XII COMPUTER SCIENCE
CBSE Board - 2013

[Time allowed: 3hours]   *[Maximum Marks: 70]*

Instructions   *(i)   All questions 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**

Ans	The benefit of using default parameter/argument in a function are as following:
	 ✓ They can be used to add new parameters to existing function.
	 ✓ They can be used to combine similar function into one.
	 Example:
	 `float intrest(float p, int t, float r = 0.10);`
	 Now if any function call is appear as follows:
	  `S_IN = intrest(5400, 2);` // third argument missing
	  Here, the value 0.10 value is used for the third argument r.	

(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()`
	 `{`
	  `    float Area, Side;`
	  `    cin>>Area;`
	  `    Side=sqrt(Area);`
	  `    cout<<"One Side of the Square:"<<Side<<endl;`
	 `}`
		1

Ans.	Following header files will be essentially required to run the above code in a C++ compiler:
	  1. iostream.h
	  2. math.h	

(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.**
	 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<endline;`
	 `}`
		2

Ans.	```#define Change(A,B) 2*A+B;```
	 `void main()`
	 `{`
	  `  `<ins>`float`</ins>` X,Y,F;`
	  `  cin>>X>>Y;`
	  `  F=Change`<ins>`(X,Y)`</ins>`;`
	  `  cout<<"Result:"<<F<<`<ins>`endl`</ins>`;`
	 `}`	

(d)	**Observe the following C++ code carefully and obtain the output, which will appear on the screen after execution of it.**	**2**

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	Important Note:
	   - **All the desired header files are already included in the code, which are required to run the code.**
	<pre>void main()
	{
	    char *Text="AJANTA";
	    int *P, Num[]={1,5,7,9};
	    P=Num;
	    cout<<*P<<Text<<endl;
	    Text++;
	    P++;
	    cout<<*P<<Text<<endl;
	}</pre>	

Ans.	Output: 1AJANTA 5JANTA	

(e)	**Observe the following C++ code carefully and obtain the output, which will appear on the screen after execution of it.**
	<pre>#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();
	}</pre>
		3

Ans.	Output: 1:15&63% 2:12&73% 1:15&78%	

(f)	**Based on the following C++ code find out the expected correct output(s) from the option (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.**
	<pre>void main()
	{
	    char Result[][10]={"GOLD","SILVER","BRONZE"};</pre>
		2

```
                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***

Ans.	Correct answer is 9GOLD*9GOLD*8SILVER*

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

Ans.
Similarities:
- ✓ Constructors and destructors do not have return type, not even void nor can they return values.
- ✓ References and pointers cannot be used on constructors and destructors because their addresses cannot be taken.

For example:
class Flight
{
   public:
        Flight(); // Constructor for class Flight
        ~Flight(); // Destructor for class Flight
};

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

```
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 option 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.**

Ans.
   (i) Option-1 Race T (30) is correct.

   (ii) Constructor overloading.

(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.**

Ans.

```cpp
#include <iostream.h>
#include <conio.h>
class Bus
{
    private:
        char From[20],To[20];
        int fare,busno,distance;
        char Type;
    public:
        Bus ( );//Constructor
        ~Bus( );//Destructor
        int CalcFare();
        void Allocate();
        void Show();
};
Bus :: Bus( )
{
    fare=500;
    Type='O';
}
void Bus :: Allocate( )
{
    cout<<"Enter the Bus no: ";
    cin>>busno;
    cout<<"\nFrom: ";
    cin>>From;
    cout<<"\nTo: ";
    cin>>To;
    cout<<" \nEnter the Type: ";
    cin>>Type;
    cout<<"\nEnter the distance: ";
    cin>>distance;
    CalcFare();
```

```
    }
    int Bus:: CalcFare( )
    {
        if(Type=='O')
        {
            fare=15*distance;
        }
        else if(Type=='E')
        {
            fare=20*distance;
        }
        else if(Type=='L')
        {
            fare=24*distance;
        }
        else
            cout<<"Wrong Type";
        return fare;
    }
    void Bus :: Show()
    {
        cout<<"\n\n****Your Booking Detail***"<<endl;
        cout<<"Bus no:   "<<busno<<endl;
        cout<<"From: "<<From<<endl;
        cout<<"To: "<<To<<endl;
        cout<<"Type: "<<Type<<endl;
        cout<<"Distance: "<<distance<<endl;
        cout<<"Total Fare: "<<fare<<endl;
    }
    Bus :: ~Bus( )
    {
         cout<<"Bus Detail is Closed";
    }
    void main( )
    {
        Bus s;
        clrscr();
        s.Allocate();
        s.Show();
        getch( );
    }
```

(d)	Consider the following c++ code and answer the questions from (i) to (iv):	4

```
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 names of those data members, which can be directly accessed from the Mentry() function of class Marks.**

Ans.	(i) Multilevel Inheritance (ii) FinalGrade, comments (iii) Rcalculate(), Rdisplay(), Mentry(), Mdisplay(); (iv) Name[20], M[5], Grade[5]

3.(a) **Write code for a function void ChangOver (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 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

Ans.
```
#include <iostream.h>
void ChangOver (int P[ ], int N);
int main (void)
{
    int  P[ ]= {1, 3, 5, 7, 9};
    ChangOver ( P, 5);
    for ( int i=0; i<5; i++)
    {
       cout << P[i] << ' ';
    }
     return(0);
}
void ChangOver (int P[ ], int N)
{
    int temp;
    int temp1;
```

```
            for (int i=0; i<(N -1); i++)
            {
                temp = P[size-1];
                P[N-1] = P[i];
                P[i] = temp;
            }
        }
```

(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
Ans.	Address of T[i][j]=address of T[0][0]+(i*number of columns present in array +j)*sizeof(element) Address of T[10][7]=14000+(10*7+10)*8 =14000+(80)*8 =14000+640 =14640	

(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:**	4

12	20	13
2	10	30

The output should be
20 10 30

Ans.
```
#include<conio.h>
#include<iostream.h>
void Sum(int A[][3],int N,int M)
{
    int i,j,S=0;
    for(i=0;i<N;i++)
        for(j=0;j<M;j++)
            if(A[i][j]%10==0)
                cout<<A[i][j]<<"  ";
}
void main()
{
    int a[][3]={{12,20,13},{2,10,30}};
    clrscr();
    Sum(a,2,3);
    getch();
}
```

(d)	Evaluate the following postfix expression. Show the status of stack after execution of each operation: 5, 2, *, 50, 5, /, 5, -, +	2

Ans.

Element Scanned	STACK
5	5
2	5,2
*	10
50	10,50
5	10,50,5
-	10,45

		+		55		

(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

Ans.		```cpp
		class Queue
		{
		        NODE *front, *rear;
		        Queue() {front=NULL; rear=NULL;}
		    public:
		        void Addq();
		        void Delete();
		};
		void Queue::Delete()
		{
		        if(front==NULL)
		            cout<<"Queue is empty";
		        else
		        {
		            NODE *t = front;
		          front = front->Link;
		         if(front==NULL)
		        rear = NULL;
		        delete t;
		        }
		}
		``				

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.
		
		``cpp
		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;
		``
						1

```
                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();
            }
```

Ans.	**Statement 1:**
	      File.seekp(Position);
	Statement 2:
	      File.write((char*) &CL, sizeof(CL));	

(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).** **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**	**2**

Ans.
```
#include<conio.h>
#include<iostream.h>
#include<fstream.h>
#include<string.h>
void COUNT()
{
    ifstream Fil;
    Fil.open("STORY.TXT");
    char Word [80];
    int C1=0, C2=0;
    while (!Fil.eof())
    {
        Fil>>Word;
        if(strcmp(Word,"You")==0)
            C1++;
        else if (strcmp(Word,"me") ==0)
            C2++;
    }
    cout<<"Count for You:"<<C1<<endl;
```

```
            cout<<"Count for me:"<<C2;
            Fil.close();
        }
```

| (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;}
};
```

| Ans | |

```
void search(float pr)
{
    Ifstream ifile("ANTIQUE.DAT", ios::in | ios::binary);
    if(!ifile)
    {
        cout<<"could not open ANTIQUE.DAT file ";  exit(-1); }
    else
    {
        ANTIQUE a; int found=0;
        while(ifile.read((char *)&a, sizeof(a)))
        {
            Pr=a.GetPrice();
            if(pr>=10000 && pr<=15000)
            {
                a.SHOW(); found=1; break;
            }
        }
    }
    if(found==0)
        cout<<"given price not match";
}
```

| 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

Ans.	A table may have more than one such attribute/group of attribute that identifies a tuple uniquely, all such attribute(s) are known as Candidate Keys. 	
(b)	**To display the details of all the products in ascending order of product names (i.e. PNAME).**	**1**
Ans	SELECT * FROM PRODUCTS ORDER BY PNAME;	
(c)	**To display product name and price of all those products, whose price is in the range of 10000 and 15000 (both value inclusive).**	**1**
Ans:	select PNAME,PRICE FROM PRODUCTS WHERE PRICE>=10000 && PRICE<=15000;	
(d)	**To display the number of products, which are supplied supplier. i.e., the expected output should be:** **S01 2** **S02 2** **S03 1**	**1**
Ans.	SELECT SUPCODE, COUNT(SUPCODE) FROM PRODUCTS GROUP BY SUPCODE;	
(e)	**To display the price, product name and quantity (i.e., qty) of those products which have quantity more than 100.**	**1**
Ans.	SELECT PRICE,PNAME,QTY FROM PRODUCTS WHERE QTY>100;	
(f)	**To display the names of those suppliers, who are either from DELHI or from CHENNAI.**	**1**
Ans:	SELECT SNAME FROM SUPPLIERS WHERE CITY="DELHI" || CITY="KOLKATA";	
(g)	**To display the name of the companies and the name of the products in descending order of company names.**	**1**
Ans:	SELECT COMPANY,PNAME FROM PRODUCTS ORDER BY COMPANY DESC;	
(h)	**Obtain the outputs of the following SQL, queries based on the data given in tables PRODUCTS and SUPPLIERS above.** **(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;**	**2**
Ans:	(h1) **SUPCODE**	

S01

S02

S03

(h2)

MAX(PRICE)	MIN(PRICE)
28000	1100

(h3) **AMOUNT**

55000

(h4)

PNAME	SNAME
DIGITAL CAMERA 14X	GET ALL INC
PEN DRIVE 16GB	GET ALL INC

6 (a)	**Verify the following using Boolean Laws X + Z = X + X' . Z + Y . Z** **IMPORTANT NOTE: This question was wrong in board paper expected question may this** $X+Z=X+Y'.Z+Yy.Z$	**2**
Ans.	x+z=x+y'.z+y.z RHS=x+y'.z+y.z =x+z(y'+y) (y'+y=1 Complementarity law) =x+z(1) =x+z =LHS	
(b)	**Obtain the Boolean Expression for the logic circuit shown below:** 	**2**
Ans.	The equivalent Boolean expression for the given Logic Circuit is: F = P'Q + (Q + R')	
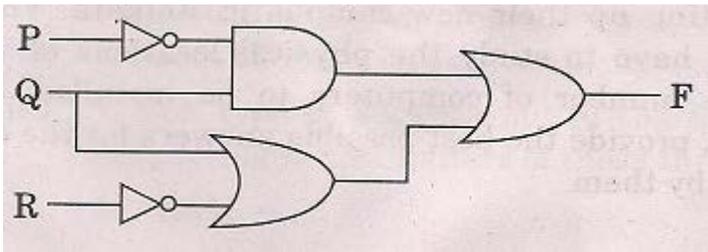
(c) **Write the Sum of Product form of the function F(A, B, C) for the following truth table representation of F.** — marks: **1**

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

Ans. Add a new column containing minterms. Now the table is as follows :

A	B	C	F	minterms
0	0	0	0	A'B'C'
0	0	1	0	A'B'C
0	1	0	1	A'BC'
0	1	1	1	A'BC

1	0	0	1	AB'C'
1	0	1	0	AB'C
1	1	0	0	ABC'
1	1	1	1	ABC

Now by adding all the minterms for which output is 1, we get desired sum-of-products expression which is

$$F(A,B,C) = A'BC' + A'BC + AB'C' + ABC$$

(d)	**Obtain the minimal form for the following Boolean expression using Karnaugh map.** **F(U, V, W, Z) = ∑(0, 1, 2, 3, 6, 7, 8, 9, 10, 13, 15)**	**3**
Ans.	There are four pairs and one quad that reduce as given below: Pair-1($m_7 + m_6$) reduces to U'VW Pair-2($m_8 + m_9$) reduces to UV'W' Pair-3($m_{13} + m_{15}$) reduces to UVZ Pair-4($m_8 + m_{10}$) reduces to UV'Z' Quad ($m_0 + m_1 + m_2 + m_3$) reduces to U'V' Simplified Boolean expression for given K-map is F(U,V,W,Z) = U'VW + A'C'O + UVZ + UV'Z' + U'V'	
7. (a)	**Write two advantages of using an optical fiber cable over an Ethernet cable to connect two service stations, which are 200 m away from each other.**	**1**
Ans.	✓ Optical fiber cable guarantees secure transmission and a very high transmission capacity. ✓ Optical fiber cable is immune to electrical and magnetic interference.	
(b)	**What is the different between HTTP and FTP?**	**1**
Ans.	FTP, is a protocol used to upload files from a workstation to a FTP server or download files from a FTP server to a workstation whereas, HTTP, is a protocol used to transfer files from a Web server onto a browser in order to view a Web page that is on the Internet.	
	Rovenza Communication 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, provider the best possible answer for the queries (i) to (iv) raised by them. Physical Locations of the blocks of RCI Administrative Block Finance Block Faculty Recording Block **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**	
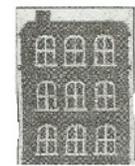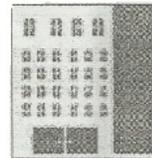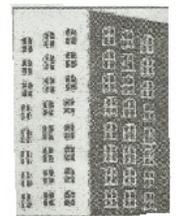
Block	Computers	
Administrative Block	30	1
Finance Block	20	
Faculty Recording Block	100	

    (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**
- **Wam**

    (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

Ans.	(i) Faculty recording block (i) (ii) LAN (iii) Satellite	
(d)	**Write two advantages of using open source software over proprietary software.**	**1**
Ans.	✓ **O**pen **S**ource **S**oftware is software whose source code is available to customer and it can be modified and redistributed without any limitations whereas source code of proprietary Software is not available. ✓ **O**pen **S**ource **S**oftware may come free of cost or with a payment of normal charges whereas proprietary software is neither open nor freely available.	
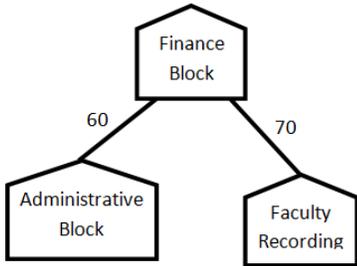
(e)	**Which of the following crime(s) does not come under cybercrime?**
	  (i) Copying some important data from a computer without taking permission from the owner of the data.
	  (ii) Stealing keyboard and mouse from a shop.
	  (iii) Getting into unknown person's social networking account and start messaging on his behalf.
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Ans.	(i) Stealing keyboard and mouse from a shop.	