

**Sample Paper 2015**  
**Subject: Computer Science C++**  
**Class: XII<sup>th</sup>**

**Time allowed: 3 hours**

**Maximum Marks: 70**

**General Instruction**

1. Please check that this question paper contains 7 questions.
2. Please write down serial number of the question before answering it.
3. All questions are compulsory.
4. Programming language : C++

**Q1**

(a) Differentiate between typedef and #define. Give example to illustrate both. 2

(b) Name the header file(s) that shall be needed for successful compilation of the following C++ code. 1  
void main( )

```
{  
int a=10;  
iota(a)  
cout<<setprecision(4)<<a;  
}
```

(c) Rewrite the given snippet after removing the syntactical error(s), if any. Underline each correction. 2

```
structure deep_CC {  
    int mem number;  
    char name;  
    char memtype[]="MIG";  
};  
void main() {  
    deep_CC m1,m2;  
    cin<<"Member Number";  
    cin>>memnumber.m1;  
    cout<<"\n Member name";  
    cin>>m1.memname;  
    m1.memtype="TEMP";  
    m2=m1;  
    cin<<"\n Member number "<<m2.memnumber;  
    cin<<"\n Member name "<<m2.memname;  
    cin<<"\n Member number "<<m2.memtype;    }
```

(d) What will be the output of the following program:

2

```

#include<iostream.h>
#include<ctype.h>
int x=10;
void fun(int &a,int b,int &c) {
    int x=10;
    c += x;
    a* = ::x;
    b += c;
    cout<<a<<"*"<<b<<"*"<<c<<endl;
}
void main()
{
int y=1, x=2;
    fun(y, ::x, x);
    cout<<x<<"@"<<y<<"@"<<::x;
    cout<<endl;
    fun(::x, x, y);
    cout<<x<<"@"<<y<<"@"<<::x;
    cout<<endl;
    fun(x,y,::x);
    cout<<x<<"@"<<y<<"@"<<::x;
}

```

- (e) Observe the following program RANDNUM.CPP carefully. If the value of VAL entered by the user is 10, choose the correct possible output(s) from the options from i) to iv) and justify your option.

2

```

//program RANDNUM.CPP
#include<iostream.h>
#include<stdlib.h>
#include<time.h>
void main()
{
    randomize();
    int VAL, Rnd; int n=random(2);
    Rnd=8 + random(sizeof(VAL)) * 1;
    while(n<Rnd)
    {

```

```

        cout<<n<< "\t";
        n++;
    }
}

```

**Output options:**

- i) 1 2 3 4 5 6 7 8 9 10 11 12 13
- ii) 0 1 2 3 4 5 6 7 8
- iii) 1 2 3 4 5
- iv) 1 2 3 4 5 6 7 8

(f) Find the output of the following program

3

```

void main( )
{
    char *poet= "SakESpHerE" ;
    for (int i=0;i<strlen(poet);i++)
    {
        if(islower(poet[i]))
            poet[i]=poet[i-1];
        else if( isupper(poet[i]))
            if(poet[i]=='S')
                poet[i]='X';
            else if(poet[i]=='E')
                poet[i]=toupper(poet[i-1]);
        else
            poet[i]--;
    }
    cout<<poet; }

```

**Q2. Answer the following questions.**

(a) What do you mean by static data members of a class? Explain the characteristics of static data members ? 2

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

```

class Science
{
    char Topic[20];
    int Weightage;
public:
    Science ( ) //Function 1
    {
        strcpy (Topic, "Optics" );
        Weightage = 30;
        cout<<"Topic Activated";
    }
}

```

```

~Science( ) //Function 2
{
cout'<<"Topic Deactivated";
}
Science(Science &S) //Function 3
{
}
}

```

- (i) Name the specific features of class shown by Function 1 and Function 2 in the above example.  
How would Function 1 and Function 2 get executed ?
- (ii) Name the specific feature of Class shown by Function 3? Complete the definition of this?
- (c) Define a class PhoneBill in C++ with the following descriptions. (4)

**Private members:**

CustomerName	of type character array
PhoneNumber	of type long
No_of_units	of type int
Rent	of type int
Amount	of type float.
calculate( )	This member function should calculate the value of amount as Rent+ cost for the units.

Where cost for the units can be calculated according to the following conditions.

No_of_units	Cost
First 50 calls	Free
Next 100 calls	0.80 @ unit
Next 200 calls	1.00 @ unit
Remaining calls	1.20 @ unit

**Public members:**

- \* A constructor to assign initial values of CustomerName as "Raju", PhoneNumber as 259461, No\_of\_units as 50, Rent as 100, Amount as 100.
- \* A function accept( ) which allows user to enter CustomerName, PhoneNumber, No\_of\_units And Rent 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 code :

4

```

class DRUG
{
    char catg[10];
    char DOF[10], comp[20];
public:
    DRUG( );
    void endrug( );
    void showdrug( );
};

class TABLET : public DRUG
{
protected:
    char tname[30], volabel[20];
}

```

```

        public:
            TABLET();
            void entab( );
            void showtab( );
    };

class PAINKILLER : public TABLET
    {
        int dose, usedays;
        char seffect[20];
        public :
            void entpain( );
            void showpain( );
    };

```

- i) How many bytes will be required by an object of TABLET?
- ii) Write names of all the member functions of class PAINKILLER.
- iii) Write names of all members accessible from object of class PAINKILLER.
- iv) Write names of all data members accessible from functions of class PAINKILLER.

### Q.3

- (a) Suppose A,B,C are arrays of size m,n,m+n respectively. Array A is stored in ascending order and array B is in descending order. Write a function to receive 3 arrays and their sizes to store the elements of A and B into C in descending order. (3)
- (b) An array Arr[35][15] is stored in the memory along the row with each of its element occupying 4 bytes. Find out the base address and the address of an element Arr[20][5], if the location Arr[2][2] is stored at the address 3000. (4)
- (c) Write a function in C++ which accepts an integer array and its size as arguments/parameters and assign the elements into a two dimensional array of integers in the following format (size must be odd) (3)
 

If the array is 1 2 3 4 5	If the array is 10 15 20
The output must be	The output must be
1 0 0 0 5	10 0 20
0 2 0 4 0	0 15 0
0 0 3 0 0	10 0 20
0 2 0 4 0	
1 0 0 0 5	
- (d) Write a function in C++ to delete a node containing city's information (ie city name and its population) from a dynamically allocated Queue of cities. (4)
- (e) Evaluate the following postfix notation of expression (show the position of stack) (2)

25 11 2 % \* 5 -

### Q4.

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

```

class Member
{
    int Member_no ;
    char Member_name[20] ;

public :
    void enterdetails ( ) ;    //function to enter Member details
    void showdetails ( ) ;    //function to display Member details
    int RMember_no( )    //function to return Member_no
    {return Member_no ;}
};

void Update (Member NEW)
{
    fstream File ;
    File.open("MEMBER.DAT" , ios :: binary | ios :: in | ios :: out) ;
    Member OM ;
    int Recordsread = 0, Found = 0 ;
    while (!Found && File.read((char*) & OM, sizeof(OM)))
    {
        Recordsread++ ;
        if (NEW.RMember_no( ) == OM.RMember_no( ))
        {
            _____ // Statement 1
            _____ // Statement 2
            Found = 1 ;
        }
        else
            File.write((char*) & OM, sizeof(OM)) ;
    }
    if (!Found)
        cout<<"Record for modification does not exist" ;
    File.close( ) ;
}

```

If the function Update( ) is supposed to modify a record in file MEMBER.DAT with the values of Member NEW passed to its argument, write the appropriate statements for statement1 using seekp( ) or

seekg( ) whichever needed, statement 2 using read( ) or write( ) method, whichever needed in the above code that would write the modified record at its proper place.

- (b) Assuming that a text file named FIRST.TXT contains some text written into it, write a function named vowelwords( ), that reads the file FIRST.TXT and creates a new file named SECOND.TXT, to contain only those words from the file FIRST.TXT which start with start with a lowercase vowel (i.e. with 'a', 'e', 'I', 'o', 'u'). (3)

For example if the file FIRST.TXT contains

**Carry umbrella and overcoat when it rains**

Then the file SECOND.TXT shall contain:

**umbrella and overcoat it**

- (c) Given a binary file STUDENT.DAT contains the records of the following structure type: (2)

struct Student

{

int rno;

float m1,m2,m3;

};

Write a function in C++ that would read contents from the file STUDENT.DAT and modify the marks to 35 if anybody's any marks are less than 35.

Q 5.

- (a) What is a relation? Differentiate between primary key & candidate key?

2

- (b) Consider the following tables Client and Bill. Write SQL commands for the statements (i) to (iv) and give outputs for SQL queries (v) to (viii)

6

Table : Client

Cust_Id	Cust_Name	Address	Phone_no	City
C007	Pritam Sharma	12,M.G Road	71274250	Bangalore
C008	Sutopa	14/1 Pritam Pura	41206819	Delhi
C010	Anurag Basu	15A, Park Road	61281921	Kolkata

C012	Hrithik	7/2 Vasant Kunj	26121949	Delhi
C013	Firoz Shah	2, Servamali road	25014192	Bangalore
C025	Vinod Nagpal	46-a Navi Mumbai	64104944	Mumbai
C027	Sameer	41,Dwarka	42101619	Delhi
C002	Pasunjit Bose	16/A K.G Marg	27220012	Bangalore
C035	Aamina Begum	13/A Versova	41612181	Mumbai

Table : BILL

Ord_id	Cust_id	Item	Ord_date	Qty	Price
7002	C007	Pizza	20-11-07	1	249.50
7003	C013	Garlic Bread	24-10-05	3	75.75
7004	C012	Pasta	03-03-07	4	173.00
7005	C010	Ice Cream	01-01-08	30	195.75
7006	C035	Pizza	02-03-06	4	249.50
7009	C035	Garlic Bread	02-03-08	2	75.75
7010	C013	Brownie	04-05-07	4	40.50
7011	C014	Ice Cream	02-06-08	5	195.75
7012	C002	Pizza	01-02-08	7	249.50

Display a report containing cust\_id, cust\_name, Item,qty,price and bill amount. Bill amount is calculated as the sum of qty\*price

Display how many customers have ordered Pizza in the month of August

Count the number of customer who have ordered item worth more than 1700, in last four month from the present day. Total amount = sum of qty\* price.

Display the name of customer along with their city .In alphabetical order of city

Select Cust\_name , City, ord\_date from Client A, Bill b Where A.Cust\_id = b.Cust\_id

Select Cust\_name from Client where Cust\_id=( Select Cust\_id from Bill where Year(ord\_date) =2004)

Select count(\*) from Client group by City;

select Distinct (Item), Distinct(Price) from Bill;

Q6.

(a) State and verify Idempotent Law and Demorgan's Law using truth table and algebraically. 2

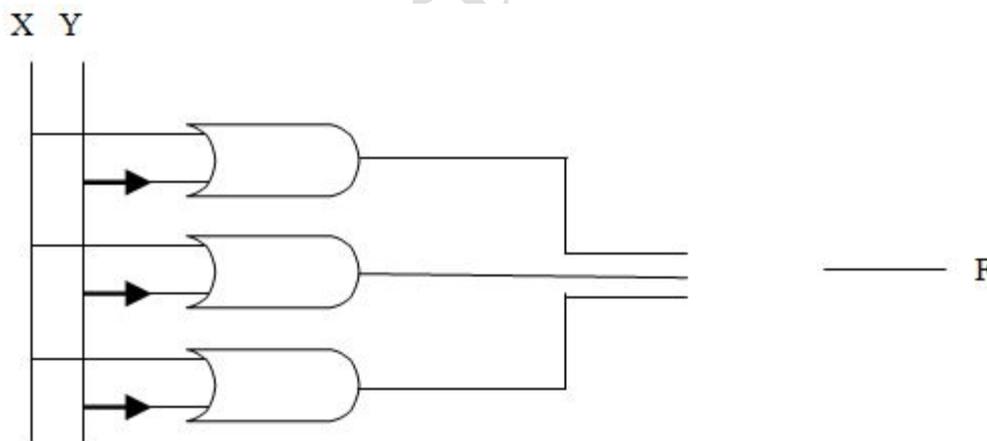
(b) Given the following truth table, write the sum-of-product form of the function

$F(x, y, z)$ .

1

X	Y	Z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

(c) Write the equivalent Boolean Expression for the following Logic Circuit



(d) Reduce the following Boolean Expression using K-Map: 3

$$F(w,x,y,z)=\Sigma(0,1,2,4,5,6,8,10)$$

(e) Convert the following Boolean expression into its equivalent Canonical Sum of Products form

$$(SOP): (X+Y+Z) (X+Y+Z') (X'+Y+Z) (X'+Y'+Z')$$

1

Q.7

(a) What is the difference between Bridge and Router? 1

(b) Differentiate the following: 1

(i) TDMA and CDMA

- (ii) FOSS and OSS.
- (c) What is the Difference between Freeware and Shareware. 1
- (d) Define and explain Cyber Law. 1
- (e) The Ever Mind organization has set up its new branch at Amritsar for its office and web based activities. It has 4 wings of buildings which are as follows :

**Center to center distances between various blocks**

Wing X to Wing Z	40 m
Wing Y to Wing Z	60 m
Wing X to Wing Y	135 m
Wing Y to Wing U	70 m
Wing X to Wing U	165 m
Wing U to Wing Z	80 m

**Number of computers**

Wing X	50
Wing Y	130
Wing U	40
Wing Z	15

- i) Suggest a most suitable cable layout of connection among the wings and topology. 1
- ii) Suggest the most suitable place to house the server of this organization with a suitable reason with justification. 1
- iii) Suggest the placement of the following devices with justification :a) Switch/Hub b) Repeater 1
- iv) The organization is planning to link its head office situated in Delhi with the offices as Amritsar. Suggest a way to connect it, the cost is not the factor. 1
- (f) What is the difference between the Web Browser and Web Server? Give suitable example? 1