

COMPUTER SCIENCE

Sample Paper – I

Time allowed: 3 hours

Max. Marks: 70

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

1.

- (a) What is the difference between Object Oriented Programming and Procedural Programming? 2
- (b) Write the names of the header files to which the following belong: 1
(i) frexp() (ii) isalnum()
- (c) Rewrite the following program after removing the syntactical errors (if any). Underline each correction. 2

```
#include <iostream.h>
struct Pixels
{ int Color, Style;}
void ShowPoint(Pixels P)
{ cout<<P.Color,P.Style<<endl;}
void main()
{
    Pixels Point1=(5,3);
    ShowPoint(Point1);
    Pixels Point2=Point1;
    Color.Point1+=2;
    ShowPoint(Point2);
}
```

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

```
#include <iostream.h>
void Changethecontent(int Arr[], int Count)
{
    for (int C=1;C<Count;C++)
        Arr[C-1]+=Arr[C];
}
void main()
{
    int A[]={3,4,5},B[]={10,20,30,40},C[]={900,1200};
    Changethecontent(A,3);
    Changethecontent(B,4);
    Changethecontent(C,2);
    for (int L=0;L<3;L++) cout<<A[L]<<'#';
    cout<<endl;
    for (L=0;L<4;L++) cout<<B[L] <<'#';
    cout<<endl;
    for (L=0;L<2;L++) cout<<C[L] <<'#';
}
```

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

```

#include <iostream.h>
struct Game
{
    char Magic[20];int Score;
};
void main()
{
    Game M={"Tiger",500};
    char *Choice;
    Choice=M.Magic;
    Choice[4]='P';
    Choice[2]='L';
    M.Score+=50;
    cout<<M.Magic<<M.Score<<endl;
    Game N=M;
    N.Magic[0]='A';N.Magic[3]='J';
    N.Score-=120;
    cout<<N.Magic<<N.Score<<endl;
}

```

- (f) In the following program, if the value of N given by the user is 20, what maximum and minimum values the program could possibly display? 2

```

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

```

2.

- (a) What do you understand by Polymorphism? Give a suitable example of the same. 2

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

```

class Match
{
    int Time;
public:
    Match()                //Function 1
    {
        Time=0;
        cout<<"Match commences"<<endl;
    }
    void Details()        //Function 2
    {
        cout<<"Inter Section Basketball Match"<<endl;
    }

    Match(int Duration)   //Function 3
    {
        Time=Duration;
        cout<<"Another Match begins now"<<endl;
    }
}

```

```

Match(Match &M)           //Function 4
{
    Time=M.Duration;
    cout<<"Like Previous Match "<<endl;
}

};

```

- i) Which category of constructor - Function 4 belongs to and what is the purpose of using it?
- ii) Write statements that would call the member Functions 1 and 3

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

Private Members

- A data member Flight number of type integer
- A data member Destination of type string
- A data member Distance of type float
- A data member Fuel of type float
- A member function CALFUEL() to calculate the value of Fuel as per the following criteria

Distance	Fuel
<=1000	500
more than 1000 and <=2000	1100
more than 2000	2200

Public Members

- A function FEEDINFO() to allow user to enter values for Flight Number, Destination, Distance & call function CALFUEL() to calculate the quantity of Fuel
- A function SHOWINFO() to allow user to view the content of all the data members

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

```

class CUSTOMER
{
    int Cust_no;
    char Cust_Name[20];
protected:
    void Register();
public:
    CUSTOMER();
    void Status();
};

class SALESMAN
{
    int Salesman_no;
    char Salesman_Name[20];
protected:
    float Salary;
public:
    SALESMAN();
    void Enter();
    void Show();
};

class SHOP : private CUSTOMER , public SALESMAN
{
    char Voucher_No[10];
}

```

```

    char Sales_Date[8];
public:
    SHOP();
    void Sales_Entry();
    void Sales_Detail();
};

```

- (i) Write the names of data members which are accessible from objects belonging to class CUSTOMER.
- (ii) Write the names of all the member functions which are accessible from objects belonging to class SALESMAN.
- (iii) Write the names of all the members which are accessible from member functions of class SHOP.
- (iv) How many bytes will be required by an object belonging to class SHOP?

3.

- (a) Write a function in C++ to combine the contents of two equi-sized arrays A and B by computing their corresponding elements with the formula $2*A[i]+3*B[i]$; where value i varies from 0 to N-1 and transfer the resultant content in the third same sized array.

4

- (b) An array P[20][30] is stored in the memory along the column with each of the element occupying 4 bytes, find out the memory location for the element P[5][15], if an element P[2][20] is stored at the memory location 5000.

4

- (c) Write a function in C++ to perform Push operation on a dynamically allocated Stack containing real numbers.

4

- (d) Write a function in C++ to find sum of rows from a two dimensional array.

2

- (e) Evaluate the following postfix notation of expression:
True, False, AND, True, True, NOT, OR, AND

2

4.

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

1

```

#include <fstream.h>
class Employee
{
    int Eno;char Ename[20];
public:
    //Function to count the total number of records
    int Countrec();
};
int Item::Countrec()
{
    fstream File;
    File.open("EMP.DAT",ios::binary|ios::in);
    _____ //Statement 1

    int Bytes = _____ //Statement 2

    int Count = Bytes / sizeof(Item);
    File.close();
}

```

```
    return Count;  
}
```

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

(b) Write a function in C++ to add new objects at the bottom of a binary file "STUDENT.DAT", assuming the binary file is containing the objects of the following class. 3

```
class STUD
{
    int Rno;
    char Name[20];
public:
    void Enter(){cin>>Rno;gets(Name);}
    void Display(){cout<<Rno<<Name<<endl;}
};

void Addnew()
{
    fstream FIL;
    FIL.open("STUDENT.DAT", ios::binary|ios::app);
    STUD S;
    char CH;
    do
    {
        S.Enter();
        FIL.write((char*)&S, sizeof(S));
        cout<<"More (Y/N) ?"; cin>>CH;
    }
    while(CH!='Y');
    FIL.close();
}
```

5.

(a) What do you understand by Primary Key & Candidate Keys? 2

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

Table: GAMES

GCode	GameName	Number	PrizeMoney	ScheduleDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

Table: PLAYER

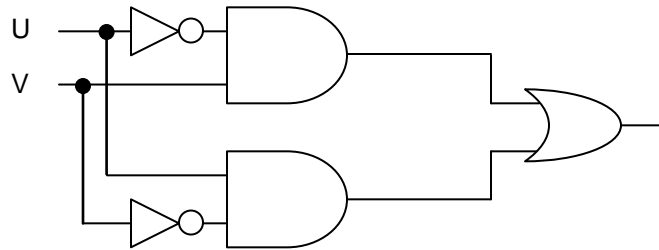
PCode	Name	Gcode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

(i) To display the name of all Games with their Gcodes

- (ii) To display details of those games which are having PrizeMoney more than 7000.
- (iii) To display the content of the GAMES table in ascending order of ScheduleDate.
- (iv) To display sum of PrizeMoney for each of the Number of participation groupings (as shown in column Number 2 or 4)
- (v) SELECT COUNT(DISTINCT Number) FROM GAMES;
- (vi) SELECT MAX(ScheduleDate), MIN(ScheduleDate) FROM GAMES;
- (vii) SELECT SUM(PrizeMoney) FROM GAMES;
- (viii) SELECT DISTINCT Gcode FROM PLAYER;

6.

- (a) State and algebraically verify Absorbion Laws. 2
- (b) Write the equivalent Boolean Expression for the following Logic Circuit 2



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

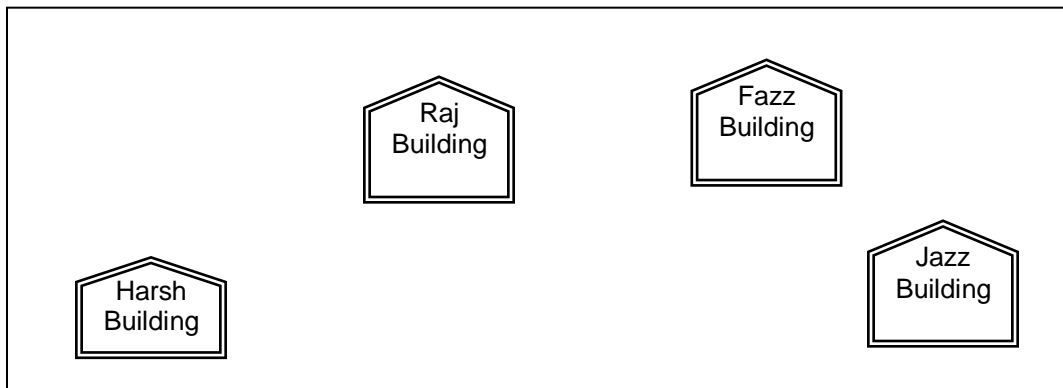
P	Q	R	G
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

- (d) Reduce the following Boolean Expression using K-Map: 3
 $F(U,V,W,Z)=\Pi(0,1,2,4,5,6,8,10)$

7.

- a) Define the term Bandwidth. Give unit of Bandwidth. 1
- b) Expand the following terminologies: 1
 (i) HTML (ii) XML
- c) Define the term firewall. 1
- d) What is the importance of URL in networking? 1
- e)

Ravya Industries has set up its new center at Kaka Nagar for its office and web based activities. The company compound has 4 buildings as shown in the diagram below:



Center to center distances between various buildings is as follows:

Harsh Building to Raj Building	50 m
Raz Building to Fazz Building	60 m
Fazz Building to Jazz Building	25 m
Jazz Building to Harsh Building	170 m
Harsh Building to Fazz Building	125 m
Raj Building to Jazz Building	90 m

Number of Computers in each of the buildings is follows:

Harsh Building	15
Raj Building	150
Fazz Building	15
Jazz Bulding	25

- e1) Suggest a cable layout of connections between 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 the placement of the following devices with justification: 1
(i) Internet Connecting Device/Modem
(ii) Switch

e4) The organisation is planning to link its sale counter situated in various parts of the same city, which type of network out of LAN, MAN or WAN will be formed? Justify your answer. 1