SAMPLE PAPER
COMPUTER SCIENCE
CLASS – XII

Time allowed : 3 hours **Maximum marks : 70**

Note :

i) **All the questions are compulsory .**

ii) **Programming Language : C++ .**

1. a) Differentiate between ***call by value & call by reference*** with suitable examples in reference to function. **2**

b) Name the header files, to which the following built-in functions belong : **1**

i) srand ii) itoa

c) Will the following program execute successfully ? If no, state the reason(s) : **2**

```
#include<iostream.h>
#include<stdio.h>
#define int M=3;
void main( )
{ const int s1=10;
        int s2=100;
        char ch;
        getchar(ch);
        s1=s2*M;
        s1+M  =  s2;
        cout<<s1<<s2 ;}
```

d) Give the ***output*** of the following program segment (Assuming all required header files are included in the program) : **2**

```
int m=100;
void main( )
{
    int m=25;
    { int m= 20*:: m;
    cout<<"m="<<m <<endl;
    cout<<"::m="<< ::m <<endl;
    }
    ::m=++m+ m;
    cout<<"m="<<m <<endl;
    ::m= ::m+2 ;
    cout<<"::m="<< ::m*2 <<endl;
    }
```

d) Find the output of the following program segment (Assuming that all required header files are included in the program) : **3**

```
void FUNC(int *a,int n)
{ int i,j,temp,sm,pos;
    for(i=0;i<n/2;i++)
        for(j=0;j<(n/2)-1;j++)
        if(*(a+j)>*(a+j+1))
            { temp=*(a+j);
              *(a+j)=*(a+j+1);
              *(a+j+1)=temp; }
    for(i=n-1;i>=n/2;i--)
    { sm=*(a+i);
    pos=i;
        for(j=i-1;j>=n/2;j--)
        if(*(a+j)<sm)
        { pos=j;
```

```
                                        sm=*(a+j); }
                    temp=*(a+i);
                    *(a+i)=*(a+pos);
                    *(a+pos)=temp;  } }
        void main( )
        {
            int w[ ]={-4,6,1,-8,19,5},i;
            FUNC(w,6);
                for(i=0;i<6;i++)
                cout<<w[i]<<' ';}
```

(e) In the following program, find the correct possible output(s) from the options and justify your answer: **2**

```
#include <iostream.h>
#include <stdlib.h>
#include <string.h>
struct card {   char suit[10];
                int digit;
            };
card* cards = new card[52];  // Allocate Memory
void createdeck()
{       char temp[][10] = {"Clubs","Spades","Diamonds","Hearts"};
        int i,m=0,cnt=1;
        for(i=1;i<=52;i++)
        {       strcpy(cards[i].suit,temp[m]);
                cards[i].digit=cnt;
                cnt++;
                if(i % 13 == 0)
                { m++;cnt=1;  }
        }
}
card drawcard(int num)
{       int rndnum;
        randomize();
        rndnum = random(num)+1;
        return (cards[rndnum]);
}
void main()
{       createdeck();
        card c;
        c = drawcard(39);
```

```
    if(c.digit > 10 || c.digit == 1)
    {
        switch(c.digit)
        {   case 11:    cout<<"Jack of ";   break;
            case 12:    cout<<"Queen of ";  break;
            case 13:    cout<<"King of ";   break;
            case 1:     cout<<"Ace of ";
        }
    }
    else
        cout<<c.digit<<" of ";
    cout<<c.suit;
    delete[] cards;     //Deallocate memory
}
```

Outputs:

i) Kind of Spades ii) Ace of Clubs

iii) Ace of Diamond iv) Queen of Hearts

2. a) Define ***container ship and Inheritance*** in context to OOP. Give suitable examples to illustrate the same. **2**

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

```
class number
    { float M;
        char str[25];
        public:
        number( )               //constructor 1
        { M=0;
          str='\0';}
    number(number &t);          //constructor 2
        };
```

i) Write c++ statement such that it invokes constructor 1.

ii) Complete the definition for constructor 2.

(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 following 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 off all members accessible from object of class PAINKILLER.
iv) Write names of all data members accessible from functions of class PAINKILLER.

3 a) Write C++ function to Arrange(int [],int) to arrange all the negative and positive numbers of the from left to right. For e.g is an array of 10 elements initially contains { 4,5,6,-7,8,-2,-10,1,13,-20}. Then the function rearrange them in following manner -20,-10,-7,-2 1,4,5,6,8,13.

b) An array Arr[-7…10, 15] is sorted in the memory in column major order. If Arr[0][6] is located at 1025 and Arr[0][0] is at -55, find the location of Arr[3][5]. 4

c) Consider the following portion of the program which implements Stack of Drama. Write the definition of the member function ADD() and DISP() to insert new information about a movie into the stack and to Display the information of the movie directed by "Sachin Dev" from the Stack. 4

```
struct Drama_node
{
    int mov_id, year; /* movie id  and release year */
    char mov_name[70]; /* movie name */
    char ac_name[70]; /* actor name*/
    char dir_name[35]; /* director name */
    float dur; /* duration of movie */
    mov_node *link;
};
class Drama
{
     node *TOP,*END;
     public :
       Drama() { TOP=END=NULL; }
       void ADD();
       void DISP();
```

```
        ~Drama() { cout<< "\n No Records Found "}
};
```

d) Write a function Sym(int[][]) to find if a square matrix is symmetric or not. If it is symmetric than the function will return 1 , otherwise will return 0. 3

e) Evaluate the following postfix expression using stack and show the contents after execution of each operations 2

470,5,4,^,25,/,6,*,+,81,-

4 a) Observe the program segment given below carefully and answer the question that follows : **1**

```
class school
{ private :
 char name[25];
int numstu;
        public:
                void inschool( );
                void outschool( );
                int retnumstu( )
                { return numstu; }
};
        void modify(school A)
        { fstream INOUT;
                INOUT.open("school.dat",ios::binary|ios::in|ios::ate);
                school B;
                        int recread=0, found=0;
                while(!found && INOUT.read((char*)&B,sizeof(B))
                        { recread++;
                                if(A.retnumstu( )= = B.retnumstu( ))
                                {
                                 _____//missing statement

                                INOUT.write((char*)&A,sizeof(A));
                                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 school A passed to its argument, write the appropriate statement for missing statement using **seekp( )** or **seekg( ),** whichever needed, in the above code that would write the modified record at its proper place.

b) Write a function in c++ to ***add new objects*** at the bottom of a binary file **"STU.DAT",** assuming that the binary file is containing the objects of the following class : **3**

```
        class STUDENT
                { int rno;
                char Name[25];
                public:
                        void Enter( ){ cin>>rno; gets(Name);}
                        void Display( ){ cout<<rno<<Name<<endl;}
                        int retrno( ) {return rno;} };
```

c) Write a function in c++ to ***count & display*** Maximum length of line, that lines ***not starting with 'A'*** present in a text file "PARA.TXT". **2**

5. a) What do you understand by the terms ***Candidate key*** and ***alternate key in*** a relation? **2**
   b) Write SQL commands for (i) to (vii) on the basis of the table LAB

Table : LAB

NO	ITEM NAME	COST	QTY	DATEOFPURCHASE	WARRANTY	OPERATIONAL
1.	COMPUTER	45000	9	21/5/96	2	7
2.	PRINTER	15000	3	21/5/97	4	2
3.	SCANNER	21000	1	29/8/98	3	1
4.	CAMERA	12000	2	13/6/96	1	2
5.	HUB	4000	1	31/10/99	2	1
6.	UPS	5000	5	21/5/96	1	4
7.	PLOTTER	13000	2	11/1/2000	2	2

i) to select the item name purchased after 31/10/97. **1**

ii) to list item name, which are within the warranty period till present date **1**

iii) to list the name in ascending order of the date of purchase where quantity is more than 3. **1**

iv) to count the number of items whose cost is more than 10000. **1**

v) Give the output of the following SQL commands : **2**

a) SELECT MIN(DISTINCT QTY) FROM LAB;

b) SELECT MIN(WARRANTY) FROM LAB WHERE QTY=2 ;

c) SELECT SUM(COST) FROM LAB WHERE QTY>2 ;

d) SELECT AVG(COST) FROM LAB WHERE DATEOFPURCHASE<{1/1/99} ;

6. a) State ***De'Morgans law*** and verify one of the laws using truth table . **2**

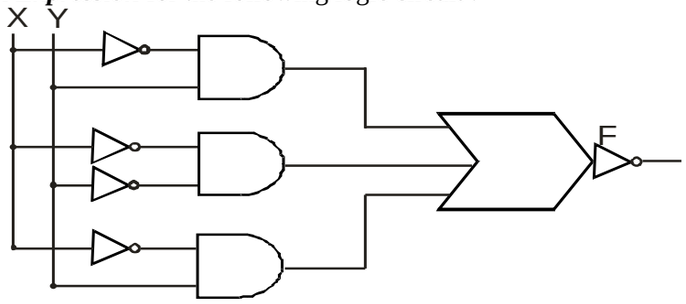
b) If F(w,x,y,z) = ∑ (0,2,4,5,7,8,10,12,13,15) , obtain the simplified form using ***K-Map***. **3**

c) Represent ***AND using NOR*** gate(s). **1**

d) Write the ***POS*** form of a Boolean function G, which is represented in a truth table as follows : **1**

P	Q	R	G
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**

e) Write the ***equivalent Boolean Expression*** for the following logic circuit : **1**



7. a) What are ***routers***? **1**

b) Expand ***VLSI, DHTML***. **1**

c) What is Cookies and Propriety Software? **1**

d) What do you mean by Cyber Law? Give any two? **1**

e) Raidient Technology in Kanpur is setting up the network among its different branches. There are four branches named as Shanti Nagar **(BGN)**, Saket Nagar **(LHT)**, Govind Nagar **(V)** and Azad Nagar **(A)**. Distance between various branches are given below :

Branch BGN to V	7 Km
Branch V to LHT	4 Km
Branch V to A	3 Km
Branch BGN to LHT	4 Km
Branch BGN to A	3.5 km

Branch LHT to A	1 km

Number of computers :

Branch BGN	137
Branch V	65
Branch A	29
Branch LHT	98

i) Suggest a ***suitable topology*** for networking the computer of all the branches. **1**

ii) Name the branch where the ***server*** should be installed. Justify your answer. **1**

iii) Suggest the placement of ***hub or switches*** in the network. **1**

iv) Mention any ***economic way to provide internet accessibility*** to all branches. **1**

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