

Roll No.

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

- Please check that this question paper contains **12** 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 students 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 :**

- All questions are compulsory.*
 - Programming Language : C++*
- (a) What is the difference between Type Casting and Automatic Type conversion ? Also, give a suitable C++ code to illustrate both. 2
 - (b) Write the names of the header files, which is/are essentially required to run/execute the following C++ code : 1

```
void main()
{
    char CH,Text["+ve Attitude"];
    for (int I=0;Text[I]!='\0';I++)
        if (Text[I]==' ')
            cout<<endl;
        else
        {
            CH=toupper(Text[I]);
            cout<<CH;
        }
}
```

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

```
include <iostream.h>
typedef char[80] String;
void main()
{
    String S="Peace";
    int L=strlen(S);
    cout<<S<<' has '<<L<<' characters'<<endl;
}
```

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

```
#include <iostream.h>
void SwitchOver(int A[], int N, int Split)
{
    for (int K=0;K<N;K++)
        if (K<Split)
            A[K]+=K;
        else
            A[K]*=K;
}
void Display(int A[],int N)
{
    for (int K=0;K<N;K++)
        (K%2==0)?cout<<A[K]<<"%":cout<<A[K]<<endl;
}
void main()
{
    int H[]={30,40,50,20,10,5};
    SwitchOver(H,6,3);
    Display(H,6);
}
```

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

2

```
#include <iostream.h>
void main()
{
    int *Queen, Moves[]={11, 22, 33, 44};
    Queen=Moves;
    Moves[2]+=22;
    cout<<"Queen @"<<*Queen<<endl;
    *Queen-=11;
    Queen+=2;
    cout<<"Now @"<<*Queen<<endl;
    Queen++;
    cout<<"Finally @"<<*Queen<<endl;
    cout<<"New Origin @"<<Moves[0]<<endl;
}
```

- (f) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum.

2

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
    randomize();
    int MyNum, Max=5;
    MyNum=20+random(Max);
    for (int N=MyNum; N<=25; N++)
        cout<<N<<"*";
}
```

- (i) 20*21*22*23*24*25
(ii) 22*23*24*25*
(iii) 23*24*
(iv) 21*22*23*24*25

2. (a) Differentiate between Constructor and Destructor function with respect to Object Oriented Programming.
- (b) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the functions [I] to [IV] :

```
#include <iostream.h>

void Line() //Function [I]
{
    for (int L=1;L<=80;L++) cout<<"-";
    cout<<endl;
}

void Line(int N) //Function [II]
{
    for (int L=1;L<=N;L++) cout<<"*";
    cout<<endl;
}

void Line(char C,int N) //Function [III]
{
    for (int L=1;L<=N;L++) cout<<C;
    cout<<endl;
}

void Line(int M,int N) //Function [IV]
{
    for (int L=1;L<=N;L++) cout<<M*L;
    cout<<endl;
}

void main()
{
    int A=9,B=4,C=3;
    char K='#';
    Line(K,B);
    Line(A,C);
}
```

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

Private Members

- A data member ANo (Admission Number) of type long
- A data member Name of type string
- A data member Agg (Aggregate Marks) of type float
- A data member Grade of type char
- A member function GradeMe() to find the Grade as per the Aggregate Marks obtained by a student. Equivalent Aggregate Marks range and the respective Grades are shown as follows :

| Aggregate Marks | Grade |
|----------------------------|-------|
| ≥ 80 | A |
| less than 80 and ≥ 65 | B |
| less than 65 and ≥ 50 | C |
| less than 50 | D |

Public Members

- A function ENTER() to allow user to enter values for ANo, Name, Agg & call function GradeMe() to find the Grade.
- A function RESULT() 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 Student
{
    int Rollno;
    char SName[20];
    float Marks1
protected:
    void Result();
public:
    Student();
    void Enroll();void Display();
};
class Teacher
```

```

{
    long TCode;
    char TName[20];
protected:
    float Salary;
public:
    Teacher();
    void Enter();
    void Show();
};
class Course: public Student , private Teacher
{
    long CCode[10];char CourseName[50];
    char StartDate[8],EndDate[8];
public:
    Course();
    void Commence();
    void CDetail();
};

```

- (i) Write the names of member functions, which are accessible from objects of class Course.
- (ii) Write the names of all the data members, which is/are accessible from member function Commence of class Course.
- (iii) Write the names of all the members, which are accessible from objects of class Teacher.
- (iv) Which type of Inheritance is illustrated in the above C++ code ?

3. (a) Write a Get2From1() function in C++ to transfer the content from one array ALL[] to two different arrays Odd[] and Even[]. The Odd[] array should contain the values from odd positions (1,3,5,...) of ALL[] and Even[] array should contain the values from even positions (0,2,4,...) of ALL[].

3

Example :

If the ALL[] array contains

12,34,56,67,89,90

The Odd[] array should contain

34,67,90

And the Even[] array should contain

12,56,89

- (b) An array G[50][20] is stored in the memory along the row with each of its elements occupying 8 bytes. Find out the location of G[10][15], if G[0][0] is stored at 4200.
- (c) Write a function in C++ to perform Delete operation on a dynamically allocated Queue containing Members details as given in the following definition of NODE :

3

4

```
struct NODE
```

```
{
```

```
    long Mno;           //Member Number
```

```
    char Mname[20];    //Member Name
```

```
    NODE *Link;
```

```
};
```

- (d) Write a DSUM() function in C++ to find sum of Diagonal Elements from a N×N Matrix.
(Assuming that the N is a odd number)
- (e) Evaluate the following postfix notation of expression :
- True, False, NOT, AND, True, True, AND, OR

2

2

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

1

```
#include <fstream.h>
class ITEM
{
    int Ino;char Iname[20];float Price;
public:
    :
    void ModifyPrice();//The function is to modify
                        price of a particular ITEM
};
void Item::ModifyPrice()
{
    fstream File;
    File.open("ITEM.DAT",ios::binary|ios::in|ios::out);
    int CIno;
    cout<<"Item No to modify price:";cin>>CIno;
    while (File.read((char*)this, sizeof(ITEM)))
    {
        if (CIno==Ino)
        {
            cout<<"Present Price:"<<Price<<endl;
            cout<<"Changed Price:";cin>>Price;
            int FilePos=_____; //Statement 1
            _____; //Statement 2
            File.write((char*)this, sizeof(ITEM));
                        //Re-writing the record
        }
    }
    File.close();
}
```


- (b) Write a function in C++ to count the no. of "He" or "She" words present in a text file "STORY.TXT".

If the file "STORY.TXT" content is as follows :

He is playing in the ground. She is playing with her dolls.

The output of the function should be

Count of He/She in file: 2

- (c) Write a function in C++ to search for a camera from a binary file "CAMERA.DAT" containing the objects of class CAMERA (as defined below). The user should enter the Model No and the function should search and display the details of the camera.

```
class CAMERA
```

```
{
    long ModelNo;
    float MegaPixel;
    int Zoom;
    char Details[120];
public:
    void Enter(){cin>>ModelNo>>MegaPixel>>Zoom;
                gets(Details);}
    void Display(){cout<<ModelNo<<MegaPixel<<Zoom
<<Details<<endl;}
    long GetModelNo() {return ModelNo;}
};
```

5. (a) What do you understand by Selection & Projection operations in relational algebra ?

Consider the following tables EMPLOYEE and SALGRADE and answer (b) and (c) parts of this question :

Table : EMPLOYEE

| ECODE | NAME | DESIG | SGRADE | DOJ | DOB |
|-------|--------------|--------------|--------|-------------|-------------|
| 101 | Abdul Ahmad | EXECUTIVE | S03 | 23-Mar-2003 | 13-Jan-1980 |
| 102 | Ravi Chander | HEAD-IT | S02 | 12-Feb-2010 | 22-Jul-1987 |
| 103 | John Ken | RECEPTIONIST | S03 | 24-Jun-2009 | 24-Feb-1983 |
| 105 | Nazar Ameen | GM | S02 | 11-Aug-2006 | 03-Mar-1984 |
| 108 | Priyam Sen | CEO | S01 | 29-Dec-2004 | 19-Jan-1982 |

Table : SALGRADE

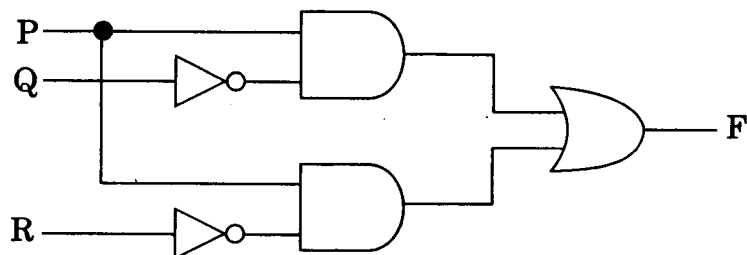
| SGRADE | SALARY | HRA |
|--------|--------|-------|
| S01 | 56000 | 18000 |
| S02 | 32000 | 12000 |
| S03 | 24000 | 8000 |

- (b) Write SQL commands for the following statements :
- (i) To display the details of all EMPLOYEEs in descending order of DOJ.
 - (ii) To display NAME and DESIG of those EMPLOYEEs, whose SALGRADE is either S02 or S03.
 - (iii) To display the content of all the EMPLOYEEs table, whose DOJ is in between '09-Feb-2006' and '08-Aug-2009'.
 - (iv) To add a new row with the following :
109, 'Harish Roy','HEAD-IT','S02','09-Sep-2007','21-Apr-1983'
- (c) Give the output of the following SQL queries :
- (i) `SELECT COUNT(SGRADE),SGRADE FROM EMPLOYEE GROUP BY SGRADE;`
 - (ii) `SELECT MIN(DOB),MAX(DOJ) FROM EMPLOYEE;`
 - (iii) `SELECT NAME, SALARY FROM EMPLOYEE E, SALGRADE S WHERE E.SGRADE= S.SGRADE AND E.ECODE<103;`
 - (iv) `SELECT SGRADE,SALARY+HRA FROM SALGRADE WHERE SGRADE='S02';`

6. (a) Verify the following using Truth Table :

$$X+Y \cdot Z = (X+Y) \cdot (X+Z)$$

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



- (c) Write the SOP 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 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 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) In networking, what is WAN ? How is it different from LAN ?
- (b) Differentiate between XML and HTML.
- (c) What is WEB2.0 ?
- (d) Out of the following, identify client side script(s) and server side script(s).
- (i) javascript
- (ii) ASP
- (iii) vbscript
- (iv) JSP
- (e) Great Sudies University is setting up its Academic schools at Sunder Nagar and planning to set up a network. The university has 3 academic schools and one administration center as shown in the diagram below :

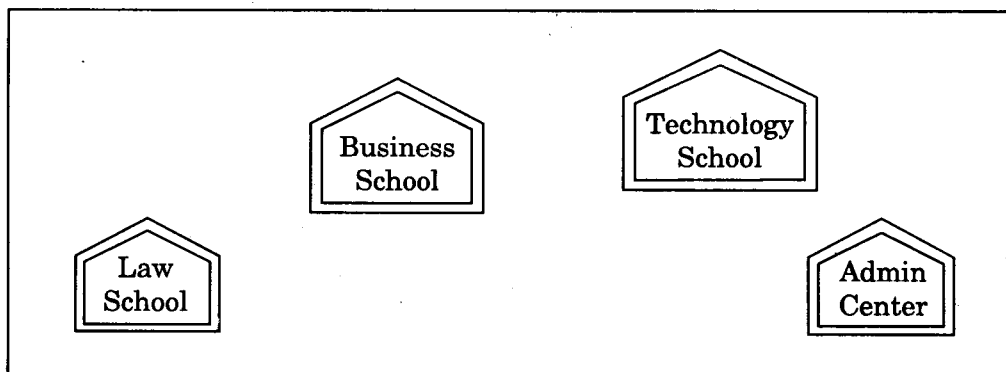
1

1

1

1

4



Center to center distances between various buildings is as follows :

| | |
|--------------------------------------|-------|
| Law School to Business School | 60 m |
| Law School to Technology School | 90 m |
| Law School to Admin Center | 115 m |
| Business School to Technology School | 40 m |
| Business School to Admin Center | 45 m |
| Technology School to Admin Center | 25 m |

Number of Computers in each of the Schools/Center is follows :

| | |
|-------------------|-----|
| Law School | 25 |
| Technology School | 50 |
| Admin Center | 125 |
| Business School | 35 |

- (i) Suggest the most suitable place (i.e. Schools/Center) to install the server of this university with a suitable reason.
 - (ii) Suggest an ideal layout for connecting these schools/center for a wired connectivity.
 - (iii) Which device will you suggest to be placed/installed in each of these schools/center to *efficiently* connect all the computers within these schools/center ?
 - (iv) The university is planning to connect its admission office in the closest big city, which is more than 350 km from the university. Which type of network out of LAN, MAN or WAN will be formed ? Justify your answer.
- (f) Compare Open Source Software and Proprietary Software. 1
- (g) What are cookies ? 1