COMPUTER SCIENCE

Time allowed : 3 hours ***Maximum Marks : 70***

Instructions:

(i) ***All*** *questions are compulsory.*

(ii) *Programming Language: C++*

QUESTION PAPER CODE 91/1

1. (a) What is the difference between call by value and call by reference? Give an example in C++ to illustrate both. 2

(b) Write the names of the header files to which the following belong: 1

(i) puts( )

(ii) sin( )

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

```
#include [iostream.h]
#include [stdio.h]
class Employee
{
    int EmpId = 901;
    char EName [20] ;
public
Employee ( ) { }
void Joining () {cin>>EmpId; gets (EName);}
void List ( ) {cout<<EmpId<<" : "<<EName<<endl;}
} ;
void main ( )
{
Employee E ;
```

```
Joining.E ( ) ;
E. List ( )
}
```

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

```
#include<iostream.h>
void main ( )
{
    int X[ ] = {10, 25, 30, 55, 100};
    int *p = X ;
    while ( *p < 110)
    {
        if (*p%3 ! = 0)
            *p = *p + 1 ;
        else
            *p = *p + 2 ;
        p++;
    }
    for(int I = 4 ; 1>= 1 ; I - -)
    {
        cout << X[I] << "*" ;
        if ( I%3 = = 0) cout<<endl ;
    }
    cout<<X[0]*3<<endl ;
}
```

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

```
#include<iostream.h>
#include<ctype.h>
void Encode (char Info [ ], int N) ;
void main ( )
{
```

```
    char Memo [ ] = "Justnow" ;
    Encode(Memo, 2) ;
    cout<<Memo<<endl ;
}
void Encode(char Info[ ], int N)
{
    for (int I = 0 ; Info[I] != '\0' ; 1++)
    if (1%2= =0)
        Info[I] = Info[I] –N ;
        else if (islower(Info[I]))
        Info[I] = toupper(Info[I]) ;
        else
        Info[I] = Info[I] +N ;
}
```

(f) Study the following program and select the possible output from it : 2

```
#include <iostream.h>
#include <stdlib.h>
const int LIMIT = 4 ;
void main ( )
{
    randomize ( ) ;
    int Points;
    Points = 100 + random(LIMIT) ;
    for (int P=Points ; P>=100 ; P– –)
        cout<<P<<"#" ;
    cout<<endl;
}
```

(i) 103#102#101#100#

(ii) 100#101#102#103#

(iii) 100#101#102#103#104#

(iv) 104#103#102#101#100#

2. (a) What is copy constructor? Give an example in C++ to illustrate copy constructor. 2

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

```
class WORK
{
    int WorkId;char WorkType ;
public:
    -WORK ( )              //Function 1
    { cout<<"Un-Allocated"<<endl ;}
    void status ( )        //Function 2
    { cout<<WorkId<<": "<<WorkType<<endl ;}
    WORK ( )               //Function 3
    { WorkId = 10; WorkType='T' ; }
    WORK(WORK &W)          //Function 4
    {
        WorkId=W. WorkId+12;WorkType=W. WorkType+l
    }
} ;
```

(i) Which member function out of Function 1, Function 2, Function 3 and Function 4 shown in the above definition of class WORK is called automatically, when the scope of an object gets over? Is it known as Constructor OR Destructor OR Overloaded Function OR Copy Constructor?

(ii) WORK W ; //Statement 1

WORK Y (W) ; //Statement 2

Which member function out of Function 1, Function 2, Function 3 and Function 4 shown in the above definition of class WORK will be called on execution of statement written as statement 2 ? What is this function specifically known as out of Destructor or Copy Constructor or Default Constructor?

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

Private Members

- Rno //*Data* member to store Room No
- Name //*Data* member to store customer name
- Charges //*Data* member to store per day charges
- Days //*Data* member to store number of days of stay
- COMPUTE( ) //A function to calculate' and return Amount as Days*Charges and if the value of Days*Charges is more than 11000 then as 1.02*Days*Charges

Public Members

- Getinfo ( ) //*A* function to enter the content Rno, Name, //*Charges* and Days
- Dispinfo ( ) //*A* function to display Rno, Name, Charges, //*Days* and Amount (Amount to be displayed by //*calling* function COMPUTE ( ))

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

```
class  FaceToFace
{
    char  CenterCode [10] ;
public:
    void Input ( ) ;
    void Output ( ) ;
} ;
class  Online
{
    char  website [50] ;
public:
    void SiteIn ( ) ;
    void SiteOut ( ) ;
} ;
class  Training:  public  FaceToFace,  private  Online
```

```
{
    long Tcode ;
    float charge;
    int period;
public:
    void Register ( ) ;
    void Show ( ) ;
} ;
```

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

(ii) Write names of all the member functions accessible from Show( ) function of class Training.

(iii) Write name of all the members accessible through an object of class Training.

(iv) Is the function Output( ) accessible inside the function SiteOut( ) ? Justify your answer.

3. (a) Write a function SORTPOINTS( ) in C++ to sort an array of structure Game in descending order of Points using Bubble Sort. 3

Note: Assume the following definition of structure Game

```
struct Game
{
    long PNo; //Player Number
    char PName [20] ;
    long Points;
} ;
```

Sample content of the array (before sorting)

PNo	PName	Points
103	Ritika Kapur	3001
104	John Philip	2819
101	Razia Abbas	3451
105	Tarun Kumar	2971

Sample content of the array (after sorting)

PNo	PName	Points
101	Razia Abbas	3451
103	Ri tika Kapur	3001
105	Tarun Kumar	2971
104	John Philip	2819

(b) An array S[40][30] is stored in the memory along the column with each of the element occupying 4 bytes, find out the base address and address of element S[20][15], if an element S[15][10] is stored at the memory location 7200. 4

(c) Write a function QUEINS( ) in C++ to insert an element in a dynamically allocated Queue containing nodes of the following given structure: 4

```
struct Node
{
    int PId ;    //Product Id
    char Pname [20] ;
    NODE *Next ;
} ;
```

(d) Define a function SWAPCOL ( ) in C++ to swap (interchange) the first column elements with the last column elements, for a two dimensional integer array passed as the argument of the function. 3

Example: If the two dimensional array contains

2	1	4	9
1	3	7	7
5	8	6	3
7	2	1	2

After swapping of the content of 1st column and last column, it should be :

9	1	4	2
7	3	7	1
3	8	6	5
2	2	1	7

(e) Convert the following infix expression to its equivalent postfix expression showing stack contents for the conversion: 2

X–Y /(Z + U) * V

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

```
#include <fstream.h>
class Stock
{
    long Ino ;   //Item Number
    char Item [20] ;//Item Name
    int Qty ;     //Quantity
public:
    void Get(int) ;//Function to enter the content
    void show ( ) ;//Function to display the content
    void Purchase (int Tqty)
    {
        Qty + = Tqty ;
    }   //Function to increment in Qty
    long KnowIno ( ) {return Ino ;}
} ;
    void Purchaseitem (long PINo, int PQty)
        //PINo -> Ino of the item purchased
        //PQty -> Number of item purchased
    {
        fstream File;
        File.open("ITEMS.DAT", ios :: binarylios ::
        inlios :: out);
        int Pos = –1 ;
        Stock S ;
```

```
    while (Pos = = –1 && File.read((char*) &S, sizeof (S)))
    if (S. KnowIno( ) = =PINo)
    {
        S. Purchase (PQty); //To update the number of Items
        Pos = File.tellg ( ) -sizeof (S) ;
    //Line 1: To place the file pointer to the required
    position ;
    //Line 2: To write the object S on to the binary
    file ;
}
if (Pos = = –1)
    cout<<"No updation done as required Ino not found.." ;
File.close ( ) ;
}
```

(b) Write a function COUNT_DO( ) in C++ to count the presence of a word 'do' in a text file "MEMO.TXT" 2

Example:

If the content of the file "MEMO.TXT" is as follows:

I will do it, if you request me to do it. It would have been done much earlier.

The function COUNT_DO ( ) will disDla

Count of -do- in file : 2

Note: In the above example, 'do' occurring as a part of word done is not considered.

(c) Write a function in C++ to read and display the detail of all the users whose status is 'A' (i.e. Active) from a binary file "USER.DAT". Assuming the binary file "USER.DAT" is containing objects of class USER, which is defined as follows: 3

```
class USER
{
    int Uid ;      //User Id
    char Uname [20];//User Name
    char Status; //User Type: A Active I Inactive
Public:
    void Register ( ) ;//Function to enter the content
    void show ( ) ;     //Function to display all data
                        members
    char Getstatus ( ) {return Status;}.
} ;
```

5. (a) What are candidate keys in a table? Give a suitable example of candidate keys in a table. 2

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

Table: GARMENT

GCODE	DESCRIPTION	PRICE	FCODE	READYDATE
10023	PENCIL SKIRT	1150	F03	19-DEC-08
10001	FORMAL SHIRT	1250	F01	12-JAN-08
10012	INFORMAL SHIRT	1550	F02	06-JUN-08
10024	BABY TOP	750	F03	07-APR-07
10090	TULIP SKIRT	850	F02	31-MAR-07
10019	EVENING GOWN	850	F03	06-JUN-08
10009	INFORMAL PANT	1500	F02	20-OCT-08
10007	FORMAL PANT	1350	F01	09-MAR-08
10020	FROCK	850	F04	09-SEP-07
10089	SLACKS	750	F03	20-OCT-08

Table : FABRIC

FCODE	TYPE
F04	POLYSTER
F02	COTTON
F03	SILK
F01	TERELENE

(i) To display GCODE and DESCRIPTION of each GARMENT in descending order of GCODE

(ii) To display the details of all the GARMENTs, which have READYDATE in between 08-DEC-07 and 16-JUN-08(inclusive of both the dates).

(iii) To display the average PRICE of all the GARMENTs, which are made up of FABRIC with FCODE as F03.

(iv) To display FABRIC wise highest and lowest price of GARMENTs from GARMENT table. (Display FCODE of each GARMENT along with highest and lowest price)

(v) SELECT SUM (PRICE) FROM GARMENT WHERE FCODE = 'F01' ;

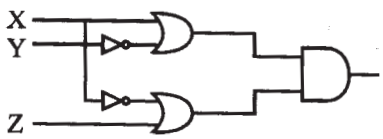
(vi) SELECT DESCRIPTION, TYPE FROM GARMENT, FABRIC WHERE GARMENT.FCODE = FABRIC.FCODE AND GARMENT. PRICE > = 1260 ;

(vii) SELECT MAX (FCODE) FROM FABRIC;

(viii) SELECT COUNT (DISTINCT PRICE) FROM GARMENT ;

6. (a) Verify X'Y + X.Y' + X'Y' = (X' + Y') using truth table. 2

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



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

A	B	C	H
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map : 3
F(P, Q, R, S) = Σ(1, 2, 3, 5,6, 7, 9, 11, 12, 13, 15)

7. (a) What is difference between Star Topology and Bus Topology of network? 1

(b) Expand the following abbreviations: 1

(i) GSM

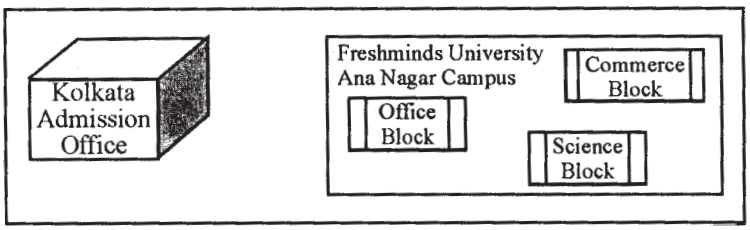
(ii) CDMA

(c) What is protocol? Which protocol is used to search information from internet using an internet browser? 1

(d) Name two switching techniques used to transfer data between two terminals (computers). 1

(e) Freshminds University of India is starting its first campus in Ana Nagar of South India with its center admission office in Kolkata. The university has 3 major blocks comprising of Office Block, Science Block and Commerce Block in the 5 KM area Campus.

As a network expert, you need to suggest the network plan as per (El) to (E4) to the authorities keeping in mind the distance and other given parameters.



Expected Wire distances between various locations:

Office Block to Science Block	90 m
Office Block to Commerce Block	80 m
Science Block to Commerce Block	15 m
Kolkata Admission office to Ana Nagar Campus	2450 km

Expected number of Computers to be installed' at various locations in the University are as follows:

Office Block	10
Science Block	140
Commerce Block	30
Kolkata Admission office	8

(E1) Suggest the authorities, the cable layout amongst various blocks inside university campus for connecting the blocks. 1

(E2) Suggest the most suitable place (i.e. block) to house the server of this university with a suitable reason. 1

(E3) Suggest an efficient device from the following to be installed in each of the blocks to connect all the computers: 1

(i) MODEM

(ii) SWITCH

(iii) GATEWAY

(E4) Suggest the most suitable. (very high speed) service to provide data connectivity between Admission Office located in Kolkata and the campus located in Ana Nagar from the following options: 1

- Telephone line
- Fixed-Line Dial-up connection
- Co-axial Cable Network
- GSM
- Leased line
- Satellite Connection