INDIAN SCHOOL SOHAR
PRE-BOARD EXAM (2019 – 20)
COMPUTER SCIENCE

CLASS: XII
DATE: 13/01/2020

MAX. MARKS: 70
DURATION: 3 HOURS

General Instructions

- Please check that this question paper contains 13 printed pages.
- 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 students will read the Question paper only and will not write any answer on the answer-book during this period.

Question1

a) Differentiate between call by value and call by reference in C++. Illustrate both with an example. 2

b) Write the names of the correct header files, which must be included in the following C++ code to compile the code successfully: 1

```
void main()
{
    char x;
    cin >> x;
    if(islower(x))
        cout << "Uppercase: " << toupper(x);
}
```

c) Rewrite the following C++ program after removing any/all syntactical error(s). Underline each corrections done in the code. (**Note: Assume all required header files are already included in the program:**) 2

```
Typedef int[2][3] Matrix;
void main()
{
    Matrix M = {24, 5, 4}, {69, 36, 44};
    for(int i = 0; i < 2; c++)
    {
        for(j = 0; j < 3; j++)
        if(M[i][j] % 5 == 0)
        cout << M[i][j] << " * ";
        cout << endl;
    }
}
```

d) Find and write output of the following C++ code. (**Note: Assume all required header files are already included**) 2

```
void My(char msg, char ch)
{
    for(int cnt=0; msg[cnt]!='\0'; cnt++)
    {
        if(msg[cnt] >= 'B' && msg[cnt] <= 'G')
            msg[cnt]=tolower(msg[cnt]);
        else if(msg[cnt] == 'A' || msg[cnt] == 'a')
            msg[cnt] = ch;
        else if(cnt%2 == 0)
            msg[cnt] = toupper(msg[cnt]);
        else
            msg[cnt]=msg[cnt-1];
    }
}
void main()
{
    char mytxt[] = "ApaCHeSeRvER";
    My(mytxt, '$');
    cout << "Changed Text : " << mytxt << endl;
}
```

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

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

```
struct thr_d
{
    int x, y, z;
};
void moveIn(thr_d &t, int step=1)
{
    t.x += step;
    t.y -= step;
    t.z -= step;
}
void moveOut(thr_d &t, int step=1)
{
    t.x -= step;
    t.y += step;
    t.z -= step;
```

```
}
void main()
{
    thr_d t1={10, 20, 5}, t2={30, 10, 40};
    moveIn(t1);
    moveOut(t2, 5);
    cout << t1.x << ":" << t1.y  << ":" << t1.z << endl;
    cout << t2.x << ":" << t2.y  << ":" << t2.z << endl;
    moveIn(t2, 10);
    cout << t2.x << ":" << t2.y  << ":" << t2.z << endl;
}
```

f) Find and write the output of the following C++ code from the options (i) to (iv). Also write the highest and lowest values that can be assigned in the array A. (**Assume all required header files are included**). **The function random(n) generates value between 0 to n-1.** 2

```
void main()
{
    randomize();
    int a[4], c = 0;
    for(c = 0; c < 4; c++)
        a[c] = random(c + 1) + 10;
    for(c = 3; c >= 0; c++)
        cout << a[c] << "@";        }
```

(i) 13@10@11@10@ (ii) 15@14@12@10@

(iii) 12@11@13@10@ (iv) 12@11@10@10@

Question 2

a) Encapsulation is one of the major properties of OOP. How is it implemented in C++? 2

b) Write any four differences between Constructor and Destructor function with respect to OOP. 2

OR

Observe the following C++ code and answer the questions (i) and (ii). Assume all necessary header files are included.

```
class Exam
{
    long Ecode;    char ETitle[20];        float Score;
    public:
    Exam()     //Member Function1
    {
        Ecode = 100;
```

```
        strcpy(ETitle, "Term-1");
        Score = 0.0;
    }
    Exam(Exam &E)                    //Member Function2
    {
        Ecode = E.Ecode + 1;
        strcpy(ETitle, E.ETitle);
        Score = E.Score;
    }
};
void main()
{
    _____          //Statement1
    _____          //Statement2
}
```

(i) Which OOP feature is illustrated by the Member Function1 and Member Function2 together in class Exam?

(ii) Write Statement1 and Statement2 to execute Member Function1 and Member Function2 respectively.

c) Define a class SUPPLY in C++ with the following descriptions: 4

Private Members

Code	integer
FoodNm	string
Sticker	string
FoodType	string
GetType()	Member function to assign the following values for FoodType as per the given Sticker

Sticker	**FoodType**
GREEN	Vegetarian
YELLOW	Contains Egg
RED	Non-Vegetarian

Public Members

FoodIn() – function to allow user to enter values of Code, FoodNm, Sticker and invoke function GetType() to assign respective FoodType.

FoodOut() – function 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 Chairperson
{
```

```
    long CID;       //Chairperson Identification Number
    char CName[20];
protected:
    char Description[40];
    void Allocate();

public:
    Chairperson();
    void Assign();
    void Show();
};
class Director
{
    int DID;
    char DName[20];
protected:
    char Profile[30];
public:
    Director();
    void Input();
    void Output();
};
class Company : private Chairperson, public Director
{
    int CID;    //Company ID
char City[20], Country[20];
public:
    Company();
    void Enter();
    void Display();
};
```

i. Which type of inheritance out of the following is illustrated in the above C++ code?
   a. Single level b. Multilevel c. Multiple

ii. Write the names of all the data members, which are directly accessible by the objects of class Company.

iii. Write the name of all member functions which are accessible by objects of class Company.

iv. Write name of all members which are accessible from member functions of class Director.

OR

Consider the following class State:

```
class State
{
    protected:
        int tp;              //No. of tourist places

    public:
        State()
        { tp = 0; }
        void intp()
        { tp++;}
        int gettp()
        { return tp; }
};
```

Write C++ code to publicly derive another class 'District' with the following additional members derived in the public visibility mode

Data Members:

Distname – char of size 50

Population – long

Member Functions:

Dinput() – to enter Distname and Population.

Doutput() – to display Distname and Population on screen

Question 3

a) Write a user defined function ADDDIAG(int P[][4], int N, int M) in C++ to find and display the sum of left diagonal and right diagonal elements as sumL and sumR from a 2D array. 2

OR

Write the definition of function Alter(int A[], int N) in C++, which should change all the multiples of 5 in the array to 5 and rest of the elements to 0. For eg. if the elements of array A is as follows:

A[] = {55, 43, 24, 15, 78, 69, 45, 50, 5, 18}

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

A[] = {5, 0, 0, 5, 0, 0, 5, 5, 5, 0}

b) Write a function SORTPOINTS() in C++ to sort an array of structure Game in descending order points using bubble sort. 3

NOTE: Assume the following definition of structure Game

```
struct Game
{
    long Pno;  //Player Number
    char Pname[20];
```

```
    long Points;
};
```

eg. Sample content of the array

Before sorting		
Pno	**Pname**	**Points**
103	Ritika	3001
104	Chetan	2819
101	Sejal	3451
105	Kiran	2971

After sorting		
Pno	**Pname**	**Points**
101	Sejal	3451
103	Ritika	3001
105	Kiran	2971
104	Chetan	2891

OR

Write code for a function void Change(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.

eg. if the content of the array is : 12 15 4 24 5

Then the changed content of the array is : 5 12 15 4 24

c) An array S[50][20] is stored in the memory along the row with each of its element occupying 4 bytes. Find out the memory location of S[30][10], if element S[10][5] is stored at location 15000. 3

OR

An array S[10][30] is stored in the memory along the column with each of its element occupying 2 bytes. Find out the memory location of S[5][10], if element S[2][5] is stored at location 8200.

d) Write the definition of a member function POP() for a class STACK in C++, to delete a book from a dynamic stack of TEXTBOOKS considering the following code is already written as a part of program. 4

```
struct TEXTBOOKS
{
    char ISBN[20];      char TITLE[20];          TEXTBOOKS *LINK;
};
class STACK
{
    TEXTBOOKS *Top;
public:
    STACK() { Top = NULL; }
    void PUSH ();
```

```
    void POP();
    void Show_TB();
    ~STACK();
};
```

OR

Write a function in C++ to perform insert operation on a dynamically queue contain member details as given in the following definition of NODE:

```
struct NODE
{
    long MNo;
    char MName[20];
    NODE *Next;
};
```

e) Convert the following infix expression to its equivalent postfix expression, showing the stack contents for each step of conversion: A / B + C * (D – E) 2

OR

Convert the following infix expression to its equivalent postfix expression, showing the stack contents for each step of conversion.

P/(Q + (R – T)) * U

Question 4

a) Observe the program code given below and fill in the blanks marked as Line1 and Line2 using appropriate fstream function. 2

```
class Stock
{
    long ino;        char item[20];
    int qty;
    public:
    void get(int);  //Function to allow user to enter ino, item and qty
    void show();    //Function to display the content
    void purchase(int tqty)
    {
        qty += tqty;
    }
    long getino() { return ino; }
};
void pur_item(long pino, int pqty)
```

```
{
    Stock s;
    fstream f;
    f.open("ITEMS.dat", ios::binary | ios::in | ios::out);
    int pos = -1;
    while(pos == -1 && f.read((char*)&s, sizeof(s)))
    {
        if(s.getino() == pino)
        {
            s.purchase(pqty);
            pos = file.tellg() – sizeof(s);
            _____ //Line1: to place the file pointer to the required position
            _____//Line2: to write the object s into the binary file
        }
    }
    if(pos == -1)
        cout << "Record not found for update.";
    f.close();
}
```

OR

Write a function in C++ to count the words "beautiful", "this" and "these" present in a text file "MYFILE.txt".

If the content of MYFILE.txt is as:

"This is a beautiful place. I love this place as there are many beautiful gardens and flowers. Hey friends look at these beautiful flowers. These flowers are of different variety and colour. I love the fragrance of these flowers. This place also has many beautiful butterflies."

Then the output of the function should be as:

Occurrence of beautiful word is 4

Occurrence of this word is 3

Occurrence of these word is 3

b) Write a user defined function FindLaptop() in C++ to read each object of a binary file Laptop.dat. The user should enter the Model number and the function should search matching record and display the details of the Laptop. 3

```
class Laptop
{
    long ModelNo;        float RAM, HDD;
    char Details[30];
public:
    void StockEnter() { cin >> ModelNo >> RAM >> HDD;    gets(Details); }
```

```
    void StockDisplay()   { cout << ModelNo << RAM << HDD;    puts(Details); }
    long returnModelNo()  { return ModelNo; }
};
```

OR

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

```
class ANTIQUE
{
    int ANO;
    char AName[20];
    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;
    }
};
```

c) Write a function definition CountCE() in C++ to read content of NOTES.txt and count the characters C & E (case insensitive) 1

eg. Assume the content of NOTES.txt is as follows:

CBSE enhanced its CCE guidelines further to enhance the education of students.

The CountCE() function should display:

Alphabet C occurrence: 6

Alphabet E occurrence: 11

OR

Differentiate between tellp() and seepk().

Question 5

a) Define DDL and DCL commands in SQL. List two commands each of DDL and DCL. 2

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

Table: SHOPPE

ID	SNAME	AREA
S001	ABC COMPUTRONICS	CONNAUGHT PALACE
S002	ALL INFOTECH MEDIA	GK II
S003	TECH SHOPPE	CP
S004	GEEKS TECHNO SOFT	NEHRU PALACE
S005	HITECH TECH STORE	NEHRU PALACE

Table: ACCESSORIES

NO	NAME	PRICE	ID
A01	MOTHER BOARD	12000	S001
A02	HARD DISK	5000	S001
A03	KEYBOARD	500	S002
A04	MOUSE	300	S001
A05	MOTHER BOARD	13000	S002
A06	KEYBOARD	400	S003
A07	LCD	6000	S004
T08	LCD	5500	S005
T09	MOUSE	350	S005
T10	HARD DISK	4500	S003

(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 area whose second name is 'PALACE'.

(iii) To display minimum and maximum price of each NAME of accessories.

(iv) To display NAME and PRICE of all accessories and their respective SNAME, AREA where they are available.

(v) Select DISTINCT NAME from Accessories where PRICE >= 5000;

(vi) Select AREA, COUNT(*) from Shoppe Group By Area;

(vii) Select COUNT(DISTINCT AREA) from Shoppe;

(viii) Select NAME, PRICE*0.05 as 'DISCOUNT', PRICE from Accessories where SNO in ('S002', 'S003');

Question 6

a) State and prove Third Distributive Law of Boolean Algebra. 2

b) Verify the following using Boolean Laws: 2

$$A' + B'.C = A'.B'.C' + A'.B.C' + A'.B.C + A'.B'.C + A.B'.C$$

c) Derive the canonical SOP 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	1
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

$F(A, B, C, D) = \pi (0, 1, 2, 4, 5, 6, 8, 10)$

Question 7

a) Roger Federrer 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 option. 2

(i) Computer virus
(ii) Spam Mail
(iii) Antivirus
(iv) Trojan Horse

b) Which protocol is used to browse through web pages using Internet browsers? Name any one internet browser. 1

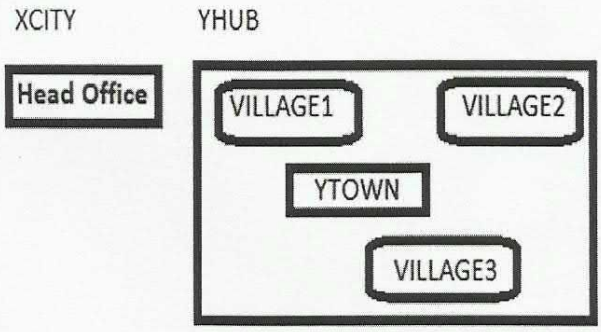
c) What is worm? How is it removed? 1

d) Write the full form of the following networking and communication terms: 2

- GPRS
- CDMA
- VOIP
- GSM

e) Intelligent Hub India is a knowledge community aimed to uplift the standard of skills and knowledge in the society. It is planning to setup its training centre in multiple towns and villages pan India with its head office in nearest city. 4

They have created a model of their network with a city, a town and 3 villages as given. As a network consultant, suggest the network related solutions for their issues/problems raised in (i) to (iv) with the following data given below:



Distance between various wings are given below

Village1 to YTOWN	2 km
Village2 to YTOWN	1.5 km
Village3 to YTOWN	3 km
Village1 to Village2	3.5 km
Village1 to Village3	4.5 km
Village2 to Village3	3.5 km
City Head Office to YHUB	30 km

Number of computers installed at various locations are as follows:

Village1	10
Village2	15
Village3	15
YTOWN	100
CITY OFFICE	5

NOTE: In villages, there are community centers, in which one room has been given as training center to this organisation to install computers. The organisation has got financial support from the government and top IT companies.

(i) Suggest the most appropriate location of the server in the YHUB to get the best and effective connectivity. Justify your answer.

(ii) Suggest the best wired medium and draw the cable layout (location to location) to efficiently connect various locations within the YHUB.

(iii) Which hardware device will you suggest to connect all the computers within each location of YHUB?

(iv) Which service/protocol will be most helpful to conduct live interactions of Experts from Head office and people at YHUB locations?