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'; 1++)
    {
        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; 1 < = 2; 1++)
    {
        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 () {retumAId;)
    } ;
    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 ld 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_ld=Product.P_ld;

(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'. (Y' + Z) 1

(c) Convert the following Boolean expression into its equivalent Canonical Sum of Product Form(SOP)
(X' + Y + Z') . (X' + Y + Z) . (X' + Y' + Z) . (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

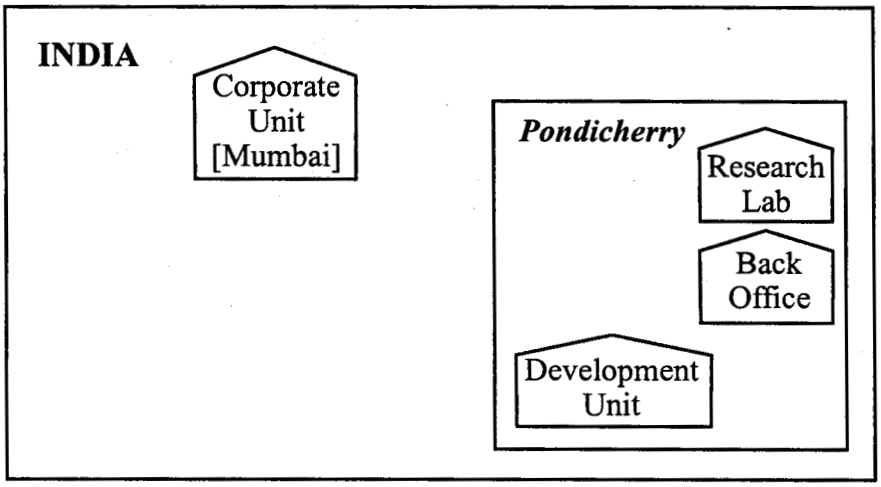
(iii) FTP

(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.