
 }
 cout<<"Number of spaces = "<<count; //Ignore
 fin.close(); //Ignore
}
```

**OR**

**Any equivalent code that counts the number of words from the file**

*(1/2 Mark for opening the file in right mode)*

*(1/2 Mark for correct loop structure i.e. with a condition checking for end of file)*

*(1/2 Mark for reading a character / line from the file)*

*(1/2 Mark for checking for space and incrementing the counter)*

```
(c) void modify()
 {
 ifstream out;

 out.open("PRODUCT.DAT", ios::binary|ios::in|ios::out);
 PRODUCT P1;
 int flag=0,stock;char PCode[10];
 gets(PCode);
 cin>>stock;
 while (out.read((char*)&P1, sizeof(P1))
 if (strcmp(P1.Product_code,Pcode)==0
 // strcmpi() may also be considered
 {
 flag=1;
 P1.Stock=stock;
 int Position=out.tellg()-sizeof(P1);
 out.seekp(Position);
 //OR
 out.seekp(-sizeof(P1), ios::cur);
 out.write((char*)&P1, sizeof(P1));
 }
 }
 if (flag==0) cout<<"Product Code does not match";
 //OR
 if (!flag) cout<<"Product Code does not match";
 out.close();
 }
```

**OR**

**Any other equivalent code**

*(1/2 Mark for opening the file in 'in' as well as 'out' mode)*

*(1/2 Mark for declaring object and temporary variables required for product code and stock)*

*(1/2 Marks for correct loop, check of end of file and reading of an object from the file)*

*(1/2 Mark for correct comparison)*

*(1/2 Mark for identifying and moving the file pointer to the correct position)*

*(1/2 Mark writing the modified/updated data on right position in the file)*



5. (a) DDL – Data Definition Language  
DML – Data Manipulation Language

*(1 Mark each for correct full form OR correctly explaining with the help of examples)*

- (b) (i) `SELECT FL_NO, NO_FLIGHTS FROM FLIGHTS  
WHERE STARTING='KANPUR' AND ENDING='BANGALORE' ;`

*(1/2 Mark for using SELECT and FROM correctly)*

*(1/2 Mark for correct WHERE clause)*

- (ii) `SELECT * FROM FLIGHTS ORDER BY FL_NO ;`

*(1/2 Mark for using SELECT and FROM correctly)*

*(1/2 Mark for correct ORDER BY clause [ASC is optional])*

- (iii) `SELECT FLIGHTS.FL_NO, FARE+FARE*TAX/100  
FROM FLIGHTS, FARES WHERE FLIGHTS.STARTING='DELHI' AND  
FLIGHTS.ENDING='MUMBAI' AND FLIGHTS.FL_NO=FARES.FL_NO ;`

**\*Assuming TAX% as TAX**

*(Full 1 Mark for correctly attempting any part of 5 (b))*

- (iv) `SELECT MIN(FARE) FROM FARES WHERE AIRLINES='INDIAN AIRLINES' ;`

*(1/2 Mark for using SELECT and FROM with MIN function correctly)*

*(1/2 Mark for correct WHERE clause)*

- (v)
- | FL_NO | NO_FLIGHTS | AIRLINES       |
|-------|------------|----------------|
| IC302 | 8          | IndianAirlines |
| AM501 | 1          | JetAirways     |
| IC701 | 4          | IndianAirlines |

*(1 Mark for correct output, Ignore First header line)*

- (vi) 7

*(1 Mark for correct output)*

6. (a) (i)  $X+(Y+Z)=(X+Y)+Z$

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

(ii)  $X.(Y.Z)=(X.Y).Z$

| X | Y | Z | YZ | X.Y | X.(Y.Z) | (X.Y).Z |
|---|---|---|----|-----|---------|---------|
| 0 | 0 | 0 | 0  | 0   | 0       | 0       |
| 0 | 0 | 1 | 0  | 0   | 0       | 0       |
| 0 | 1 | 0 | 0  | 0   | 0       | 0       |
| 0 | 1 | 1 | 1  | 0   | 0       | 0       |
| 1 | 0 | 0 | 0  | 0   | 0       | 0       |
| 1 | 0 | 1 | 0  | 0   | 0       | 0       |
| 1 | 1 | 0 | 0  | 1   | 0       | 0       |
| 1 | 1 | 1 | 1  | 1   | 1       | 1       |

*(1 Mark for stating any one of the law)*

*(1 Mark for verification of any one of the law)*

(b)  $(A+C)'.(A+B)'.(B+C)'$

*(1/2 Mark each for  $(A+C)'$ ,  $(A+B)'$ ,  $(B+C)'$  and final expression)*

**OR**

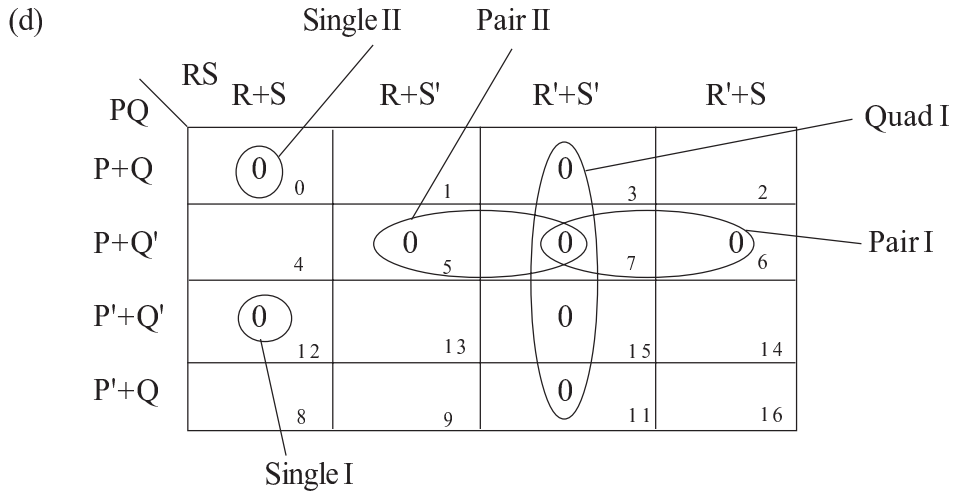
*(Full 2 marks even if students have mentioned the reduced form of the same expression)*

(c)  $(P+Q').(P+R)$

OR

$(P+Q'+R).(P+Q'+R').(P+Q+R)$

*(1 Mark for any of the two POS forms of the given expression)*



$$F(P,Q,R,S) = (P+Q+R+S).(P'+Q'+R+S).(P+Q'+R').(P+Q'+S').(R'+S')$$

*(1 mark for representing correct places in K-Maps)*

**AND**

*(1/2 mark for grouping and writing minimum 2 Groups)*

**OR**

*(1 mark for grouping and writing minimum 3 Groups)*

**OR**

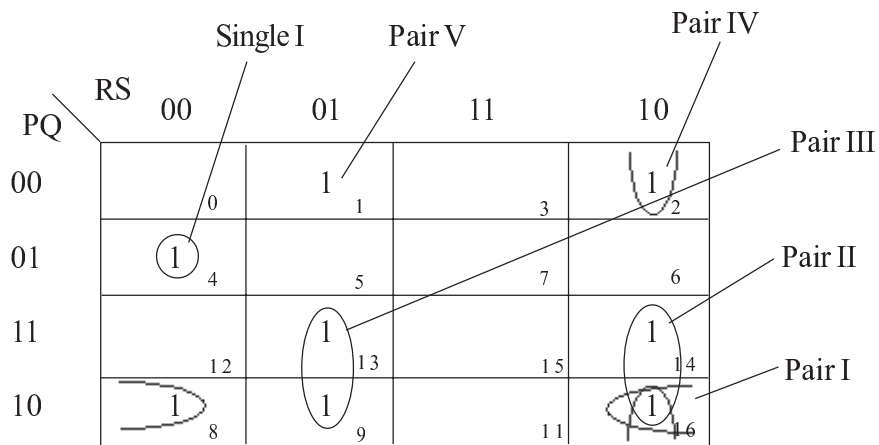
*(1 1/2 mark for grouping and writing 5 Groups)*

**OR**

*(2 mark for grouping and writing final expression in reduced form)*

**Important: 1/2 Mark to be deducted for redundant group(s)**

**OR**



$$F(P,Q,R,S) = P'QR'S' + PQ'S' + PRS' + PR'S + Q'RS' + Q'R'S$$

*(1 mark for representing correct places in K-Maps)*

**AND**

*(1/2 mark for grouping and writing minimum 2 Groups)*

**OR**

*(1 mark for grouping and writing minimum 4 Groups)*

**OR**

*(1 ½ mark for grouping and writing 6 Groups)*

**OR**

*(2 mark for grouping and writing final expression in reduced form)*

**Important: 1/2 Mark to be deducted for redundant group(s)**

7. (a) **Optical Fiber**

**Ethernet Cable or twisted pair cable or UTP or STP**

**Co-axial Cable**

**Infrared**

**Radio Link OR Radiowave**

**Microwave link OR Microwave**

**Satellite Link**

**[Any TWO of the mentioned above OR any other correct media]**

*(1/2 Mark for each correct answer)*

- (b) (i) XML            Extensible Markup Language  
(ii) GSM            Global System for Mobile communication    {ignore communication}  
(iii) SMS            Short Messaging Service    {Message/Messaging both acceptable}  
(iv) MAN            Metropolitan Area Network

*(1/2 Mark for each correct answer)*

*(No marks for partially correct answers)*

- (c) **Hackers:** Computer enthusiasts who enjoy learning about computer systems and get into other system/network for gaining more knowledge or may find flaws in the system for rectification purposes.

**Crackers:** Malicious programmers who break into secure systems for stealing and corrupting/spoiling data.

*(1/2 Mark for definition of each Hacker and Cracker)*

**OR**

*(Full 1 Mark for mentioning the difference)*

(d) (i) Star Topology

OR

Bus Topology

*(1 Mark for mentioning any one of the two topologies)*

**OR**

*(1 Mark for diagrammatic representation of any of the above mentioned topologies)*

(ii) Wing S

as it has the maximum number of computers

OR

Wing A

as it is placed in the Admin Wing (for security reasons)

*(1/2 Mark for identification of the correct Wing)*

*(1/2 Mark for correct justification)*

(iii) Inside all the four wings

*(1 Mark for the correct answer)*

(iv) Any one of the following:

Dialup, TCP/IP, DSL, Modem, Broadband, Cable, ISDN, Telephone Line, Co-axial, Ethernet Cable, Radiowave

*(1 Mark for the correct answer)*

**Important Note: Satellite Link, Optical Fiber, Microwave and Leased line are not acceptable solution for this question**