CLASS XII
SAMPLE PAPER
COMPUTER SCIENCE

TIME: 3 hours MARKS: 70

- Please Check this question paper contains 10 printed papers.
- Code number of the subject for Computer Science is **083.**
- Please check that it has 6 main questions followed by sub questions.
- Pease write down the serial number of the question before attempting it.
- Attempt all the sub questions under each main question.
- Don't carry the sub questions under different main question, check before you attempt.

INSTRUCTIONS:

i) All questions are compulsory.

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

Q1.

(a) Give the difference between type casting and automatic type conversion. Also give suitable C++ code to illustrate both. **2**

(b) Which C++ header files are required to be included to run / execute the following C++ source code.(Note do not include header file, which is not required.) **1**

```
void  main()
{
        char Text[ ] =”Some Thing”;
        cout<< “Remaining SMS chars:”<<160- strlen(Text) <<endl;
}
```

(c) Rewrite the following program after removing the syntactical errors. (If any). Underline each correction. **3**

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

```
  {
      long Tid, Qty;

      public:
      void purchase
      { cin>> tid>> Qty;  }

      void sale()
 {
      cout<<"setw(5)<<Tid<< " OLD :"<<Qty<<ensl;
      cout<<"  NEW  :' "<<- - Qty<< endl;
 }
 };
  void main()
 {
      Item I;
      Purchase ();
      I . sale();
      I . sale();
 }
```

(d) Find output of the following program: **2**

```
# include<iostream.h>
#include<conio.h>
#include<ctype.h>
#include<string.h>
void change (char msg [ ], int len)
}
for(int cnt=0; cnt<len; cnt++)
      {
      if (islower(msg[cnt]))
      msg[cnt]=toupper(msg[cnt]);
      else if (isdigit(msg[cnt]))
      msg[cnt]= msg[cnt] = " $ ";
      }
}
```

```
void main()
{
        char message[ ] =" 2008 Exams Ahead";
        int size=strlen(message);
        change(message ,size);
        cout<<message<<endl;
        for( int C=0; R= size -1 ; C<= size/2; C++, R- - )
        {
                char Temp=message[C];
                message[C] =message [R];
                message[R] =Temp;
        }
        cout<<message<<endl;  }
```

(e) Observe the following program and find the correct possible output(s) from the given options: **2**

```
#include<iostream.h>
# include<conio.h>
#include<stdlib.h>
void main()
{
randomize();
char area[] [10]= {"NORTH" ,"SOUTH", "EAST" , "WEST"};
int Label;
for(int  i= 0; i < 3; i++)
{
        Label = random (2) +1;
        cout<< Area [Label] <<":";
        }
}
```

Output

i) SOUTH: EAST: SOUTH
ii) NORTH: SOUTH: EAST
iii) SOUTH: EAST: WEST
iv) SOUTH: EAST: EAST

(f). Observe the program GAME.CPP carefully if the value of num entered by the user is14, choose the correct possible output from the options (i) to (iv) and justify

your answers. **3**

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

void main()
{  randomize ();
int num, Rndnum;
cin>>num;
Rndnum=random(num)+7;
for(int N-1; N<=Rndnum; N++)
cout<<N<< “      ”;
}
```

Output:

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

Q2.

(a) Explain the working of Virtual Base class with reference to Inheritance with an suitable example. **2**

(b) Answer the following questions (i) to (iv) after going through the following class: **2**

```
class Exam
{
        int rollno, maxmarks, minmarks,marks;
        public:
        Exam();                                  // Module 1
        {
        Rno=101; maxmarks=100; minmarks = 40; marks = 75;
        }
Exam (int Prno, int Pmarks)                      // Module 2
{
        Rno =Prno; maxmarks=100; minmarks=40; marks= Pmarks;
}
~ Exam();                                        // Module 3

{
        cout<<"Exam Over!!!"<<endl;
}
void show()                                      // module 4
{
        cout<<Rno<<":"<<maxmarks<<":"<<min marks<<endl;
```

```
    }
};
```

i) As per OOPS, which concept is illustrated by Module 1 & module 2 together?

ii) What is Module 3 specifying referred as? When do you think Module 3 will be invoked or called? What is roll of the Module 4 in the code?

(c) Define class Hotel in C++ with the following specification: **4**

Private Members:

Rno	:	data member to store room no.
Name	:	Data members to store name of the customer.
Tariff	:	Data member to store per day charges.
Nod	:	Data member to store number of days staying.
CALC( )	:	Function to calculate and return amount s Nod = Tariff is more than 10,000 then as 1.05 days * Tariff.

Public:

CheckIn()	:	Function to enter the content Rno, Name, Tariff and NOD.
Checkout	:	Function to display Rno, Name, Tariff and NOD and amount (amount to be displayed by calling the function CACL()).

(d) Consider the following declarations and answer the questions given below: **4**

```
#include <iostream.h>
class book
{
    char title[20];
    char author[20];
    int noof pages;
    public:

    void read();
    void show();
};
```

```
        class textbook: private textbook
{
        int noofchapters, noofassignments;
        protected: int standard;
        void readtextbook();
        void showtextbook();
};
        class physicsbook: public textbook
{
        char topic[20];
        public:
        void readphysicsbook ();
        void showphysicsbook();
};
```

(i) Name the members, which can be accessed from the member functions of class physicsbook.

(ii) Name the members, which can be accessed by an object of Class textbook.

(iii) Name the members, which can be accessed by an object of Class physicsbook.

(iv) What will be the size of an object (in bytes) of class physicsbook?

Q3.

a) Following are the contents of a one dimensional array

30, 27, 24, 21, 18, 15, 12, 9, 6, 3

Give the value of mid that will be calculated each time the binary search operation is performed on this array to search for the value 6. **2**

b) An array T [20][10] is stored in the memory along the column with each of the elements occupying 2 Bytes. Find out the memory location of T[10][5], if the element T[2][9]is stored at the location 7600. **3**

c) An array RAY[5][10] is stored in the memory with each element requiring 10 bytes of storage. If the base address is 3000, determine the location of Ray[4][6] when the array RAY is stored by: (i) row major (ii) column major. **3**

Q4.

a) Write a function in C++ to sort a one-dimensional array of integers by the bubble sorting method. **2**

b) Write a function SKIPEACH(int H[3][3], int C, int R) in C++ to display all alternate elements from two-dimensional array H(Starting from H[0][0]). **2**

Example:

If the array is containing:

11 88 66

33 99 77

22 44 55

The output will be: 11 66 99 22 55.

c) Write a function PATT( ) in C++ which accepts an integer array and its size as arguments and assign the elements into a two dimensional array of integers in the following format: **2**

If the one-dimensional array is: 1, 2, 3, 4

Then the resultant two-dimensional array is:

0 0 0 4

0 0 3 4

0 2 3 4

1 2 3 4

d) Find the output of the following program: **2**

```
#include <iostream.h>
#include<conio.h>
void manipulate (int a[ ], int size)
{
for (i=0; i<size; i++)
{
if (a [i] % 2 = = 1)
a [i] = a [i] * 3;
else
a [i] = a [i] * 2;
}
}
void show(int a[], int size)
{
for(int i=0; i<size; i++)
{
if (i%2 !=0)
cout<<a[i]<<"#";
else
cout<<a[i]<<"#"<<endl;
}
int main()
```

```
{
int arr[]={5, 10, 15, 20, 25, 30, 35,40};
manipulate(arr, 8);
show(arr, 8);
getch();
return 0;
}
```

Q5.

(a) Observe the program segment given below carefully and answer the question that follows: **2**

```
# include<fstream>
 class Country
{

    int code; char Name[20]; int population;
    public:
    // function to search and display the content from a record no

    void search (int) ;

    // function to modify the content of a particular record no.

    void update(int);
}
void country: : search(int record)
{
    Country C;
    fstream File;
    File.open ("Country .Dat", ios:binary | ios:: in);
    File. Read((char *)&C, sizeof C ));
```

```
        ……..                                    // Statement 1
        cout<<C.code<<"= ="<<C.Name<,"=="<<C.population<<endl;
        File. close();
}

void Country : : Update(int record)
{
        Country C;
        fstream File;
        File.open("Country.dat", ios ::binary  |  ios: :in | ios : : out);
        cin>>C.code;
        cin.getline (C.Name, 20);
        cin>>C.population<<endl;
        ……..                                    // statement 2
        File. write ((char*) &C ,sizeof (C));
        File. close ();
}
```

Complete the statements 1 & 2 .Using any function from seekg(), seekp(), tellp() & tellg() for performing the required task.

(b) Write a function using to count the number of words "to" and 'the" present in text file "POEM.TXT" . (Note that "to" and "the" are complete words) **2**

(c) Given a binary file GAME.DAT, containing records of the following class type. **3**

```
  class Game
{
        char Gname[20];
```

```
    char Participant[30];
};
```

Write a function in C++ that would read contents from the file GAME.DAT and create a file named BASKET. DAT copying only those records from GAME.Dat, where the game name is "Basket Ball".

(d) Write a function in C++ that would count and display the number of lines starting with alphabet 'A' present in a text file "STORY.TXT". **2**

If the file "STORY.TXT" contains the following lines.

The rose is red.
A girl is playing there.
There is a playground
An Aero plane is in the sky
Numbers are not allowed in the password

The function should display the output as: 2.

(e) Differentiate between ifstream class and ofstream class. **2**

(f) What is the difference between ios : : app and ios : : ate**.** **2**

Q6.

a) Verify the following algebraically. **1**

(A' + B') . (A + B) = A' B+A B'

b) Give the complement of the following Boolean Expression. **1**

X Y Z' + X Y' Z

c) Give the dual for the following Boolean expression. **1**

(A + 0). (A. 1 . A')

d) Write the canonical Sum-Of-Product expression for the following POS

expression. $F(X, Y, Z) = \prod(1, 3, 6, 7)$ **1**

e) State De Morgan's laws. Prove the second law. **2**

f) Realize "OR" operation using only NAND gates. **2**

g) Represent the Boolean expression $(A' + B' + C') . (A + B' + C') . (A + B + C')$ with the help of NOR-to-NOR logic network. **2**

h) Find the minimum Product-Of-Sum expression of **3**

$Y (A, B, C, D) = \prod (0, 1, 3, 5, 6, 7, 10, 14, 15)$ using K-map.

i) Minimize the following using a K-map. **3**

$F(A, B, C, D) = \Sigma (7, 9, 10, 11, 12, 13, 14, 15$

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