Computer Science (Code 083)
Sample Paper Set - 1

Max. Marks: 70 **Duration: 3 Hours**

1.

(a) What is the difference between Global Variable and Local Variable? **2**

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

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

```
#include [iostream.h]
class PAYITNOW
{
   int Charge;
PUBLIC:
   void Raise(){cin>>Charge;}
   void Show{cout<<Charge;}
};
void main()
{
   PAYITNOW P;
   P.Raise();
   Show();
}
```

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

```
#include <iostream.h>
struct PLAY
{ int Score, Bonus;};
void Calculate(PLAY &P, int N=10)
{
   P.Score++;P.Bonus+=N;
}
void main()
{
   PLAY PL={10,15};
   Calculate(PL,5);
   cout<<PL.Score<<":"<<PL.Bonus<<endl;
   Calculate(PL);
   cout<<PL.Score<<":"<<PL.Bonus<<endl;
   Calculate(PL,15);
   cout<<PL.Score<<":"<<PL.Bonus<<endl;
}
```

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

```
#include <iostream.h>
#include <ctype.h>
void Encrypt(char T[])
{
   for (int i=0;T[i]!='\0';i+=2)
      if (T[i]=='A' || T[i]=='E') T[i]='#';
         else if (islower(T[i])) T[i]=toupper(T[i]);
            else T[i]='@';
}
```

```
void main()
{
   char Text[]="SaVE EArtH";//The two words in the string Text
                            //are separated by single space
   Encrypt(Text);
   cout<<Text<<endl;
}
```

(f) In the following program, if the value of N given by the user is 15, what maximum and minimum values the program could possibly display? 2

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
     int N,Guessme;
     randomize();
     cin>>N;
     Guessme=random(N)+10;
     cout<<Guessme<<endl;
}
```

2.

(a) What do you understand by Data Encapsulation and Data Hiding? 2

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

```
class Seminar
{
   int Time;
public:
   Seminar()                  //Function 1
   {
      Time=30;cout<<"Seminar starts now"<<end1;
   }
   void Lecture()             //Function 2
   {
      cout<<"Lectures in the seminar on"<<end1;
   }
   Seminar(int Duration)      //Function 3
   {
      Time=Duration;cout<<"Seminar starts now"<<end1;
   }
   ~Seminar()                 //Function 4
   {
     cout<<"Vote of thanks"<<end1;
   }
};
```

i) In Object Oriented Programming, what is **Function 4** referred as and when does it get invoked/called?

ii) In Object Oriented Programming, which concept is illustrated by **Function 1** and **Function 3** together? Write an example illustrating the calls for these functions.

(c) Define a class TEST in C++ with following description: 4
Private Members

a. TestCode of type integer
b. Description of type string
c. NoCandidate of type integer
d. CenterReqd (number of centers required) of type integer
e. A member function CALCNTR() to calculate and return the number of centers as (NoCandidates/100+1)

Public Members

- A function SCHEDULE() to allow user to enter values for TestCode, Description, NoCandidate & call function CALCNTR() to calculate the number of Centres
- A function DISPTEST() to allow user to view the content of all the data members

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

```
class PUBLISHER
{
   char Pub[12];
   double Turnover;
protected:
   void Register();
public:
   PUBLISHER();
   void Enter();
   void Display();
};

class BRANCH
{
   char CITY[20];
protected:
   float Employees;
public:
   BRANCH();
   void Haveit();
   void Giveit();
};

class AUTHOR:private BRANCH,public PUBLISHER
{
   int Acode;
   char Aname[20];
   float Amount;
public:
   AUTHOR();
   void Start();
   void Show();
};
```

(i) Write the names of data members, which are accessible from objects belonging to class AUTHOR.

(ii) Write the names of all the member functions which are accessible from objects belonging to class BRANCH.

(iii) Write the names of all the members which are accessible from member functions of class AUTHOR.

(iv) How many bytes will be required by an object belonging to class AUTHOR?

3.

(a) Write a function in C++ to merge the contents of two sorted arrays A & B into third array C. Assuming array A is sorted in ascending order, B is sorted in descending order, the resultant array is required to be in ascending order. **4**

(b) An array S[40][30] is stored in the memory along the row with each of the element occupying 2 bytes, find out the memory location for the element S[20][10], if an element S[15][5] is stored at the memory location 5500. **4**

(c) Write a function in C++ to perform Insert operation in a dynamically allocated Queue containing names of students. **4**

(d) Write a function in C++ to find the sum of both left and right diagonal elements from a two dimensional array (matrix). **2**

(e) Evaluate the following postfix notation of expression: **2**
20,30,+,50,40,-,*

4.

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

```
#include <fstream.h>
class Item
{
   int Ino;char Item[20];
public:
   //Function to search and display the content from a particular
   //record number
   void Search(int );
   //Function to modify the content of a particular record number
   void Modify(int);
};
void Item::Search(int RecNo)
{
   fstream File;
   File.open("STOCK.DAT",ios::binary|ios::in);
   _____________________                          //Statement 1
   File.read((char*)this,sizeof(Item));
   cout<<Ino<<"==>"<<Item<<endl;
   File.close();
}
void Item::Modify(int RecNo)
{
   fstream File;
   File.open("STOCK.DAT",ios::binary|ios::in|ios::out);
   cout>>Ino;cin.getline(Item,20);
   _____________________                          //Statement 2
   File.write((char*)this,sizeof(Item));
   File.close();
}
```

(b) Write a function in C++ to count the number of lines present in a text file "STORY.TXT". **2**

(c) Write a function in C++ to search for a BookNo from a binary file "BOOK.DAT", assuming the binary file is containing the objects of the following class. 3

```
class BOOK
{
    int Bno;
    char Title[20];
public:
    int RBno(){return Bno;}
    void Enter(){cin>>Bno;gets(Title);}
    void Display(){cout<<Bno<<Title<<endl;}
};
```

5.

(a) What do you understand by Degree and Cardinality of a table? 2

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

Table: ACTIVITY

ACode	ActivityName	ParticipantsNum	PrizeMoney	ScheduleDate
1001	Relay 100x4	16	10000	23-Jan-2004
1002	High jump	10	12000	12-Dec-2003
1003	Shot Put	12	8000	14-Feb-2004
1005	Long Jump	12	9000	01-Jan-2004
1008	Discuss Throw	10	15000	19-Mar-2004

Table: COACH

PCode	Name	ACode
1	Ahmad Hussain	1001
2	Ravinder	1008
3	Janila	1001
4	Naaz	1003

(i) To display the name of all activities with their Acodes in descending order.

(ii) To display sum of PrizeMoney for each of the Number of participants groupings (as shown in column ParticipantsNum 10,12,16)

(iii) To display the coach's name and ACodes in ascending order of ACode from the table COACH

(iv) To display the content of the GAMES table whose ScheduleDate earliar than 01/01/2004 in ascending order of ParticipantNum.

(v) SELECT COUNT(DISTINCT ParticipantsNum) FROM ACTIVITY;

(vi)SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM ACTIVITY;

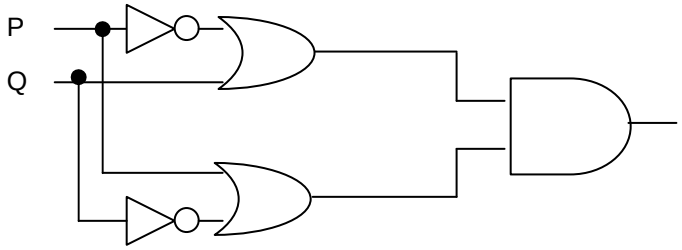
(vii)SELECT SUM(PrizeMoney) FROM ACTIVITY;

(viii) SELECT DISTINCT ParticipantNum FROM COACH;

6.

(a) State and verify Demorgan's Laws. 2

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



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

U	V	W	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

(d) Reduce the following Boolean Expression using K-Map: 3
$F(A,B,C,D)=\Sigma(0,1,2,4,5,6,8,10)$

7.

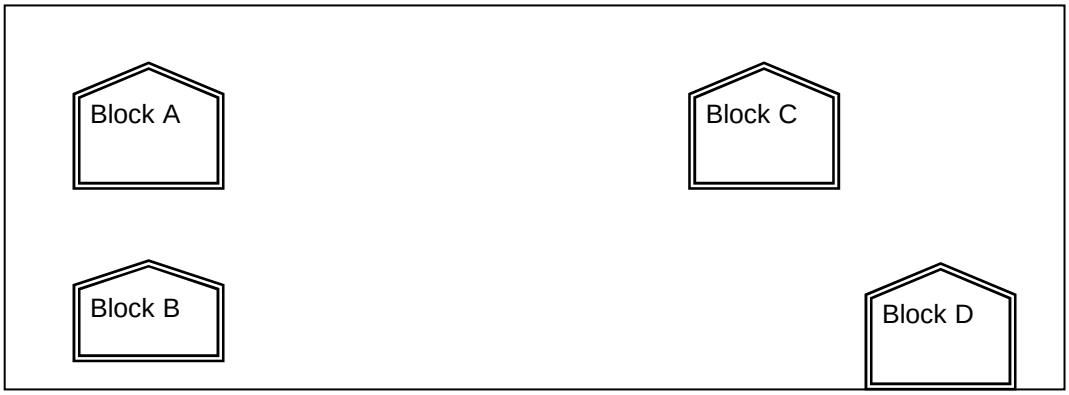
a) What is the significance of ARPANET in the network? 1

b) Expand the following terminologies: 1
(i) CDMA (ii) GSM

c) Give two major reasons to have network security. 1

d) What is the purpose of using a Web Browser? Name any one commonly used Web Browser. 1

e) Knowledge Supplement Organisation has set up its new center at Mangalore for its office and web based activities. It has 4 blocks of buildings as shown in the diagram below:



Center to center distances between various blocks

Black A to Block B	50 m
Block B to Block C	150 m
Block C to Block D	25 m
Block A to Block D	170 m
Block B to Block D	125 m
Block A to Block C	90 m

Number of Computers

Black A	25
Block B	50
Block C	125
Block D	10

e1) Suggest a cable layout of connections between the blocks. 1

e2) Suggest the most suitable place (i.e. block) to house the server of this organisation with a suitable reason. 1

e3) Suggest the placement of the following devices with justification 1
(i) Repeater
(ii) Hub/Switch

e4) The organization is planning to link its front office situated in the city in a hilly region where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed? 1