

(1)

K.V. NO. 2 ARMY AREA, PATHANKOT
MONTHLY TEST - JULY (2017-2018)
SUBJECT : COMPUTER SCIENCE (CODE-083)
CLASS : XII

TIME : 3 HRS.**M.M : 70****INSTRUCTIONS :**

- i) All the questions are compulsory.
- ii) Programming Language : C++

Q. 1. a) Write the typeof C++ tokens (keywords and user defined identifiers) from the following:

- i) Case
- ii) for
- iii) sum_diagonal
- iv) While

2

b) Write the names of the header files required to successfully run the following program :

void main()

1

```
{
    #include <iostream.h>
    char Txt[] = "Welcome";
    #include <conio.h>
    for(int C=0; C<strlen(Txt); C++)
        Txt[C]=Txt[C]+1;
    cout<<Txt<<endl;
```

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

2

```
_include<iostream.h>
_include<stdio.h>
classMyStudent
{
    intStudentId=1001;
    char Name[20];
public:
    MyStudent() {}
    void Register() { cin>>StudentId; gets (Name); }
    void Display() { cout<<StudentId<< ":"<<Name<<endl; }
};
```

(2)

```
void main()
{
    MyStudent MS;
    Register.MS();
    MS.Display();
}
```

(d) Find the output of the following program ;

3

```
#include<iostream.h>
#include<conio.h>
void Indirect(int Temp=20)
{
    for(int I=0; I<=Temp; I+=5)
        cout<<I<< ",";
    cout<<endl;
}
void Direct(int& Num)
{
    Num+=10;
    Indirect(Num);
}
void main()
{
    int Number=20;
    Direct(Number);
    Indirect();
    cout<< "Number=" << Number << endl;
}
```

0, 5, 10, 15, 20, 25, 30,
0, 5, 10, 16, 20,
Number = 30.

(e) In the following C++ program what is expected value of Myscore from Options (i) to (iv) given below. Justify your answer.

2

```
#include<iostream.h>
#include<stdlib.h>
void main()
{
    randomize();
    int Score[ ]={25,20,34,56,72,63}, Myscore;
    Myscore = Score[2 + random(2)];
    cout<<Myscore<<endl;
}
```

- (i) 25
- ~~(ii)~~ 34
- (iii) 20
- (iv) None of the above

(f) Find the output of the following program :

```
#include<iostream.h>
struct Package
{
    int Length, Breadth, Height;
};
void Occupies (Package M)
{
    cout<<M.Length<<"x"<<M.Breadth<<"x";
    cout<<M.Height<<endl;
}

void main()
{ Package P1={50,100,25}, P2, P3;
++P1.Length;
Occupies (P1);
P3 = P1;
++P3.Breadth;
P3.Breadth++;
Occupies(P3);
P2=P3;
P2.Breadth +=50;
P2.Height--;
Occupies(P2);
}
```

Q. 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
    { 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); //Line2

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

{ charSchoolCode[10];

public:

 voidInRegular();

 voidOutRegular();

};

class Distance

{ charStudyCentreCode[5];

public :

 voidInDistance();

 voidOutDistance();

};



```
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 member accessible through an object of class Course.
- (iv) Is the function InRegular() accessible inside the function InDistance()? Justify your answer.

Q. 3. (a) void main()

```
{ charch= 'A';
fstreamfileout("data.dat",ios::app);
fileout<<ch;
int p=fileout.tellg();           4
cout<<p;
}
```

What is the output if the file content before the execution of the program is the string?
"ABC" (Note that " " are not part of the file)

(b) Write a function to count the number of blanks present in a text file named
"PARA.TXT".

1

(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:

2

Class CLUB

```
{ intMno; //Member number
charMname; //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 the data members
    char WhatType() {return Type;};}
```

3

- Q. 4.** a) Observe the following program GAME.CPP carefully, if the value of Num entered by the user is 14, choose the correct possible output(s) from the options from (i) to (iv), and justify your option.

2

```
//Program : GAME.CPP
#include<stdlib.h>
#include<iostream.h>
void main()
{
    Randomize();
    IntNum, Randnum;
    Cin>>Num;
    Rndnum = random(Num) + 7
    For(int N=1;N<=Rndnum; N++)
        Cout<<N<<" ";
}
```

Output Options :

- (i) 1 2 3
- (ii) 1 2 3 4 5 6 7 8 9 10 11
- (iii) 1 2 3 4 5
- (iv) 1 2 3 4

(b) Differentiate between a Logical Error and Syntax Error. Also give suitable examples. 3

(c) Write a function in C++ to count and display the number of lines not starting with alphabet 'A' present in a text file "STORY.TXT". 3

(d) Define the term Data Encapsulation in the Context of Object Oriented Programming. Give a suitable example in C++ to illustrate the same. 2

(e) What do you mean by Inline function? 2

Q. 5. a) Define the term Inheritance in the context of Object Oriented Programming. Give a suitable example using a C++ Code to illustrate the same. 2

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

```
class Exam
{
    int Marks;
    char Subject[20];
```

```

public:
    Exam()           //Function 1
    {
        Marks=0;
        strcpy(Subject,"Computer");
    }

    Exam(char S[])      //Function 2
    {
        Marks=0;
        strcpy(Subject,S);
    }

    Exam(int M)         //Function 3
    {
        Marks=M;
        strcpy(Subject,"Computer");
    }

    Exam(char S[],int M) //Function 4
    {
        Marks=M;
        strcpy(Subject,S);
    }
};

```

- (i) Write statements in C++ that would execute Function 3 and Function 4 of class Exam.
- (ii) Which feature of Object Oriented Programming is demonstrated using Function 1, Function 2, Function 3 and Function 4 in the above class Exam?

- (c) Define a class BUS in C++ with the following specifications :

4

Data Members :

- Busno – to store Bus No.
- From – to store Place name of origin
- To – to store Place name of destination
- Type – to store Bust Type such as ‘O’ for ordinary
- Distance – to store the Distance in Kilometers
- Fare - to store the Bus Fare

Member Functions

- A constructor function to initialize Type as 'O' and Freight as 500
- A function CalcFare() to calculate Fare as per the following criteria :

Type	Fare
'O'	$15 * \text{Distance}$
'E'	$20 * \text{Distance}$
'L'	$24 * \text{Distance}$
- A Function Allocate() to allow user to enter values for Busno, From, To, Type and Distance. Also, this function should call CalcFare() to calculate Fare.
- A function Show() to display the content of all the data members on screen.

(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) What will be the size of object of class Course?
- (ii) Write names of all the member functions accessible from OutCourse function of class Course.
- (iii) Which type of Inheritance is depicted in the above example?

(iv) What will be the order of execution of the constructors, when the object of class Course is declared?

Q..6 (a) Fill in the blanks marked as Statement 1 and Statement 2 in the program segment given below with appropriate functions for the required task. 2

```

class Club
{
    longintMNo;//Member Number
    charMName[20]; //Member Name
    char Email[30]; //Email of Member
public:
    void Register(); //Function to register member
    voidDisp(); //Functon to display details
    voidChangeEmail() //Function to change Email
    {
        cout<<"\nEnter Changed Email:";
        cin>>Email;
    }
    longintGetMno() { return MNo; }
};

voidModifyData()
{
    fstream File;
    File.open("CLUB.DAT",ios::binary|ios::in|ios::out);
    int Modify=0,Position;
    longintModiMno;
    cout<<"\nMno - whose email required to be modified:";
    cin>>ModiMno;
    Club CL;
    while(!Modify &&File.read((char*)&CL,sizeof(CL)))
    {
        if(CL.GetMno()==ModiMno)
        {
            CL.ChangeEmail();
            Position=File.tellg()-sizeof(CL);
            //statement 1 : To place file pointer to the required position
            _____;
            //statement 2: To write the object CL on to the binary file
        }
    }
}

```

```

_____;
Modify++;
}
}

if(Modify)
    cout<<"\nEmail Changed.....";
else
    cout<<"\nMember not Found.....";
File.close();
}

```

(b) Write a function ContYouMe() in C++ which reads the contents of a text file story.txt and counts the words You and Me (not case sensitive). 3

(c) Assuming the class ANTIQUE as declared below, write a function in C++ to read the objects of ANTIQUE from binary file ANTIQUE.DAT and display those antique items, which are priced between 10000 and 15000. 3

```

class ANTIQUE
{
    int ANO;
    charAname[10];
    float price;
public:
void BUY() { cin>>ANO; gets(Aname); cin>>price; }
void SHOW()
{
    cout<<ANO<<endl;
    cout<<Aname<<endl;
    cout<<price<<endl;
}
floatGetPrice() { return price; }
};

```

Q. 7 (a) What do you mean by constructors and Destructors? Explain with the help of suitable examples in C++. 3

(b) Explain the difference between `ios::app` and `ios::ate`. 2

(c) What do you mean by Inheritance? Explain with suitable example. 2

abhishek

KENDRIYA VIDYALAYA CHANDIGARH REGION

SELECTION TEST

Computer Science (Theory) – Class –XII

Subject Code: 083 SET-B

Time allowed : 3 Hours

Maximum Marks : 70

Note (i) All questions are compulsory. (ii) Programming Language : C++

1.(a) What is the difference between Global Variable and Local Variable? Also, give a suitable
C++ code to illustrate both. 2

(b) Which C++ header file(s) will be essentially required to be included to run /execute the
following C++ code:

2

```
void main()
{
    clrscr();
    charMsg[ ]="Sunset Gardens";
    for (int l=5; l<strlen(Msg); l++)
        cout<<setw(20)<<Msg;
}
```

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

```
#include [iostream.h]
class MEMBER
{
    INT Mno;
    float Fees;
PUBLIC:
    void Register(){cin>>Mno>>Fees;}
    void Display{cout<<Mno<<" : "<<Fees<<endl;}
};
void main()
{
    MEMBER M;
    Register();
    M.Display();
}
```

(d) Find the output of the following program:

```
#include <iostream.h>
void Secret(char Str[])
{
    for (int L=0;Str[L]!='\0';L++);

    for (int C=0;C<L/2;C++)
        if (Str[C]=='A' || Str[C]=='E')
            Str[C]='#';
        else
    {
        char Temp=Str[C];
        Str[C]=Str[L-C-1];
        Str[L-C-1]=Temp;
    }
}
void main()
{
    char Message[ ]="ArabSagar";
    Secret(Message);
    cout<<Message<<endl;
}
```

#arSbgara

(e) Find the output of the following program:

```
#include <iostream.h>
struct GAME
{
    int Score, Bonus;
};
void Play(GAME &g, int N=10)
{
    g.Score++;
    g.Bonus+=N;
}
void main()
{
    GAME G={110,50};
    Play(G,10);           111:60
    cout<<G.Score<<"+"<<G.Bonus<<endl;      112:70
    Play(G);             113:85
    cout<<G.Score<<"+"<<G.Bonus<<endl;
    Play(G,15);
    cout<<G.Score<<"+"<<G.Bonus<<endl;
}
```

(f) In the following program, if the value of Guess entered by the user is 65, what will be the expected output(s) from the following options (i), (ii), (iii) and (iv)? Write the minimum and maximum value of variable New when iteration is executing for I=4. 3

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
    int Guess;
    randomize();
    cin>>Guess;
    for (int I=1;I<=4;I++)
    {
        New=Guess+random(I);
        cout<<(char)New;
    }
}
```

(i) ABBC

(ii) ACBA

(iii) BCDA

(iv) CABD

(g) Find the syntax error(s), if any in the following program, underline the wrong statement and write the correct code also. 2

```
#include(iostream.h)
void main()
{
    int x, y;
    cin>>x;
    for(y=0;y<10, y++)
    {
        if x == y
            cout<<y+x;
        else
            cout>>y
    }
}
```

(h) Find the output of the following program: 3

```
#include<iostream.h>
void Execute(int&X, int Y=200)
{
    int temp=X+Y;
    X += temp;
    if(Y!=200)
        cout<<temp<< " , " <<X<< " , " <<Y<<endl;
}
void main()
{
    int a=50, b=20;
    Execute ( b );
    cout<<a<<" , "<<b<<endl;
    Execute( a , b );
    cout<<a<<" , "<<b<<endl;
}
```

50, 240
290, 340, 240
340, 240

- 2.(a) What do you understand by Data Encapsulation and Data Hiding? 2
 (b) Differentiate between While and Do-While loop. 2
 (c) Answer the questions (i) and (ii) after going through the following class: 3

```

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

- 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?
 iii) Write an example illustrating the calls for the functions 1 and 2.
 (d) Define a class TEST in C++ with following description:

Private Members

- TestCode of type integer
- Description of type string
- NoCandidate of type integer
- CenterReqd (number of centers required) of type integer
- A member function CALCCTR() 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 CALCCTR() to calculate the number of Centres
- A function DISPTEST() to allow user to view the content of all the data members

- (e) Write about the various features of constructors in context of C++. 3
 (f) Define Inheritance; write about any two types of Inheritance supported by C++. 2
 (g) 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 70

3. (a) Write a function in C++ , which accepts an integer array and its size as parameters and exchange the values at alternate locations. 3

Example: : If the array is 8,10, 3, 7, 16, 40, 21,6,

then the function should rearrange the array as 10,8,7,3,40,16,6,21

(b) An array S[40][30] is stored in the memory **alongthe row** with each of the element occupying 2 bytes, find out the memory location for the element S[20][10], if the Base Address of the array is 5000. 3

6220

(c) Each element of an array A[-20..20,10..35] requires one byte of storage. If the array is stored in **column major order** and the beginning location is 500, then determine the location of A[0,30]. 3

1320.

(d) Write a function in C++ to find the sum of both left and right diagonal elements from a two dimensional array (matrix). 3

(e) Give the postfix form expression for the following: 2
NOT A OR NOT B AND NOT C

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

(g) Evaluate the following postfix notation of expression: 220, 30, +, 50, 40, -, * 2500 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. 2

```
#include <fstream.h>
class Employee
{
    intEno;char Ename[20];
public:
    intCountrec(); //Function to count the total number of
records
};
intEmployee::Countrec()
{
    fstream File;
    File.open("EMP.DAT",ios::binary|ios::in);
    _____ //Statement 1 - To take the file pointer to the
end of file.
    int Bytes = _____ //Statement 2- To return total number of
bytes from the beginning of file to the file pointer.
    int Count = Bytes / sizeof(Item);
    File.close();
    return Count;
}
```

6 OF 9

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

(c). Write a C++ program to display each letter of the file "Notes.txt" in uppercase. 3

(d) 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. 4

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

END OF PAPER

QUESTION PAPER
Subject: Computer Science
Class: XII (2017-18)

Time: 3 Hrs.			M.M.:70
Instructions:			
(a) All questions are compulsory, (b) Answer either Section A or Section B: (i) Section A - Programming Language with C++ (ii) Section B - Programming Language with Python (c) Section C is compulsory.			
SECTION – A (C++)			
Q. No.	Part	Question Description	Marks
Q1.	(a)	<p>What is the role of a parameter/argument passed in a function? Can a default value be assigned to a parameter(Yes/No)? If yes, justify your answer with the help of a suitable example otherwise give reason.</p>	2
	(b)	<p>Raman suggests Kishan the following header files which are required to be included in the given C++ program. Identify the header files which are wrongly suggested by Raman.</p> <p>Program:</p> <pre>void main() { char Grade; cin.get(Grade); if(isalpha(Grade)) cout.put(Grade); }</pre> <p>Suggested header files:-</p> <ol style="list-style-type: none"> 1. iostream.h 2. stdio.h 3. conio.h 4. ctype.h 	1
	(c)	Rewrite the following program after removing the syntactical errors (if any). Underline each correction.	2

	<pre> Typdef int Num; Num full=100; Num Calc(int X) { full=(X>2)?1:2; return (full%2) } void main { int full=1000; full=Calc(::full); cout<<::full<<"::">>full>>endl; } </pre>	
(d)	<p>Write the output of the following C++ program code (assume all necessary header files are included in program):</p> <pre> void Encrypt(char *S, int key) { char *Temp=S; if(key%2==0) { key--; } while(*Temp!='\0') { *Temp+=key; Temp+= key; } } void main() { int Key_Set[]={1,2,3}; char Pvt_Msg[]="Computer2017"; for(int C=0;C<2;C++) { Encrypt(Pvt_Msg, Key_Set[C]); cout<<"New Encrypted Message after Pass "<<C+1<<" is :"<<Pvt_Msg; cout<<endl; } } </pre>	2
(e)	<p>Write the output of the following C++ program code (assume all necessary header files are included in program):</p>	3

```

struct Ticket
{
    char Level;
    int Price;
};

void Compute(Ticket &T)
{
    if (T.Level=='A')
        T.Price+=50;
    else if (T.Level=='B')
        T.Price+=30;
    else if (T.Level=='C')
        T.Price+=25;
    cout<<T.Level<<"::"<<T.Price<<endl;
}

void main()
{
    Ticket Mon_Show[ ]={{'C',250},{'A',300},{'B',350}};
    for(int count=2;count>=0; )
    {
        Compute(Mon_Show[count--]);
    }
}

```

- (f) Consider the following C++ program code and choose the option(s) which are **not** possible as output. Also. print the **minimum & maximum** value of variable **Pick** during complete execution of the program.(assume all necessary header files are included in program): 2

```

const int NUM=5;
void main()
{
    randomize();
    int V1=1, V2=5, Pick;
    while(V1<V2)
    {
        Pick = random(NUM) + (V2-V1);
        cout<<Pick<<"";
        V1++;
    }
}

```

(a) 5:6:6:6:

(b) 4:7:5:3:

(c) 8:6:1:2:

(d) 7:5:3:1

- Q2. (a) What do you mean by Data Abstraction in OOPs? Explain its significance in programming with a suitable example. 2

- (b) Answer the question (i) & (ii) after going through the following code. (assume all necessary header files are included in program):- 2

```

class Game
{
    char Name[21];
    int No_of_Players;
public:
    Game()           //Function 1
    {
        strcpy(Name,"Cricket");
        No_of_Players=11;
        cout<<"New Game Starts\n";
    }
    Game(char N[],int No)      //Function 2
    {
        strcpy(Name,N);
        No_of_Players=No;
        cout<<Name<<"comprises"<<No_of_Players<<" number of players\n";
    }
    ~Game()           //Function 3
    {
        cout<<"Game Ends\n";
    }
};

```

- (i) Give the name of the feature of OOP which is implemented by Function 1 & 2 together in the above class Game.
- (ii) Anuj made changes to the above class Game and made Function 3 private. Will he be able to execute the Line 1 successfully given below? Justify.

```

void main()
{
    Game ABC;      //Line 1
}

```

(c) Define a class Bill in OOP with the following specification:- 4

Private members:

1. Bill_no - type long(bill number)
2. Bill_period - type integer(number of months)
3. No_of_calls - type integer(number of mobile calls)
4. Payment_mode - type string("online" or "offline")
5. Amount - type float(amount of bill)
6. Calculate_Bill() function to calculate the amount of bill given as per the following conditions:

No_of_calls	Calculation Rate/call (in rupees)
<=500	1.0
501-1200	2.0
>1200	4.0

	<p>Also, the value of Amount should be reduced by 5% if Payment_mode is “online”.</p> <p><u>Public members:</u></p> <ol style="list-style-type: none"> 1. A member function New_Bill() that will accept the values for Bill_no, Bill_period, No_of_calls, Payment_mode from the user and invoke Caluculate_Bill() to assign the value of Amount. 2. A member function Print_Bill() that will display all details of a Bill. 	
(d)	<p>Answer the question from (i) to (iv) based on the given below code(assume all necessary header files are included in program):-</p> <pre> class City { int City_Id; char City_Name[30]; protected: int City_Population; public: City(); void Get_Population(); void New_City(); void Show_City(); }; class State : public City { int State_Id; char State_Name[25]; protected: int State_Population; public: State(); void New_State(); void Print_State(); }; class Country : private State { int Country_Id; char Country_Name[25]; public: Country(); void New_Country(); void Display_Country(); }; (i) Write name of the class whose constructor is invoked first on the creation of a new object of class Country. (ii) Write name of the data members which are accessible through the object of class Country. </pre>	4

		<p>(iii) List name of the members which are accessible through the member function “void New_Country()”.</p> <p>(iv) What will be the size(in bytes) of an object of class Country & State respectively.</p>	
Q3	(a)	<p>Write the definition of function named Array_Swap() that will accept an integer array & its size as arguments and the function will interchange/swap elements in such a way that the first element is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd.</p> <p>E.g. if initially array of seven elements is:</p> <p style="text-align: center;">5, 16, 4, 7, 19, 8, 2</p> <p>After execution of the above function, the contents of the array will be:</p> <p style="text-align: center;">2,16, 19, 7, 4, 8, 5</p>	3
	(b)	An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base address of the array and the memory address of element stored at location A[30][25]?	3
	(c)	<p>Write the definition of a member function Q_Insert() for a class Exam_Queue in C++ to insert a new Application information in a dynamically allocated queue whose code is already given below as a part of the program(assume all necessary header files are included in program):</p> <pre> struct Application { int App_Id; char App_Name[21]; Application *Link; }; class Exam_Queue { Application *Front, *Rear; public: Exam_Queue() //Constructor { Front=Rear=NULL; } void Q_Insert (); void Q_Delete(); }; </pre>	4
	(d)	<p>Write the definition of a user-defined function REPEAT_ROW(int A[][3],int R, int C) in C++ that will store the elements in the following manner</p> <ol style="list-style-type: none"> 1. All row elements except the 1st element replaced by the 1st element, 2. All row elements except the 1st & 2nd element replaced by the 2nd element, 3. All row elements except the 1st, 2nd & 3rd element replaced by the 3rd element and 	2

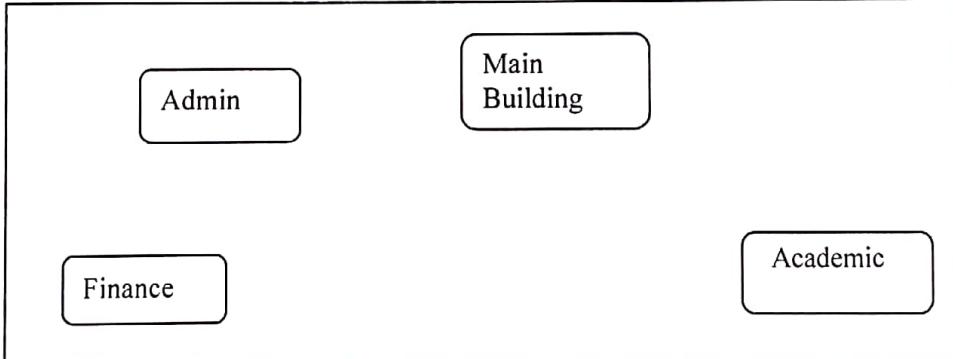
	<p>so on.</p> <p>For example: if initially the array was:-</p> <table border="1"> <tr><td>5</td><td>6</td><td>10</td><td>2</td></tr> <tr><td>2</td><td>6</td><td>9</td><td>12</td></tr> <tr><td>18</td><td>14</td><td>5</td><td>6</td></tr> </table> <p>Then, the contents of the array after execution of the above function will be:-</p> <table border="1"> <tr><td>5</td><td>5</td><td>5</td><td>5</td></tr> <tr><td>2</td><td>6</td><td>6</td><td>6</td></tr> <tr><td>18</td><td>14</td><td>14</td><td>14</td></tr> </table>	5	6	10	2	2	6	9	12	18	14	5	6	5	5	5	5	2	6	6	6	18	14	14	14	
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2	6	6	6																							
18	14	14	14																							
	<p>(e) Evaluate the following POSTFIX expression. Show the status of Stack after execution of each operation separately:</p> <p style="text-align: center;">TRUE, FALSE, OR, NOT, TRUE, FALSE, AND, OR</p>	2																								
Q4.	<p>(a) Answer the questions (i) & (ii) in the program segment given below for the required task.</p> <pre> class Route { int Route_No; //Route Number char Route_Name[21]; //Name of Route int No_Kms; //Distance in kms on Route public: void New_Route(); //Accepts details of new Route void Show_Route(); //Display details of a Route int Get_RouteNo() //Return the Route Number { return Route_No; } void Update_Kms(int K) { No_Kms=K; } }; void Update_Route(int No, int New_Kms) //Update No_Kms of a Route { Route R; fstream File("ROUTE.DAT",ios::in ios::out ios::binary); while(!File.eof()) { File.read((char*)&R, sizeof(R)); if((R.Get_RouteNo()==No)) { R.Update_Kms(New_Kms); _____ _____ cout<<"Route Details updated\n"; } } File.close(); } (i) Write Statement 1 to position the file pointer to the appropriate place so that the data updation is done for the correct Route. (ii) Write Statement 2 to perform the write operation so that the updation is done </pre>	1																								

		in the binary file “ROUTE.DAT”.	
	(b)	<p>Write a user-defined function named Count() that will read the contents of text file named “Report.txt” and count the number of lines which starts with either „I“ or „M“.</p> <p>E.g. In the following paragraph, there are 2 lines starting with „I“ or „M“:</p> <p>“India is the fastest growing economy.</p> <p>India is looking for more investments around the globe.</p> <p>The whole world is looking at India as a great market.</p> <p>Most of the Indians can foresee the heights that India is capable of reaching.”</p>	2
	(c)	<p>Consider the following class Item:-</p> <pre>class Item { int ItemId; int Quantity; float Price; public: void NewItem() { cin>>ItemId>>Quantity>>Price; } void ShowItem() { cout<<ItemId<<":"<<Quantity<<":"<<Price<<endl; } void Set_Price(float P) { Price=P; } int Ret_Id() { return ItemId; } };</pre> <p>Write a function named Change_Item(int Id, float Pr) to modify the price of the item whose ItemId & new price are passed as an argument.</p>	3

SECTION – C

Q5	(a)	Differentiate between DDL & DML. Identify DDL & DML commands from the following:- (UPDATE, SELECT, ALTER, DROP)	2																																																																	
	(b)	Consider the following relation MobileMaster & MobileStock:- <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="5"><u>MobileMaster</u> M'</th> </tr> <tr> <th>M_Id</th> <th>M_Company</th> <th>M_Name</th> <th>M_Price</th> <th>M_Mf_Date</th> </tr> </thead> <tbody> <tr> <td>MB001</td> <td>Samsung</td> <td>Galaxy</td> <td>4500</td> <td>2013-02-12</td> </tr> <tr> <td>MB003</td> <td>Nokia</td> <td>N1100</td> <td>2250</td> <td>2011-04-15</td> </tr> <tr> <td>MB004</td> <td>Micromax</td> <td>Unite3</td> <td>4500</td> <td>2016-10-17</td> </tr> <tr> <td>MB005</td> <td>Sony</td> <td>XperiaM</td> <td>7500</td> <td>2017-11-20</td> </tr> <tr> <td>MB006</td> <td>Oppo</td> <td>SelfieEx</td> <td>8500</td> <td>2010-08-21</td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="4"><u>MobileStock</u> M>-</th> </tr> <tr> <th>S_Id</th> <th>M_Id</th> <th>M_Qty</th> <th>M_Supplier</th> </tr> </thead> <tbody> <tr> <td>S001</td> <td>MB004</td> <td>450</td> <td>New Vision</td> </tr> <tr> <td>S002</td> <td>MB003</td> <td>250</td> <td>Praveen Gallery</td> </tr> <tr> <td>S003</td> <td>MB001</td> <td>300</td> <td>Classic Mobile Store</td> </tr> <tr> <td>S004</td> <td>MB006</td> <td>150</td> <td>A-one Mobiles</td> </tr> <tr> <td>S005</td> <td>MB003</td> <td>150</td> <td>The Mobile</td> </tr> <tr> <td>S006</td> <td>MB006</td> <td>50</td> <td>Mobile Centre</td> </tr> </tbody> </table>		<u>MobileMaster</u> M'					M_Id	M_Company	M_Name	M_Price	M_Mf_Date	MB001	Samsung	Galaxy	4500	2013-02-12	MB003	Nokia	N1100	2250	2011-04-15	MB004	Micromax	Unite3	4500	2016-10-17	MB005	Sony	XperiaM	7500	2017-11-20	MB006	Oppo	SelfieEx	8500	2010-08-21	<u>MobileStock</u> M>-				S_Id	M_Id	M_Qty	M_Supplier	S001	MB004	450	New Vision	S002	MB003	250	Praveen Gallery	S003	MB001	300	Classic Mobile Store	S004	MB006	150	A-one Mobiles	S005	MB003	150	The Mobile	S006	MB006
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		Write the SQL query for questions from (i) to (iv) & write the output of SQL command for questions from (v) to (viii) given below:- (i) Display the Mobile company, name & price in descending order of their	6																																																																	

		<p>manufacturing date,</p> <p>(ii) List the details of mobile whose name starts with „S“ or ends with „a“,</p> <p>(iii) Display the Mobile supplier & quantity of all mobiles except „MB003“,</p> <p>(iv) List showing the name of mobile company having price between 3000 & 5000,</p> <p>(v) <code>SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;</code></p> <p>(vi) <code>SELECT MAX(M_Date), MIN(M_Date) FROM MobileMaster;</code></p> <p>(vii) <code>SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty>=300;</code></p> <p>(viii) <code>SELECT AVG(M_Price) FROM MobileMaster;</code></p>																																					
Q6.	(a)	State & prove De-Morgan's law using truth table.	2																																				
	(b)	Draw the equivalent logic circuit diagram of the following Boolean expression:- $(A''+B).C''$	2																																				
	(c)	Write the SOP form for the Boolean Function $F(X,Y,Z)$ represented by the given truth table:- <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th><th>Y</th><th>Z</th><th>F</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>0</td><td>1</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>1</td><td>0</td><td>1</td><td>0</td></tr> <tr><td>1</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>1</td><td>1</td><td>1</td><td>1</td></tr> </tbody> </table>	X	Y	Z	F	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	0	1	0	0	0	1	0	1	0	1	1	0	1	1	1	1	1	1
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	(d)	Reduce the following Boolean expression using K-Map:- $F(U,V,W,Z)=\pi(0,2,5,7,12,13,15)$	3																																				
Q7.	(a)	A teacher provides " http://www.XtSchool.com/default.aspx " to his/her students to identify the URL & domain name.	1																																				
	(b)	Which out of the following does not come under Cyber Crime? <p>(i) Copying data from the social networking account of a person without his/her information & consent.</p> <p>(ii) Deleting some files, images, videos, etc. from a friend's computer with his consent.</p> <p>(iii) Viewing & transferring funds digitally from a person's bank account without his/her knowledge.</p> <p>(iv) Intentionally making a false account on the name of a celebrity on a social</p>	1																																				

	networking site.	
(c)	Expand the following:- 1. GSM 2. TDMA	1
(d)	What is the significance of cookies stored on a computer?	1
(e)	Kabir wants to purchase a Book online and he has placed the order for that book using an e-commerce website. Now, he is going to pay the amount for that book online using his Mobile, then he needs which of the following to complete the online transaction:- 1. A bank account, 2. Mobile phone which is attached to above bank account, 3. The mobile banking app of the above bank installed on that mobile, 4. Login credentials(UID & Pwd) provided by the bank, 5. Or all of above.	1
(f)	What do you mean by data encryption? For what purpose it is used for?	1
(g)	Sanskar University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office & web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions in the campus & other details which are given below:	
	 <pre> graph LR Admin[Admin] --- MainBuilding[Main Building] Admin --- Finance[Finance] Admin --- Academic[Academic] MainBuilding --- Finance MainBuilding --- Academic Finance --- Academic </pre>	

The distances between various buildings of university are given as:-

Building 1	Building 2	Distance(in mtrs.)
Main	Admin	50
Main	Finance	100
Main	Academic	70
Admin	Finance	50
Finance	Academic	70
Admin	Academic	60

Number of computers:-

Building	No. of Computers
Main	150
Admin	75
Finance	50
Academic	60

As a network expert, you are required to give best possible solutions for the given queries of the university administration:-

- (a) Suggest cable layout for the connections between the various buildings,
- (b) Suggest the most suitable building to house the server of the network of the university,
- (c) Suggest the placement of following devices with justification:
 1. Switch/Hub
 2. Repeater
- (d) Suggest the technology out of the following for setting-up very fast Internet connectivity among buildings of the university
 1. Optical Fibre
 2. Coaxial cable
 3. Ethernet Cable

PRE-BOARD-I (2017-18)

CLASS: XII (SET- B)

SUBJECT: COMPUTER SCIENCE (083)

TIMES: 3 HOURS

MAX MARKS: 70

General Instructions

1. All questions are compulsory.
 2. Programming Language is C++
-

1 a) Illustrate the use of inline function in C++ with the help of an example. 2

b) Observe the following program very carefully and write the names of those header file(s), 1 which are essentially needed to compile and execute the following program successfully:

```
typedef char TEXT[80];
void main()
{
    TEXT Str[] = "Peace is supreme";
    int Index=0;
    while (Str[Index]!='\0')
        if (isupper(Str[Index]))
            Str[Index++]= '#';
        else
            Str[Index++]= '*';
    puts(str);
}
```

c) Rewrite the following program after removing the syntactical errors (if any). 2

Underline each correction.

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

```

void show {cout<<Charge;}
};

void main()
{
    PAYITNOW P;
    P. Raise();
    Show();
}

```

- d) Write the output of the following C++ program code: 2

Note: Assume all required header files are already being included in the program.

```
void Position (int&C1, int C2=3)
```

```
{
    C1+=2;
    C2+=1; 10;
}
```

```
void main()
```

```
{
    int P1=20, P2=4;
    Position(P1);
    cout<<P1<<","<<P2<<endl;
    Position(P2,P1);
    cout<<P1<<","<<P2<<endl;
}
```

Y Y Y Y 6

- e) Find the output of the following program: 3

```
#include<iostream.h>
struct Solid
{
    int length, breadth, height;
};
void Dimension(Solid S)
{
    cout<<S.length<<" x "<<S.breadth<<" x "<<S.height<<endl;
}
void main()
```

```

{
Solid S1={10,20,30},S2,S3;
++S1.height;
Dimension(S1);
S3=S1;
++S3.length;
S3.breadth++;
Dimension(S3);
S2=S3;
S2.height += 5;
S2.length = S2.length - 5;
S2.breadth += 5;
Dimension(S2);
}

```

*array
6x6 . 10x20x31
11x21x31
6x26x36*

- f) Study the following program and select the possible output(s) from the option (i) to (iv) following it. Also write the maximum and the minimum values that can be assigned to the variable NUM. 2

Note:

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n-1.

```

void main()
{
randomize();
int NUM;
NUM=random(3)+2;
char TEXT[]="ABCDEFGHIJK";
for (int I=1;I<=NUM; I++)
{
for (int J=NUM;J<=7;J++)
cout<<TEXT[J];
cout<<endl;
}

```

}

(i)FGHI (ii) BCDEFGH (iii) EFGH (iv) CDEFGH

FGHI	BCDEFGH	EFGH	CDEFGH
FGHI		EFGH	
FGHI		EFGH	

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 program:

```
class mytime
{
    int hour, minute, second;
public:
    mytime()           //Function 1
    void Details()      //Function 2
    {
        cout<<"The time is "<<hour<<" :"<< minute << " :"<<second<<endl;
    }
    mytime(int x, int y, int z)           //Function 3
    mytime(mytime&mt)                  //Function 4
};
```

- i) Write the complete function definition for Function 4.
- ii) Write statements that would call the Member Functions 1 and 3.

c) Define a class IncomeTax in C++ with the following descriptions. 4

Private members:

EmpName of type character array

Empcode of type long

Grosssalary of type long

Nettax of type long

Calculate() This member function should calculate the value of Nettax according to
the following conditions.

<u>Grosssalary</u>	<u>Tax to be paid</u>
Up to 2 Lakh	No Tax
>2 Lakh and <=5 Lakhs	5 % of (Grosssalary – 2 Lakh)
>5 Lakhs and <=10 Lakhs	15,000 + 20% of (Grosssalary – 5 Lakhs)
Above 10 Lakhs	115,000 + 30% of (Grosssalary – 10 Lakhs)

Public members:

* A function Accept() which allows user to enter EmpName, Empcode, Grosssalary and should call function Calculate().

* A function Display() to display the values of all the data members on the screen.

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

4

```

class HQ
{
    long HQmaxvalue;
protected :
    long HQfundvalue;
public:
    intno_of_HQmeritcert;
    HQ( );
    void HQREAD( );
    void HQWRITE( );
};

class RO: protected HQ
{
    intROcode;
    long ROmaxvalue;
protected:
    long ROfundvalue;
public:
    intno_of_ROmeritcert;
    RO( );
}

```

```

        void HQUPDATE( );
        void ROREAD( );
        void ROWRITE( );
    };

class KV: private RO
{
    intKVcode, no_of_achievements;
    char KVname[30];
public:
    long cashprize;
    KV();
    void ROUPDATE( );
    void KVREAD( );
    void KVWRITE( );
};

all

```

- i) Mention the member names that are accessible by an object of RO class.
- ii) Name the members which can be accessed by the objects of KV class.
- iii) Name the date members that can be accessed by the ROUPDATE() of KV class.
- iv) How many bytes will be occupied by an object of class KV?
- 3 a) Write a function in C++ which accepts an integer array and its size as arguments and find the sum of all the elements which are fully divisible by 3 and 5 both. Example: if an array of five elements initially contains the element as
3,5,1,15,25,30
The output will be 45
- b) An array A[50][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the element A[10][15] is stored at 21500, then find out the base address of the array and the memory address of element stored at location A[30][25]?
- c) Write a function in C++ to print the sum of all the values which are ending with 2 present in a two-dimensional array passed as argument to the function.
- d) Write the definition of a member function Pop() in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already included in the program.
- ```

struct TEXTBOOKS
{
 char ISBN[20]; char TITLE[80];
 TEXTBOOKS *Link;
}

```

```

};

class STACK
{
 TEXTBOOKS *Top;
public:
 STACK() {Top=NULL;}
 void Push();
 void Pop();
 ~STACK();
};

```

- e) Evaluate the following postfix notation of expression: 2

5,20,15,-,\* ,25,2,\* ,+

- 4 a) Write function definition for SUCCESS () in C++ to read the content of a text file 2  
 STORY.TXT count the presence of word *success* and display the number of occurrence of  
 “*success*” word.

**Note :**

- The word STORY should be an independent word
- Ignore type cases (i.e. lower/upper case)

**Example:**

If the content of the file Story.TXT is as follows:

Success shows others that we can do it. It is possible to achieve success with hard work. Lot of money does not mean SUCCESS.

**The function SUCCESS() should display the following:3**

- b) Observe the program segment given below carefully, and answer the question that follows 1

class vidyalaya

{

char name[25];

intnumstu;

public:

void inschool( );

void outschool( );

intretnumstu( )

```

 { return numstu; }

};

void modify(vidyalaya A)
{
fstream INOUT;
 INOUT.open("school.dat",ios::binary|ios::in|ios::out|ios::ate);

vidyalaya B;
intrecread=0, found=0;
 while(!found &&INOUT.read((char*)&B,sizeof(B)))
 {
recread++;
 if(A.retnumstu() == B.retnumstu())
 {

 //missing statement 1

 //missing statement 2

Found=1;
}

else
 INOUT.write((char*)&B,sizeof(B));
}

if(!found)
 cout<<"\nRecord for modification does not exist";
 INOUT.close();
}

```

If the function modify( ) is supposed to modify a record in file school.dat with the values of vidyalaya A passed to its argument, write the appropriate statement for missing statements 1 & 2 so that the function would write the modified record at its proper place.

- c) Given the binary file BOOK.DAT, containing the records of the following structure:

3

```

class book
{
 intbook_no;

```

```

char book_name[20];
int stock;
public:
 int bookreturn()
 {
 return book_no;
 }
 void DeleteStock(int);
};

```

Write the complete definition of the function DelStock(), which delete the records that match with the book\_no passed as the argument to the function.

- 5 a) What is Degree and Cardinality of a table? Explain with the help of examples? 2  
 b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. 6

Table : VEHICLE

| CODE | VTYPE         | PERKM |
|------|---------------|-------|
| 101  | VOLVO BUS     | 160   |
| 102  | AC DELUXE BUS | 150   |
| 103  | ORDINARY BUS  | 90    |
| 105  | SUV           | 40    |
| 104  | CAR           | 20    |

Note : PERKM is Freight Charges per kilometer , VTYPE is Vehicle Type

Table : TRAVEL

| NO  | NAME        | TDATE      | KM  | CODE | NOP |
|-----|-------------|------------|-----|------|-----|
| 101 | Janish Kin  | 2015-11-13 | 200 | 101  | 32  |
| 103 | VedikaSahai | 2016-04-21 | 100 | 103  | 45  |
| 105 | Tarun Ram   | 2016-03-23 | 350 | 102  | 42  |
| 102 | John Fen    | 2016-02-13 | 90✓ | 102  | 40  |
| 107 | Ahmed Khan  | 2015-01-10 | 75✓ | 104  | 2   |
| 104 | Raveena     | 2016-05-28 | 80✓ | 105  | 4   |
| 106 | Kripal Anya | 2016-02-06 | 200 | 101  | 25  |

**Note :**

- NO is Traveller Number
- KM is Kilometer travelled
- NOP is number of travellers travelled in vehicle
- TDATE is Travel Date
- (i) To display NO, NAME, TDATE from the table TRAVEL in descending order of NO.
- (ii) To display the NAME of all the travelers from the table TRAVEL who are traveling by vehicle with code 101 or 102.
- (iii) To display the NO and NAME of those travellers from the table TRAVEL who travel between 100 to 200 KM (both 100 and 200 values included)
- (iv) To delete all travelers whose KM is less than 100.
- (v) `SELECT COUNT (*) CODE FROM TRAVEL GROUP BY CODE HAVING COUNT(*)>1;`
- (vi) `SELECT DISTINCT CODE FROM TRAVEL;`
- (vii) `A.CODE,NAME,VTYPE FROM TRAVEL A,VEHICLE B WHERE A.CODE=B.CODE AND KM<90;`
- (viii) `SELECT NAME,KM*PERKM FROM TRAVEL A, VEHICLE B WHERE A.CODE=B.CODE AND A.CODE='105';`

6 a) Define and Prove Commutative Law.

2

b) Draw the logic circuit for the Boolean expression.

2

$$(A' + B).C'$$

c) Derive a Canonical SOP expression for a Boolean function F,

1

represented by the following truth table:

| X | Y | Z | F(X,Y,Z) |
|---|---|---|----------|
| 0 | 0 | 0 | 0        |
| 0 | 0 | 1 | 1        |
| 0 | 1 | 0 | 1        |
| 0 | 1 | 1 | 0        |
| 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:-  
 $F(U,V,W,Z) = \pi(0,2,5,7,12,13,15)$

3



Center to center distances between various blocks

|                    |       |
|--------------------|-------|
| Block 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**

Block A            25

Block B            50

Block C            125

Block D            10

- i) Suggest a cable layout of connections between the blocks.
- ii) Suggest the most suitable place (i.e. block) to house the server of organization with a suitable reason.
- iii) Suggest the placement of the following devices with justification
  - 1) Repeater
  - 2) Hub/Switch
- iv) 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?

## **Second Pre Board (2017-18)**

CLASS 12 (Set-A)

**SUBJECT:-Computer Science (083)**

Max. Marks: 70

**Duration: 3 Hours**

---

## *General Instructions*

- General Instructions**

  - (i) All Questions are Compulsory. Language is C++.
  - (ii) Please check that this question paper contains 7 questions.
  - (iii) Please write down the serial number of question before attempting it.
  - (iv) 15 minutes extra should be given to read the question paper. During this reading time students will read the question paper only and will not write anything on answer-sheet during this period.

1.



(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
```

v

Pixels Point1=(5,3);

ShowPoint(Point1);

## Pixels Point2D $\equiv$ Point

Color: I. Omit 1+2,

1

(d) Find the output of the following program:

```
#include<iostream.h>
```

```

void main()
{
 int a[]={5,10,15,20,25,30};
 int *p=a+3;
 for(int i=0;i<3;i++)
 {
 p[i]=a[i];
 a[i]=p[i]*2;
 }
 for(i=0;i<6;i++)
 cout<<(a+i)<<" ";
}

```

- (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 30, 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-20)+15;
 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 Exam
{
 int year;
 public :
Exam(int y) { year=y; } //constructor 1
Exam(Exam &t); //constructor 2
}
```

- (i) Create an object, such that it invokes constructor 1.  
(ii) Write complete definition for constructor 2.

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

#### Private Members

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

| Distance                       | Fuel |
|--------------------------------|------|
| $\leq 1000$                    | 500  |
| more than 1000 and $\leq 2000$ | 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
- (d) Answer the questions (i) to (iv) based on the following: 4

class COMP

```
{ private :
 char Manufacturer [30];
 char addr[15];
 public:
 toys();
 void RCOMP();
 void DCOMP();
};
```

$30+15+10+8+30+10+1 = 104$

$40+40+15+9 = 104$

$80+15+9 = 104$

$95+9 = 104$

class TOY: public COMP

```
{ private:
 char bcode[10];
 public:
 double cost_of_toy;
 void RTOY ();
 void DTOY();
};
```

class BUYER: public TOY

```
{ private:
 char nm[30];
 char delivery date[10];
 char baddr;
 public:
 void RBUYER();
 void DBUYER();
};
```

void main ( )

```
{ BUYER MyToy; }
```

- i) Mention the member names that are accessible by My Toy declared in main( ) function.
- ii) Name the data members which can be accessed by the functions of BUYER class.
- iii) Name the members that can be accessed by function RTOY( ).
- iv) How many bytes will be occupied by the objects of class BUYER?

Q3 (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  $2 \cdot A[i] + 3 \cdot B[i]$ ; where value i varies from 0 to N-1 and transfer the resultant content in the third same sized array. 3

(b) An array PP[20][25] is stored in the memory along the row with each of the elements occupying 4 bytes. Find out the memory location for the element  $PP[13][20]$ , if the element  $PP[7][10]$  is stored at memory location 3454 3

(c) Write a function in C++ to perform Push operation on a dynamically allocated Stack containing real numbers (float Values). 4

(d) Write a function in C++ to display the sum of all the positive and even numbers , stored in a two dimensional array. The function prototype is as follows:

void SumPosEven(int Array[5][5]); 2

(e) Obtain the postfix notation for the following infix notation: 2

$A + (B \cdot C / D) - (E \cdot F) / G$

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. Where Countrec() function is to count the total number of records in the file. 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 digits present in a text file “FILE.TXT”. 2  
 (c) 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;}
};
```

5.

- (a) What do you understand by Degree and Cardinality of a table? 2  
 (b) Consider the following tables GAMES and PLAYER. Write SQL commands for the statements (i) to (iv) (1 Mark Each) and give outputs for SQL queries (v) to (viii) (1/2 Mark each) 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   |

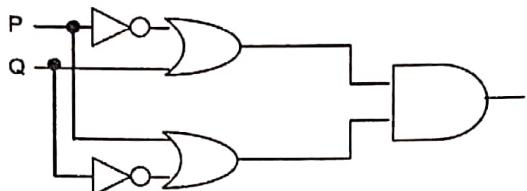
12005

- (i) To display the name of all Games starting from letter ‘c’.  
 (ii) To display details of those games which are having Number in the range of 2 to 3 including both values.  
 (iii) To display the content of the GAMES table in descending order of Prizemoney.  
 (iv) To display the Name of Players with the games they play.

- v) select COUNT(DISTINCT Number) FROM GAMES;  
 (vi) SELECT MAX(ScheduleDate),MIN(ScheduleDate) FROM GAMES;  
 (vii) SELECT Number , sum(PrizeMoney) FROM GAMES group by Number;  
 (viii) SELECT DISTINCT Gcode FROM PLAYER;

6. (a) State and algebraically verify Absorbtion 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

$$F(U,V,W,Z)=\sum(1,5,8,9,12,13)$$

7. a) Define the term Bandwidth. Give unit of Bandwidth. 1

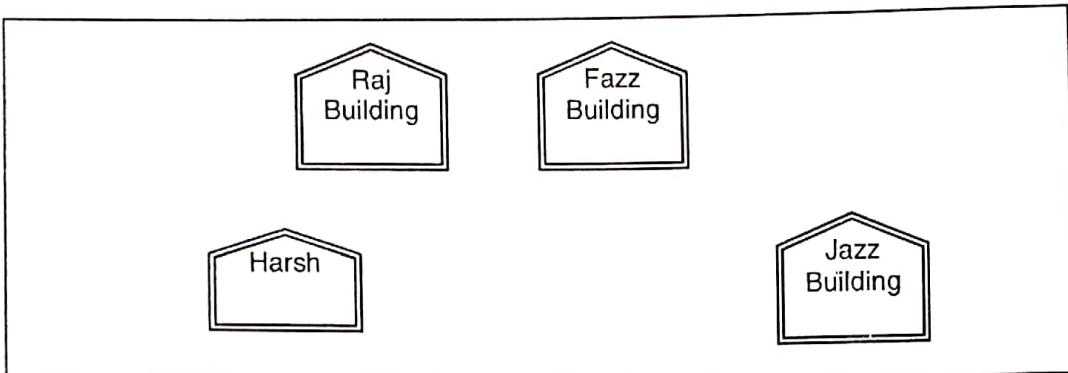
b) Expand the following terminologies: 1

(i) CDMA                       (ii) SMTP

c) What is http?. 1

d) What is a HUB? 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.
- e2) Suggest the most suitable place (i.e. building) to house the server of this organisation with a suitable reason.
- c3) Suggest the placement of the following devices with justification:
  - (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.
- f ) What is spam mail ?
- g) What is cookies?

**KENDRIYA VIDYALAYA SANGATHAN CHANDIGARH REGION**  
**PRE BOARD EXAMINATION 2017-18**  
**COMPUTER SCIENCE (083)**  
**CLASS XII (SET C)**

*Time allowed: 3Hrs*

*Maximum Marks :70*

**Instructions:**

- i) All the questions are compulsory
- ii) Programming Language C++

**1. (a) Identify the type of C++ tokens (keywords OR user defined identifiers) from the following: 2**

- (i) delete
- (ii) for
- (iii) switch
- (iv) num\_4

**(b) Write the names of the header files which are necessary to execute the following C++ code 1**

```
void main()
{
 int Rno=24;
 char Name[] = "Pre Board Exams";
 cout<<setw(10)<<Rno<<setw(25)<<Name<<endl;
}
```

**(c) Identify and correct the errors if any, underline the correction 2**

```
#include<iostream h>
int main
{
 Unsigned long i, fact=1;
 cout<<"Enter a number ";
 cin>>num;
 while(num)
 {
 fact=fact*num;
 --num;
 }
 cout<<"the factorial is "<<fact;
}
```

(d) Find the output of the following program (imagine header files are included) 2

```
void main()
{
 clrscr();
 char *str = "VIDYALAYA";
 for (int i = 0; str[i]!='\0';i++)
 { for(int j=0;j<=i;j++)
 cout<<str[j];
 Cout<<endl;
 }
}
```

(e) Give the output of the following program 3

```
#include<iostream.h>
#include<conio.h>
void Execute(int &B, int C = 50)
{
 int TEMP = B+C;
 B += TEMP;
 if(C != 150)
 cout << " " << TEMP << " " << " << B << " " << C << endl;
}
void main ()
{
 clrscr();
 int M = 20, N = 10;
 Execute(M);
 cout << " " << M << " " << " << N << endl;
 Execute(M, N);
 cout << " " << M << " " << N << endl;
 getch();
}
```

(f) Find the possible outputs from (i) to (iv) option and what will be the minimum & Maximum values of numgus.

2

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



**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 TestMeOut
{
public:
~TestMeOut() //Function 1
{ cout<<"Play over"<<endl; }

TestMeOut() //Function 2
{ cout<<"Preparing to play"<<endl; }

void MyWork()
{ cout<<"Playing"<<endl}

};


```

- (i) In OOP what is Function 1 referred as and when does it get invoked?
  - (ii) In OOP what is Function 2 referred as and when does it get invoked? Write the statement to invoke Function2.

(c) Define a class serverspace with the following specifications.

Private members of the class

|            |   |                                                                                                   |
|------------|---|---------------------------------------------------------------------------------------------------|
| Filenames  | - | an array of strings of size[10][25]<br>( to represent all the names of files inside serverspace ) |
| Availspace | - | Long<br>( to represent total number of bytes available in serverspace)                            |
| Usedspace  | - | Long<br>( to represent total number of bytes used in serverspace)                                 |

public members of the class

|                 |   |                                                                                            |
|-----------------|---|--------------------------------------------------------------------------------------------|
| Newfileentry()  | - | A function to accept values of Filenames, Availspace and Usedspace from user               |
| Retavailspace() | - | A Function that returns the value of total Kilobytes available ( 1 Kilobvtes = 1024 bytes) |
| Showfiles()     | - | a function that displays the names of all the files in serverspace                         |

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

class WORLD

{

    int H;

protected :

    int S;

public :

    void INPUT(int);

    void OUTPUT();

};

class COUNTRY : private WORLD

{

    int T;

protected :

    int U;

public :

    void INDATA( int, int);

    void OUTDATA();

```
};

class STATE : public COUNTRY
{
 int M;
public :
 void DISPLAY (void);
};
```

- (i) Name the base class and derived class of the class COUNTRY.
- (ii) Name the data member(s) that can be accessed from function DISPLAY( ).
- (iii) Name the member function(s), which can be accessed from the objects of class STATE.
- (iv) Is the member function OUTPUT() accessible by the objects of the class COUNTRY ?

3. (a) Write a function in C++, which accept an integer array and its size as arguments and replace elements having even values with its half and elements having odd values with twice its value. 2

If an array of 4 elements initially contains the elements as

1, 2, 4, 3

Then, the function should rearrange the content of the array as

2, 1, 2, 6

(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. 3

(c) Write a function in C++ which accepts a 2D array of integers and its size as arguments and displays the elements which lie on diagonals. 3

[Assuming the 2D array to be square matrix with odd dimension i.e. 3\*3, 5\*5, 7\*7 etc....]

Eg: 5 4 3

6 7 8

1 2 9

Output through the function should be :

Diagonal one : 5 7 9

Diagonal two : 3 7 1

(d) Evaluate the following postfix notation of expression: 20, 8, 4, /, 2, 3, +, \*, -

2

Show the operation of stack.

(e) Write a function in C++ to delete a node containing customers information, from a dynamically allocated Queue of customers implemented with the help of the following structure. (4)

Assume the Queue implemented with the following structures.

```
struct Customer
{
 int CNo;
 char CName[20];
 Customer *Link;
};
```

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 num;
 char Item_name[25];
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 Rno)
{
 fstream File;
 File.Open("STOCK.DAT", ios::binary |ios::in);
 _____ // Statement 1
 File.read((char*) this, size of (Item));
 cout<< num << " = > " << Item_name << endl;
 File.close();
}
```

```

void Item :: Modify(int Rno)
{
 fstream File;
 File.Open("STOCK.DAT", ios::binary | ios::in | ios::out);
 cout<< Num;
 cin.getline(Item_name, 25);

 _____ // Statement 2

 File.write((char*) this, size of (Item));
 File.close();
}

```

- (b) Write a function in C++ to calculate the average word size in a text file "Report.txt", each word is separated by single space or full stop. 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 the term Primary key and Foreign key in a relational database? 2

**NOTE:** Answer the questions (b) and (c) on the basis of the following tables **SCHOOL** and **ADMIN**

SCHOOL

| CODE | TEACHERNAME  | SUBJECT | DOJ        | PERIODS | EXPERIENCE |
|------|--------------|---------|------------|---------|------------|
| 1001 | RAVI SHANKAR | ENGLISH | 12/03/2000 | 24      | 10         |
| 1009 | PRIYA RAI    | PHYSICS | 03/09/1998 | 26      | 12         |
| 1203 | LISA ANAND   | ENGLISH | 09/04/2000 | 27      | 5          |
| 1045 | YASHRAJ      | MATHS   | 24/08/2000 | 24      | 15         |
| 1123 | GANAN        | PHYSICS | 16/07/1999 | 28      | 3          |

|      |          |           |            |    |    |
|------|----------|-----------|------------|----|----|
| 1167 | HARISH B | CHEMISTRY | 19/10/1999 | 27 | 5  |
| 1215 | UMESH    | PHYSICS   | 11/05/1998 | 22 | 16 |

### ADMIN

| CODE | GENDER | DESIGNATION    |
|------|--------|----------------|
| 1001 | MALE   | VICE PRINCIPAL |
| 1009 | FEMALE | COORDINATOR ✓  |
| 1203 | FEMALE | COORDINATOR ✓  |
| 1045 | MALE   | HOD            |
| 1123 | MALE   | SENIOR TEACHER |
| 1167 | MALE   | SENIOR TEACHER |
| 1215 | MALE   | HOD            |

(b) Write the SQL Queries:

4

- i) To display TEACHERNAME, PERIODS of all teachers whose periods less than 25.
- ii) To display TEACHERNAME, CODE and DESIGNATION from tables SCHOOL and ADMIN.
- iii) To display the total number of teachers in each subject.
- iv) To display CODE, TEACHERNAME and SUBJECT of all teachers who have joined the school after 01/01/1999.

(c) Write the output of the following SQL commands:

2

- i) SELECT MAX(EXPERIENCE), SUBJECT FROM SCHOOL GROUP BY SUBJECT;
- ii) SELECT TEACHERNAME, GENDER FROM SCHOOL, ADMIN WHERE DESIGNATION = 'COORDINATOR' AND SCHOOL.CODE=ADMIN.CODE ;
- iii) SELECT DESIGNATION, COUNT(\*) FROM ADMIN GROUP BY DESIGNATION HAVING COUNT(\*) <3;
- iv) SELECT COUNT(DISTINCT SUBJECT) FROM SCHOOL;

6. (a) Verify the law using truth table  $(X+Y)'=X'Y'$

2

(b) Draw the logic circuit for  $Q=((B+C).(B.C))+(A.B))$

2

(c) Derive the SOP form of Boolean expression from the given truth table.

1

| X | Y | Z | F(A B C) |
|---|---|---|----------|
| 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

$$F(a,b,c,d) = \Sigma(0,3,4,5,7,8,9,11,12,13,15)$$

7.

(a) What is the difference between Repeater and a Bridge?

1

(b) What is 80 - 20 rule in networking

1

(c) Explain GSM.

1

(d) What is the purpose of using HTTP?

1

(e) Sathyam computers decided to open a new office at Gurgaon , the office consist of Five

Buildings and each contains number of computers . the details are shown below.

4

Building-1

Building-2

Building-3

Building-5

Building-4

**Distance between the buildings**

|                  |            |
|------------------|------------|
| Building 1 and 2 | 20 Meters  |
| Building 2 and 3 | 50 Meters  |
| Building 3 and 4 | 120 Meters |
| Building 3 and 5 | 70 Meters  |
| Building 1 and 5 | 65 Meters  |
| Building 2 and 5 | 50 Meters  |

| Building | No of computers |
|----------|-----------------|
| 1        | 40              |
| 2        | 45              |
| 3        | 110             |
| 4        | 70              |
| 5        | 60              |

Computers in each building are networked but buildings are not networked so far. The Company has now decided to connect building also.

- (i) Suggest a cable layout for connecting the buildings
  - (ii) Which hardware/software device you will advise to use to protect and control the network and internet uses within the Campus.
  - (iii) Do you think anywhere Repeaters required in the campus? Why
  - (iv) Suggest the most appropriate building, where server and modem should be installed?
- (f)** Which protocol helps us to transfer files to and from a remote computer? 1

- (g)** Categories the following under client side and server side script category. 1
- (i) Java Script
  - (ii) ASP
  - (iii) VB Script
  - (iv) JSP

**END OF PAPER**

Roll No.

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
| R | A | N | V | E | E | R |
|---|---|---|---|---|---|---|

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

- Please check that this question paper contains **20** 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 minute 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-book during this period.

## **COMPUTER SCIENCE**

*Time allowed : 3 hours*

*Maximum Marks : 70*

**General Instructions :**

- (i) *SECTION A refers to programming language C++.*
- (ii) *SECTION B refers to programming language Python.*
- (iii) *SECTION C is compulsory for all.*
- (iv) *Answer either SECTION A or SECTION B.*
- (v) *It is compulsory to mention on the page 1 in the answer book whether you are attempting SECTION A or SECTION B.*
- (vi) *All questions are compulsory within each section.*

## SECTION A

[Only for candidates, who opted for C++]

1. (a) Write the type of C++ tokens (keywords and user defined identifiers) from the following : 2

- (i) new
- (ii) While
- (iii) case
- (iv) Num\_2

- (b) Anil typed the following C++ code and during compilation he found three errors as follows :

- (i) Function strlen should have prototype
- (ii) Undefined symbol cout
- (iii) Undefined symbol endl

On asking, his teacher told him to include necessary header files in the code. Write the names of the header files, which Anil needs to include, for successful compilation and execution of the following code : 1

```
void main()
{
 char Txt[] = "Welcome";
 for(int C= 0; C<strlen(Txt); C++)
 Txt[C] = Txt[C]+1;
 cout<<Txt<<endl;
}
```

- (c) Rewrite the following C++ code after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all required header files are already being included in the program.

```
void main()
{
 cout<<"Enter an Alphabet:" ;
 cin>>CH;
 switch(CH)

 case 'A' cout<<"Ant"; Break;
 case 'B' cout<<"Bear" ; Break;
}
```

- (d) Find and write the output of the following C++ program code : 2

Note : Assume all required header files are already included in the program.

```
#define Diff(N1,N2) ((N1>N2)?N1-N2:N2-N1)
void main()
{
 int A,B,NUM[] = {10,23,14,54,32};
 for(int CNT =4; CNT>0; CNT--)
 {
 A=NUM[CNT];
 B=NUM[CNT-1];
 cout<<Diff(A,B)<<'#';
 }
}
```

O/P  
22# 40# 9# 13#

- (e) Find and write the output of the following C++ program code : 3

Note : Assume all required header files are already being included in the program.

```
void main()
{
 int *Point, Score[]={100,95,150,75,65,120};
 Point = Score;
 for(int L = 0; L<6; L++)
 {
 if((*Point)%10==0)
 *Point /= 2;
 else
 *Point -= 2;
 if((*Point)%5==0)
 *Point /= 5;
 Point++;
 }
 for(int L = 5; L>=0; L--)
 cout<<Score[L]<<"*";
}
```

O/P  
12\* 63\* 73\* 15\*  
93\* 10\*

- (f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum values that can be assigned to each of the variables N and M.

2

Note :

- Assume all the required header files are already being included in the code.
- The function random(n) generates an integer between 0 and  $n - 1$ .

```
void main()
{
 randomize(); 0-2 0-3
 int N=random(3),M=random(4);
 int DOCK[3][3] = {{1,2,3},{2,3,4},{3,4,5}};

 for(int R=0; R<N; R++)
 {
 for(int C=0; C<M; C++)
 cout<<DOCK[R][C]<<" ";
 cout<<endl;
 }
}
```

| (i)                     | (ii)              |
|-------------------------|-------------------|
| 1 2 3<br>2 3 4<br>3 4 5 | 1 2 3<br>2 3 4    |
| (iii)                   | (iv)              |
| 1 2<br>2 3              | 1 2<br>2 3<br>3 4 |

2. (a) Differentiate between protected and private members of a class in context of Object Oriented Programming. Also give a suitable example illustrating accessibility/non-accessibility of each using a class and an object in C++. 2

- (b) Observe the following C++ code and answer the questions (i) and (ii).  
*Note : Assume all necessary files are included.*

```
class TEST
{
 long TCode;
 char TTitle[20];
 float Score;
public:
 TEST() //Member Function 1
 {
 TCode=100; strcpy(TTitle, "FIRST Test"); Score=0;
 }
 TEST(TEST &T) //Member Function 2
 {
 TCode=E.TCode+1;
 strcpy(TTitle, T.TTitle);
 Score=T.Score;
 }
};

void main()
{
 _____ //Statement 1
 _____ //Statement 2
}
```

- (i) Which Object Oriented Programming feature is illustrated by the Member Function 1 and the Member Function 2 together in the class TEST ? 1

- (ii) Write Statement 1 and Statement 2 to execute Member Function 1 and Member Function 2 respectively. 1

- (c) Write the definition of a class BOX in C++ with the following description :

4

Private Members

- **BoxNumber** // data member of integer type
- **Side** // data member of float type
- **Area** // data member of float type
- **ExecArea()** // Member function to calculate and assign  
// Area as Side \* Side

Public Members

- **GetBox()** // A function to allow user to enter values of  
// BoxNumber and Side. Also, this  
// function should call ExecArea() to calculate  
// Area
- **ShowBox()** // A function to display BoxNumber, Side  
// and Area

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

4

```
class First
{
 int X1;

protected:
 float X2;

public:
 First();
 void Enter1(); void Display1();
};
```

```

class Second : private First
{
 int Y1;
protected:
 float Y2;
public:
 Second();
 void Enter2();
 void Display();
};

class Third : public Second
{
 int Z1;
public:
 Third();
 void Enter3();
 void Display();
};
void main()
{
 Third T; //Statement 1
 _____; //Statement 2
}

```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?  
Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
- (ii) Write the names of all the member functions, which are directly accessible by the object T of class Third as declared in main() function.
- (iii) Write Statement 2 to call function Display() of class Second from the object T of class Third.
- (iv) What will be the order of execution of the constructors, when the object T of class Third is declared inside main() ?

3. (a) Write the definition of a function AddUp(int Arr[], int N) in C++, in which all even positions (i.e., 0,2,4,...) of the array should be added with the content of the element in the next position and odd positions (i.e., 1,3,5,...) elements should be incremented by 10. 3

Example : if the array Arr contains

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 23 | 30 | 45 | 10 | 15 | 25 |
|----|----|----|----|----|----|

Then the array should become

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 53 | 40 | 55 | 20 | 40 | 35 |
|----|----|----|----|----|----|

Note :

- The function should only alter the content in the same array.
- The function should not copy the altered content in another array.
- The function should not display the altered content of the array.
- Assuming, the Number of elements in the array are Even.

- (b) Write a definition for a function SUMMIDCOL(int MATRIX[][10], int N,int M) in C++, which finds the sum of the middle column's elements of the MATRIX (Assuming N represents number of rows and M represents number of columns, which is an odd integer). 2

Example : If the content of array MATRIX having N as 5 and M as 3 is as follows :

|   |   |   |
|---|---|---|
| 1 | 2 | 1 |
| 2 | 1 | 4 |
| 3 | 4 | 5 |
| 4 | 5 | 3 |
| 5 | 3 | 2 |

The function should calculate the sum and display the following :

Sum of Middle Column : 15

- (c) ARR[15][20] is a two-dimensional array, which is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[5][15], if the element ARR[10][5] is stored at the memory location 35000.

3

- (d) Write the definition of a member function PUSHGIFT() for a class STACK in C++, to add a GIFT in a dynamically allocated stack of GIFTS considering the following code is already written as a part of the program :

4

```
struct GIFT
{
 int GCODE; //Gift Code
 char GDESC[20]; //Gift Description
 GIFT *Link;
};

class STACK
{
 Gift *TOP;
public:
 STACK(){TOP=NULL;}
 void PUSHGIFT();
 void POPGIFT();
 ~STACK();
};
```

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion :

2

$$X - (Y + Z) / U * V$$

91

9

P.T.O.

4. (a) Polina Raj has used a text editing software to type some text in an article. After saving the article as **MYNOTES.TXT**, she realised that she has wrongly typed alphabet K in place of alphabet C everywhere in the article.

Write a function definition for **PURETEXT()** in C++ that would display the corrected version of the entire article of the file **MYNOTES.TXT** with all the alphabets "K" to be displayed as an alphabet "C" on screen.

3

*Note : Assuming that **MYNOTES.TXT** does not contain any C alphabet otherwise.*

**Example :**

If Polina has stored the following content in the file **MYNOTES.TXT**:

```
I OWN A KUTE LITTLE KAR.
I KARE FOR IT AS MY KHILD.
```

The function **PURETEXT()** should display the following content:

```
I OWN A CUTE LITTLE CAR.
I CARE FOR IT AS MY CHILD.
```

- (b) Write a definition for function COUNTPICS() in C++ to read each object of a binary file PHOTOS.DAT, find and display the total number of PHOTOS of type PORTRAIT. Assume that the file PHOTOS.DAT is created with the help of objects of class PHOTOS, which is defined below:

2

```
class PHOTOS
{
 int PCODE;
 char PTYPE[20];//Photo Type as "PORTRAIT", "NATURE"
public:
 void ENTER()
 {
 cin>>PCODE; gets(PTYPE);
 }

 void SHOWCASE()
 {
 cout<<PCODE<<" :" <<PTYPE<<endl;
 }
 char *GETPTYPE(){return PTYPE;}
};
```

- (c) Find the output of the following C++ code considering that the binary file CLIENTS.DAT exists on the hard disk with a data of 200 clients :

1

```
class CLIENTS
{
 int CCode;char CName[20];
public:
 void REGISTER(); void DISPLAY();
};

void main()
{
 fstream File;
 File.open("CLIENTS.DAT",ios::binary|ios::in);
 CLIENTS C;
 File.seekg(6*sizeof(C));
 File.read((char*)&C, sizeof(C));
 cout<<"Client Number:"<<File.tellg()/sizeof(C) + 1;
 File.seekg(0,ios::end);
 cout<<" of "<<File.tellg()/sizeof(C)<<endl;
 File.close();
}
```

## SECTION C

### [For all the candidates]

5. (a) Observe the following table MEMBER carefully and write the name of the RDBMS operation out of (i) SELECTION (ii) PROJECTION (iii) UNION (iv) CARTESIAN PRODUCT, which has been used to produce the output as shown in RESULT. Also, find the Degree and Cardinality of the RESULT :

2

MEMBER

| NO   | MNAME   | STREAM     |
|------|---------|------------|
| M001 | JAYA    | SCIENCE    |
| M002 | ADITYA  | HUMANITIES |
| M003 | HANSRAJ | SCIENCE    |
| M004 | SHIVAK  | COMMERCE   |

RESULT

| NO   | MNAME  | STREAM     |
|------|--------|------------|
| M002 | ADITYA | HUMANITIES |

- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables.

6

DVD

| DCODE | DTITLE            | DTYPE     |
|-------|-------------------|-----------|
| F101  | Henry Martin      | Folk      |
| C102  | Dhrupad           | Classical |
| C101  | The Planets       | Classical |
| F102  | Universal Soldier | Folk      |
| R102  | A day in life     | Rock      |

MEMBER

| MID | NAME        | DCODE | ISSUEDATE  |
|-----|-------------|-------|------------|
| 101 | AGAM SINGH  | R102  | 2017-11-30 |
| 103 | ARTH JOSEPH | F102  | 2016-12-13 |
| 102 | NISHA HANS  | C101  | 2017-07-24 |

- (i) To display all details from the table MEMBER in descending order of ISSUEDATE.
- (ii) To display the DCODE and DTITLE of all Folk Type DVDs from the table DVD.
- (iii) To display the DTYPE and number of DVDs in each DTYPE from the table DVD.
- (iv) To display all NAME and ISSUEDATE of those members from the table MEMBER who have DVDs issued (i.e., ISSUEDATE) in the year 2017.
- (v) SELECT MIN(ISSUEDATE) FROM MEMBER;
- (vi) SELECT DISTINCT DTYPE FROM DVD;
- (vii) SELECT D.DCODE, NAME, DTITLE  
FROM DVD D, MEMBER M WHERE D.DCODE=M.DCODE;
- (viii) SELECT DTITLE FROM DVD  
WHERE DTYPE NOT IN ("Folk", "Classical");

6. (a) State DeMorgan's Laws of Boolean Algebra and verify them using truth table. 2
- (b) Draw the Logic Circuit of the following Boolean Expression using only NOR Gates : 2
- $$(A+B) \cdot (C+D)$$
- (c) Derive a Canonical POS expression for a Boolean function G, represented by the following truth table : 1
- | X | Y | Z | G(X,Y,Z) |
|---|---|---|----------|
| 0 | 0 | 0 | 0        |
| 0 | 0 | 1 | 0        |
| 0 | 1 | 0 | 1        |
| 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 to its simplest form using K-Map : 3
- $$E(U,V,Z,W) = \Sigma(2,3,6,8,9,10,11,12,13)$$
7. (a) Differentiate between communication using Optical Fiber and Ethernet Cable in context of wired medium of communication technologies. 2
- (b) Janish Khanna used a pen drive to copy files from his friend's laptop to his office computer. Soon his computer started abnormal functioning. Sometimes it would restart by itself and sometimes it would stop different applications running on it. Which of the following options out of (i) to (iv), would have caused the malfunctioning of the computer ? Justify the reason for your chosen option : 2
- (i) Computer Virus
  - (ii) Spam Mail
  - (iii) Computer Bacteria
  - (iv) Trojan Horse

(c) Ms. Raveena Sen is an IT expert and a freelancer. She recently used her skills to access the Admin password for the network server of Super Dooper Technology Ltd. and provided confidential data of the organization to its CEO, informing him about the vulnerability of their network security. Out of the following options (i) to (iv), which one most appropriately defines Ms. Sen ?

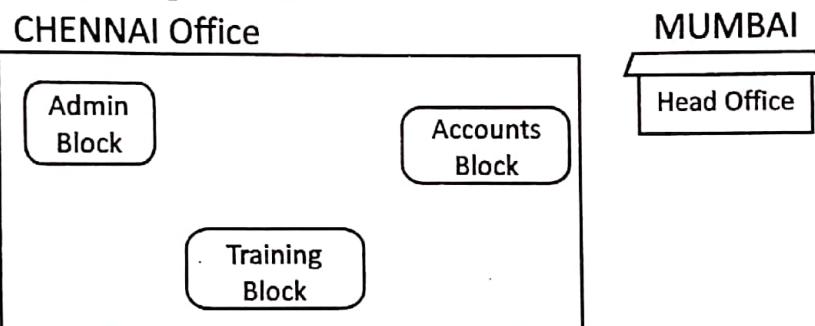
2

Justify the reason for your chosen option :

- (i) Hacker
- (ii) Cracker
- (iii) Operator
- (iv) Network Admin

(d) Hi Standard Tech Training Ltd. is a Mumbai based organization which is expanding its office set-up to Chennai. At Chennai office compound, they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has a number of computers, which are required to be connected in a network for communication, data and resource sharing.

As a network consultant, you have to suggest the best network related solutions for them for issues/problems raised by them in (i) to (iv), as per the distances between various blocks/locations and other given parameters.



Shortest distances between various blocks/locations :

|                                      |            |
|--------------------------------------|------------|
| Admin Block to Accounts Block        | 300 Metres |
| Accounts Block to Training Block     | 150 Metres |
| Admin Block to Training Block        | 200 Metres |
| MUMBAI Head Office to CHENNAI Office | 1300 Km    |

Number of computers installed at various blocks are as follows :

|                |     |
|----------------|-----|
| Training Block | 150 |
| Accounts Block | 30  |
| Admin Block    | 40  |

- (i) Suggest the most appropriate block/location to house the SERVER in the CHENNAI office (out of the 3 blocks) to get the best and effective connectivity. Justify your answer. 1
- (ii) Suggest the best wired medium and draw the cable layout (Block to Block) to efficiently connect various blocks within the CHENNAI office compound. 1
- (iii) Suggest a device/software and its placement that would provide data security for the entire network of the CHENNAI office. 1
- (iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smartphone/laptop users in the CHENNAI office. 1

Abhishek  
Kumar

Roll No. **R A N V E E R**

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

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## COMPUTER SCIENCE

*Time allowed : 3 hours*

*Maximum Marks : 70*

### *General Instructions :*

- Programming Language in SECTION A : C++.*
- Programming Language in SECTION B : Python.*
- Answer either SECTION A or B, and SECTION C is compulsory.*
- It is compulsory to mention on the page 1 in answer book whether you are attempting SECTION A or SECTION B.*
- All questions are compulsory within each section.*

## SECTION - A

[Only for candidates, who opted for C++]

1. (a) Out of the following, find those identifiers, which cannot be used for 2 naming Variables, Constants or Functions in a C++ program :

Total\*Tax, double, Case, My Name,  
NeW, switch, Column31, \_Amount

- (b) Ronica Jose has started learning C++ and has typed the following 1 program. When she compiled the following code written by her, she discovered that she needs to include some header files to successfully compile and execute it. Write the names of those header files, which are required to be included in the code.

```
void main()
{
 double X,Times,Result;
 cin>>X>>Times;
 Result=pow(X,Times);
 cout<<Result<<endl;
}
```

- (c) Rewrite the following C++ code after removing any/all syntactical errors 2 with each correction underlined.

Note : Assume all required header files are already being included in the program.

```
#define Formula(a,b) = 2*a+b
void main()
{
 float X=3.2;Y=4.1;
 Z=Formula(X,Y);
 cout<<'Result='<<Z<<endl;
}
```

(d) Find and write the output of the following C++ program code :

2

Note: Assume all required header files are already included in the program.

```
typedef char TEXT[80];

void JumbleUp(TEXT T)

{
 int L=strlen(T);

 for (int C=0;C<L-1;C+=2)

 {
 char CT=T[C];

 T[C]=T[C+1];

 T[C+1]=CT;
 }

 for (C=1;C<L;C+=2)

 if (T[C]>='M' && T[C]<='U')

 T[C]='@';

}

void main()

{
 TEXT Str="HARMONIOUS";

 JumbleUp(Str);

 cout<<Str<<endl;
}
```

R.W.  
H A R M O N I O U S  
A H M @ N @ O I S @  
@ @ @

- (e) Find and write the output of the following C++ program code :

3

Note : Assume all required header files are already being included in the program.

```
class Share
{
 long int Code;
 float Rate;
 int DD;

public:
 Share() {Code=1000;Rate=100;DD=1;}
 void GetCode(long int C, float R)
 {
 Code=C;
 Rate=R;
 }
 void Update(int Change,int D)
 {
 Rate+=Change;
 DD=D;
 }
 void Status()
 {
 cout<<"Date:"<<DD<<endl;
 cout<<Code<<"#"<<Rate<<endl;
 }
};

void main()
{
 Share S,T,U;
 S.GetCode(1324,350);
}
```

O/P  
1324 400

O/P

Date : 28

1324 # 400

Date : 1

1435 # 250

Date : 26

1000 # 75

| C    | S               | T    | U    |
|------|-----------------|------|------|
| R    | D,D             | C    | C    |
| 1324 | 350             | 1435 | 1435 |
|      | 28              | 250  | 1    |
|      | <del>1400</del> |      |      |
|      |                 |      | 100  |
|      |                 |      | 100  |
|      |                 |      | 100  |
|      |                 |      | 100  |
|      |                 |      | 100  |

T.GetCode(1435,250);      1324      350  
 S.Update(50,28);                  ~~1400~~  
 U.Update(-25,26);  
 S.Status();  
 T.Status();  
 U.Status();  
 }

- (f) Look at the following C++ code and find the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable PICKER. 2

Note : Assume all the required header files are already being included in the code.

The function random(n) generates an integer between 0 and n-1.

```
void main()
{
 randomize();
 int PICKER;
 PICKER=1+random(3);
 char COLOR[5][5]={"BLUE","PINK","GREEN","RED"};
 for(int I=0;I<=PICKER; I++)
 {
 for(int J=0; J<=I;J++)
 cout<<COLOR[J];
 cout<<endl;
 }
}
```

| (i)          | (ii)                              | (iii)    | (iv)          |
|--------------|-----------------------------------|----------|---------------|
| PINK         | BLUE                              | GREEN    | BLUE          |
| PINKGREEN    | BLUEPINK                          | GREENRED | BLUEPINK      |
| PINKGREENRED | BLUEPINKGREEN<br>BLUEPINKGREENRED |          | BLUEPINKGREEN |

2. (a) Write any four important characteristics of Object Oriented Programming ? Give example of any one of the characteristics using C++.  
 (b) Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary files are included :

```

class BOOK

{
 long Code;
 char Title[20];
 float Price;

public:
 BOOK() //Member Function 1
 {
 cout<<"Bought"<<endl;
 Code=10; strcpy(Title,"NoTitle"); Price=100;
 }
 BOOK(int C,char T[],float P) //Member Function 2
 {
 Code=C;
 strcpy(Title,T);
 Price=P;
 }
 void Update(float p) //Member Function 3
 {
 Price+=p;
 }
 void Display() //Member Function 4
}

```

```

{
 cout<<Code<<":"<<Title<<":"<<Price<endl;
}
~BOOK() //Member Function 5
{
 cout<<"Book Discarded!"<<endl;
}
};

void main() //Line 1
{
 BOOK B,C(101,"Truth",350); //Line 3
 for (int I=0;I<4;I++) //Line 4
 {
 //Line 5
 B.Update(50);C.Update(20); //Line 6
 B.Display();C.Display(); //Line 7
 } //Line 8
} //Line 9

```

- (i) Which specific concept of object oriented programming out of the 1 following is illustrated by Member Function 1 and Member Function 2 combined together ?
- Data Encapsulation
  - Polymorphism
  - Inheritance
  - Data Hiding
- (ii) How many times the message "Book Discarded!" will be displayed 1 after executing the above C++ code ? Out of line 1 to Line 9, which line is responsible to display the message "Book Discarded!"

- (c) Write the definition of a class CITY in C++ with following description :

4

**Private Members**

- Ccode //Data member for City Code (an integer)
- CName //Data member for City Name (a string)
- Pop //Data member for Population (a long int)
- KM //Data member for Area Coverage (a float)
- Density //Data member for Population Density (a float)
- DenCal() //A member function to calculate ---  
//Density as Pop/KM

**Public Members**

- Record() //A function to allow user to enter values of  
//Acode,Name,Pop,KM and call DenCal()  
function
- View() //A function to display all the data members  
//also display a message "Highly Populated  
City"  
//if the Density is more than 10000

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

```
class ITEM
{
 int Id;
 char IName[20];
```

```

protected:
 float Qty;

public:
 ITEM();
 void Enter();void View();

};

class TRADER

{
 int DCode;
protected:
 char Manager[20];

public:
 TRADER();
 void Enter();
 void View();

};

class SALEPOINT : public ITEM,private TRADER
{
 char Name[20],Location[20];

public:
 SALEPOINT();
 void EnterAll();
 void ViewAll();
};

```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?
- Single Level Inheritance
  - Multi Level Inheritance
  - Multiple Inheritance
- (ii) Write the names of all the data members, which are directly accessible from the member functions of class SALEPOINT.
- (iii) Write the names of all the member functions, which are directly accessible by an object of class SALEPOINT.
- (iv) What will be the order of execution of the constructors, when an object of class SALEPOINT is declared ?
3. (a) Write the definition of a function FixSalary(float Salary[ ], int N) in C++, which should modify each element of the array Salary having N elements, as per the following rules :

| <b>Existing Salary Values</b>   | <b>Required Modification in Value</b> |
|---------------------------------|---------------------------------------|
| If less than 1,00,000           | Add 35% in the existing value         |
| If $>= 1,00,000$ and $< 20,000$ | Add 30% in the existing value         |
| If $>= 2,00,000$                | Add 20% in the existing value         |

- (b) R[10][50] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 8 bytes, find the address of the element R[5][15], if the element R[8][10] is stored at the memory location 45,000.
- (c) Write the definition of a member function DELETE() for a class QUEUE in C++, to remove a product from a dynamically allocated Queue of products considering the following code is already written as a part of the program.

```

struct PRODUCT
{
 int PID; char PNAME[20];
 PRODUCT *Next;
};

class QUEUE
{
 PRODUCT *R, *F;
public:
 QUEUE () {R=NULL; F=NULL; }
 void INSERT();
 void DELETE();
 ~QUEUE ();
};

```

- (d) Write definition for a function DISPMID (int A[ ][5], int R, int C) in C++      3  
 to display the elements of middle row and middle column from a two dimensional array A having R number of rows and C number of columns.

For example, if the content of array is as follows :

|     |     |     |     |     |
|-----|-----|-----|-----|-----|
| 215 | 912 | 516 | 401 | 515 |
| 103 | 901 | 921 | 802 | 601 |
| 285 | 209 | 609 | 360 | 172 |

The function should display the following as output :

103 901 921 802 601

516 921 609

- (e) Convert the following Infix expression to its equivalent Postfix      2  
 expression, showing the stack contents for each step of conversion.

P / (Q-R) \* S + T

P A R - / S \* T +

4. (a) Write function definition of DISP3CHAR( ) in C++ to read the content of a text file KIDINME.TXT, and display all those words, which has three characters in it.

Example :

If the content of the file KIDINME.TXT is as follows :

When I was a small child, I used to play in the garden with my grand mom. Those days were amazingly funful and I remember all the moments of that time.

The function DISP3CHAR( ) should display the following :

**was the mom and all the**

- (b) Write a definition for function ONOFFER( ) in C++ to read each object of a binary file TOYS.DAT, find and display details of those toys, which has status as "ON OFFER". Assume that the file TOYS.DAT is created with the help of objects of class TOYS, which is defined below :

```
class TOYS
{
 int TID;char Toy[20],Status[20]; float MRP;
public:
 void Getinstock()
 {
 cin>>TID;gets(Toy);gets(Status);cin>>MRP;
 }
 void View()
 {
 cout<<TID<<" :" <<Toy<<" :" <<MRP<<" :" <<Status<<endl;
 }
 char *SeeOffer(){return Status;};
};
```

- (c) Find the output of the following C++ code considering that the binary file CLIENT.DAT exists on the hard disk with a data of 1000 clients. 1

```
class CLIENT

{
 int Ccode;char CName[20];

public:
 void Register();void Display();

};

void main()
{
 fstream CFile;

 CFile.open("CLIENT.DAT",ios::binary/ios::in);

 CLIENT C;

 CFile.read((char*)&C, sizeof(C));

 cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl;

 CFile.read((char*)&C, sizeof(C));

 CFile.read((char*)&C, sizeof(C));

 cout<<"Rec:"<<CFile.tellg()/sizeof(C)<<endl;

 CFile.close();
}
```

## SECTION - C

[For all the candidates]

5. (a) Observe the following PARTICIPANTS and EVENTS tables carefully and write the name of the RDBMS operation which will be used to produce the output as shown in RESULT ? Also, find the Degree and Cardinality of the result. 2

PARTICIPANTS

| PNO | NAME              |
|-----|-------------------|
| 1   | Aruanabha Tariban |
| 2   | John Fedricks     |
| 3   | Kanti Desai       |

EVENTS

| EVENTCODE | EVENTNAME    |
|-----------|--------------|
| 1001      | IT Quiz      |
| 1002      | Group Debate |

RESULT

| PNO | NAME              | EVENTCODE | EVENTNAME    |
|-----|-------------------|-----------|--------------|
| 1   | Aruanabha Tariban | 1001      | IT Quiz      |
| 1   | Aruanabha Tariban | 1002      | Group Debate |
| 2   | John Fedricks     | 1001      | IT Quiz      |
| 2   | John Fedricks     | 1002      | Group Debate |
| 3   | Kanti Desai       | 1001      | IT Quiz      |
| 3   | Kanti Desai       | 1002      | Group Debate |

- (b) Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii), which are based on the tables. 6

Table : VEHICLE

| VCODE | VEHICLETYPE   | PERKM |
|-------|---------------|-------|
| V01   | VOLVO BUS     | 150   |
| V02   | AC DELUXE BUS | 125   |
| V03   | ORDINARY BUS  | 80    |
| V05   | SUV           | 30    |
| V04   | CAR           | 18    |

Note : PERKM is Freight Charges per kilometer

Table : TRAVEL

| CNO | CNAME        | TRAVELDATE | KM  | VCODE | NOP |
|-----|--------------|------------|-----|-------|-----|
| 101 | K. Niwal     | 2015-12-13 | 200 | V01   | 32  |
| 103 | Fredrick Sym | 2016-03-21 | 120 | V03   | 45  |
| 105 | Hitesh Jain  | 2016-04-23 | 450 | V02   | 42  |
| 102 | Ravi Anish   | 2016-01-13 | 80  | V02   | 40  |
| 107 | John Malina  | 2015-02-10 | 65  | V04   | 2   |
| 104 | Sahanubhuti  | 2016-01-28 | 90  | V05   | 4   |
| 106 | Ramesh Jaya  | 2016-04-06 | 100 | V01   | 25  |

Note :     • Km is Kilometers travelled  
           • NOP is number of passengers travelled in vehicle

- (i) To display CNO, CNAME, TRAVELDATE from the table TRAVEL in descending order of CNO.
- (ii) To display the CNAME of all the customers from the table TRAVEL who are traveling by vehicle with code V01 or V02.
- (iii) To display the CNO and CNAME of those customers from the table TRAVEL who travelled between '2015-12-31' and '2015-05-01'.
- (iv) To display all the details from table TRAVEL for the customers, who have travel distance more than 120 KM in ascending order of NOP.
- (v) 

```
SELECT COUNT(*), VCODE FROM TRAVEL
 GROUP BY VCODE HAVING COUNT(*) > 1;
```
- (vi) 

```
SELECT DISTINCT VCODE FROM TRAVEL;
```
- (vii) 

```
SELECT A.VCODE, CNAME, VEHICLETYPE
 FROM TRAVEL A, VEHICLE B
 WHERE A.VCODE=B.VCODE AND KM<90;
```
- (viii) 

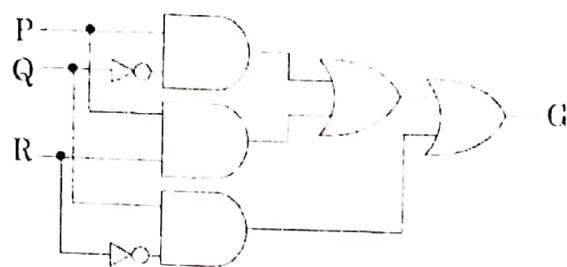
```
SELECT CNAME, KM*PERKM
 FROM TRAVEL A, VEHICLE B
 WHERE A.VCODE=B.VCODE AND A.VCODE='V05';
```

6. (a) Verify the following using Boolean Laws.

2

$$X' + Y'Z = X' \cdot Y' \cdot Z' + X' \cdot Y \cdot Z' + X'Y \cdot Z + X' \cdot Y' \cdot Z + X \cdot Y' \cdot Z$$

- (b) Write the Boolean Expression for the result of the Logic Circuit as shown below :



- (c) Derive a Canonical SOP expression for a Boolean function G, represented by the following truth table : 1

| A | B | C | G (A, B, C) |
|---|---|---|-------------|
| 0 | 0 | 0 | 1           |
| 0 | 0 | 1 | 0           |
| 0 | 1 | 0 | 1           |
| 0 | 1 | 1 | 0           |
| 1 | 0 | 0 | 0           |
| 1 | 0 | 1 | 0           |
| 1 | 1 | 0 | 1           |
| 1 | 1 | 1 | 1           |

- (d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(P, Q, R, S) = \Sigma(0, 4, 5, 8, 9, 10, 11, 12, 13, 15)$$

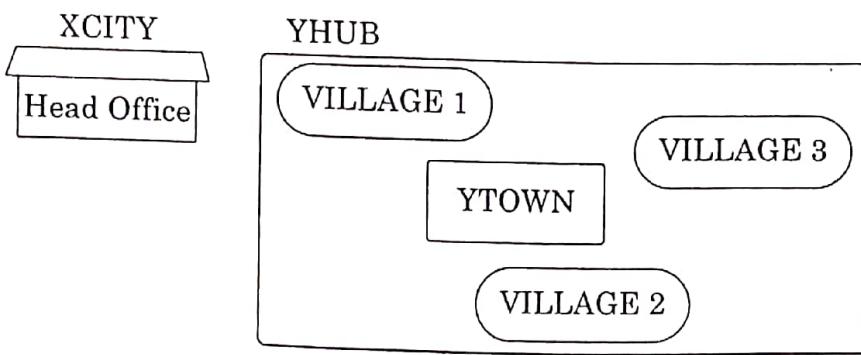
91

21

P.T.O.

7. (a) Differentiate between PAN and LAN types of networks. 1
- (b) Which protocol helps us to transfer files to and from a remote computer ? 1
- (c) Write two advantages of 3G over 2G Mobile Telecommunication Technologies in terms of speed and services ? 1
- (d) Write two characteristics of Web 2.0. *Logs, wikis, video-sharing websites, social net sites.* 1
- (e) What is the basic difference between Computer Worm and Trojan Horse ? 1
- (f) Categorise the following under Client side and Server Side script category ? 1
- (i) Java Script
- (ii) ASP
- (iii) VB Script
- (iv) JSP
- (g) Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge in the society. It is planning to set up its training centers in multiple towns and villages pan India with its head offices in the nearest cities. They have created a model of their network with a city, a town and 3 villages as follows.

As a network consultant, you have to suggest the best network related solutions for their issues/problems raised in (i) to (iv), keeping in mind the distances between various locations and other given parameters.



Shortest distances between various locations :

|                          |        |
|--------------------------|--------|
| VILLAGE 1 to YTOWN       | 2 KM   |
| VILLAGE 2 to YTOWN       | 1.5 KM |
| VILLAGE 3 to YTOWN       | 3 KM   |
| VILLAGE 1 to VILLAGE 2   | 3.5 KM |
| VILLAGE 1 to VILLAGE 3   | 4.5 KM |
| VILLAGE 2 to VILLAGE 3   | 3.5 KM |
| CITY Head Office to YHUB | 30 Km  |

Number of Computers installed at various locations are as follows :

|             |     |
|-------------|-----|
| YTOWN       | 100 |
| VILLAGE 1   | 10  |
| VILLAGE 2   | 15  |
| VILLAGE 3   | 15  |
| CITY OFFICE | 5   |

Note : In Villages, there are community centers, in which one room has been given as training center to this organization to install computers.

The organization has got financial support from the government and top IT companies.

- (i) Suggest the most appropriate location of the SERVER in the YHUB (out of the 4 locations), to get the best and effective connectivity. Justify your answer. 1
- (ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB. 1
- (iii) Which hardware device will you suggest to connect all the computers within each location of YHUB ? 1
- (iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head Office and people at YHUB locations ? 1

alchi Shek  
kumar

Roll No.

R A N V E E R

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

- Please check that this question paper contains **20** 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 minute 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-book during this period.

## COMPUTER SCIENCE

Time allowed : 3 hours

Maximum Marks : 70

### Instructions :

- SECTION A refers to programming language C++.*
- SECTION B refers to programming language Python.*
- SECTION C is compulsory for all*
- Answer either SECTION A or SECTION B.*
- It is compulsory to mention on the page 1 in the answer book whether you are attempting SECTION A or SECTION B.*
- All questions are compulsory within each section.*

## SECTION A

[Only for candidates, who opted for C++]

1. (a) Find the correct identifiers out of the following, which can be used for naming Variable, Constants or Functions in a C++ program : 2  
~~For, while, INT, NeW, delete, 1stName, Add+Subtract, name1~~

- (b) Observe the following program very carefully and write the names of those header file(s), which are essentially needed to compile and execute the following program successfully : 1

```
typedef char STRING[80];
void main()
{
 STRING Txt[] = "We love Peace";
 int Count=0;
 while (Txt[Count]!='\0')
 if (isalpha(Txt[Count]))
 Txt[Count++]= '@';
 else
 Txt[Count++]= '#';
 puts(Txt);
}
```

- (c) Observe the following C++ code very carefully and rewrite it after removing any/all syntactical errors with each correction underlined. 2

Note : Assume all required header files are already being included in the program.

```
#Define float MaxSpeed=60.5;
void main()
{
 int MySpeed
 char Alert='N';
 cin>>MySpeed;
 if(MySpeed>MaxSpeed)
 Alert='Y'; crlf
 cout<<Alert<<endl;
}
```

- (d) Write the output of the following C++ program code : 2

Note : Assume all required header files are already being included in the program.

```
void Location(int &X,int Y=4)
{
 Y+=2;
 X+=Y;
}
void main()
{
 int PX=10,PY=2;
 Location(PY);
 cout<<PX<<" , " <<PY<<endl;
 Location(PX,PY);
 cout<<PX<<" , " <<PY<<endl;
}
```

- (e) Write the output of the following C++ program code : 3

Note : Assume all required header files are already being included in the program.

```
class Eval
{
 char Level;
 int Point;
public:
 Eval(){Level='E';Point=0;}
 void Sink(int L)
 {
 Level-=L;
 }
 void Float(int L)
 {
 Level+=L;
 Point++;
 }
 void Show()
 {
 cout<<Level<<"#"<<Point<<endl;
 }
};
```

```

void main()
{
 Eval E;
 E.Sink(3);
 E.Show();
 E.Float(7);
 E.Show();
 E.Sink(2);
 E.Show();
}

```

- (f) Study the following program and select the possible output(s) from the options (i) to (iv) following it. Also, write the maximum and the minimum values that can be assigned to the variable VAL.

2

Note :

- Assume all required header files are already being included in the program.
- random(n) function generates an integer between 0 and n-1.

```

void main()
{
 randomize();
 int VAL;
 VAL=random(3)+2;
 char GUESS []="ABCDEFGHIJK";
 for (int I=1; I<=VAL; I++)
 {
 for(int J=VAL; J<=7; J++)
 cout<<GUESS[J];
 cout<<endl;
 }
}

```

| (i)     | (ii)   | (iii) | (iv) |
|---------|--------|-------|------|
| BCDEFGH | CDEFGH | EFGH  | FGHI |
| BCDEFGH | CDEFGH | EFGH  | FGHI |

2. (a) What is a copy constructor ? Give a suitable example in C++ to illustrate with its definition within a class and a declaration of an object with the help of it.

2

- (b) Observe the following C++ code and answer the questions (i) and (ii) :

```
class Passenger
{
 long PNR;
 char Name[20];
public:
 Passenger() //Function 1
 { cout<<"Ready" << endl; }

 void Book(long P,char N[]) //Function 2
 { PNR = P; strcpy(Name, N); }

 void Print() //Function 3
 { cout<<PNR << Name << endl; }

 ~Passenger() //Function 4
 { cout<<"Booking cancelled!" << endl; }
};
```

- (i) Fill in the blank statements in Line 1 and Line 2 to execute Function 2 and Function 3 respectively in the following code :

1

```
void main()
{
 Passenger P;
 _____ //Line 1
 _____ //Line 2
} //Ends here
```

- (ii) Which function will be executed at // Ends here ? What is this function referred as ?

1

- (c) Write the definition of a class Photo in C++ with following description : 4

**Private Members**

- Pno //Data member for Photo Number (an integer)
- Category //Data member for Photo Category (a string)
- Exhibit //Data member for Exhibition Gallery (a string)
- FixExhibit //A member function to assign  
//Exhibition Gallery as per Category  
//as shown in the following table

| Category | Exhibit  |
|----------|----------|
| Antique  | Zaveri   |
| Modern   | Johnsen  |
| Classic  | Terenida |

**Public Members**

- Register() //A function to allow user to enter values  
//Pno, Category and call FixExhibit() function
- ViewAll() //A function to display all the data members

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

```
class Interior
{
 int OrderId;
 char Address[20];
protected:
 float Advance;
public:
 Interior();
 void Book(); void View();
};
```

```

class Painting:public Interior
{
 int WallArea,ColorCode;
protected:
 char Type;
public:
 Painting();
 void PBook();
 void PView();
};

class Billing : public Painting
{
 float Charges;
 void Calculate();
public:
 Billing();
 void Bill();
 void BillPrint();
};

```

- (i) Which type of Inheritance out of the following is illustrated in the above example ?
  - Single Level Inheritance
  - Multi Level Inheritance
  - Multiple Inheritance
- (ii) Write the names of all the data members, which are directly accessible from the member functions of class Painting.
- (iii) Write the names of all the member functions, which are directly accessible from an object of class Billing.
- (iv) What will be the order of execution of the constructors, when an object of class Billing is declared ?

3. (a) Write the definition of a function Change(int P[], int N) in C++, which should change all the multiples of 10 in the array to 10 and rest of the elements as 1. For example, if an array of 10 integers is as follows :

| P[0] | P[1] | P[2] | P[3] | P[4] | P[5] | P[6] | P[7] | P[8] | P[9] |
|------|------|------|------|------|------|------|------|------|------|
| 100  | 43   | 20   | 56   | 32   | 91   | 80   | 40   | 45   | 21   |

2

After executing the function, the array content should be changed as follows :

| P[0] | P[1] | P[2] | P[3] | P[4] | P[5] | P[6] | P[7] | P[8] | P[9] |
|------|------|------|------|------|------|------|------|------|------|
| 10   | 1    | 10   | 1    | 1    | 1    | 10   | 10   | 1    | 1    |

- (b) A two dimensional array ARR[50][20] is stored in the memory along the row with each of its elements occupying 4 bytes. Find the address of the element ARR[30][10], if the element ARR[10][5] is stored at the memory location 15000.
- (c) Write the definition of a member function PUSH() in C++, to add a new book in a dynamic stack of BOOKS considering the following code is already included in the program :

3

```

struct BOOKS
{
 char ISBN[20], TITLE[80];
 BOOKS *Link;
};

class STACK
{
 BOOKS *Top;
}

public:
 STACK(){Top=NULL;}
 void PUSH();
 void POP();
 ~STACK();
};

```

4

- (d) Write a function REVROW(int P[ ][5],int N,int M) in C++ to display the content of a two dimensional array, with each row content in reverse order.

3

For example, if the content of array is as follows :

|    |    |    |    |    |
|----|----|----|----|----|
| 15 | 12 | 56 | 45 | 51 |
| 13 | 91 | 92 | 87 | 63 |
| 11 | 23 | 61 | 46 | 81 |

The function should display output as

51 45 56 12 15  
63 87 92 91 13  
81 46 61 23 81

- (e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion :

2

$U * V + R / (S - T)$

4. (a) Write function definition for TOWER( ) in C++ to read the content of a text file WRITEUP.TXT, count the presence of word TOWER and display the number of occurrences of this word.

2

Note :

- The word TOWER should be an independent word
- Ignore type cases (i.e. lower/upper case)

Example :

If the content of the file WRITEUP.TXT is as follows :

Tower of hanoi is an interesting problem. Mobile phone tower is away from here. Views from EIFFEL TOWER are amazing.

The function TOWER( ) should display the following :

3

- (b) Write a definition for function COSTLY( ) in C++ to read each record of a binary file GIFTS.DAT, find and display those items, which are priced more than 2000. Assume that the file GIFTS.DAT is created with the help of objects of class GIFTS, which is defined below : 3

```
class GIFTS
{
 int CODE; char ITEM[20]; float PRICE;
public:
 void Procure()
 {
 cin>>CODE; gets (ITEM); cin>>PRICE;
 }
 void View()
 {
 cout<<CODE<<" :" <<ITEM<<" :" <<PRICE<<endl;
 }
 float GetPrice() {return PRICE;}.
};
```

- (c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members : 1

```
class MEMBER
{
 int Mno; char Name[20];
public:
 void In(); void Out();
};

void main()
{
 fstream MF;
 MF.open("MEMBER.DAT", ios::binary | ios::in);
 MEMBER M;
 MF.read((char*)&M, sizeof(M));
 MF.read((char*)&M, sizeof(M));
 MF.read((char*)&M, sizeof(M));
 int POSITION= MF.tellg()/sizeof(M);
 cout<<"PRESENT RECORD :" <<POSITION << endl;
 MF.close();
}
```

## **SECTION C**

### **[For all candidates]**

5. (a) Observe the following table carefully and write the names of the most appropriate columns, which can be considered as (i) candidate keys and (ii) primary key :

2

| Code | Item                   | Qty | Price | Transaction Date |
|------|------------------------|-----|-------|------------------|
| 1001 | Plastic Folder 14"     | 100 | 3400  | 2014-12-14       |
| 1004 | Pen Stand Standard     | 200 | 4500  | 2015-01-31       |
| 1005 | Stapler Mini           | 250 | 1200  | 2015-02-28       |
| 1009 | Punching Machine Small | 200 | 1400  | 2015-03-12       |
| 1003 | Stapler Big            | 100 | 1500  | 2015-02-02       |

91

15

P.T.O.

- (b) Consider the following DEPT and EMPLOYEE tables. Write SQL queries for (i) to (iv) and find outputs for SQL queries (v) to (viii). 6

**Table : DEPT**

| DCODE | DEPARTMENT     | LOCATION |
|-------|----------------|----------|
| D01   | INFRASTRUCTURE | DELHI    |
| D02   | MARKETING      | DELHI    |
| D03   | MEDIA          | MUMBAI   |
| D05   | FINANCE        | KOLKATA  |
| D04   | HUMAN RESOURCE | MUMBAI   |

**Table : EMPLOYEE**

| ENO  | NAME         | DOJ        | DOB        | GENDER | DCODE |
|------|--------------|------------|------------|--------|-------|
| 1001 | George K     | 2013-09-02 | 1991-09-01 | MALE   | D01   |
| 1002 | Ryma Sen     | 2012-12-11 | 1990-12-15 | FEMALE | D03   |
| 1003 | Mohitesh     | 2013-02-03 | 1987-09-04 | MALE   | D05   |
| 1007 | Anil Jha     | 2014-01-17 | 1984-10-19 | MALE   | D04   |
| 1004 | Manila Sahai | 2012-12-09 | 1986-11-14 | FEMALE | D01   |
| 1005 | R SAHAY      | 2013-11-18 | 1987-03-31 | MALE   | D02   |
| 1006 | Jaya Priya   | 2014-06-09 | 1985-06-23 | FEMALE | D05   |

Note : DOJ refers to date of joining and DOB refers to date of Birth of employees.

- (i) To display Eno, Name, Gender from the table EMPLOYEE in ascending order of Eno.
- (ii) To display the Name of all the MALE employees from the table EMPLOYEE.

- (iii) To display the Eno and Name of those employees from the table EMPLOYEE who are born between '1987-01-01' and '1991-12-01'.
- (iv) To count and display FEMALE employees who have joined after '1986-01-01'.
- (v) 

```
SELECT COUNT(*),DCODE FROM EMPLOYEE
GROUP BY DCODE HAVING COUNT(*)>1;
```
- (vi) 

```
SELECT DISTINCT DEPARTMENT FROM DEPT;
```
- (vii) 

```
SELECT NAME,DEPARTMENT FROM EMPLOYEE E,DEPT D
WHERE E.DCODE=D.DCODE AND ENO<1003;
```
- (viii) 

```
SELECT MAX(DOJ), MIN(DOB) FROM EMPLOYEE;
```

6. (a) Verify the following using Boolean Laws : 2

$$U' + V = U'V' + U' \cdot V + U \cdot V$$

(b) Draw the Logic Circuit for the following Boolean Expression : 2

$$(X' + Y) \cdot Z + W'$$

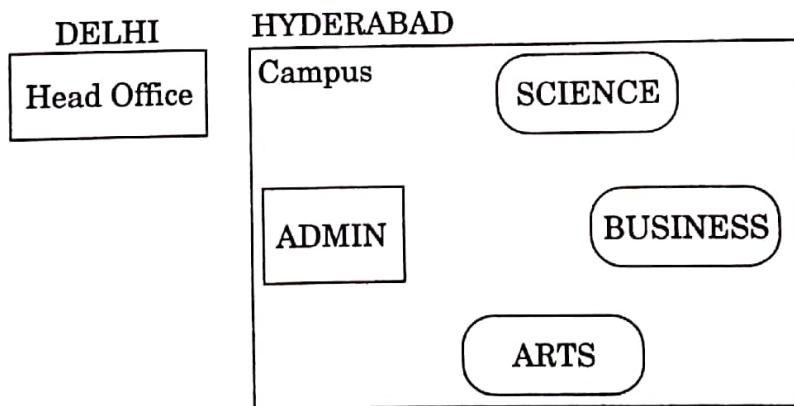
(c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table : 1

| P | Q | R | F(P,Q,R) |
|---|---|---|----------|
| 0 | 0 | 0 | 1        |
| 0 | 0 | 1 | 0        |
| 0 | 1 | 0 | 0        |
| 0 | 1 | 1 | 1        |
| 1 | 0 | 0 | 1        |
| 1 | 0 | 1 | 0        |
| 1 | 1 | 0 | 0        |
| 1 | 1 | 1 | 1        |

(d) Reduce the following Boolean Expression to its simplest form using K-Map : 3

$$F(X,Y,Z,W) = \Sigma(0,1,4,5,6,7,8,9,11,15)$$

7. (a) Illustrate the layout for connecting 5 computers in a Bus and a Star topology of Networks. 1
- (b) What kind of data gets stored in cookies and how is it useful ? 1
- (c) Differentiate between packet switching over message switching ? 1
- (d) Out of the following, which is the fastest (i) wired and (ii) wireless medium of communication ? 1
- Infrared, Coaxial Cable, Ethernet Cable, Microwave, Optical Fiber
- (e) What is Trojan Horse ? 1
- (f) Out of the following, which all comes under cyber crime ? 1
- (i) Stealing away a brand new hard disk from a showroom.
  - (ii) Getting in someone's social networking account without his consent and posting on his behalf.
  - (iii) Secretly copying data from server of an organization and selling it to the other organization.
  - (iv) Looking at online activities of a friends blog.
- (g) Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings - ADMIN, SCIENCE, BUSINESS and ARTS. You as a network expert have to suggest the best network related solutions for their problems raised in (i) to (iv), keeping in mind the distances between the buildings and other given parameters.



**Shortest distances between various buildings :**

|                                       |         |
|---------------------------------------|---------|
| ADMIN to SCIENCE                      | 65 m    |
| ADMIN to BUSINESS                     | 100 m   |
| ADMIN to ARTS                         | 60 m    |
| SCIENCE to BUSINESS                   | 75 m    |
| SCIENCE to ARTS                       | 60 m    |
| BUSINESS to ARTS                      | 50 m    |
| DELHI Head Office to HYDERABAD Campus | 1600 Km |

**Number of computers installed at various buildings are as follows :**

|                   |     |
|-------------------|-----|
| ADMIN             | 100 |
| SCIENCE           | 85  |
| BUSINESS          | 40  |
| ARTS              | 12  |
| DELHI Head Office | 20  |

- (i) Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum number of computers. Justify your answer. 1
- (ii) Suggest and draw the cable layout to efficiently connect various buildings within the HYDERABAD campus for connecting the computers. 1
- (iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus ? 1

(iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the Admin Office of HYDERABAD campus and DELHI Head Office ?

- (i) E-mail
- (ii) Text Chat
- (iii) Video Conferencing
- (iv) Cable TV !

— — —

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HATDHYSC/G

2013-14abhishek**Series OSR****Code No. 91**

Roll No.

|   |   |   |   |   |   |   |
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| R | A | N | V | E | E | R |
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Candidates must write the Code on the title page of the answer-book.

- Please check that this question paper contains **16** 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-book 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 call by reference and call by value with respect to memory allocation ? Give a suitable example to illustrate using C++ code.

2

91

1

P.T.O.

- (b) Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run it in a C++ compiler:

```

void main()
{
 char CH, STR[20];
 cin>>STR;
 CH=toupper(STR[0]);
 cout<<STR<<"starts with"<<CH<<endl;
}

```

- (c) Rewrite the following C++ code after removing all the syntax error(s), if present in the code. Make sure that you underline each correction done by you in the code.

Important Note:

- Assume that all the required header files are already included, which are essential to run this code.
- The corrections made by you do not change the logic of the program.

```

typedef char [80] STR;
void main()
{
 Txt STR;
 gets(Txt);
 cout<<Txt[0]<<'t<<Txt[2];
 cout<<Txt<<endl;
}

```

- (d) Obtain the output from the following C++ program as expected to appear on the screen after its execution:

2

Important Note :

- All the desired header files are already included in the code, which are required to run the code.

```
void main()
{
 char *Text="AJANTA";
 int *P, Num[]={1,5,7,9};
 P=Num;
 cout<<*P<<Text<<endl;
 Text++;
 P++;
 cout<<*P<<Text<<endl;
}
```

- (e) Obtain the output of the following C++ program, which will appear on the screen after its execution.

3

Important Note :

- All the desired header files are already included in the code, which are required to run the code.

```
class Game
{
 int Level, Score;
 char Type;
public:
 Game(char GType='P')
 {Level=1;Score=0;Type=GType;}
 void Play(int GS);
 void Change();
 void Show()
 {
 cout<<Type<<"@"<<Level<<endl;
 cout<<Score<<endl;
 }
};
```

P.T.O.

```

void main()
{
 Game A('G'), B;
 B.Show();
 A.Play(11);
 A.Change();
 B.Play(25);
 A.Show();
 B.Show();
}
void Game::Change()
{
 Type=(Type=='P')?'G':'P';
}
void Game::play(int GS)
{
 Score+=GS;
 if(Score>=30)
 Level=3;
 else if(Score>=20)
 Level=2;
 else
 Level=1;
}

```

- (f) Read the following C++ code carefully and find out, which out of the given options (i) to (iv) are the expected correct output(s) of it. Also, write the maximum and minimum value that can be assigned to the variable Taker used in the code :

2

```

void main()
{
 int GuessMe[4]={100, 50, 200, 20};
 int Taker=random(2)+2;
 for (int Chance=0;Chance<Taker;Chance++)
 cout<<GuessMe[Chance]<<"#";
}
(i) 100#
(ii) 50#200#
(iii) 200#50#200#
(iv) 100#50

```

(a) What is function overloading ? Write an example using C++ to illustrate the concept of function overloading. 2

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

```
class Hospital
{
 int Pno, Ono;
public:
 Hospital(int PN); //Function 1
 Hospital(); //Function 2
 Hospital(Hospital &H); //Function 3
 void In(); //Function 4
 void Disp(); //Function 5
};

void main()
{
 Hospital H(20); //Statement 1
}
```

(i) Which of the functions out of Function 1, 2, 3, 4 or 5 will get executed when the Statement 1 is executed in the above code ?

(ii) Write a statement to declare a new object G with reference to already existing object H using Function 3.

(c) Define a class Tourist in C++ with the following specification : 4

#### Data Members

- CNo - to store Cab No
- CType - to store a character 'A', 'B', or 'C' as City Type
- PerKM - to store per Kilo Meter charges
- Distance - to store Distance travelled (in KM)

### Member Functions.

- A constructor function to initialize CType as 'A' and CNo as '0000'
- A function CityCharges( ) to assign PerKM as per the following table :

| CType | PerKM |
|-------|-------|
| A     | 20    |
| B     | 18    |
| C     | 15    |

- A function RegisterCab() to allow administrator to enter the values for CNo and CType. Also, this function should call CityCharges() to assign PerKM Charges.
- A function Display() to allow user to enter the value of Distance and display CNo, CType, PerKM, PerKM\*Distance (as Amount) on screen.

(d) Consider the following C++ code and answer the questions from (i) to (iv) :

```
class University
{
 long Id;
 char City[20];
protected:
 char Country[20];
public:
 University();
 void Register();
 void Display();
};
```

```

class Department: private University
{
 long DCode[10];
 char NOD[20];
protected:
 double Budget;
public:
 Department();
 void Enter();
 void Show();
};

class Student: public Department University
{
 long RollNo;
 char Name[20];
public:
 Student();
 void Enrol();
 void View();
};

```

- (i) Which type of Inheritance is shown in the above example ?
- (ii) Write the names of those member functions, which are directly accessed from the objects of class Student.
- (iii) Write the names of those data members, which can be directly accessible from the member functions of class Student.
- (iv) Is it possible to directly call function Display() of class University from an object of class Department ?

(Answer as Yes or No).

3. (a) Write code for a function void EvenOdd(int T[], int C) in C++, to add 1 in all the odd values and 2 in all the even values of the array T.

Example: If the original content of the array T is

| T[0] | T[1] | T[2] | T[3] | T[4] |
|------|------|------|------|------|
| 35   | 12   | 16   | 69   | 26   |

The modified content will be:

| T[0] | T[1] | T[2] | T[3] | T[4] |
|------|------|------|------|------|
| 36   | 14   | 18   | 70   | 28   |

- (b) An array A[20][30] is stored along the row in the memory with each element requiring 4 bytes of storage. If the base address of array A is 32000, find out the location of A[15][10]. Also, find the total number of elements present in this array.

- (c) Write a user-defined function AddEnd2(int A[][], int N, int M) in C++ to find and display the sum of all the values, which are ending with 2 (i.e., units place is 2).  
For example if the content of array is:

|    |    |    |
|----|----|----|
| 22 | 16 | 12 |
| 19 | 5  | 2  |

The output should be  
36

- (d) Evaluate the following postfix expression. Show the status of stack after execution of each operation separately:  
T, E, NOT, AND, OR, F, AND

- (e) Write a function PUSHBOOK() in C++ to perform insert operation on a Dynamic Stack, which contains Book\_no and Book\_Title. Consider the following definition of NODE, while writing your C++ code

```
struct NODE
{
 int Book_No;
 char Book_Title[20];
 NODE *Next;
};
```

4. (a) Fill in the blanks marked as Statement 1 and Statement 2, in the program segment given below with appropriate functions for the required task.

1

```
class Agency
{
 int ANo; //Agent Code
 char AName[20]; //Agent Name
 char Mobile[12]; //Agent Mobile
public:
 void Enter(); //Function to enter details of agent
 void Disp(); //Function to display details of agent
 int RAno() {return ANo;}
 void UpdateMobile() //Function to update Mobile
 {
 cout<<"Updated Mobile:";
 gets(Mobile);
 }
};

void AgentUpdate()
{
 fstream F;
 F.open("AGENT.DAT",ios::binary|ios::in|ios::out);
 int Updt=0;
 int UAno;
 cout<<"Ano (Agent No - to update Mobile):";
 cin>>UAno;
 Agency A;
 while (!Updt && F.read((char*)&A,sizeof(A)))
 {
 if (A.RAno()==UAno)
 {
 //Statement 1: To call the function to update Mobile No.
 _____;
 }
 }
}
```

2  
26/2

```

//Statement 2: To reposition file pointer to re-write
the updated object back in the file
;

F.write((char*)&A, sizeof(A));
Updt++;
}

if (Updt)
 cout<<"Mobile Updated for Agent"<<UAno<<endl;
else
 cout<<"Agent not in the Agency"<<endl;
F.close();
}

```

- (b) Write a function AECount() in C++, which should read each character of a text file NOTES.TXT, should count and display the occurrence of alphabets A and E (including small cases a and e too).

**Example:**

If the file content is as follows:

CBSE enhanced its  
CCE guidelines further.

The AECount() function should display the output as  
A:1  
E:7

- (c) Assuming the class TOYS as declared below, write a function in C++ to read the objects of TOYS from binary file TOYS.DAT and display those details of those TOYS, which are meant for children of AgeRange "5 to 8".

3

```
class TOYS
{
 int ToyCode;
 char ToyName[10];
 char AgeRange;
public:
 void Enter()
 {
 cin>>ToyCode;
 gets(ToyName);
 gets(AgeRange);
 }
 void Display()
 {
 cout<<ToyCode<<":"<<ToyName<<endl;
 cout<<AgeRange<<endl;
 }
 char* WhatAge() {return AgeRange;}
};
```

5. (a) Explain the concept of Cartesian Product between two tables, with the help of appropriate example.

**NOTE :** Answer the questions (b) and (c) on the basis of the following tables **SHOPPE** and **ACCESSORIES**.

**Table : SHOPPE**

| <b>Id</b> | <b>SName</b>       | <b>Area</b> |
|-----------|--------------------|-------------|
| S001      | ABC Computronics   | CP          |
| S002      | All Infotech Media | GK II       |
| S003      | Tech Shoppe        | CP          |
| S004      | Geeks Techno Soft  | Nehru Place |
| S005      | Hitech Tech Store  | Nehru Place |

**Table : ACCESSORIES**

| <b>No</b> | <b>Name</b>  | <b>Price</b> | <b>Id</b> |
|-----------|--------------|--------------|-----------|
| A01       | Mother Board | 12000        | S01       |
| A02       | Hard Disk    | 5000         | S01       |
| A03       | Keyboard     | 500          | S02       |
| A04       | Mouse        | 300          | S01       |
| A05       | Mother Board | 13000        | S02       |
| A06       | Keyboard     | 400          | S03       |
| A07       | LCD          | 6000         | S04       |
| T08       | LCD          | 5500         | S05       |
| T09       | Mouse        | 350          | S05       |
| T10       | Hard Disk    | 4500         | S03       |

(b) Write the SQL queries :

4

- (i) To display Name and Price of all the Accessories in ascending order of their Price.
- (ii) To display Id and SName of all Shoppe located in Nehru Place.
- (iii) To display Minimum and Maximum Price of each Name of Accessories.
- (iv) To display Name, Price of all Accessories and their respective SName where they are available.

(c) Write the output of the following SQL commands :

2

- (i) `SELECT DISTINCT NAME FROM ACCESSORIES WHERE PRICE >= 5000;`
- (ii) `SELECT AREA, COUNT(*) FROM SHOPPE GROUP BY AREA;`
- (iii) `SELECT COUNT(DISTINCT AREA) FROM SHOPPE;`
- (iv) `SELECT NAME, PRICE*0.05 DISCOUNT FROM ACCESSORIES WHERE SNO IN ('S02', 'S03');`

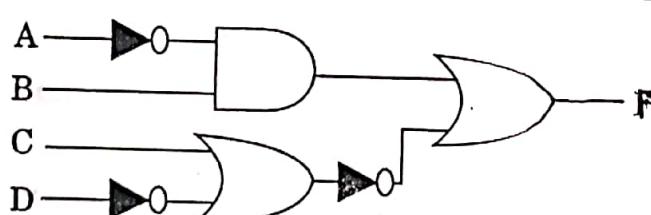
6. (a) Name the law shown below and verify it using a truth table.

2

$$X+X' \cdot Y = X+Y$$

(b) Obtain the Boolean Expression for the logic circuit shown below :

2



- (c) Write the Product of Sum form of the function  $F(X, Y, Z)$  for the following truth table representation of  $F$ :

| X | Y | Z | 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 |

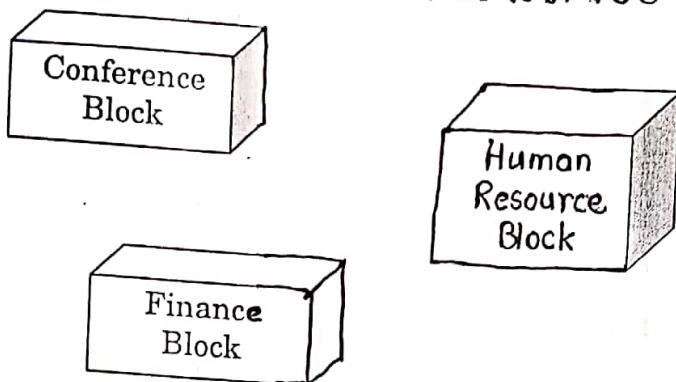
- (d) Obtain the minimal form for the following Boolean expression using Karnaugh's Map:

$$F(A, B, C, D) = \sum(1, 3, 4, 5, 6, 7, 12, 13)$$

7. (a) Write two characteristics of Wi-Fi. 1
- (b) What is the difference between E-mail and Chat? 1
- (c) Expand the following: 1
- GSM
  - GPRS
- (d) Which type of network (out of LAN, PAN and MAN) is formed, when you connect two mobiles using Bluetooth to transfer a video? 1

- (e) Tech Up Corporation (TUC) is a professional consultancy company. The company is planning to set up their new offices in India with its hub at Hyderabad. As a network adviser, you have to understand their requirement and suggest to them the best available solutions. Their queries are mentioned as (i) to (iv) below.

### Physical Locations of the blocks of TUC



### Block to Block distances (in Mtrs.)

| Block (From)   | Block (To) | Distance |
|----------------|------------|----------|
| Human Resource | Conference | 60       |
| Human Resource | Finance    | 120      |
| Conference     | Finance    | 80       |

### Expected Number of Computers to be installed in each block

| Block          | Computers |
|----------------|-----------|
| Human Resource | 125       |
| Finance        | 25        |
| Conference     | 60        |

- (i) What will the most appropriate block, where TUC should plan to install their server ?
- (ii) Draw a block to block cable layout to connect all the buildings in the most appropriate manner for efficient communication.
- (iii) What will be the best possible connectivity out of the following, you will suggest to connect the new setup of offices in Bangalore with its London based office ?
- Infrared
  - Satellite Link
  - Ethernet Cable
- (iv) Which of the following devices will be suggested by you to connect each computer in each of the buildings ?
- Gateway
  - Switch
  - Modem
- (f) Write names of any two popular Open Source Software, which are used as Operating Systems.
- (g) Write any two important characteristics of Cloud Computing.

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|   |   |   |   |   |   |   |
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| R | A | N | V | E | E | R |
|---|---|---|---|---|---|---|

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

- 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 students will read the question paper only and will not write any answer on the answer-book during this period.

## COMPUTER SCIENCE

Time allowed : 3 hours

Maximum Marks : 70

**Instructions :**

- (i) All question are compulsory.
  - (ii) Programming Language : C++
1. (a) What is the benefit of using default parameter/argument in a function ? Give a suitable example to illustrate it using C++ code. 2
  - (b) Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run it in a C++ compiler : 1

```

void main()
{
 float Area, Side;
 cin>>Area;
 Side=sqrt(Area);
 cout<<"One Side of the Square:"<<Side<<endl;
}

```

- (c) Observe the following C++ code carefully and rewrite the same after removing all the syntax error(s) present in the code. Ensure that you underline each correction in the code.

2

**Important Note :**

- All the desired header files are already included, which are required to run the code.
- Correction should not change the logic of the program.

```
#define Change(A,B) 2*A+B;
void main()
{
 Float X,Y,F;
 cin>>X>>Y;
 F=Change[X,Y];
 cout<<"Result:"<<F<endl;
}
```

- (d) Observe the following C++ code carefully and obtain the output, which will appear on the screen after execution of it.

2

**Important Note :**

- All the desired header files are already included in the code, which are required to run the code.

```
void main()
{
 char *Text="AJANTA";
 int *P, Num[]={1,5,7,9};
 P=Num;
 cout<<*P<<Text<<endl;
 Text++;
 P++;
 cout<<*P<<Text<<endl;
}
```

/ AJANTA  
5 JANTA

- (e) Observe the following C++ code carefully and obtain the output, which will appear on the screen after execution of it. 3

```
#include <iostream.h>
class Mausam
{
 int City, Temp, Humidity;
public:
 Mausam(int C=1) {City=C; Temp=10; Humidity=63;}
 void Sun(int T) {Temp+=T;}
 void Rain(int H) {Humidity+=H;}
 void CheckOut()
 {
 cout<<City<<" : "<<Temp<<" & "<<Humidity<<"%"<<endl;
 }
};

void main()
{
 Mausam M,N(2);
 M.Sun(5);
 M.CheckOut();
 N.Rain(10);
 N.Sun(2);
 N.CheckOut();
 M.Rain(15);
 M.CheckOut();
}
```

- (f) Based on the following C++ code, find out the expected correct output(s) from the options (i) to (iv). Also, find out the minimum and the maximum value that can be assigned to the variable **Guess** used in the code at the time when value of **Turn** is 3. 2

```
void main()
{
 char Result[][10] = {"GOLD", "SILVER", "BRONZE"};
 int Getit=9, Guess;
 for (int Turn=1; Turn<4; Turn++)
 {
 Guess=random(Turn);
 cout<<Getit-Guess<<Result[Guess]<<"*";
 }
}
(i) 9GOLD*9GOLD*8SILVER*
(ii) 9GOLD*7BRONZE*8GOLD*
(iii) 9GOLD*8SILVER*9GOLD*
(iv) 9GOLD*8SILVER*8GOLD*
```

2. (a) Write any two similarities between Constructors and Destructors. Write the function headers for constructor and destructor of a class **Flight**. 2

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

```
class Race
{
 int CarNo, Track;
public:
 Race(); //Function 1
 Race(int CN); //Function 2
 Race(Race &R); //Function 3
 void Register(); //Function 4
 void Drive(); //Function 5
};

void main()
{
 Race R;
 :
}
```

- (i) Out of the following, which of the options is correct for calling Function 2 ?  
Option 1 - Race T(30);  
Option 2 - Race U(R);
- (ii) Name the feature of Object Oriented Programming, which is illustrated by Function 1, Function 2 and Function 3 combined together.
- (c) Define a class Bus in C++ with the following specifications : 4

**Data Members**

- Busno – to store Bus No
- From – to store Place name of origin
- To – to store Place name of destination
- Type – to store Bus Type such as 'O' for ordinary
- Distance – to store the Distance in Kilometers
- Fare – to store the Bus Fare

**Member Functions**

- A constructor function to initialize Type as 'O' and Freight as 500
- A function CalcFare() to calculate Fare as per the following criteria:

| Type | Fare        |
|------|-------------|
| 'O'  | 15*Distance |
| 'E'  | 20*Distance |
| 'L'  | 24*Distance |

- A function **Allocate()** to allow user to enter values for Busno, From, To, Type and Distance. Also, this function should call **CalcFare()** to calculate Fare.
- A function **Show()** to display the content of all the data members on screen.

- (d) Consider the following C++ code and answer the questions from (i) to (iv):

```
class Personal
{
 int Class, Rno;
 char Section;
protected:
 char Name[20];
public:
 Personal();
 void Pentry();
 void Pdisplay();
};

class Marks: private Personal
{
 float M[5];
protected:
 char Grade[5];
public:
 Marks();
 void Mentry();
 void Mdisplay();
};

class Result: public Marks
{
 float Total, Agg;
public:
 char FinalGrade, Comments[20];
 Result();
 void Rcalculate();
 void Rdisplay();
};
```

- (i) Which type of Inheritance is shown in the above example ?
- (ii) Write the names of those data members, which can be directly accessed from the objects of class Result.
- (iii) Write the names of those member functions, which can be directly accessed from the objects of class Result.
- (iv) Write the names of those data members, which can be directly accessed from the `Mentry()` function of class Marks.
3. (a) Write code for a function `void ChangeOver(int P[], int N)` in C++, which re-positions all the elements of the array by shifting each of them to the next position and by shifting the last element to the first position. 3

For example: If the content of the array is

| 0  | 1  | 2  | 3  | 4  |
|----|----|----|----|----|
| 12 | 15 | 17 | 13 | 21 |

The changed content will be:

| 0  | 1  | 2  | 3  | 4  |
|----|----|----|----|----|
| 21 | 12 | 15 | 17 | 13 |

- (b) An array `T[15][10]` is stored along the row in the memory with each element requiring 8 bytes of storage. If the base address of array `T` is 14000, find out the location of `T[10][7]`. 3

- (c) Write a user-defined function  
`DispTen(int A[][][4], int N, int M)`  
 in C++ to find and display all the numbers, which are divisible by 10. For example if the content of array is : 2

|    |    |    |
|----|----|----|
| 12 | 20 | 13 |
| 2  | 10 | 30 |

The output should be

20 10 30

- (d) Evaluate the following postfix expression. Show the status of stack after execution of each operation:

5, 2, \*, 50, 5, /, 5, -, +

2

- (e) Write a function QDELETE() in C++ to perform delete operation on a Linked Queue, which contains Passenger no and Passenger name. Consider the following definition of node in the code.

```
struct node
{
 long int Pno;
 char Pname[20];
 node *Link;
};
```

4

4. (a) Fill in the blanks marked as Statement 1 and Statement 2, in the program segment given below with appropriate functions for the required task.

1

```
class Club
{
 long int MNo; //Member Number
 char MName[20]; //Member Name
 char Email[30]; //Email of Member

public:
 void Register(); //Function to register member
 void Disp(); //Function to display details
 void ChangeEmail(); //Function to change Email
 {
 cout<<"Enter Changed Email:" ;
 cin>>Email;
 }
 long int GetMno(){return MNo; }
};
```

```

void ModifyData()
{
 fstream File;
 File.open("CLUB.DAT",ios::binary|ios::in|ios::out);
 int Modify=0,Position;
 long int ModiMno;
 cout<<"Mno - whose email required to be modified:";
 cin>>ModiMno;
 Club CL;
 while (!Modify && File.read((char*)&CL,sizeof(CL)))
 {
 if (CL.GetMno()==ModiMno)
 {
 CL.ChangeEmail();
 Position=File.tellg()- sizeof(CL);
 //Statement 1:To place file pointer to the required position
 _____;
 //statement 2:To write the object CL on to the binary file
 _____;
 Modify++;
 }
 }
 if (Modify)
 cout<<"Email Changed... "<<endl;
 else
 cout<<"Member not found... "<<endl;
 File.close();
}

```

- (b) Write a function CountYouMe () in C++ which reads the contents of a text file **story.txt** and counts the words **You** and **Me** (not case sensitive).

2

For example, if the file contains:

You are my best friend.  
You and me make a good team.

The function should display the output as

Count for You: 2  
Count for Me: 1

- (c) Assuming the class ANTIQUE as declared below, write a function in C++ to read the objects of ANTIQUE from binary file **ANTIQUE.DAT** and display those antique items, which are priced between 10000 and 15000.

3

```
class ANTIQUE
{
 int ANO;
 char Aname[10];
 float Price;
public:
 void BUY(){cin>>ANO;gets(Aname);cin>>Price;}
 void SHOW()
 {
 cout<<ANO<<endl;
 cout<<Aname<<endl;
 cout<<Price<<endl;
 }
 float GetPrice(){return Price;}
};
```

5. (a) Explain the concept of candidate keys with the help of an appropriate example.

2

**NOTE :**

Write SQL queries for (b) to (g) and write the outputs for the SQL queries mentioned shown in (h1) to (h4) parts on the basis of tables **PRODUCTS** and **SUPPLIERS**

Table: **PRODUCTS**

| PID | PNAME              | QTY | PRICE | COMPANY     | SUPCODE |
|-----|--------------------|-----|-------|-------------|---------|
| 101 | DIGITAL CAMERA 14X | 120 | 12000 | RENIX       | S01     |
| 102 | DIGITAL PAD 11i    | 100 | 22000 | DIGI POP    | S02     |
| 104 | PEN DRIVE 16 GB    | 500 | 1100  | STOREKING   | S01     |
| 106 | LED SCREEN 32      | 70  | 28000 | DISPEXPERTS | S02     |
| 105 | CAR GPS SYSTEM     | 60  | 12000 | MOVEON      | S03     |

Table: **SUPPLIERS**

| SUPCODE | SNAME            | CITY    |
|---------|------------------|---------|
| S01     | GET ALL INC      | KOLKATA |
| S03     | EASY MARKET CORP | DELHI   |
| S02     | DIGI BUSY GROUP  | CHENNAI |

- (b) To display the details of all the products in ascending order of product names (i.e. PNAME). 1
- (c) To display product name and price of all those products, whose price is in the range of 10000 and 15000 (both values inclusive). 1

- (d) To display the number of products, which are supplied by each supplier. i.e., the expected output should be:

S01 2  
S02 2  
S03 1

1

- (e) To display the price, product name and quantity (i.e., qty) of those products which have quantity more than 100.

1

- (f) To display the names of those suppliers, who are either from DELHI or from CHENNAI.

1

- (g) To display the name of the companies and the name of the products in descending order of company names.

1

- (h) Obtain the outputs of the following SQL queries based on the data given in tables PRODUCTS and SUPPLIERS above.

2

(h1) SELECT DISTINCT SUPCODE FROM PRODUCTS;

(h2) SELECT MAX(PRICE), MIN(PRICE) FROM PRODUCTS;

(h3) SELECT PRICE\*QTY AMOUNT  
FROM PRODUCTS WHERE PID=104;

(h4) SELECT PNAME, SNAME  
FROM PRODUCTS P, SUPPLIERS S  
WHERE P.SUPCODE=S.SUPCODE AND QTY>100;

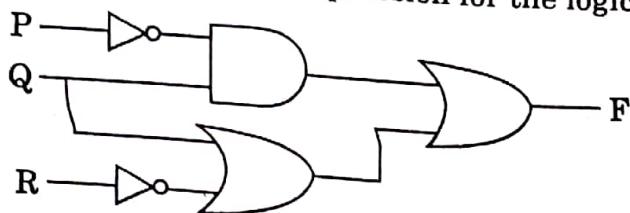
W

6. (a) Verify the following using Boolean Laws

2

$$X+Z=X+X' \cdot Z+Y \cdot Z$$

- (b) Obtain the Boolean Expression for the logic circuit shown below : 2



- (c) Write the Sum of Product form of the function  $F(A,B,C)$  for the following truth table representation of  $F$ . 1

| A | B | C | F |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 |

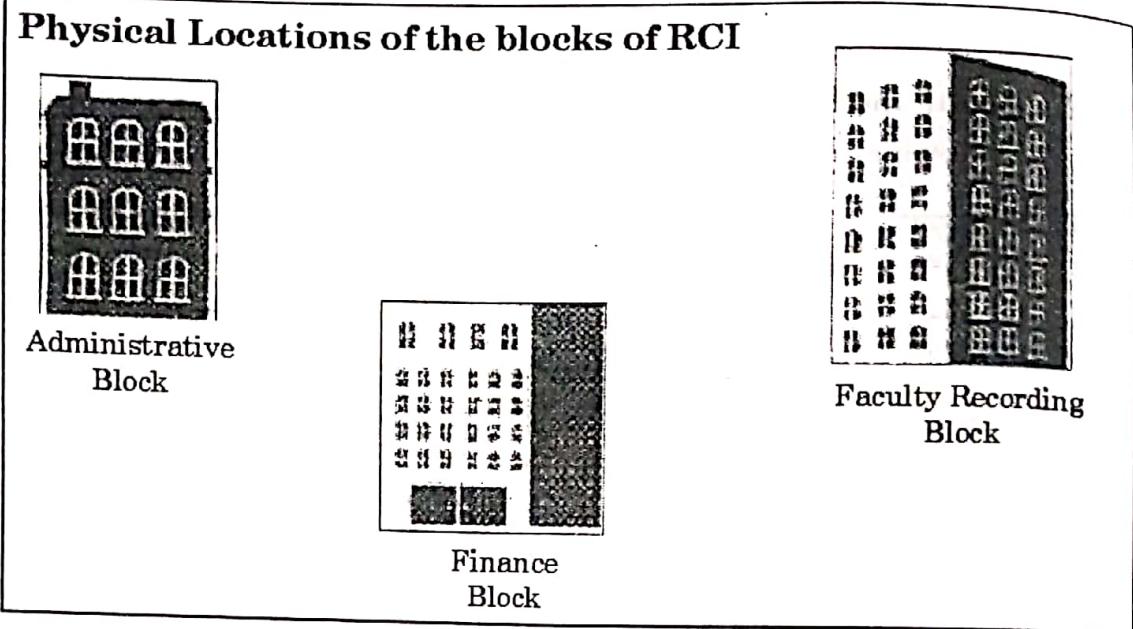
- (d) Obtain the minimal form for the following Boolean expression using Karnaugh's Map. 3

$$F(U,V,W,Z) = \Sigma(0,1,2,3,6,7,8,9,10,13,15)$$

7. (a) Write two advantages of using an optical fibre cable over an Ethernet cable to connect two service stations, which are 200 m away from each other. 1

- (b) What is the difference between HTTP and FTP ? 1

- (c) Rovenza Communications International (RCI) is an online corporate training provider company for IT related courses. The company is setting up their new campus in Kolkata. You as a network expert have to study the physical locations of various blocks and the number of computers to be installed. In the planning phase, provide the best possible answers for the queries (i) to (iv) raised by them.



**Block to Block distances (in Mtrs.)**

| From                 | To                      | Distance |
|----------------------|-------------------------|----------|
| Administrative Block | Finance Block           | 60       |
| Administrative Block | Faculty Recording Block | 120      |
| Finance Block        | Faculty Recording Block | 70       |

**Expected Computers to be installed in each block**

| Block                   | Computers |
|-------------------------|-----------|
| Administrative Block    | 30        |
| Finance Block           | 20        |
| Faculty Recording Block | 100       |

- (i) Suggest the most appropriate block, where RCI should plan to install the server.
- (ii) Suggest the most appropriate block to block cable layout to connect all three blocks for efficient communication.
- (iii) Which type of network out of the following is formed by connecting the computers of these three blocks ?
- LAN
  - MAN
  - WAN
- (iv) Which wireless channel out of the following should be opted by RCI to connect to students from all over the world ?
- Infrared
  - Microwave
  - Satellite
- (d) Write two advantages of using open source software over proprietary software. 1

- (e) Which of the following crime(s) does **not** come under cybercrime ? 1
- (i) Copying some important data from a computer without taking permission from the owner of the data.
- (ii) Stealing keyboard and mouse from a shop.
- (iii) Getting into unknown person's social networking account and start messaging on his behalf.