

COMPUTER SCIENCE

Time allowed : 3 hours

Maximum Marks : 70

General Instructions:

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

QUESTION PAPER CODE 91/1

1. (a) What is the difference between #define and const? Explain with suitable example. 2
- (b) Name the header files that shall be needed for the following code 1
- ```
void main ()
{
 char String [] = "Peace";
 cout<<setw (20) << String;
}
```
- (c) Rewrite the following program after removing the syntactical error(s) if any. Underline each correction. 2
- ```
#include <iostream.h >
void main ()
{
    First = 10, Second = 20;
    Jumpto (First; Second);
    Jumpto (Second);
}

void Jumpto (int N1, int N2=20)
{
    N1 = N1 + N2;
    cout<<N1>>N2;
}
```
- (d) Find the output of the following program: 3
- ```
#include<iostream.h>
#include<ctype.h>
```

```

void main ()
{
 char Text [] = "Mind@Work!";
 for (int I = 0; Text (I) != '\0'; I++)
 {
 if (!isalpha (Text[I]))
 Text [I] = '*';
 else if (isupper (Text[I]))
 Text [I] = Text [I] + 1 ;
 else
 Text (I) = Text [I+ 1];
 }
 cout<<Text;
}

```

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

```

#include<iostream.h>
void main ()
{
 int U = 10, V = 20;
 for (int I = 1; I <= 2; I++)
 {
 cout<<"[1]="<<U++<<"&"<<V-5<<endl;
 cout<<"[2]="<<++V<<"&"<<U+ 2<<endl;
 }
}

```

- (f) In the following program, find the correct possible output(s) from the options: 2

```

#include<stdlib.h>
#include<iostream.h>
void main ()
{
 randomize ();
 char City [] [10] = {"DEL", "CHN", "KOL", "BOM", "BNG"};
 int Fly;
 for (int I=0;I<3;I++)
 {
 Fly=random (2)+ 1;
 cout<<City[Fly]<<" ";
 }
}

```

```

 }
}

```

**outputs:**

- (i) **DEL:CHN:KOL:**
- (ii) **CHN:KOL:CHN:**
- (iii) **KOL:BOM:BNG:**
- (iv) **KOL:CHN:KOL:**

2. (a) Differentiate between public and private visibility modes in context of Object Oriented Programming using a suitable example illustrating each. 2
- (b) Answer the questions (i) and (ii) after going through the following program 2

```

#include<iostream.h>
#include<string.h>
class Bazar
{
 char Type[20];
 char Product[20];
 int Qty;
 float Price;
 Bazar () //Function 1
 {
 strcpy (Type, "Electronic");
 strcpy (Product, "Calculator");
 Qty=10;
 Price=225;
 }
public:
 void Disp () // Function 2
 {
 cout<<Type<<"-"<<Product<<":"<<Qty
 <<"@"<<Price<<endl;
 }
};
void main ()
{
 Bazar B; //Statement 1

```

```

 B. Disp (); // Statement 2
 }

```

- (i) Will Statement 1 initialize all the data members for object B with the values given in the Function I? (Yes OR No). Justify your answer suggesting the correction(s) to be made in the above code.
- (ii) What shall be the possible output when the program gets executed? (Assuming, if required - the suggested correction(s) are made in the program)

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

Private Members:

|         |                 |
|---------|-----------------|
| GCode   | of type string  |
| GType   | of type string  |
| GSize   | of type integer |
| GFabric | of type string  |
| GPrice  | of type float   |

A function Assign ( ) which calculates and assigns the value of GPrice as follows

|                                       |            |
|---------------------------------------|------------|
| For the value of GFabric as “COTTON”, |            |
| GType                                 | GPrice(Rs) |
| TROUSER                               | 1300       |
| SHIRT                                 | 1100       |

For GFabric other than “COTTON” the above mentioned GPrice gets reduced by 10%.

Public Members:

A constructor to assign initial values of GCode, GType and GFabric with the word “NOT ALLOTTED” and GSize and GPrice with 0

A function Input ( ) to input the values of the data members GCode, GType, GSize and GFabric and invoke the Assign ( ) function.

A function Display ( ) which displays the content of all the data members for a Garment.

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

```

class Dolls
{
 char DCode[5];
protected:
 float Price;

```

```

 void CalcPrice(float);
public:
 Dolls ();
 void DInput ();
 void DShow ();
};
class SoftDolls : public Dolls
{
 char SDName[20];
 float Weight;
public:
 SoftDolls ();
 void SDInput ();
 void SDSHow ();
};
class ElectronicDolls: public Dolls
{
 char EDName[20];
 char BatteryType[10];
 int Batteries;
public:
 ElectronicDolls ();
 void EDInput ();
 void EDSHow ();
};

```

- (i) Which type of Inheritance is shown in the above example?
- (ii) How many bytes will be required by an object of the class ElectronicDolls? .
- (iii) Write name of all the data members accessible from member functions of the class SoftDolls
- (iv) Write name of all the member functions accessible by an object of the class ElectronicDolls.

3. (a) Write a function in C++, which accepts an integer array and its size as parameters and rearranges the array in reverse. Example: if an array of nine elements initially contains the elements as

4, 2, 5, 1, 6, 7, 8, 12, 10

then the function should rearrange the array as

10, 12, 8, 7, 6, 1, 5, 2, 4

4

- (b) An array `Arr[40][10]` is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the location `Arr[3][6]` if the location `Arr[30][10]` is stored at the address 9000

4

- (c) Write a function in `c++` to Insert an element into a dynamically allocated Queue where each node contains a name (of type string) as data.

4

Assume the following definition of `THENODE` for the same.

```
struct THENODE
{
 char Name[20];
 THENODE *Link;
};
```

- (d) Write a function in `C++` to print the product of each column of a two dimensional integer array passed as the argument of the function.

2

Explain: if the two dimensional array contains

|   |   |   |
|---|---|---|
| 1 | 2 | 4 |
| 3 | 5 | 6 |
| 4 | 3 | 2 |
| 2 | 1 | 5 |

Then the output should appear as :

Product of Column 1 = 24

Product of Column 2 = 30

Product of Column 3 = 240

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

2

4, 10, 5, +, \*, 15, 3, /, -

4. (a) Observe the program segment given below carefully, and answer the question that follows:

1

```
class Applicant
{
 long AId; //Applicant's Id
```

```

 char Name [20]; //Applicant's Name
 float Score; //Applicant's Score
public:
 void Enroll ();
 void Disp ();
 void MarksScore (); //Function to change Score
 long R_AId () {return AId;}
};
void ScoreUpdate (long Id)
{
fstream File;
File.open ("APPLI.DAT",ios::binary|ios::in|ios::out);
Applicant A;
int Record = 0, Found = 0 ;
while (!Found && File.read((char*) &C, sizeof(c)))
{
 if(Id == A.R_AId ())
 {
 cout<<"Enter new Score";
 A.MarksScore ();
 _____ // Statement 1
 _____ //Statement 2
 Found = 1;
 }
 Record ++;
}
if(Found ==1) cout<<"Record Updated";
File.close ();
}

```

Write the Statement1 **to position** the File Pointer at the beginning of the Record for which the Applicant's Id matches with the argument passed, and Statement2 **to write** the updated Record at that position.

- (b) Write a function in C++ to count the number of lowercase alphabets present in a text file "BOOK.TXT". 2
- (c) Given a binary file PHONE.DAT, containing records of the following structure type 3

```

class Phonlist
{
 char Name [20];
 char Address[30];
 char AreaCode[5];
 char PhoneNo[15];
public:
 void Register ();
 void Show ();
 int CheckCode (char AC [])
 {
 return strcmp (AreaCode, AC);
 }
};

```

Write a function TRANSFER () in C++, that would copy all those records which are having AreaCode as "DEL" from PHONE.DAT to PHONBACK.DAT.

5. (a) Differentiate between **Candidate Key** and **Primary Key** in context of RDBMS 2  
(b) Consider the following tables Product and Client. Write SQL commands for the statement (i) to (iv) and give outputs for SQL queries (v) to (viii) 6

**TABLE: PRODUCT**

| P_ID | ProductName   | Manufacturer | Price |
|------|---------------|--------------|-------|
| TP01 | Talcom Powder | LAK          | 40    |
| FW05 | Face Wash     | ABC          | 45    |
| BS01 | Bath Soap     | ABC          | 55    |
| SH06 | Shampoo       | XYZ          | 120   |
| FW12 | Face Wash     | XYZ          | 95    |

**TABLE: CLIENT**

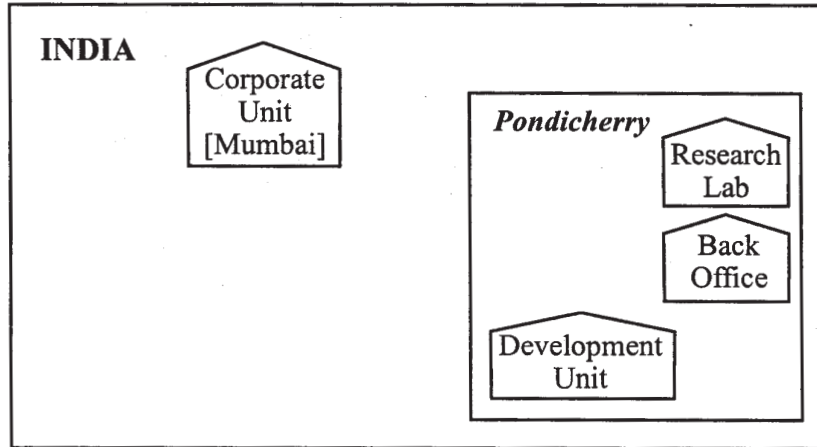
| C_ID | ClientName    | City      | P_ID |
|------|---------------|-----------|------|
| 01   | Cosmetic Shop | Delhi     | FW05 |
| 06   | Total Health  | Mumbai    | BS01 |
| 12   | Live Life     | Delhi     | SH06 |
| 15   | Pretty Woman  | Delhi     | FW12 |
| 16   | Dreams        | Bangalore | TP01 |



- (i) To display the details of those Clients whose City is Delhi
  - (ii) To display the details of Products whose Price is in the range of 50 to 100 (Both values included)
  - (iii) To display the ClientName, City from table Client, and ProductName and Price from table Product, with their corresponding matching P\_ID
  - (iv) To increase the Price of all Products by 10
  - (v) SELECT DISTINCT Address FROM Client;
  - (vi) SELECT Manufacturer, MAX(Price), Min(Price), Count(\*) FROM Product GROUP BY Manufacturer;
  - (vii) SELECT ClientName, ManufacturerName FROM Product, Client WHERE Client.Prod\_Id=Product.P\_Id;
  - (viii) SELECT ProductName, Price \*4 FROM Product
6. (a) State and verify De Morgan's law in Boolean Algebra 2
- (b) Draw a Logical Circuit Diagram for the following Boolean Expression  $X' \cdot (Y' + Z)$  1
- (c) Convert the following Boolean expression into its equivalent Canonical Sum of Product Form(SOP)  $(X' + Y + Z') \cdot (X' + Y + Z) \cdot (X' + Y' + Z) \cdot (X' + Y' + Z')$  2
- (d) Reduce the following Boolean expression using K - Map  $F(A,B,C,D) = \sum(0,2,3,4,6,7,8,10,12)$  3
7. (a) What is a Hub? 1
- (b) Expand the following terms with respect to Networking: 2
- (i) MODEM
  - (ii) WLL
  - (iii) FTP
  - (iv) TCP/IP
- (c) How is Coaxial cable different from Optical Fibre? 1
- (d) "Bias Methodologies" is planning to expand their network in India, starting with three cities in India to build infrastructure for research and development

of their chemical products. The company has planned to setup their main office in Pondicherry - at three different locations and have named their offices as “Back Office”, “Research Lab” and “Development Unit”. The company has one more Research office namely “Corporate Office” in “Mumbai”. A rough layout of the same is as follows :

4



Approximate distances between these offices is as follows:

| From         | To               | Distance |
|--------------|------------------|----------|
| Research Lab | Back Office      | 110 Mts  |
| Research Lab | Development Unit | 16 KM    |
| Research Lab | Corporate Unit   | 1800 KM  |
| Back Office  | Development Unit | 13 KM    |

In continuation of the above, the company experts have planned to install the following number of computers in each of their offices:

|                  |     |
|------------------|-----|
| Research Lab     | 158 |
| Back Office      | 79  |
| Development Unit | 90  |
| Corporate Unit   | 51  |

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
  - Research Lab and Back Office
  - Research Lab and Development Unit
- (ii) Which one of the following device will you suggest for connecting all the computers with in each of their office units?

- Switch/Hub
  - Modem
  - Telephone
- (iii) Which of the following communication medium, you will suggest to be procured by the company for connecting their local office units in Pondicherry for very effective (High Speed) communication?
- Telephone Cable
  - Optical Fiber
  - Ethernet Cable
- (iv) Suggest a cable/wiring layout for connecting the company's local office units located in Pondicherry. Also, suggest an effective method/technology for connecting the company's office unit located in Mumbai.

### QUESTION PAPER CODE 91

1. (a) What is the purpose of using a typedef command in C++. Explain with suitable example. 2
- (b) Name the header files that shall be needed for the following code: 1
- ```
void main ()
{
    char Word [ ]="Exam";
    cout<<setw(20)<<Word;
}
```
- (c) Rewrite the following program after removing the syntax error(s), if any. Underline each correction. 2
- ```
#include <iostream.h>
void main ()
{
 One = 10, Two = 20;
 Callme (One;Two);
 Callme (Two);
}
void Callme (int Arg1, int Arg2=20)
{
```

```

 Arg1 = Arg1 + Arg2;
 cout<<Arg1>> Arg2;
}

```

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

```

#include<iostream.h>
#include<ctype.h>
void main ()
{
 char Mystring[]="What@OUTPUT!";
 for(int I = 0; Mystring [I] != '\0'; I++)
 {
 if(!isalpha(Mystring[I]))
 Mystring [I] = '*';
 else if(isupper(Mystring[I]))
 Mystring [I] = Mystring[I] + 1;
 else
 Mystring [I] = Mystring [I+1];
 }
 cout<<Mystring;
}

```

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

```

#include<iostream.h>
void main ()
{
 int A=5, B=10;
 for (int I = 1; I<=2; I++)
 {
 cout<<"Line1="<<A++<<"&"<<B-2<<endl;
 cout<<"Line2="<<++B<<"&"<<A+3<<endl;
 }
}

```

- (f) In the following program, find the correct possible output(s) from the options: 2

```

#include<stdlib.h>
#include<iostream.h>
void main ()
{

```

```

randomize();
char Area [][10] = {"NORTH", "SOUTH", "EAST", "WEST"};
int ToGo;
for (int I=0; I<3; I++)
{
 ToGo = random(2) + 1;
 cout<<Area [ToGo]<<" : ";
}
}

```

outputs:

- (i) SOUTH:EAST:SOUTH:
- (ii) NORTH:SOUTH:EAST:
- (iii) SOUTH:EAST:WEST:
- (iv) SOUTH:EAST:EAST:

2. (a) Differentiate between **private** and **protected** visibility modes in context of Object Oriented Programming giving a suitable example illustrating each. 2

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

```

#include<iostream.h>
#include<string.h>
class Retail
{
 char Category [20];
 char Item [20];
 int Qty;
 float Price;
 Retail() //Function 1
 {
 strcpy (Category, "Cereal");
 strcpy (Item, "Rice");
 Qty = 100;
 Price = 25;
 }
public:
 void Show () //Function 2
 {
 cout<<Category<<"_"<<Item<<" : "<<Qty

```

```

 <<"@"<<Price<<endl;
 }
};
void main ()
{
 Retail R; //Function 1
 R. Show () ;. //Function 2
}

```

- (i) Will Statement 1 initialize all the data members for object R with the values given in the Function 1 ? (Yes OR No). Justify your answer suggesting the correction(s) to be made in the above code.
- (ii) What shall be the possible output when the program gets executed? (Assuming, if required - the suggested correction(s) are made in the program)

(c) Define a class **Clothing** in C++ with the following descriptions:

4

Private Members:

|          |                 |
|----------|-----------------|
| Code     | of type string  |
| Type     | of type string  |
| Size     | of type integer |
| Material | of type string  |
| Price    | of type float   |

A function Calc\_Price() which calculates and assigns the value of Price as follows:

For the value of Material as "COTTON" :

| Type    | Price (Rs.) |
|---------|-------------|
| TROUSER | 1500        |
| SHIRT   | 1200        |

For Material other than "COTTON" the above mentioned Price gets reduced by 25%.

Public Members:

A constructor to assign initial values of Code, Type and Material with the word "NOT ASSIGNED" and Size and Price with 0.

A function Enter() to input the values of the data members Code, Type, Size and Material and invoke the CalcPrice() function.

A function Show() which displays the content of all the data members for a Clothing.

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

4

```
class Toys
{
 char TCode [5] ;
protected:
 float Price;
 void Assign (float);
public:
 Toys();
 void TEntry () ,
 void TDisplay () ;
};
class SoftTOYS: public Toys
{
 char STName [20] ;
 float weight;
public:
 SoftToys();
 void STEntry () ;
 void STDisplay () ;
};
class ElectronicToys: public Toys
{
 char ETName[20];
 int No_of_Batteries;
public:
 ElectronicToys();
 void ETEntry () ;
 void ETDisplay () ;
};
```

- (i) Which type of Inheritance is shown in the above example?
- (ii) How many bytes will be required by an object of the class SoftToys ?
- (iii) Write name of all the data members accessible from member functions of the class SoftToys.
- (iv) Write name of all the member functions, which are accessible from an object of the class ElectronicToys.

3. (a) Write a function in C++, which accepts an integer array and its size as arguments and swaps the elements of every even location with its following odd location. 4

Example: if an array of nine elements initially contains the elements as

2, 4, 1, 6, 5, 7, 9, 23, 10

then the function should rearrange the array as

4, 2, 6, 1, 7, 5, 23, 9, 10

- (b) An array Arr[50][100] is stored in the memory along the row with each element occupying 2 bytes. Find out the address of the location Arr[20][50], if the location Arr[10][25] is stored at the address 10000. 4

- (c) Write a function in C++ to Delete an element from a dynamically allocated Queue where each node contains a real number as data.

Assume the following definition of MYNODE for the same.

```
struct MYNODE
{
 float NUM;
 MYNODE *Link;
};
```

4

- (d) Write a function in C++ to print the product of each row of a two dimensional integer array passed as the argument of the function. 2

Example: if the two dimensional array contains

|    |    |    |
|----|----|----|
| 20 | 40 | 10 |
| 40 | 50 | 30 |
| 60 | 30 | 20 |
| 40 | 20 | 30 |

Then the output should appear as :

Product of Row 1= 8000

Product of Row 2= 6000

Product of Row 3= 3600

Product of Row 4= 2400

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

5, 20, 15, -, \*, 25, 2, \*, +



4. (a) Observe the program segment given below carefully, and answer the question that follows:

```

class Candidate
{
 long CId; //Candidate's Id
 char CName [20]; //Candidate's Name
 float Marks; //Candidate's Marks
public:
 void Enter ();
 void Display ();
 void MarksChange(); //Function to change marks
 long R_Cid() {return CId;}
};

void MarksUpdate (long Id)
{
 ifstream File;
 File.open ("CANDIDAT.DAT",ios: :binary | ios: :in | ios: :out);
 Candidate C;
 int Record=0, Found=0;
 while (! Found && File.read ((char*) &C, sizeof(C)))
 {
 if (Id==C. R_Cid ())
 {
 cout<<"Enter new Marks";
 C.MarksChange();
 _____ //Statement 1
 _____ //Statement 2
 Found = 1;
 }
 Record++;
 }
 if (Found = 1) cout<<"Record Updated";
 File.close ();
}

```

Write the Statement 1 **to position** the File Pointer at the beginning of the Record for which the Candidate's Id matches with the argument passed, and Statement 2 **to write** the updated Record at that position.

1

(b) Write a function in C++ to count the number of uppercase alphabets present in a text file "ARTICLE.TXT". 2

(c) Given a binary file TELEPHON.DAT, containing records of the following class Directory:

```
class Directory
{
 char Name[20];
 char Address [30];
 char AreaCode[5];
 char Phone_No[15];
public:
 void Register ();
 void Show ();
 int CheckCode(char AC[])
 {
 return strcmp (AreaCode, AC);
 }
};
```

Write a function COPYABC() in C++, that would copy only those records having AreaCode as "123" from TELEPHON.DAT toTELEBACK.DAT. 3

5. (a) Differentiate between **Candidate Key** and **Alternate Key** in context of RDBMS. 2

(b) Consider the following tables Item and Customer. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii). 6

**TABLE : ITEM**

| I_ID | ItemName          | Manufacturer | Price |
|------|-------------------|--------------|-------|
| PC01 | Personal Computer | ABC          | 35000 |
| LC05 | Laptop            | ABC          | 55000 |
| PC03 | Personal Computer | XYZ          | 32000 |
| PC06 | Personal Computer | COMP         | 37000 |
| LC03 | Laptop            | PQR          | 57000 |

**TABLE : CUSTOMER**

| <b>C_ID</b> | <b>CustomerName</b> | <b>City</b> | <b>I_Id</b> |
|-------------|---------------------|-------------|-------------|
| 01          | N Roy               | Delhi       | LC03        |
| 06          | H Singh             | Mumbai      | PC03        |
| 12          | R Pandey            | Delhi       | PC06        |
| 15          | C Sharma            | Delhi       | LC03        |
| 16          | K Agarwal           | Bangalore   | PC01        |

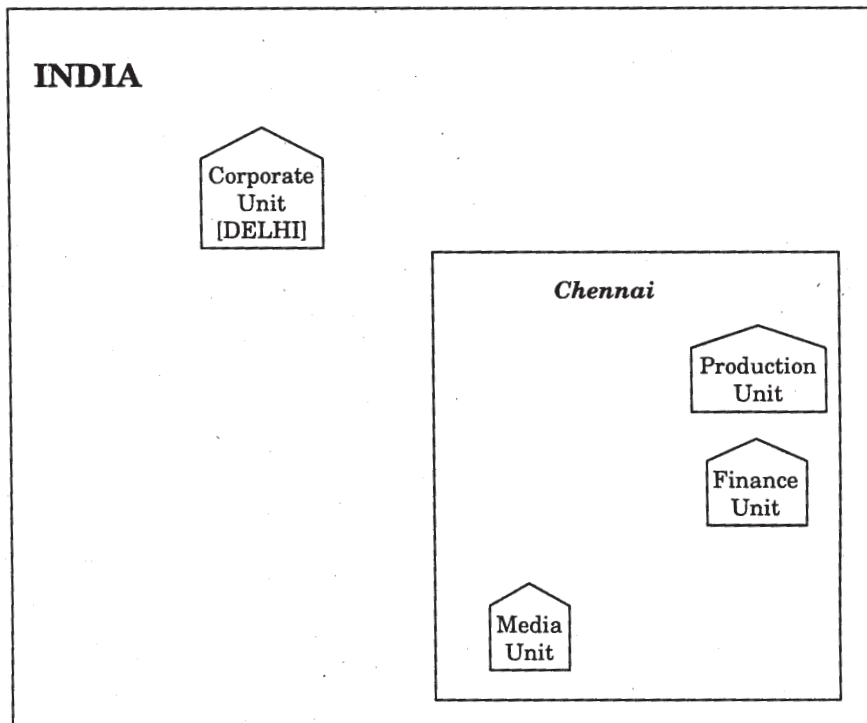
- (i) To display the details of those Customers whose City is Delhi
- (ii) To display the details of Items whose Price is in the range of 35000 to 55000 (Both values included)
- (iii) To display the CustomerName, City from table Customer and ItemName and Price from table Item, with their corresponding matching I-Id
- (iv) To increase the Price of all Items by 1000 in the table Item
- (v) SELECT DISTINCT City FROM Customer;
- (vi) SELECT ItemName, MAX(Price), Count(\*)  
FROM Item GROUP BY ItemName;
- (vii) SELECT CustomerName, Manufacturer FROM Item, Customer  
WHERE Item.Item\_Id=Customer.Item.I\_Id
- (viii) SELECT ItemName, Price \* 100  
FROM Item WHERE Manufacturer='ABC'; .

6. (a) State any verify Absorption law in Boolean Algebra. 2
- (b) Draw a Logical Circuit Diagram for the following Boolean Expression : 1  
 $A \cdot (B + C')$
- (c) Convert the following Boolean expression into its equivalent Canonical Product of Sum Form (POS) : 2  
 $A \cdot B' \cdot C + A' \cdot B \cdot C + A' \cdot B \cdot C'$
- (d) Reduce the following Boolean expression using K - Map: 3  
 $F(A, B, C, D) = \sum (0, 1, 2, 4, 5, 8, 9, 10, 11)$
7. (a) What is a Modem? 1
- (b) Expand the following terms with respect to Networking: 2
- (i) PPP

- (ii) GSM
  - (iii) XML
  - (iv) HTTP
- (c) How is a Hacker different from a Cracker?
- (d) “China Middleton Fashion” is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of their product. The company has planned to set up their main office units in Chennai at three different locations and have named their offices as “Production Unit”, “Finance Unit” and “Media Unit”. The company has its corporate unit in Delhi.

1

A rough layout of the same is as follows:



Approximate distances between these Units is as follows:

| From            | To             | Distance |
|-----------------|----------------|----------|
| Production Unit | Finance Unit   | 70 Mtr   |
| Production Unit | Media Unit     | 15 KM    |
| Production Unit | Corporate Unit | 2112 KM  |
| Finance Unit    | Media Unit     | 15 KM    |

In continuation of the above, the company experts have planned to install the following number of computers in each of their office units:

|                        |            |
|------------------------|------------|
| <b>Production Unit</b> | <b>150</b> |
| <b>Finance Unit</b>    | <b>35</b>  |
| <b>Media Unit</b>      | <b>10</b>  |
| <b>Corporate Unit</b>  | <b>30</b>  |

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
  - Production Unit and Media Unit
  - Production Unit and Finance Unit
- (ii) Which one of the following devices will you suggest for connecting all the computers within each of their office units?
  - Switch/Hub
  - Modem
  - Telephone
- (iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local office units in Chennai for very effective (High Speed) communication?
  - Telephone Cable
  - Optical Fiber
  - Ethernet Cable
- (iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

4

## Marking Scheme — Computer Science

### **General Instructions :**

1. The answers given in the marking scheme are SUGGESTIVE, Examiners are requested to award marks for all alternative correct Solutions / Answers conveying the similar meaning
2. All programming questions have to be answered with respect to. C++ Language only.
3. In C++, ignore case sensitivity for identifiers (Variable/Functions/Structures/Class Names).
4. In SQL related questions - both ways of text/character entries should be acceptable for Example: “AMAR” and ‘amar’ both are correct .
5. In SQL related questions - semicolon should be ignored for terminating the SQL statements
6. In SQL related questions, ignore case sensitivity.

QUESTION PAPER CODE 91/1

### **EXPECTED ANSWERS**

1. (a) What is the difference between #define and const? Explain with suitable example.

2

Ans: **#define:** It is a preprocessor directive in C++ for creating a Macro.

#### **Example:**

```
#define sqr(i) i*i
```

**const:** It is an Access Modifier in C++ that assigns a constant (non modifiable) value to a variable. Any attempt in modifying the value assigned to such a variable is reported as an error by the compiler.

#### **Example:**

```
const float Pi = 3.14;
```

*(½ Mark for each correct explanation of #define and const)*

*(½ Mark for each correct example of #define and const)*

**OR**

*(Full 2 Marks for correct examples demonstrating the difference between #define and const)*

**OR**

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

(b) Name the header files that shall be needed for the following code

1

```
void main ()
{
 char String [] = "Peace";
 cout<<setw(20)<<String;
}
```

Ans: iostream.h  
iomanip.h

*(½ Mark for identifying each correct header file)*

**Note: Ignore any other header files, if mentioned.**

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

2

```
#include <iostream.h>
void main()
{
 First = 10 , Second = 20;
 Jump to (First; Second) ;
 Jumpto (Second);
}
void Jumpto(int N1, int N2=20)
{
 N1 = N1 + N2;
 cout<<N1>>N2;
}
```

Ans: #include <iostream.h>  
void Jumpto(int N1, int N2=20); // Error 1  
void main( )  
{  
    int First = 10, Second = 20; // Error 2  
    Jumpto(First, Second); // Error 3  
    Jumpto(Second) ;  
}  
void Jumpto(int N1, int N2=20)  
{  
    N1 = N1 + N2;  
    cout<<N1<<N2; // Error 4  
}  
**OR**  
#include <iostream.h>  
void Jumpto(int N1, int N2=20) // Error 1

```

{
 N1 = N1 + N2;
 cout<<N1<< N2; // Error 2
}
void main ()
{
 int First = 10, Second = 20; // Error 3
 Jumpto(First, Second); // Error 4
 Jumpto (Second) ;
}

```

*(½ Mark for each correction)*

**OR**

*(1 Mark for identifying at least three errors, without suggesting correction)*

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

3

```

#include<iostream.h>
#include<ctype.h>
void main ()
{
 char Text [] = "Mind@Work!";
 for (int I = 0; Text [I] !='\0'; I++)
 {
 if (!isalpha (Text [I])
 Text [I] = '*';
 else if (isupper(Text [I]))
 Text [I] = Text [I]+1;
 else
 Text (I) = Text [I+1];
 }
 cout<<Text;
}

```

**Ans:** Nnd@\*Xrk!\*

*(½ Mark for N in the 1st position)*

*(½ Mark for nd in the 2nd and 3rd position)*

*(½ Mark for @ in the 4th position)*

*(½ Mark for \* in the 5th position)*

*(½ Mark for Xrk!)*

*(½ Mark for \* at the end)*



**OR**

*(Full 3 Marks If error is mentioned in the code for Text (I) after last else)*

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

2

```
#include<iostream.h>
void main()
{
 int U=10, V=20;
 for (int I = 1; I<=2; I++)
 {
 cout<<" [1]="<<U++<<"&"<<V-5<<endl;
 cout<<" [2]="<<V++<<"&"<<U+2<<endl;
 }
}
```

**Ans: [1]=10&15**

**[2]=21&13**

**[1]=11 &16**

**[2]=22&14**

*(½ Mark for each correct line of output)*

**Note:**

- ½ Mark to be deducted for missing "=" and "&" symbols in the output.
- ½ Mark to be deducted if endl is not considered in the output

- (f) In the following program, find the correct possible output(s) from the options:

2

```
#include<stdlib.h>
#include<iostream.h>
void main()
{
 randomize();
 char City [] [10] = {"DEL", "CHN", "KOL", "BOM", "BNG"};
 int Fly;
 for (int I=0;I<3;I++)
 {
 Fly = random(2)+1;
 cout<<City [Fly]<<" :";
 }
}
```

**outputs:**

- (i) **DEL:CHN:KOL:**
- (ii) **CHN:KOL:CHN:**
- (iii) **KOL:BOM:BNG:**
- (iv) **KOL:CHN:KOL:**

Ans: (ii) & (iv)

*(2 Marks for mentioning both correct options)*

**OR**

*(1 Mark for mentioning anyone correct option)*

2. (a) Differentiate between public and private visibility modes in context of Object Oriented Programming using a suitable example illustrating each.

2

Ans: **public visibility mode:**

Members of a class declared under this visibility are accessible inside the class (in member functions of the class) as well as by the Objects of that class (in any non member function of the program, prototyped / defined after the class declaration).

**private visibility mode:**

Members of a class declared under this visibility are accessible only inside the class (in member functions of the class). They can not be accessed outside the class.

```
class Example
{
 int Priv;
public:
 void Assign ()
 {
 Priv =10; //private member accessible only inside class
 }
};
void main ()
{
 Example E;
 E.Assign(); //public member accessible by Object
}
```

*(2 Marks for differentiating public and private correctly using suitable example)*

**OR**

*(1 Mark for correct explanation of private visibility)*

*(1 Mark for correct explanation of public visibility)*

**OR**

*(1 Mark for any valid example of a private member of a class)*

*(1 Mark for any valid example of a public member of a class)*

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

2

```
#include<iostream.h>
#include<string.h>
class Bazar
{
 char Type [20];
 char Product [20];
 int Qty;
 float Price;
 Bazar ()
 {
 //Function 1
 strcpy (Type,"Electronic");
 strcpy (Product,"Calculator");
 Qty = 10;
 Price = 225;
 }
public:
 void Disp ()
 {
 //Function 2
 cout<<Type<<"-"<<Product<<":"<<Qty
 <<"@"<<Price<<endl;
 }
};
void main ()
{
 Bazar B; //Statement 1
 B. Disp () ; //Statement 2
}
```

- (i) Will Statement 1 initialize all the data members for object B with the values given in the Function 1? (Yes OR No). Justify your answer suggesting the correction(s) to be made in the above code.

**Ans: No, since the constructor Bazar has been defined in private section Suggested Correction: Constructor Bazar() to be ,defined in public**

*(½ Mark for identifying NO)*

*(½ Mark for justification and correction)*

- (ii) What shall be the possible output when the program gets executed? (Assuming, if required - the suggested correction(s) are made in the program)

Ans: If the constructor is defined as a public member, the following output shall be generated:

```
Electronic-Calculator:10@225
```

*(1 Mark for correct answer)*

**OR**

*(½ Mark each for the String and Numeric values)*

(c) Define a class Garments in C++ with the following descriptions:

4

Private Members:

|         |                 |
|---------|-----------------|
| GCode   | of type string  |
| GType   | of type string  |
| GSize   | of type integer |
| GFabric | of type string  |
| GPrice  | of type float   |

A function Assign ( ) which calculates and assigns the value of GPrice as follows

For the value of GFabric as “COTTON”,

|       |            |
|-------|------------|
| GType | GPrice(Rs) |
|-------|------------|

|         |      |
|---------|------|
| TROUSER | 1300 |
|---------|------|

|       |      |
|-------|------|
| SHIRT | 1100 |
|-------|------|

For GFabric other than “COTTON” the above mentioned

GPrice gets reduced by 10%.

Public Members:

A constructor to assign initial values of GCode, GType and GFabric with the word “NOT ALLOTTED” and GSize and GPrice with 0

A function Input ( ) to input the values of the data members GCode, GType, GSize and GFabric and invoke the Assign ( ) function.

A function Display ( ) which displays the content of all the data members for a Garment.

Ans:

```
class Garments
{
 char GCode[10];
 char GType[10];
 int GSize;
 char GFabric[10] ;
 float GPrice;
```

```

 void Assign() ;
public:
 Garments()
 {
 strcpy(GCode,"NOT ALLOTTED") ;
 strcpy(GType,"NOT ALLOTTED") ;
 strcpy (GFabric, "NOT ALLOTTED") ;
 GSize=0;
 GPrice=0;
 }
 void Input() ;
 void Display() ;
} ;
void Garments::Assign()
{
 if (strcmp(GFabric,"COTTON")==0)
 //if (!strcmp(GFabric, "COTTON"))
 {
 if (strcmp(GType,"TROUSER") ==0)
 GPrice=1300;
 else if (strcmp(GType,"SHIRT")==0)
 GPrice=1100;
 }
 else
 {
 if (strcmp(GType,"TROUSER") = =0)
 GPrice=1300*0.9; // 10% reduction
 else if (strcmp(GType,"SHIRT")= =0)
 GPrice=1100*0.9; // 10% reduction
 }
}
void Garments::Input()
{
 gets(GCode) ; // or cin >> GCode;
 gets(GType) ; // or cin >> GType;
 cin>>GSize;
 gets(GFabric) ;// or cin >> GFabric;
 Assign() ;
}
void Garments::Display()
{
 cout<<GCode<<GType<<GSize<<GFabric<<GPrice<<endl;
}

```

*(½ Mark for correct syntax for class header)*

*(½ Mark for correct declaration of data members)*

*(½ Mark for correct definition of constructor)*

*(1 Mark for correct definition of Assign( ))*

*(1 Mark for correct definition of Input() with proper invocation of Assign() function)*

*(½ Mark for correct definition of Display( ))*

NOTE:

Deduct % Mark if Assign() is not invoked properly inside Input() function

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

4

```
class Dolls
{
 char DCode[5] ;
protected:
 float Price;
 void CalcPrice(float);
public:
 Dolls ();
 void DInput () ;
 void DShow () ;
} ;
class SoftDolls : public Dolls
{
 char SDName[20] ;
 float Weight;
public:
 SoftDolls () ;
 void SDInput () ;
 void SDSHOW () ;
} ;
class ElectronicDolls: public Dolls
{
 char EDName[20] ;
 char BatteryType[10];
 int Batteries;
public:
 ElectronicDolls () ;
 void EDInput () ;
 void EDSHOW () ;
} ;
```

- (i) Which type of Inheritance is shown in the above example?  
 Ans: Hierarchical Inheritance  
 OR  
 Single Level Inheritance  
*(1 mark for mentioning any of the above mentioned type of Inheritance)*
- (ii) How many bytes will be required by an object of the class ElectronicDolls?  
 Ans: 41 bytes  
*(1 Mark for correct answer)*
- (iii) Write name of all the data members accessible from member functions of the class SoftDolls  
 Ans: SDName, Weight, Price  
*(1 Mark for correct answer)*

**Note:**

**No marks to be awarded for partially correct answer**

- (iv) Write name of all the member functions accessible by an object of the class ElectronicDolls.  
 Ans: EDInput(), EDShow(), DInput(), DShow()  
*(1 Mark for Correct answer)*

Note:

- **Constructor functions ElectronicDolls() & Dolls() to be Ignored.**
- **No marks to be awarded for partially correct answers**

3. (a) Write a function in C++, which accepts an integer array and its size as parameters and rearranges the array in reverse. Example: if an array of nine elements initially contains the elements as  
 4, 2, 5, 1, 6, 7, 8, 12, 10  
 then the function should rearrange the array as  
 10, 12, 8, 7, 6, 1, 5, 2, 4

4

Ans:

```
void Rearrange(int Arr [], int Size)
{
 for (int i = 0; i<Size/2; i++)
 {
 int T = Arr[i];
 Arr[i] = Arr[Size-1-i];
 Arr[Size-1-i]=T;
 }
}
```

OR

**Any other correct equivalent function definition**

*(1 Mark for correct Function Header with proper Arguments)*

*(1 Mark for correct loop)*

*(2 Marks for swapping the values correctly)*

**Note:**

**Deduct ½ Mark if loop runs till Size instead of Size/2 for swapping**

**Deduct ½ Mark if reversed values are stored in another array**

- (b) An array Arr[40][10] is stored in the memory along the column with each element occupying 4 bytes. Find out the address of the location Arr[3][6] if the location Arr[30][10] is stored at the address 9000

4

Ans:

Address of Array[i][j] along the column =

$$\text{Base Address} + W [(i - L1) + (j - L2) * M]$$

where,

$$W = \text{size of each location in bytes} = 4$$

$$L1 = \text{Lower Bound of rows} = 0$$

$$L2 = \text{Lower Bound of columns} = 0$$

$$M = \text{Number of rows per column} = 40$$

$$\text{Address of Array}[30][10] = \text{Base Address} + 4 * (30 + 10 * 40)$$

$$9000 = \text{Base Address} + 4 * 430$$

$$\text{Base Address} = 9000 - 4 * 430$$

$$= 9000 - 1720$$

$$= 7280$$

$$\text{Address of Array}[3][6] = 7280 + 4 * (3 + 6 * 40)$$

$$= 7280 + 4 * 243$$

$$= 7280 + 972$$

$$= 8252$$

OR

Address of Array[i][j] along the column =

$$\text{Base Address} + W ((i - L1) + (j - L2) * M)$$

where,

$$W = \text{size of each location in bytes} = 4$$

$$L1 = \text{Lower Bound of rows} = 1$$

$$L2 = \text{Lower Bound of columns} = 1$$

$$M = \text{Number of rows per column} = 40$$

$$\text{Address of Array}[30][10] = \text{Base Address} + 4 * ((30 - 1) + (10 - 1) * 40)$$

$$9000 = \text{Base Address} + 4 * (29 + 9 * 40)$$



$$\begin{aligned}
9000 &= \text{Base Address} + 4 * (29+360) \\
9000 &= \text{Base Address} + 4 * (389) \\
\text{Base Address} &= 9000 - 4 * 389 \\
&= 9000 - 1556 \\
&= 7444
\end{aligned}$$

$$\begin{aligned}
\text{Address of Array}[3][6] &= 7444 + 4 * ((3 - 1) + (6 - 1) * 40) \\
&= 7444 + 4 * (2+5 * 40) \\
&= 7444 + 4 * (2+200), \\
&= 7444 + 4 * 202 \\
&= 7444 + 808 \\
&= 8252
\end{aligned}$$

OR

Address of Array[i][j] along the column =

$$\text{Address of Array}[x][y] + W [(i-x) + (j - y) * M]$$

where,

$$W = \text{size of each location in bytes} = 4$$

$$M = \text{Number of rows per column} = 40$$

i, j = Index value of the unknown element

x, y = Index value of the known element

$$\begin{aligned}
\text{Address of Array}[3][6] &= \text{Address of Array}[30][10] + 4 [(3 - 30) + (6 - 10) * 40] \\
&= 9000 + 4 [-27 - 160] \\
&= 9000 - 4 * 187 \\
&= 9000 - 748 \\
&= 8252
\end{aligned}$$

*(2 Marks for writing correct formula (for column major), substituting formula with correct values and/or calculate Base Address)*

*(2 Marks for writing correct formula/correct substituted values, for column major properly, for calculating Address of Arr[20][50])*

- (c) Write a function in c++ to Insert an element into a dynamically allocated Queue where each node contains a name (of type string) as data.

4

Assume the following definition of THENODE for the same.

```

struct THENODE
{
 char Name[20];
 THENODE *Link;
};

```

Ans:

```
void Qinsert (THENODE *&Front, THENODE *&Rear)
{
 THENODE *Temp = new THENODE;
 gets(Temp->Name); //or cin>>Temp->Name;
 Temp->Link = NULL;
 if (Rear == NULL)
 {
 Front = Temp;
 Rear = Temp;
 }
 else
 {
 Rear -> Link = Temp;
 Rear = Temp;
 }
}
```

OR

```
class Queue
{
 THENODE *Front, *Rear;
public:
 QUEUE() //Constructor to initialize Top
 {
 Front = NULL;
 Rear = NULL;
 }
 void Qinsert();//Function to insert a node
 void QDelete();//Function to delete a node
 void QDisplay();//Function to display nodes of Stack
 ~Queue(); //Destructor to delete all nodes
};
```

```
void Queue: : Qinsert ()
{
 THENODE *Temp;
 Temp = new THENODE;
 gets (Temp->Name) ;//Or cin>>Temp->Name;
 Temp->Link = NULL;
 if (Rear == NULL)
 {
 Front = Temp;
```

```

 Rear = Temp;
 }
 else
 {
 Rear->Link = Temp;
 Rear = Temp;
 }
}

```

- (½ Mark for declaration of a temporary pointer to THENODE)
- (½ Mark for new allocation for temporary pointer)
- (½ Mark for assigning OR entering the value of NAME on temporary pointer)
- (½ Mark for assigning NULL to Temp->Link)
- (½ Mark for checking Empty QUEUE)
- (½ Mark for assigning Front and Rear in case of Empty QUEUE)
- (½ Mark for assigning Rear ->Link with Temporary pointer when QUEUE is not Empty)
- (½ Mark for reassigning Rear with Temp when the QUEUE is not Empty)

(d) Write a function in C++ to print the product of each column of a two dimensional integer array passed as the argument of the function.

2

Explain: if the two dimensional array contains

|   |   |   |
|---|---|---|
| 1 | 2 | 4 |
| 3 | 5 | 6 |
| 4 | 3 | 2 |
| 2 | 1 | 5 |

Then the output should appear as :

Product of Column 1 = 24

Product of Column 2 = 30

Product of Column 3 = 240

Ans:

```

void ProdCol(int Arr[][100], int Row, int Col)
{
 int i, j, Prod;
 for (j = 0; j < Col; j++)
 {
 Prod=1;
 for (i = 0; i < Row; i++)

```

```

 Prod * = Arr[i][j];
 cout<<"Product of Column"<<j<< "=" <<Prod<<endl;
 }
}

```

OR

**Any other correct equivalent function definition**

*(½ Mark for correct function header)*

*(½ Mark for correct loop(s))*

*(½ Mark for finding product of elements for each column correctly)*

*(½ Mark for printing the product in correct format)*

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

2

4, 10, 5, +, \*, 15, 3, /, -

Ans:

| Operator Scanned | Stack Content |
|------------------|---------------|
| 4                | 4             |
| 10               | 4, 10         |
| 5                | 4, 10, 5      |
| +                | 4, 15         |
| *                | 60            |
| 15               | 60, 15        |
| 3                | 60, 15, 3     |
| /                | 60, 5         |
| -                | 55            |

OR

Any other method of evaluating correctly the postfix expression is showing the Stack Status.

*(½ Mark for each operation correctly evaluated showing the Stack Status)*

OR

*(½ Mark only to be given for writing correct answer without showing the Stack Status)*

4. (a) Observe the program segment given below carefully, and answer the question that follows:

1

```

class Applicant

```

```

{
 long AId; //Applicant's Id
 char Name [20] ; //Applicant's Name
 float Score; //Applicant's Score
public:
 void Enroll ();
 void Disp ();
 void MarksScore(); //Function to change Score
 long R_AId () {returnAId;}
} ;
void ScoreUpdate (long Id)
{
 fstream File;
 File.open ("APPLI.DAT",ios::binary|ios::in|ios::out);
 Applicant A;
 int Record = 0, Found = 0 ;
 while (!Found && File.read((char*) &C, sizeof(c)))
 {
 if(Id ==A.R_AId ())
 {
 cout<<"Enter new Score" ;
 A.MarksScore ();
 _____ // Statement 1
 _____ //Statement 2
 Found = 1 .
 }
 Record ++;
 }
 if (Found ==1) cout<<"Record Updated";
 File.close () ;
}

```

Write the Statement1 to position the File Pointer at the beginning of the Record for which the Applicant's Id matches with the argument passed, and Statement2 to write the updated Record at that position.

Ans:

Statement 1 :

```
File.seekp (Record * sizeof (A));
```

OR

```
File.seekp (Record * sizeof (Applicant));
```

OR

```
File.seekp (File. tellg() - sizeof(A));
```

OR

```
File. seekp(File. tellg() - sizeof{Applicant});
```

OR

```
File. seekp(-sizeof (A) , ios::cur);
```

OR

```
File.seekg(Record * sizeof(A));
```

OR

```
File.seekg(Record * sizeof(Applicant));
```

OR

```
File. seekg(-sizeof (A) , ios::cur);
```

OR

Any equivalent correct method

**Statement 2:**

```
File.write((char*) &A, sizeof (A));
```

OR

```
File.write((char*)&A, sizeof(Applicant));
```

OR

**Any equivalent correct method using A or C as object**

*(½ Mark for each correct Statement)*

Note:

(Full 1 Mark to be given for mentioning error in code for undeclared symbols C and c in the File.read(...))

- (b) Write a function in C++ to count the number of lowercase alphabets present in a text file “BOOK.TXT”.

2

Ans:

```
int CountLower()
{
 ifstream Fil;
 Fil.open("BOOK. TXT")
 char Ch;
 int Count =0;
 while (Fil.get(Ch))
 {
 if (Ch>='a' && Ch<='z')
 Count++;
 }
}
OR ifstream Fil ("BOOK.TXT");
```

```

 }
 Fil.close() ; //Ignore
 return Count;
}

```

OR

```

int CountLower()
{
 ifstream Fil;
 Fil.open("BOOK. TXT"); } OR ifstream Fil ("BOOK.TXT");
 char Ch;
 int Count =0;
 while (Fil.get(Ch))
 {
 if (islower(Ch))
 Count++;
 }
 Fil.close(); //Ignore
 return Count;
}

```

OR

```

int CountLower()
{
 ifstream Fil;
 Fil.open("BOOK.TXT"); } OR ifstream Fil ("BOOK.TXT");
 char Ch;
 int Count = 0;
 while (!Fil.eof())
 {
 ch=Fil.get() ;
 if (islower(Ch))
 Count++;
 }
 Fil.close() ; //Ignore
 return Count;
}

```

OR

**Any other correct function definition**

- (½ Mark for opening BOOK. TXT correctly)*
- (½ Mark for reading each character from the file)*
- (½ Mark for checking lowercase alphabet)*
- (½ Mark for calculating the lowercase alphabets)*

**NOTE:**

**No Mark should be deducted if Count is not returned**

- (c) Given a binary file PHONE.DAT, containing records of the following structure type

3

```
class Phonlist
{
 char Name [20] ;
 char Address[30];
 char AreaCode[5];
 char PhoneNo[15] ;
public:
 void Register () ;
 Void Show () ;
 int CheckCode (char AC[])
 {
 return strcmp (AreaCode, AC) ;
 }
} ;
```

Write a function TRANSFER () in C++, that would copy all those records which are having AreaCode as “DEL” from PHONE.DAT to PHONBACK.DAT.

Ans:

```
void TRANSFER()
{
 Phonlist P;
 fstream fin,fout;
 fin.open("PHONE.DAT",ios::binary|ios::in);
 fout.open("PHONBACK.DAT", ios:: binary | ios::out);
 while (fin.read((char*)&P, sizeof(P)))
 {
 if (P. CheckCode("DEL") ==0)
 fout.write((char*)&P,sizeof(P));
 }
 fin.close(); //ignore
 fout.close(); //ignore
}
OR
void TRANSFER()
{
 Phonlist P;
 fstream fin, fout;
 fin. open ("PHONE. DAT", ios: : binary | ios: : in);
```



```

fout.open("PHONBACK.DAT", ios: :binary|ios: :in);
if (fin)
{
 fin.read((char*)&P, sizeof(P));
 while (!fn.eof())
 {
 if (P.CheckCode("DEL") ==0)
 fout.write((char*)&P, sizeof(P));
 fin.read((char*)&P, sizeof(P));
 }
}
fin.close(); //ignore
fout.close(); //ignore
}

```

- (½ Mark for opening PHONE.DAT correctly)
- (½ Mark for opening PHONBACK.DAT correctly)
- (½ Mark for reading each record from PHONE.DAT)
- (½ Mark for correct loop / checking end of file)
- (½ Mark for comparing value returned by CheckCode("DEL") with 0)
- (½ Mark for writing the record to PHONBACK.DAT)

5. (a) Differentiate between Candidate Key and Primary Key in context of RDBMS

Ans: **Candidate Key:** All such attributes/columns, which can uniquely identify each row/record in a table

**Primary Key:** An attribute/column among the Candidate Keys which is used to uniquely identify each row/record in a table

(2 Marks for any valid difference/relation between Candidate Key and Primary Key)

**OR**

(1 Mark for correct explanation of Candidate Key)

(1 Mark for correct explanation of Primary Key)

(b) Consider the following tables Product and Client. Write SQL commands for the statement (i) to (iv) and give outputs for SQL queries (v) to (viii)

6

**TABLE: PRODUCT**

| P_ID | ProductName   | Manufacturer | Price |
|------|---------------|--------------|-------|
| TP01 | Talcom Powder | LAK          | 40    |
| FW05 | Face Wash     | ABC          | 45    |
| BS01 | Bath Soap     | ABC          | 55    |
| SH06 | Shampoo       | XYZ          | 120   |
| FW12 | Face Wash     | XYZ          | 95    |

**TABLE: CLIENT**

| C_ID | ClientName    | City      | P_ID |
|------|---------------|-----------|------|
| 01   | Cosmetic Shop | Delhi     | FW05 |
| 06   | Total Health  | Mumbai    | BS01 |
| 12   | Live Life     | Delhi     | SH06 |
| 15   | Pretty Woman  | Delhi     | FW12 |
| 16   | Dreams        | Bangalore | TP01 |

(i) To display the details of those Clients whose City is Delhi

Ans: **SELECT \* FROM Client WHERE City = 'Delhi';**

*(½ Mark for correct SELECT)*

*(½ Mark for correct WHERE clause)*

(ii) To display the details of Products whose Price is in the range of 50 to 100 (Both values included)

Ans: **SELECT \* FROM Product  
WHERE Price >=50 AND Price <=100;**

OR

**SELECT \* FROM Product  
WHERE Price BETWEEN 50 AND 100;**

*(½ Mark for correct SELECT)*

*(½ Mark for correct WHERE clause)*

(iii) To display the ClientName, City from Table Client, and ProductName and Price from table Product, with their corresponding Matching P\_ID

Ans: **SELECT ClientName, City, ProductName, Price, Client.P\_ID  
FROM Client, Product  
WHERE Client.P\_ID = Product.P\_ID;**

*(½ Mark for correct SELECT)*

*(½ Mark for correct WHERE clause)*

(iv) To increase the Price of all Products by 10

Ans: **UPDATE Product SET Price = Price +10;**

*(½ Mark for correct SELECT)*

*(½ Mark for correct WHERE clause)*

(v) SELECT DISTINCT Address FROM Client

Ans: **DISTINCT City  
Bangalore  
Delhi**

**Mumbai**

(½ Mark for correct output)

OR

(½ Mark for mentioning Address is not a Column in the Table Client OR mentioning ERROR)

(vi) SELECT Manufacturer, MAX(Price), Min(Price), Count(\*)  
FROM Product GROUP BY Manufacturer;

Ans:

| <b>Manufacturer</b> | <b>MAX(Price)</b> | <b>MIN(Price)</b> | <b>Count(*)</b> |
|---------------------|-------------------|-------------------|-----------------|
| ABC                 | 55                | 45                | 2               |
| LAK                 | 40                | 40                | 1               |
| XYZ                 | 120               | 95                | 2               |

(½ Mark for correct output)

(vii) SELECT ClientName, ManufacturerName FROM Product, Client  
WHERE Client.Prod\_Id = Product.P\_Id;

Ans:

| <b>ClientName</b> | <b>Manufacturer</b> |
|-------------------|---------------------|
| Cosmetic Shop     | ABC                 |
| Total Health      | ABC                 |
| Live life         | XYZ                 |
| Pretty Woman      | XYZ                 |
| Dreams            | LAK                 |

(½ Mark for correct output)

OR

(½ Mark for mentioning ManufactureName and Prod\_Id are not valid Column in the respective Tables)

(viii) SELECT ProductName, Price \* 4

Ans:

| <b>Product Name</b> | <b>Price * 4</b> |
|---------------------|------------------|
| Talcom Powder       | 160              |
| Face Wash           | 180              |
| Bath Soap           | 220              |
| Shampoo             | 480              |
| Face Wash           | 380              |

(½ Mark for correct output)

NOTE:

For Parts (v) to (viii), Ignore the Column Header and order of output rows

6. (a) State and verify De Morgan's law in Boolean Algebra

2

Ans:

$$(X + Y)' = X' \cdot Y'$$

OR

$$(X \cdot Y)' = X' + Y'$$

**Verification:**

| X | Y | X + Y | (X+Y)' | X' | Y' | X'.Y' |
|---|---|-------|--------|----|----|-------|
| 0 | 0 | 0     | 1      | 1  | 1  | 1     |
| 0 | 1 | 1     | 0      | 1  | 0  | 0     |
| 1 | 0 | 1     | 0      | 0  | 1  | 0     |
| 1 | 1 | 1     | 0      | 0  | 0  | 0     |

↑ VERIFIED ↑

OR

$$(X+Y)' = X' \cdot Y'$$

$$\text{If } (X+Y)' \cdot (X+Y) = (X' \cdot Y') \cdot (X+Y)$$

$$\text{If } 0 = X' \cdot Y' \cdot X + X' \cdot Y' \cdot Y$$

$$\text{If } 0 = 0 + 0$$

Hence Proved and Verified

*(1 Mark for stating anyone of the De Morgan's Law)*

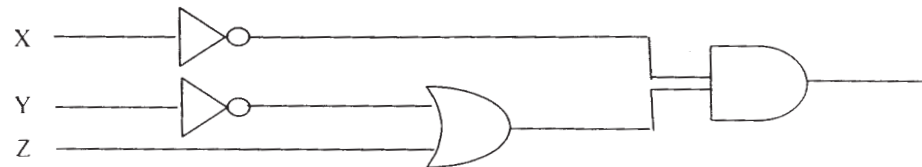
*(1 Mark for verifying anyone of the De Morgan's Law)*

- (b) Draw a Logical Circuit Diagram for the following Boolean Expression

1

$$X' \cdot (y' + Z)$$

Ans:



*(1 Marks for Drawing Logic Circuit Diagram for all )*

- (c) Convert the following Boolean expression into its equivalent Canonical Sum of Product Form«SOP)

2

$$(X' + Y + Z) \cdot (X' + Y + Z) \cdot (X' + Y' + Z) \cdot (X' + Y' + Z)''$$

$$\text{Ans: } F(X, Y, Z) = \Pi(4, 5, 6, 7)$$

$$= \Sigma(0, 1, 2, 3)$$

$$= X'. Y'. Z' + X'. Y'. Z + X'. Y. Z' + X'. Y. Z$$

(2 Marks for writing correct Canonical SOP Expression)

OR

(1 Mark for only deriving Product Terms)

(d) Question

Ans:

|      | A'B'           | A'B            | AB              | AB'             |
|------|----------------|----------------|-----------------|-----------------|
| C'D' | 1 <sub>0</sub> | 1 <sub>4</sub> | 1 <sub>12</sub> | 1 <sub>8</sub>  |
| C'D  |                | 1 <sub>5</sub> | 1 <sub>13</sub> | 1 <sub>9</sub>  |
| CD   | 1 <sub>3</sub> | 1 <sub>7</sub> | 1 <sub>15</sub> | 1 <sub>11</sub> |
| CD'  | 1 <sub>2</sub> | 1 <sub>6</sub> | 1 <sub>14</sub> | 1 <sub>10</sub> |

$$F = C'.D' + A'.C + B'.D'$$

(½ Mark for drawing correct K-Map)

(½ Mark for plotting 1's correctly)

(1 Mark for correct grouping)

(1 Mark for correct Answer)

7. (a) What is a Hub?

1

Ans: **A Hub is used for a central connection between two or more computers on a network.**

OR

**A Hub is a network device used to connect two or more computers.**

OR

**A Hub is an unintelligent network device to connect computers.**

(1 Mark for any correct definition / explanation)

(b) Expand the following terms with respect to Networking:

2

(i) Modem (ii) WLL (iii) FTP (iv) TCP/IP

Ans:

(i) **Modulator - Demodulator**

(ii) **Wireless Local Loop** OR **Wireless in Local Loop**

(iii) **File Transfer Protocol**

(iv) **Transfer Control Protocol/Internet Protocol**

(½ Mark for each correct expansion)

(c) How is Coaxial cable different from Optical Fibre?

1

Ans: **Coaxial Cable:** Comparatively Slow, Economic, convenient to lay down, used in Bus topology of networks

**Optical Fibre:** Very fast, expensive, reliable, no interference

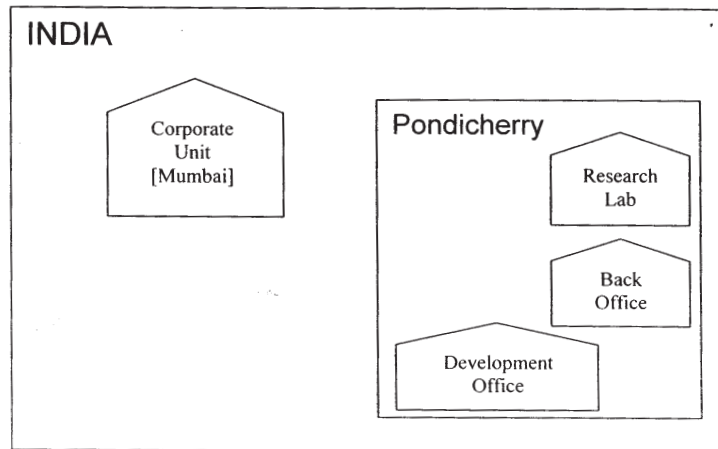
*(1 Mark for mentioning anyone valid difference)*

**OR**

*(½ Mark for anyone characteristic each of Coaxial Cable or Optical Fibre)*

(d) “Bias Methodologies” is planning to expand their network in India, starting with three cities in India to build infrastructure for research and development of their chemical products. The company has planned to setup their main office in Pondicherry - at three different locations and have named their offices as “Back Office”, “Research Lab” and “Development Unit”. The company has one more Research office namely “Corporate Office” in “Mumbai”. A rough layout of the same is as follows :

4



Approximate distances between these offices is as follows:

| From         | To               | Distance |
|--------------|------------------|----------|
| Research Lab | Back Office      | 110 Mts  |
| Research Lab | Development Unit | 16 KM    |
| Research Lab | Corporate Unit   | 1800 KM  |
| Back Office  | Development Unit | 13 KM    |

In continuation of the above, the company experts p.aye planned to install the following number of computers in each of their offices:

|                  |     |
|------------------|-----|
| Research Lab     | 158 |
| Back Office      | 79  |
| Development Unit | 90  |
| Corporate Unit   | 51  |

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
- Research Lab and Back Office
  - Research Lab and Development Unit

Ans: **Research Lab and Back Office - LAN**  
**Research Lab and Development Unit - MAN**  
*(½ Mark for each answer)*

- (ii) Which one of the following device will you suggest for connecting all the computers within each of their office units?
- Switch/Hub
  - Modem
  - Telephone

Ans: **Switch I Hub**

*(1 Mark for mentioning correct option)*

- (iii) Which of the following communication medium, you will suggest to be procured by the company for connecting their local office units in Pondicherry for very effective (High Speed) communication?
- Telephone Cable
  - Optical Fiber
  - Ethernet Cable

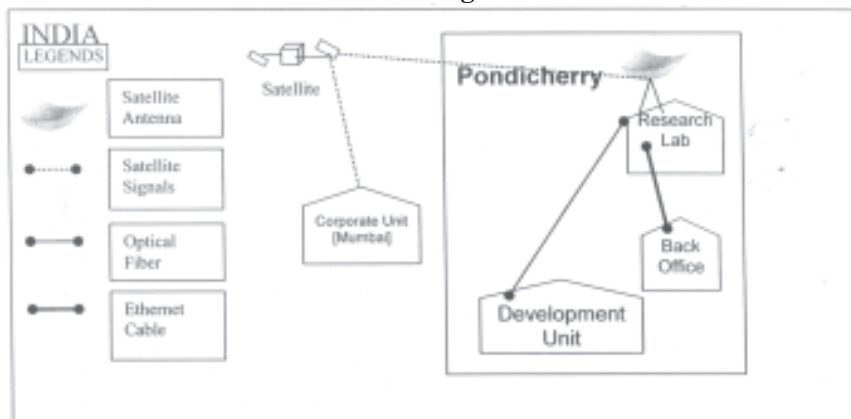
Ans: **Optical Fibre**

*(1 Mark for mentioning correct option)*

- (iv) Suggest a cable/wiring layout for connecting the company's local office units located in Pondicherry. Also, suggest an effective method/technology for connecting the company's office unit located in Mumbai.

Ans: **Local office units at Pondicherry to be connected using LAN / MAN / star Topology / Tree Topology**

**Mumbai Office to be connected using Satellite/WAN**



*(½ Mark for mentioning valid connectivity or topology or diagram for local office in Pondicherry)*

*(½ Mark. for mentioning valid connectivity or topology or diagram for Mumbai office)*

MARKING SCHEME  
QUESTION PAPER CODE 91  
**EXPECTED ANSWERS**

1. (a) What is the purpose of using a typedef command in C++. Explain with suitable example. 2

Ans: **Typedef:**

This keyword allows creating synonyms or aliases for previously defined data types

The general form of typedef is

```
typedef old_name new_name;
```

OR

typedef is used for renaming a data type.

**Example:**

```
typedef char STR [80];
```

OR

```
typedef signed char SMALLNUM;
```

OR

```
typedef float REAL;
```

OR

```
typedef long int BIGNUM;
```

OR

```
typedef int MAT[2][3] ;
```

*(1 Mark for definition of typedef)*

*(1 Mark for example of typedef)*

OR

*(Full 2 Marks for an example with an appropriate explanation)*

- (b) Name the header files that shall be needed for the following code: 1

```
void main ()
{
 char Word [] ="Exam";
 cout<<setw(20)<<Word;
}
```

Ans:

iostream.h

iomanip.h

*(½ Mark for identifying each correct header file)*

*Note: Marks are not to be deducted if any additional header file is mentioned*



- (c) Rewrite the following program after removing the syntax error(s), if any. Underline each correction.

2

```
#include <iostream.h>
void main ()
{
 One = 10, Two = 20;
 Callme (One;Two) ;
 Callme (Two) ;
}
void Callme (int Arg1, int Arg2=20)
{
 Arg1 = Arg1 + Arg2;
 cout<<Arg1>> Arg2;
}
```

Ans:

```
#include <iostream.h>
void Callme (int,int Arg2=20); //Error 1
void main ()
{
 int One=10,Two=20; //Error 2
 Callme(One,Two); //Error 3
 Callme (Two);
}
void Callme (int Arg1, int Arg2=20)
{
 Arg1=Arg1 +Arg2 ;
 cout<<Arg1<<Arg2; //Error 4
}
```

*(½ Mark for each correction)*

OR

*(1 Mark for only identifying at least three errors, without suggesting correction)*

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

```
#include<iostream.h>
#include<ctype.h>
void main ()
{
 char Mystring[] ="What@OUTPUT!" ;
 for(int I = 0; Mystring [I] !=' \0'; I++)
 {
```

```

 if (!isalpha (Mystring[I]))
 Mystring [I] = '*';
 else if (isupper (Mystring[I]))
 Mystring [I] = Mystring[I] +1;
 else
 Mystring [I] = Mystring [I+1];
 }
 cout<<Mystring;
}

```

Ans:

Xat@\*PVUQVU\*

*(½ Mark for X in the first position)*

*(½ Mark for at in the 2nd & 3rd positions)*

*(½ Mark for @ in the 4th position)*

*(½ Mark for \* in the 5th position)*

*(½ Mark for PVUQvu)*

*(½ Mark for \* at the end)*

(e) Find the output of the following program :

```

#include<iostream.h>
void main ()
{
 int A=5, B=10;
 for (int I = 1; I<=2; I++)
 {
 cout<< "Line1="<<A++<<"&"<<B-2<<endl;
 cout<<"Line2="<<I++B<<"&"<<A+3<<endl;
 }
}

```

Ans:

Line1=5&8

Line2=11&9

Line1=6&9

Line2=12&10

*(½ Mark for each correct line of output)*

Note: .

- ½ Mark to be deducted for missing Ampersand (&) in each line of output
- ½ Mark to be deducted if endl is not considered in the output

(f) In the following program, find the correct possible output(s) from the options:

```

#include<stdlib.h>

```

```

#include<iostream.h>
void main ()
{
 randomize() ;
 char Area [] [10] = { ``NORTH", ``SOUTH", "EAST", "WEST" } ;
 int ToGo;
 for (int I=0; I<3; I++)
 {
 ToGo = random(2) +1;
 cout<<Area [ToGo]<<" : ";
 }
}

```

(i) SOUTH:EAST:SOUTH:  
(ii) NORTH:SOUTH:EAST:  
(iii) SOUTH:EAST:WEST:  
(iv) SOUTH:EAST:EAST:

Ans:

(i) and (iv)  
(2 Mark for the correct answer)  
OR  
(1 Mark for anyone of the option)

2. (a) Differentiate between **private** and **protected** visibility modes in context of Object Oriented Programming giving a suitable example illustrating each.

| Private Visibility Mode                                                                                                                                                  | Protected Visibility Mode                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| The members in private visibility modes are not accessible to objects as well as derived classes                                                                         | The members in protected visibility modes are not accessible to objects but are accessible in derived classes |
| <pre> class A {     int x; protected:     int y; public:     void display(void) ; } ; class B:public A {     int a; public:     int b;     void readit(void) ; }; </pre> |                                                                                                               |

(1 mark for anyone correct difference given above)

(1 mark for correct example).

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

```
#include<iostream.h>
#include<string.h>
class Retail
{
 char Category [20];
 char Item [20];
 int Qty;
 float Price;
 Retail () // Function 1
 {
 strcpy (Category, "Cereal");
 strcpy (Item, "Rice");
 Qty = 100;
 Price = 25;
 }
public:
 void Show () // Function 2
 {
 cout<<Category<<"-"<<Item<<" : "<<Qty
 <<"@"<<Price<<endl;
 }
};
void main ()
{
 Retail R; // Function 1
 R. Show (); // Function 2
}
```

- Ans: i) No, since the constructor Retail has been defined in private section.  
Suggested Correction: Constructor RetailO to be defined in public section of class.

(½ mark for identifying No)

(½ mark for justification)

- Ans: ii) **Cereal-Rice:100@25**

(1 full mark for the correct answer)

- (c) Define a class **Clothing** in C++ with the following descriptions:  
Private Members:

Code            of type string  
Type            of type string  
Size            of type integer  
Material        of type string  
Price           of type float

A function Calc\_Price() which calculates and assigns the value of Price as follows:

For the value of Material as "COTTON" :

| Type    | Price (Rs.) |
|---------|-------------|
| TROUSER | 1500        |
| SHIRT   | 1200        |

For Material other than "COTTON" the above mentioned Price gets reduced by 25%.

Public Members:

A constructor to assign initial values of Code, Type and Material with the word "NOT ASSIGNED" and Size and Price with 0.

A function Enter() to input the values of the data members Code, Type, Size and Material and invoke the CalcPrice() function.

A function Show() which displays the content of all the data members for a Clothing.

Ans:

```
class Clothing
{
 char Code[25];
 char Type[25];
 int Size;
 char Material[30];
 float Price;
public:
 Clothing() ;
 void Calc_Price() ;
 void Enter() ;
 void Show() ;
};
Clothing::Clothing()
{
 strcpy(Code,"NOT ASSIGNED");
 strcpy(Type,"NOT ASSIGNED");
 Size=0;
```

```

 strcpy (Material, "NOT ASSIGNED");
 Price=0;
 }
void Clothing:: Calc_Price()
{
 if (strcmp(Type, "TROUSER") ==0 && strcmp (Material,"COTTON")==0)
 Price=1500;
 else if (strcmp(Type, "SHIRT") ==0 && strcmp(Material,"COTTON")==0)
 Price=1200;
 else if (strcmp(Type, "TROUSER") ==0 && strcmp(Material,"COTTON")!=0)
 Price=1500*0.75;
 else if (strcmp(Type,"SHIRT")==0) && strcmp(Material,"COTTON")!= 0)
 Price=1200*0.75;
}
void Clothing::Enter()
{
 gets(Code) ; // or cin >> Code;
 gets(Type) ; // or cin >> Type;
 cin>>Size;
 gets(Material) ;// or cin >> Material;
 Calc_Price() ;
}
void Clothing::Show()
{
 cout<<Code<<Type<<Size<<Material<<Price<<endl;
}

```

(½ Mark for correct syntax for class header)

(½ Mark for correct declaration of data members)

(½ Mark for correct definition of function Calc\_price())

(½ Mark for constructor)

(1 Mark for calculation of correct Price for each condition)

(½ Mark for correct Enter() with proper invocation of Calc\_Price())

(½ Mark for displaying all data Members in function Show())

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

```

class Toys
{
 char TCode [5] ;
protected:
 float Price;
 void Assign (float);
public:
 Toys() ;
 void TEntry () ; ,

```

```

 void TDisplay () ;
 } ;
class SoftTOYS: public Toys
{
 char STName [20] ;
 float weight;
public:
 SoftToys() ;
 void STEntry () ;
 void STDisplay () ;
} ;
class ElectronicToys: public Toys
{
 char ETName[20];
 int No_of_Batteries;
public:
 ElectronicToys() ;
 void ETEntry () ;
 void ETDisplay () ;
} ;

```

(i) Which type of inheritance is shown in the above example?

Ans: Hierarchical Inheritance

OR

Single Level Inheritance

*(1 Mark to be given for mentioning any of the above mentioned type of inheritance)*

(ii) How many bytes will be required by an object of the class softToys?

Ans:

**33**

**(1 Mark for correct answer)**

(iii) Write name of all the data member(s) accessible from member functions of class SoftToys.

Ans: **Data Members: Price, STName, Weight**

*(1 Mark for all correct members)*

**NOTE:**

**No marks to be awarded for partially correct answers**

(iv) Write name of all the member functions, which are accessible from an object of the class ElectronicToys.

Ans:

**Member Functions: TEntry ( ) , TDisplay ( ) , ETEntry ( ) , ETDisplay ( )**

**(1 Mark for correct answer)**

**NOTE:**

- Constructors Toys() & ElectronicToys(), it mentioned to be ignored.
- No marks to be awarded for partially correct answers

3. (a) Write a function in C++, which accepts an integer array and its size as arguments and swaps the elements of every even location with its following odd location. 4

Example: if an array of nine elements initially contains the elements as

2, 4, 1, 6, 5, 7, 9, 23, 10

then the function should rearrange the array as

4, 2, 6, 1, 7, 5, 23, 9, 10

Ans:

```
void Display (int NUM[], int N)
{
 int T;
 for (int I=0; I<N-1; I+=2)
 {
 T=N[I] ;
 N[I]=N[I+1] ;
 N[I+1] = T ;
 }
}
```

*(1 Mark for correct Function Header with proper Arguments)*

*(1 Mark for correct loop)*

*(2 Marks for swapping values correctly with/without a temporary variable)*

- (b) An array Arr[50][100] is stored in the memory along the row with each element occupying 2 bytes. Find out the address of the location Arr[20][50], if the location Arr[10][25] is stored at the address 10000.

Ans:

Assuming LBR=LBC=0

S=2 bytes

Number of Rows (N)=50

Number of Columns (M)=100

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

LOC (Arr [10] [25])=B + (10\*100+25)\*2

10000 = B + (1000+25)\*2

B = 10000-2050

B = 7950

LOC (Arr [20] [50]) = 7950+(20\*100+50)\*2

= 7950 + (2050\*2)



$$= 7950+4100$$

$$= 12050$$

OR

Assuming LBR=LBC=1

S=2 bytes

Number of Rows (N)=50

Number of Columns (M) =100

LOC (Arr [I] [J]) =B +((I-LBR)\*M+(J-LBC))\*S

LOC (Arr [10] [25]) =B +((10-1)\*100+(25-1))\*2

$$10000 = B + (900+24) * 2$$

$$B = 10000 - 1848$$

$$B = 8152$$

LOC (Arr [20] [50]) = 8152+ ((20-1)\*100+ (50-1))\*2

$$= 8152 + (1949*2)$$

$$= 8152+3898$$

$$= 12050$$

*(2 Mark for writing correct formula(for row major), substituting formula with correct values and calculate Base Address)*

*(1 Mark for writing correct formula/correct substituted values, for row major properly, for calculating Address of Arr[20][50])*

*(1 Mark for calculating correct Address of Arr[20][50])*

- (c) Write a function in C++ to Delete an element from a dynamically allocated Queue where each node contains a real number as data.

Assume the following definition of MYNODE for the same.

```
struct MYNODE
{
 float NUM;
 MYNODE *Link;
} ;
```

Ans:

```
class QUEUE
{
 MYNODE *Rear,*Front;
public:
 QUEUE() { Rear=NULL; Front=NULL;}
 void DELETE();
 ~QUEUE() ;
};
//Function definition DELETE()
```

```

void QUEUE:: DELETE()
{
 if (Front==NULL) // OR if{!Front}
 cout<<"\n Queue Underflow\n"i
 else
 {
 MYNODE *Temp;
 Temp=Front;
 cout<<Front->NUM<<":"<<"Deleted"<<endl;
 // To be ignored
 Front=Front->Link;
 delete Temp;
 if (Front==NULL)
 Rear=NULL;
 }
}

```

OR

```

void DELETE(MYNODE *& Front, MYNODE *& Rear)
{
 if (! Front)
 cout<<"\n Queue Underflow\n";
 else
 {
 MYNODE *Temp;
 Temp=Front;
 cout<<Front->NUM<<":"<<"Deleted"<<endl;
 //To be ignored
 Front=Front->Link;
 delete Temp;
 if (Front==NULL)
 Rear=NULL;
 }
}

```

Note. If Front and Rear are declared as Global variables then Parameters are not needed in the above function.

*(½ Mark for correct function header)*

*(½ Mark for declaring Front and Rear as members OR passing them as arguments OR declaring them as global variables)*

*(1 Mark for checking Underflow)*

*(1 Mark for updating Front)*

*(1 Mark for deleting node)*

- (d) Write a function in C++ to print the product of each row of a two dimensional integer array passed as the argument of the function.

Example: if the two dimensional array contains

|    |    |    |
|----|----|----|
| 20 | 40 | 10 |
| 40 | 50 | 30 |
| 60 | 30 | 20 |
| 40 | 20 | 30 |

Then the output should appear as :

Product of Row 1= 8000  
 Product of Row 2= 6000  
 Product of Row 3= 3600  
 Product of Row 4= 2400

Ans:

```
// Function definition
void Display(int A[][3], int M, int N)
{
 int I, J;
 long int T; // OR int T;
 cout<<"Performing Calculation:"<<endl;
 for (I=0; I<M; I=I+1)
 {
 T=1;
 for (J=0; J<N; J=J+1)
 T=T*A[M][N] ;
 cout<<"Product of Row "<<I+1<<"=" <<T<<endl;
 }
}
```

**OR**

*Any other correct equivalent function definition*

*(1/2 mark for correct function header)*

*(1/2 mark for correct loops)*

*(1/2 mark for calculating product)*

*(1/2 mark for correct initialization of T after every inner loop)*

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

5, 20, 15, -, \*, 25, 2, \*, +

Ans: Evaluation of the given postfix expression is explained below

| Operator Scanned | Stack Content |
|------------------|---------------|
| 5                | 5             |
| 20               | 5, 20         |
| 15               | 5, 20, 15     |
| -                | 5, 5          |
| *                | 25            |
| 25               | 25, 25, 2     |
| 2                | 25, 25, 2     |
| *                | 25, 50,       |
| +                | 75            |

**OR**

**Any other method of evaluating the postfix expression is shown.**

*(2 Marks to be given for correct answer)*

*(½ Mark for each operation correctly evaluated)*

*(Only 1 Mark is to be awarded if correct answer is given without steps)*

4. (a) Observe the program segment given below carefully, and answer the question that follows:

```
class Candidate
{
 long Cld; //Candidate' s Id
 char CName [20]; //Candidate's Name
 float Marks; //Candidate's Marks
public:
 void Enter () ;
 void Display () ;
 void MarksChange() ; //Function to change marks
 long R_Cid() {return Cld; }
};
void MarksUpdate (long Id)
{
 fstream File;
 File.open ("CANDIDAT.DAT",ios: :binary | ios: :in | ios: :out);
 Candidate C;
 int Record=0, Found=0;
 while (! Found && File.read ((char*) &C, sizeof (C)))
 {
```

```

 if (Id==C. R_Cld ())
 {
 cout<<"Enter new Marks";
 C.MarksChange() ;
 _____/ /Statement 1
 _____/ /Statement 2
 Found -= 1;
 }
 Record++;
 }
 if (Found= =1) cout<<"Record Updated";
 File.close () ;
}

```

Write the Statement 1 **to position** the File Pointer at the beginning of the Record for which the Candidate's Id matches with the argument passed, and Statement 2 **to write** the updated Record at that position.

Ans:

**Statement 1:**

```
File.seekp(Record*sizeof(C));
```

**OR**

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

**OR**

```
File.seekg (Record*sizeof(C));
```

**OR**

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

**OR**

Any equivalent correct method of calculating size of the record in place of sizeof operator.

**Statement 2:**

```
File.write((char*)&C, sizeof(C));
```

**OR**

```
File.write((char*)&C,sizeof(Candidate));
```

*(½ Mark for each correct statement)*

- (b) Write a function in C++ to count the number of uppercase alphabets present in a text file "ARTICLE.TXT".

Ans:

```

void theUpperAlphaCount()
{
 ifstream Fil("ARTICLE. TXT") ;

```

```

 //R fstream Fil;
 //Fil.open("ARTICLE. TXT", ios : : in) ;
Char ch;
int c=0;
while(Fil) // OR while (!Fil.eof())
 Fil.get(ch) ; //OR ch = Fil.get();
 if (isupper(ch))
 //OR if (ch>=65 && ch<=90) OR if (ch>='A' && ch<='Z')
 c++;
 }
cout<<"Number of alphabets in uppercase"<<c<<endl.;
Fil.close() ;
}

```

**OR**

```

void theUpperAlphaCount()
{
 ifstream Fil("ARTICLE.TXT");
 //R fstream Fil;
 //Fil.open("ARTICLE. TXT", ios:: in) ;
char ch;
int c=0;
while (Fil.get(ch))
{
 if (isupper(ch))
 //OR if (ch>=65 && ch<=90) OR if (ch>='A' && ch<='Z')
 c++;
 }
cout<<"Number of alphabets in uppercase"<<c<<endl;
Fil.close();
}

```

(½ Mark for opening file in the correct mode)

(½ Mark for reading the content from the file and the loop)

(½ Mark for correct comparison)

(½ Mark for initialization and increment of the counter(variable))

- (c) Given a binary file TELEPHON.DAT, containing records of the following class Directory:

```

class Directory
{
 char Name[20] ;
 char Address[30] ;
 char AreaCode[5] ;
}

```

```

 char Phone_No[15];
public:
 void Register () ;
 void Show () ;
 int CheckCode(char AC[])
 {
 return strcmp (AreaCode, AC);
 }
};

```

Write a function COPYABC() in C++, that would copy only those records having AreaCode as "123" from TELEPHON.DAT to TELEBACK.DAT.

Ans:

```

//Function to copy records from TELEPHON.DAT to
//TELEBAC.DAT
void COPYABC()
{
 fstream IS, OA;
 IS.open("TELEPHON.DAT", ios::binary|ios: :in);
 OA.open("TELEBACK. DAT", ios::binary | ios:: out);
 Directory D;
 while (IS.read((char*)&D,sizeof(D)))
 {
 if (D. CheckCode("123")==0)
 OA.write((char *)&D,sizeof(D));
 }
 IS.close() ;
 OA.close() ;
}

```

**OR**

Any other equivalent code

*(½ Mark for opening each file in the correct mode)*

*(½ Mark for reading the content from the file)*

*(½ Mark for the correct loop)*

*(½ Mark for the correct comparison with "123")*

*(½ Mark for writing the content to the second file)*

5. (a) Differentiate between **Candidate Key** and **Alternate Key** in context of RDBMS.

Ans: Candidate Key: It is the one that is capable of becoming primary key i.e., a column or set of columns that identifies a row uniquely in the relation.

Alternate Key: A candidate key that is not selected as a primary key is called an Alternate Key.

(1 Mark each for correct definition/explanation of Candidate Key and Alternate Key)

OR

(Full 2 Marks for illustrating the concept of Candidate and Alternate key with appropriate example)

- (b) Consider the following -tables Item and Customer. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii).

**TABLE : ITEM**

| I_ID | ItemName          | Manufacturer | Price |
|------|-------------------|--------------|-------|
| PC01 | Personal Computer | ABC          | 35000 |
| LC05 | Laptop            | ABC          | 55000 |
| PC03 | Personal Computer | XYZ          | 32000 |
| PC06 | Personal Computer | COMP         | 37000 |
| LC03 | Laptop            | PQR          | 57000 |

**TABLE : CUSTOMER**

| C_ID | CustomerName | City      | I_Id |
|------|--------------|-----------|------|
| 01   | N Roy        | Delhi     | LC03 |
| 06   | H Singh      | Mumbai    | PC03 |
| 12   | R Pandey     | Delhi     | PC06 |
| 15   | C Sharma     | Delhi     | LC03 |
| 16   | K Agarwal    | Bangalore | PC01 |

- (i) To display the details of those Customers whose City is Delhi.

Ans:

```
SELECT * FROM CUSTOMER WHERE City='Delhi' ;
```

(½ Mark for correct use of *SELECT* and *FROM*)

(½ Mark for correct use of *WHERE* clause)

- (ii) To display the details of Items whose Price is in the range of 35000 to 55000 (Both values included)

Ans:

```
SELECT * FROM ITEM WHERE PRICE BETWEEN 35000 AND 55000;
```

OR

```
SELECT * FROM ITEM WHERE PRICE >= 35000 AND PRICE <= 55000;
```

(½ Mark for correct use of *SELECT* and *FROM*)

(½ Mark for correct use of *WHERE* clause)



- (iii) To display the CustomerName, City from table Customer and ItemName and Price from table item with their corresponding matching I\_Id.

Ans:

```
SELECT CustomerName, City, ItemName , Price
FROM CUSTOMER C, ITEM I WHERE I. I_Id=C.I_ID;
OR
SELECT CustomerName, City, ItemName, Price
FROM CUSTOMER, ITEM WHERE CUSTOMER.I_Id=ITEM.I_ID;
OR
SELECT C. CustomerName, C.City, I.ItemName, I.Price
FROM CUSTOMER C, ITEM I WHERE C.I_Id=I.I_ID;
OR
SELECT CUSTOMER.CustomerName, CUSTOMER.City,
 ITEM. ItemName, ITEM. Price
FROM CUSTOMER, ITEM WHERE CUSTOMER.I_Id=ITEM.I_ID;
```

*(½ Mark for correct use of SELECT and FROM)*  
*(½ Mark for correct use of WHERE clause)*

- (iv) To increase the Price of all Items by 1000 in the table Item.

Ans:

```
UPDATE ITEM SET PRICE=PRICE+1000;
```

*(½ Mark for cbrrect use of UPDATE)*  
*(½ Mark for correct use of SET)*

- (v) SELECT DISTINCT City FROM Customer;

Ans:

```
DISTINCT City
Delhi
Mumbai
Bangalore
```

*(½ Mark for correct output - ignore the order of City in the output & Column Header)*

- (vi) SELECT ItemName, Max (Price), Count(\*) From Item Group by ItemName;

Ans:

| ItemName          | Max (Price) | Count ( * ) |
|-------------------|-------------|-------------|
| Personal Computer | 37000       | 3           |
| Laptop            | 57000       | 2           |

*(½ Mark for correct output - ignore the order of rows in the output & Column Headers)*

(vii) SELECT CustomerName, Manufacturer FROM Item, Customer  
WHERE Item.Item\_Id=Customer.Item.I\_Id;

Ans:

| <u>CustomerName</u> | <u>Manufacturer</u> |
|---------------------|---------------------|
| N Roy               | PQR                 |
| H Singh             | XYZ                 |
| R Pandey            | COMP                |
| C Sharma            | PQR                 |
| K Agarwal           | ABC                 |

(½ Mark for correct output - ignore the order of rows in the output & Column Headers)

OR

(½ Mark for mentioning syntax error or error as the column Item\_Id is not present)

(viii) SELECT ItemName, Price\*100 FROM Item WHERE Manufacturer = 'ABC';

Ans:

| <u>ItemName</u>   | <u>Price*100</u> |
|-------------------|------------------|
| Personal Computer | 3500000          |
| Laptop            | 5500000          |

(½ Mark for correct output - ignore the order of rows in the output & Column Headers)

6. (a) State any verify Absorption law in Boolean- Algebra.

Ans:

$$X+X.Y=Y$$

| X | Y | X.Y | X+X.Y | Y |
|---|---|-----|-------|---|
| 0 | 0 | 0   | 0     | 0 |
| 0 | 1 | 0   | 0     | 1 |
| 1 | 0 | 0   | 1     | 0 |
| 1 | 1 | 1   | 1     | 1 |

OR

$$X.(X+Y)=X$$

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

OR

$$X+X'.Y=X+Y$$

| X | Y | X' | X'.Y | X+X'.Y | X+Y |
|---|---|----|------|--------|-----|
| 0 | 0 | 1  | 0    | 0      | 0   |
| 0 | 1 | 1  | 1    | 0      | 0   |
| 1 | 0 | 0  | 0    | 1      | 1   |
| 1 | 1 | 0  | 0    | 1      | 1   |

OR

$$X.(X'+Y)=X.Y$$

| X | Y | X' | X'+Y | X.(X'+Y) | X.Y |
|---|---|----|------|----------|-----|
| 0 | 0 | 1  | 1    | 0        | 0   |
| 0 | 1 | 1  | 1    | 0        | 0   |
| 1 | 0 | 0  | 0    | 0        | 0   |
| 1 | 1 | 0  | 1    | 1        | 1   |

OR

$$X+X.Y=X$$

$$\begin{aligned} \text{L.H.S} &= X+X.Y \\ &= X.1+X.Y \\ &= X.(1+Y) \\ &= X.1 \\ &= X \\ &= \text{R.H.S} \end{aligned}$$

Verified

OR

$$X(X+Y)=X$$

$$\begin{aligned} \text{L.H.S} &= X.(X+Y) \\ \text{L.H.S} &= X.X+X.Y \\ &= X+X.Y \\ &= X.1+X.Y \\ &= X.(1+Y) \\ &= X.1 \\ &= X \\ &= \text{R.H.S} \end{aligned}$$

Verified

OR

$$\begin{aligned}
X+X' \cdot Y &= X+Y \\
\text{L.H.S} &= (X+X') \cdot (X+Y) \\
&= 1 \cdot (X+Y) \\
&= X+Y \\
&= \text{R.H.S}
\end{aligned}$$

Verified

OR

$$\begin{aligned}
X \cdot (X' + Y) &= X \cdot Y \\
\text{L.H.S} &= X \cdot (X' + Y) \\
&= X \cdot X' + X \cdot Y \\
&= 0 + X \cdot Y \\
&= X \cdot Y \\
&= \text{R.H.S}
\end{aligned}$$

Verified

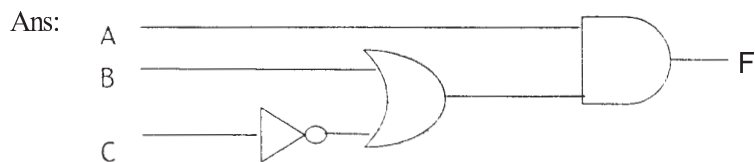
*(2 Marks for verification of anyone form of the Absorption Law)*

OR

*(1 Mark for stating anyone form of the Absorption Law)*

- (b) Draw a Logical Circuit Diagram for the following Boolean Expression :

$$A \cdot (B + C')$$



*(1 mark for the correct circuit diagram)*

- (c) Convert the following Boolean expression into its equivalent Canonical Product of Sum Form (POS) :

$$A \cdot B' \cdot C + A' \cdot B \cdot C + A' \cdot B \cdot C'$$

Ans:

$$= \Pi (0, 1, 4, 6, 7)$$

OR

$$= (A+B+C) \cdot (A+B+C') \cdot (A'+B+C) \cdot (A'+B'+C) \cdot (A'+B'+C')$$

*(2 Marks for the correct expression)*

OR

*(1 Mark if only truth table is given for the expression without deriving POS expression)*

Note: No marks to be awarded for partial answers

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

$$F(A, B, C, D) = \sum (0, 1, 2, 4, 5, 8, 9, 10, 11)$$

Ans:

|         | A' . B' | A' . B | A . B | A . B' |
|---------|---------|--------|-------|--------|
| C' . D' | 1       | 1      |       | 1      |
| C' . D  | 1       | 1      |       | 1      |
| C . D   |         |        |       | 1      |
| C . D'  | 1       |        |       | 1      |

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

(1 Mark for drawing correct K-Map )

(½ Mark for plotting 1 's correctly)

(½ Mark for each correct grouping)

Note: No marks should be deducted even if the solution is arrived with the help of POS form.

7. (a) What is a Modem ?

Ans: **Modem** is a Modulation Demodulation device that converts analog signal to digital signal and vice versa.

(1 Mark for any correct definition/explanation)

(b) Expand the following terms with respect to Networking :

(i) PPP (ii) GSM (iii) XML (iv) HTTP

Ans: (i) Point To Point Protocol

(ii) Global System for Mobile Communication

(iii) eXtensible Markup Language

(iv) Hyper Text Transfer Protocol

(½ Mark for each correct expansion)

(c) How is a Hacker different from a Cracker?

Ans:

Hackers are the ones who get into someone's code or computer without any malicious intentions, whereas Crackers are the one's who get into someone's code or computer with malicious intentions.

OR

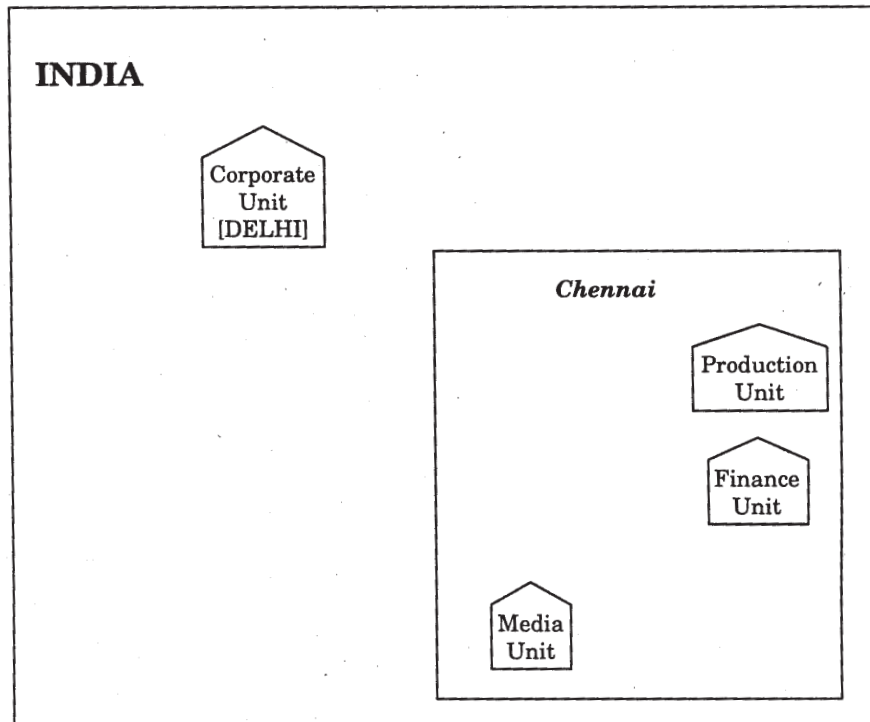
*Any equivalent difference*

(½ Mark for each correct definition)

(d) "China Middleton Fashion" is planning to expand their network in India, starting with two cities in India to provide infrastructure for distribution of

their product. The company has planned to set up their main office units in Chennai at three different locations and have named their offices as “Production Unit”, “Finance Unit” and “Media Unit”. The company has its corporate unit in Delhi.

A rough layout of the same is as follows:



Approximate distances between these Units is as follows:

| <b>From</b>     | <b>To</b>      | <b>Distance</b> |
|-----------------|----------------|-----------------|
| Production Unit | Finance Unit   | 70 Mtr          |
| Production Unit | Media Unit     | 15 KM           |
| Production Unit | Corporate Unit | 2112 KM         |
| Finance Unit    | Media Unit     | 15 KM           |

In continuation of the above, the company experts have planned to install the following number of computers in each of their office units:

|                 |     |
|-----------------|-----|
| Production Unit | 150 |
| Finance Unit    | 35  |
| Media Unit      | 10  |
| Corporate Unit  | 30  |

- (i) Suggest the kind of network required (out of LAN, MAN, WAN) for connecting each of the following office units:
- Production Unit and Media Unit
  - Production Unit and Finance Unit

Ans:

- Production Unit and Media Unit : **MAN**
  - Production Unit and Finance Unit : **LAN**
- (½ Mark for mention of each - MAN and LAN correctly)

- (ii) Which one of the following device will you suggest for connecting all the computers within each of their office units?

- Switch/Hub
- Modem
- Telephone

Ans:

- Switch/Hub
- (1 Mark for the correct device)

- (iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local offices in Chennai for very effective (High Speed) communication?

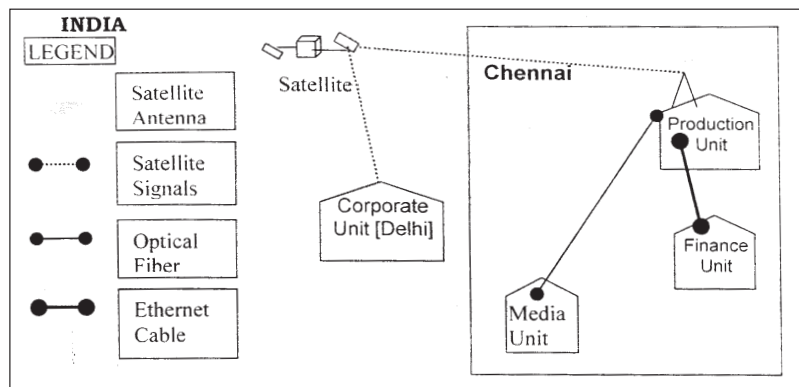
- Ethernet cable
- Optical Fiber
- Telephone cable

Ans:

- Optical Fiber
- (1 Mark for the correct media)

- (iv) Suggest a cable/wiring layout for connecting the company's local office units located in Chennai. Also, suggest an effective method/technology for connecting the company's office unit located in Delhi.

Ans:



Optical Fiber/Star Topology

Wireless/Satellite Link/leased Line

(½ Mark for the correct layout)

(½ Mark for the equivalent correct method/technology)