XII . 2009

Series SSO

Code No. 91

Candidates must write the Code on the title page of the answer-book.

Roll No. | | | | | | | |

- Please check that this question paper contains **15** printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains **7** questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minutes time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the student will read the question paper only and will not write any answer on the answer script during this period.

COMPUTER SCIENCE

Time allowed : 3 hours *Maximum Marks : 70*

Instructions :

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

(ii) *Programming Language : C++*

1. (a) What is the difference between Actual Parameter and Formal Parameter ? Give an example in C++ to illustrate both types of parameters. *2*

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

(i) **setw()**

(ii) **sqrt()**

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

```
include <iostream.h>
include <stdio.h>
class MyStudent
{
   int StudentId=1001;
   char Name[20];
public
  MyStudent(){}
  void Register(){cin>>StudentId; gets(Name);}
  void Display(){cout<<StudentId<<" :"<<Name<<endl;}
};
void main()
{
   MyStudent MS;
   Register.MS();
   MS.Display();
}
```

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

```
#include<iostream.h>
void main()
{
   int A[] = {10,15,20,25,30};
   int *p = A;
   while ( *p < 30)
   {
      if ( *p%3 != 0 )
         *p = *p + 2;
```

```
        else
            *p = *p + 1;
        p++;
    }
    for(int J = 0; J<=4; J++)
    {
        cout << A[J] << "*" ;
        if ( J%3 == 0) cout<<endl;
    }
    cout<<A[4] * 3<<endl;
}
```

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

```
#include <iostream.h>
#include <ctype.h>
void Secret(char Msg[],int N);
void main()
{
    char SMS[]="rEPorTmE";
    Secret(SMS,2);
    cout<<SMS<<endl;
}
void Secret(char Msg[],int N)
{
    for (int C=0;Msg[C]!='\0';C++)
        if (C%2==0)
            Msg[C]=Msg[C]+N;
        else if (isupper(Msg[C]))
            Msg[C]=tolower(Msg[C]);
        else
            Msg[C]=Msg[C]-N;
}
```

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

```
#include <iostream.h>
#include <stdlib.h>
const int MAX=3;
void main()
{
   randomize();
   int Number;
   Number=50+random(MAX);
   for (int P=Number;P>=50;P--)
      cout<<P<<" # ";
   cout<<endl;
}
```

(i) 53#52#51#50#

(ii) 50#51#52#

(iii) 50#51#

(iv) 51#50#

2. (a) What is function overloading ? Give an example in C++ to illustrate function overloading. *2*

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

```
class Job
{
    int JobId;char JobType;
public:
    ~Job()                    //Function 1
    { cout<<"Resigned"<<endl; }
    Job()                     //Function 2
```

```
    { JobId=10;JobType='T';}
    void TellMe()            //Function 3
    { cout<<JobId<<":"<<JobType<<endl;}
    Job(Job &J)              //Function 4
    {
            JobId=J.JobId+10;JobType=J.JobType+1;
    }
};
```

(i) Which member function out of Function 1, Function 2, Function 3 and Function 4 shown in the above definition of class Job 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)
```
Job P;          //Line 1
Job Q(P);       //Line 2
```

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

(c) Define a class HOTEL in C++ with the following description : *4*

Private Members :

- Rno //Data member to store Room No
- Name //Data member to store customer name
- Tariff //Data member to store per day charges
- NOD //Data member to store number of days of stay
- CALC() //A function to calculate and return Amount as NOD*Tariff and if the value of NOD*Tariff is more than 10000 then as 1.05*NOD*Tariff

Public Members

- Checkin() //A function to enter the content Rno, Name, //Tariff and NOD
- Checkout()//A function to display Rno, Name, Tariff, //NOD and Amount (Amount to be displayed by //calling function CALC())

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

```
class Regular
{
   char SchoolCode[10];
public:
   void InRegular( );
   void OutRegular( );
};
class Distance
{
   char StudyCentreCode[5];
public:
   void InDistance( );
   void OutDistance( );
};
class Course: public Regular, private Distance
{
   char Code[5];
   float Fees ;
   int Duration;
public:
   void InCourse( );
   void OutCourse( );
};
```

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

(ii) Write names of all the member functions accessible from OutCourse function of class Course.

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

(iv) Is the function InRegular( ) accessible inside the function InDistance( ) ? Justify your answer.

3. (a) Write a function SORTSCORE() in C++ to sort an array of structure Examinee in descending order of Score using Bubble Sort. *3*

Note : Assume the following definition of structure Examinee

```
struct Examinee
{
   long RollNo;
   char Name[20];
   float Score;
};
```

Sample Content of the array (before sorting)

RollNo	Name	Score
1001	Ravyank Kapur	300
1005	Farida Khan	289
1002	Anika Jain	345
1003	George Peter	297

Sample Content of the array (after sorting)

RollNo	Name	Score
1002	Anika Jain	345
1001	Ravyank Kapur	300
1003	George Peter	297
1005	Farida Khan	289

(b) An array T[50][20] is stored in the memory along the column with each of the elements occupying 4 bytes. Find out the base address and address of element T[30][15], if an element T[25][10] is stored at the memory location 9800. *4*

(c) Write a function QUEDEL() in C++ to display and delete an element from a dynamically allocated Queue containing nodes of the following given structure : *4*

```
struct NODE
{
   int Itemno;
   char Itemname[20];
   NODE *Link;
};
```

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

Example : If the two dimensional array contains

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

After swapping of the content of first row and last row, it should be as follows :

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

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

A + B *(C - D) / E

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

```
#include <fstream.h>
class Library
{
   long Ano;          //Ano - Accession Number of the Book
   char Title[20];  //Title - Title of the Book
   int Qty;           //Qty - Number of Books in Library
public:
   void Enter(int );//Function to enter the content
   void Display(); //Function to display the content
   void Buy(int Tqty)
   {
      Qty+=Tqty;
   }                //Function to increment in Qty
   long GetAno() {return Ano;}
};
void BuyBook(long BANo,int BQty)
                //BANo → Ano of the book purchased
                //BQty → Number of books purchased
{
   fstream File;
   File.open("STOCK.DAT ",ios::binary|ios::in|ios::out);
   int Position=-1;
   Library L;
   while (Position==-1 && File.read((char*)&L,sizeof(L)))
    if (L.GetAno()==BANo)
    {
     L.Buy(BQty);//To update the number of Books
     Position=File.tellg()-sizeof(L);
```

```
//Line 1:To place the file pointer to the required position
        ____________________;
//Line 2:To write the object L on to the binary file
        ____________________;
    }
  if (Position==-1)
    cout<<"No updation done as required Ano not found..";
  File.close();
}
```

(b) Write a function COUNT_TO() in C++ to count the presence of a word 'to' in a text file "NOTES.TXT". *2*

Example :

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

It is very important to know that smoking is injurious to health. Let us take initiative to stop it.

The function COUNT_TO() will display the following message :

Count of -to- in file: 3

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

(c) Write a function in C++ to read and display the detail of all the members whose membership type is 'L' or 'M' from a binary file "CLUB.DAT". Assume the binary file "CLUB.DAT" contains objects of class CLUB, which is defined as follows : *3*

```
class CLUB
{
 int Mno;          //Member Number
 char Mname[20];//Member Name
 char Type;//Member Type:L Life Member M Monthly Member G Guest
```

```
public:
    void Register();//Function to enter the content
    void Display(); //Function to display all data members
    char  WhatType(){return  Type;}.
};
```

5. (a) What is the purpose of a key in a table ? Give an example of a key in a table. *2*

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

Table : **DRESS**

DCODE	DESCRIPTION	PRICE	MCODE	LAUNCHDATE
10001	FORMAL SHIRT	1250	M001	12-JAN-08
10020	FROCK	750	M004	09-SEP-07
10012	INFORMAL SHIRT	1450	M002	06-JUN-08
10019	EVENING GOWN	850	M003	06-JUN-08
10090	TULIP SKIRT	850	M002	31-MAR-07
10023	PENCIL SKIRT	1250	M003	19-DEC-08
10089	SLACKS	850	M003	20-OCT-08
10007	FORMAL PANT	1450	M001	09-MAR-08
10009	INFORMAL PANT	1400	M002	20-OCT-08
10024	BABY TOP	650	M003	07-APR-07

Table : **MATERIAL**

MCODE	TYPE
M001	TERELENE
M002	COTTON
M004	POLYESTER
M003	SILK

(i) To display DCODE and DESCRIPTION of each dress in ascending order of DCODE.

(ii) To display the details of all the dresses which have LAUNCHDATE in between 05-DEC-07 and 20-JUN-08 (inclusive of both the dates).

(iii) To display the average PRICE of all the dresses which are made up of material with MCODE as M003.

(iv) To display materialwise highest and lowest price of dresses from DRESS table. (Display MCODE of each dress along with highest and lowest price)

(v) SELECT SUM(PRICE) FROM DRESS WHERE MCODE='M001';

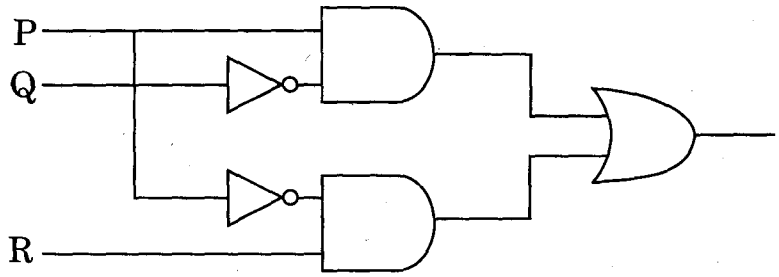
(vi) SELECT DESCRIPTION, TYPE FROM DRESS, MATERIAL WHERE DRESS.DCODE = MATERIAL.MCODE AND DRESS.PRICE>=1250;

(vii) SELECT MAX(MCODE) FROM MATERIAL;

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

6. (a) State and verify absorption law 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 G, which is represented in a truth table as follows : *1*

U	V	W	G
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

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

$$H(U,V,W,Z)=\sum(0,1,4,5,6,7,11,12,13,14,15)$$

7. (a) What is the difference between LAN and WAN ? *1*

(b) Expand the following abbreviations : *1*

(i) HTTP

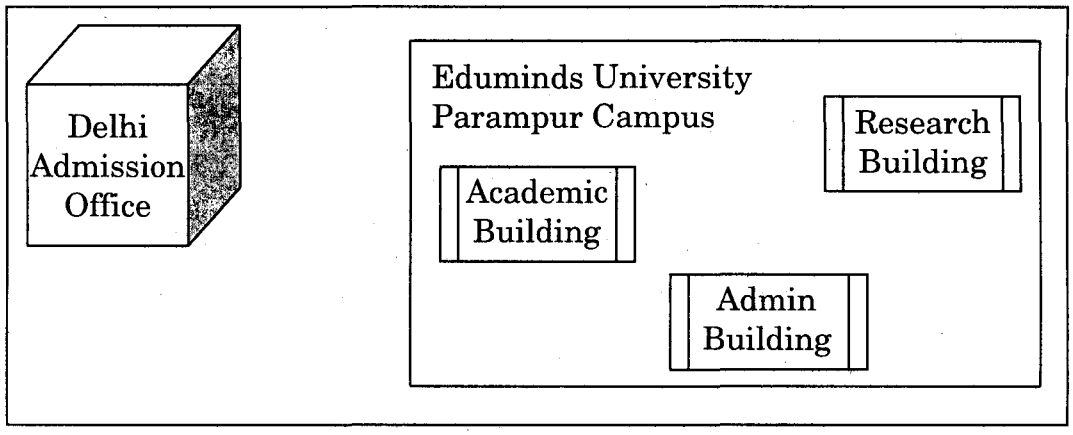
(ii) ARPANET

(c) What is protocol ? Which protocol is used to copy a file from/to a remotely located server ? *1*

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

(e) Eduminds University of India is starting its first campus in a small town Parampur of Central India with its center admission office in Delhi. The university has 3 major buildings comprising of Admin Building, Academic Building and Research Building in the 5 KM area Campus.

As a network expert, you need to suggest the network plan as per (E1) to (E4) to the authorities keeping in mind the distances and other given parameters.



Expected Wire distances between various locations :

Research Building to Admin Building	90 m
Research Building to Academic Building	80 m
Academic Building to Admin Building	15 m
Delhi Admission Office to Parampur Campus	1450 km

Expected number of computers to be installed at various locations in the university are as follows :

Research Building	20
Academic Building	150
Admin Building	35
Delhi Admission Office	5

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

(E2) Suggest the most suitable place (i.e. building) to house the server of this organisation, with a suitable reason. *1*

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

(i) GATEWAY
(ii) MODEM
(iii) SWITCH

(E4) Suggest the most suitable (very high speed) service to provide data connectivity between Admission Building located in Delhi and the campus located in Parampur from the following options : *1*

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