

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 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 :**
- All questions are compulsory.*
 - Programming Language : C++*

1. (a) What is the difference between Local Variable and Global Variable ? 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 C, String [ ] = "Excellence Overload";
    for (int I=0 ;String [I] != '\0' ;I++)
        if (String[I] == ' ')
            cout<<endl ;
        else
        {
            C=toupper (String[I]);
            cout<<C;
        }
}
```

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

```
#include [iostream.h]
typedef char Text (80) ;
void main ( )
{
    Text T="Indian" ;
    int Count=strlen (T) ;
    cout<<T<< 'has' <<Count<< 'characters' <<endl ;
}
```

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

```
#include <iostream.h>
void ChangeArray (int Number, int ARR[ ], int Size)
{
    for (int L=0; L<Size; L++)
        if (L<Number)
            ARR[L] += L;
        else
            ARR[L] *=L;
}
void Show(int ARR [ ], int Size)
{
    for (int L=0; L<Size; L++)
        (L%2!=0) ? cout<<ARR[L] <<"#" : cout<<ARR[L] <<endl;
}
void main ( )
{
    int Array [ ] = {30, 20, 40, 10, 60, 50 };
    ChangeArray (3, Array, 6) ;
    Show (Array, 6) ;
}
```

(e) Find the output of the following program :

2

```
# include <iostream.h>
void main ( )
{
    int Track [ ] = {10, 20, 30, 40}, *Striker ;
    Striker=Track ;
    Track [1] += 30 ;
    cout<<"Striker"<<*Striker<<endl ;
    * Striker -=10 ;
    Striker++ ;
    cout<< "Next @" <<* Striker<<endl ;
    Striker+=2 ;
    cout<< "Last @" <<*Striker<<endl;
    cout << "Reset To" <<Track [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 least value and highest value, which can be assigned to the variable Guess.

2

```
# include <iostream.h>
#include <stdlib.h>
void main ( )
{
    randomize ( ) ;
    int Guess, High=4 ;
    Guess=random (High) + 50 ;
    for (int C=Guess ; C<=55 ; C++)
        cout<<C<< "#";
}
```

- (i) 50 # 51 # 52 # 53 # 54 # 55 #
- (ii) 52 # 53 # 54 # 55
- (iii) 53 # 54 #
- (iv) 51 # 52 # 53 # 54 # 55

2. (a) Differentiate between members, which are present within the private visibility mode with those which are present within the public visibility modes. 2

(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]. 2

```
#include <iostream.h>

void Print ( ) // Function [I]
{
    for (int K=1 ; K<=60 ;K++) cout<<“-” ;
    cout<<endl ;
}

void Print (int N) // Function [II]
{
    for (int K=1 ;K<=N ; L++) cout<<“*” ;
    cout<<endl ;
}

void Print (int A, int B) // Function [III]
{
    for (int K=1 ;K<=B ;K++) cout <<A*K ;
    cout<<endl ;
}

void Print (char T, int N) // Function [IV]
{
    for (int K=1 ;K<=N ;K++) cout<<T ;
    cout<<endl ;
}

void main ( )
{
    int U=9, V=4, W=3;
    char C= '@' ;
    Print (C, V) ;
    Print (U, W) ;
}
```

2. (a) Differentiate between members, which are present within the private visibility mode with those which are present within the public visibility modes. 2
- (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]. 2

```
#include <iostream.h>

void Print ( )                // Function [I]
{
    for (int K=1 ; K<=60 ;K++) cout<< “-” ;
    cout<<endl ;
}

void Print (int N)            // Function [II]
{
    for (int K=1 ;K<=N ; L++) cout<< “*” ;
    cout<<endl ;
}

void Print (int A, int B)     // Function [III]
{
    for (int K=1 ;K<=B ;K++) cout <<A *K ;
    cout<<endl ;
}

void Print (char T, int N)    // Function [IV]
{
    for (int K=1 ;K<=N ;K++) cout<<T ;
    cout<<endl ;
}

void main ( )
{
    int U=9, V=4, W=3;
    char C= ‘@’ ;
    Print (C, V) ;
    Print (U, W) ;
}
```

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

4

Private Members

- A data member RNo (Registration Number) of type long
- A data member Name of type string
- A data member Score of type float
- A data member Remarks of type string
- A member function AssignRem() to assign Remarks as per the Score obtained by a candidate. Score range and the respective Remarks are shown as follows :

Score	Remarks
>=50	Selected
less than 50	Not selected

Public Members

- A function ENTER() to allow user to enter values for RNo, Name, Score & call function AssignRem() to assign the remarks.
- A function DISPLAY() 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 Rno ;  
    char Name[20] ;  
    float Marks ;  
protected :  
    void Result ( ) ;  
public :  
    Student ( ) ;  
    void Register ( ) ; void Display ( ) ;  
};
```

class Faculty

```
{  
    long FCode ;  
    char FName [20] ;
```

```

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

```

- (i) Which type of inheritance is illustrated in the above C++ code ?
- (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 member functions, which are accessible from objects of class Course.
- (iv) Write the names of all the members, which are accessible from objects of class Faculty.

3. (a) Write a Get1From2() function in C++ to transfer the content from two arrays FIRST[] and SECOND[] to array ALL[]. The even places (0, 2, 4, ...) of array ALL[] should get the content from the array FIRST[] and odd places (1, 3, 5, ...) of the array ALL[] should get the content from the array SECOND[].

Example :

If the FIRST[] array contains
30, 60, 90

And the SECOND[] array contains
10, 50, 80

The ALL[] array should contain
30, 10, 60, 50, 90, 80

3

(b) An array P[20][50] is stored in the memory along the column with each of its element occupying 4 bytes, find out the location of P[15][10], if P[0][0] is stored at 5200. 3

(c) Write a function in C++ to perform Insert operation on a dynamically allocated Queue containing Passenger details as given in the following definition of NODE. 4

```
struct NODE
{
    long Pno;                //Passenger Number
    char Pname[20];         //Passenger Name
    NODE *Link;
};
```

(d) Write a COLSUM() function in C++ to find sum of each column of a NxM Matrix. 2

(e) Evaluate the following postfix notation of expression : 2
50, 60, +, 20, 10, -, *

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 PRODUCT
{
    int Pno ;char Pname [20] ; int Qty ;
public :
    :
    void ModifyQty ( ) ; // The function is to modify quantity of a
    PRODUCT
};
void PRODUCT :: ModifyQty ( )
{
    fstream File ;
    File.open ("PRODUCT.DAT", ios :: binary | ios :: in | ios :: out) ;
    int MPno;
    cout << "Product No to modify quantity :";cin>> MPno ;
```



```

while (Fil.read ((char*) this, sizeof (PRODUCT) ) )
{
    if (MPno==Pno)
    {
        cout<< "Present Quantity:" <<Qty<<endl ;
        cout<< "Changed Quantity:" ;cin>>Qty ;
        int Position = _____ ; //Statement 1
        _____ ; //Statement 2
        Fil.write ( (char*) this, sizeof (PRODUCT) ) ; // Re-writing the
        record
    }
}
Fil.close() ;
}

```

- (b) Write a function in C++ to count the no. of "Me" or "My" words present in a text file "DIARY.TXT". 2

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

My first book was Me and My
family. It gave me chance to be
known to the world.

The output of the function should be
Count of Me/My in file : 4

- (c) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as defined below). The user should enter the Model No and the function should search and display the details of the laptop. 3

class LAPTOP

{

long ModelNo ;
float RAM, HDD ;
char Details [120] ;

public :

void StockEnter () {cin>>ModelNo>>RAM>>HDD ; gets (Details) ; }

void StockDisplay () {cout<<ModelNo<<RAM<<HDD<<Details<<endl ;}

long ReturnModelNo () {return ModelNo ;}

};

5. (a) What do you understand by Union & Cartesian Product operations in relational algebra ?

2

Consider the following tables WORKER and PAYLEVEL and answer (b) and (c) parts of this question :

Table : WORKER

ECODE	NAME	DESIG	PLEVEL	DOJ	DOB
11	Radhe Shyam	Supervisor	P001	13-Sep-2004	23-Aug-1981
12	Chander Nath	Operator	P003	22-Feb-2010	12-Jul-1987
13	Fizza	Operator	P003	14-Jun-2009	14-Oct-1983
15	Ameen Ahmed	Mechanic	P002	21-Aug-2006	13-Mar-1984
18	Sanya	Clerk	P002	19-Dec-2005	09-Jun-1983

Table : PAYLEVEL

PLEVEL	PAY	ALLOWANCE
P001	26000	12000
P002	22000	10000
P003	12000	6000

- (b) Write SQL commands for the following statements :

4

- (i) To display the details of all WORKERs in descending order of DOB.
- (ii) To display NAME and DESIG of those WORKERs, whose PLEVEL is either P001 or P002.
- (iii) To display the content of all the WORKERs table, whose DOB is in between '19-JAN-1984' and '18-JAN-1987'.
- (iv) To add a new row with the following :
19, 'Daya Kishore', 'Operator', 'P003', '19-Jun-2008', '11-Jul-1984'

- (c) Give the output of the following SQL queries :

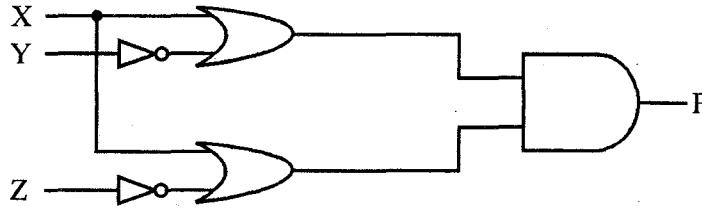
2

- (i) SELECT COUNT (PLEVEL), PLEVEL FROM WORKER GROUP BY PLEVEL;
- (ii) SELECT MAX(DOB), MIN(DOJ) FROM WORKER;
- (iii) SELECT Name, Pay FROM WORKER W, PAYLEVEL P
WHERE W.PLEVEL= S.PLEVEL AND P.ECODE<13;
- (iv) SELECT PLEVEL, PAY+ALLOWANCE FROM PAYLEVEL WHERE PLEVEL='P003';

6. (a) Verify the following using Truth Table. 2

$$U.(U' + V) = (U+V)$$

(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

A	B	C	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
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

$$F(P, Q, R, S) = \sum (0, 1, 2, 4, 5, 6, 8, 12)$$

7. (a) Differentiate between packet switching and message switching technique in network communication. 1

(b) Differentiate between BUS and STAR topology of networks. 1

(c) What is VoIP ? 1

(d) Out of the following, identify client side script(s) and server side script(s). 1

(a) ASP

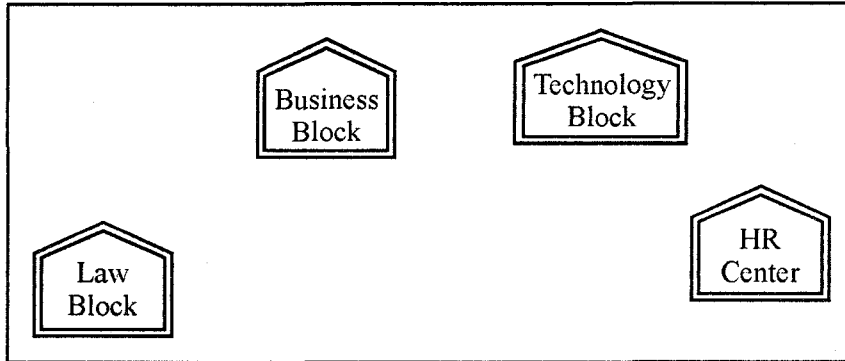
(b) Javascript

(c) VBScript

(d) JSP

- (e) Quick Learn University is setting up its Academic blocks at Prayag Nagar and planning to set up a network. The university has 3 academic blocks and one Human Resource Center as shown in the diagram below :

4



Center to center distances between various blocks/center is as follows :

Law Block to Business Block	40 m
Law Block to Technology Block	80 m
Law Block to HR Center	105 m
Business Block to Technology Block	30 m
Business Block to HR Center	35 m
Technology Block to HR Center	15 m

Number of Computers in each of the Blocks/Centre is follows :

Law Block	15
Technology Block	40
HR Center	115
Business Block	25

- (e1) Suggest the most suitable place (i.e. Block/Center) to install the server of this university with a suitable reason.
- (e2) Suggest an ideal layout for connecting these blocks/center for a wired connectivity.
- (e3) Which device you will suggest to be placed/installed in each of these blocks/center to efficiently connect all the computers with in these blocks/center.
- (e4) The university is planning to connect its admission office in the closest big city, which is more than 250 km from university, which type of network out of LAN, MAN or WAN will be formed ? Justify your answer.

- (f) Which of the following will come under Cyber Crime ? 1
- (i) Theft of a brand new sealed pack Laptop
 - (ii) Access to a bank account for getting unauthorized Money Transaction
 - (iii) Modification in a company data with unauthorized access
 - (iv) Photocopying a printed report
- (g) Compare open source software and proprietary software. 1
-