# Pre Board -1 Examination – December 2019

**Roll No.**

**Series  SSR / 1**                                   **Code No. 283/ 1 / 1**

## Computer Science (Old)

Class : XII                                          Time allowed :  3  hrs.
Date :  05-12-2019                                   Max marks :  70

**Instructions:**

1. *All questions are compulsory.*
2. *Use C++ as the programming language.*
3. *Questions 2(b,d),3 and 4 have internal choice.*

## SECTION A

1.
(a) What is the difference between #define and const? Explain with  a suitable C++ code.     (2)
(b) Which C++ header file(s) are essentially required to be included to run/execute the
    following C++ code :                                                                    (1)
```
void main() {
    char Text[ ]="+ve Attitude" ,c;
    cout<<setw(5)<<"Hello"<<setw(25)<<Text;      }
```
(c) Rewrite the following C++ code after removing any/all syntactical errors with each
    correction underlined.                                                                  (2)
    Note : Assume all required header files are already being included in the program.
```
void main()
{        Struct movie
         {
            char m_name[20];
            char m_type;
            int ticket =100;
         }M1;
    gets(m_name);
    gets(m_type);
}
```
(d) Write the output of the following C++ program code:                                     (2)
    Note: Assume all required header files are already being included in the program
    struct MyBox {

```cpp
void dimension(MyBox M)
{
  cout<<M.l<<"x"<<M.b<<"x"<<M.h<<endl;
}
void main() {
    MyBox B1={10,15,5},B2,B3;
    ++B1.h;
    dimension(B1);
    B3=B1;
    ++B3.l;
    B3.b++;
    dimension(B3);
    B2=B3;
    B2.h+=5;
    B2.l- -;
    dimension(B2);
}
```

(e) Find and write the output of the following C++ program code :   (3)
Note : Assume all required header files are already being included in the program.

```cpp
void main(){
    char *Name="a ProFile";
    for(int x=0;x<strlen(Name);x++)
        if(islower(Name[x]));
        else
        if(isupper(Name[x]))
            if(x%2!=0)
                    Name[x]=tolower(Name[x-1]);
            else
                    Name[x]- -;
    cout<<Name<<endl;

}
```

(f) Study the following program and select the possible output(s) from the option **(i)** to
**(iv)** following it. Justify your answer.   (2)
Note:
-Assume all required header files are already being included in the program.
-random(n) function generates an integer between 0 and n-1.

```cpp
cons tint LOW=25;
void main()
{
    randomize();
    int POINT=5, Number;

    for (int f=1;f<=4;f++)
    {
            Number= LOW+random(POINT);
```

```
        POINT- -;
    }
}
```
i) 29:26:25:28:    ii) 24:28:25:26:    iii)29:26:24:28:    iv)29:26:25:26:

2.
(a)  How does a class enforce data abstraction, data hiding and encapsulation?          (2)
(b)  Predict the output for the following:          (2)

```
#include<iostream.h>
class Train
{
        int TNo,TripNo,PCount;
public:
        Train(int TN=1)
        {
        TNo=TN;
        TripNo=0;
        PCount=0;
        }
        void trip(int TC=100)
        {
        TripNo++;
        PCount+=TC;
        }
        void show()
        {
        cout<<TNo<<":"<<TripNo<<":";
        cout<<PCount<<endl;
        }
};
void main()
{
        Train T(10),N;
        N.trip();
        T.show();
        T.trip(70);
        N.trip(40);
        N.show();
        T.show();
}
```

## OR

Answer the questions (i) and (ii) after going through the following code:
```
class Motor
{
    int MotorNo, Track;
```

```
        Motor();                              //Function1
        Motor(int MN);                        //Function 2
        Motor(&M);                            //Function3
        void allocate();                      //Function 4
        void Move();                          //Function 5
};
void main()
{
Motor M;
........
.......
}
```

i.   Out of the following which is the correct option for calling **Function2:**
        a)      Motor N(M);
        b)      Motor P(10);
ii.  In object Oriented programming which concept is illustrated by **Function1,**
     **Function 2, and Function 3** together?

(c)  Write the definition of a class TravelPlan in C++ with the following description :          (4)
**Private Members**
    - PlanCode                            // data member of long type
    - Place                               // data member of char array type
    - No_of_Travellers                    // data member of int type
    - No_of_Busses                        // data member of int type

**Public Members**
-A constructor to assign initial values as follows:
    •      PlanCode  as 1001
    •      Place as AGRA
    •      No_of_Travellers  as 5
    •      No_of_Busses     as 1
  - A function New Plan which allows user to enter PlanCode,Place and
  No_of _Travellers. It should also assign the value of No_of_Busses as
  follows:

| No_of_Travellers | No_of_Busses |
|------------------|--------------|
| Less tha 20      | 1            |
| >=20 and <40     | 2            |
| >=40             | 3            |

  - A function ShowPlan() to display the content of all the data members on the
  screen.

(d) Answer the questions (i) to (iv) based on the following: (4)
```
class Complex
{
    int Code;
protected:
    double Area;char Location[20];
public:
    void Get();void Put();
};
class Block: private Complex
{
    char BCode;
public:
    void BGet(); void BPut();
};
class Flat : public Block
{
    int FNo,NOR;
public:
    void FGet(); void FPut();
};
void main()
{
    Flat F;  }
```

i. Which type of Inheritance out of the following is illustrated in the above example?
    – Single Level Inheritance, Multilevel Inheritance, Multiple Inheritance
ii. Write the names of all the members , which are directly accessible by the member function BPut() of class Block .
iii. Write the names of all the data members , which are directly accessible by the member functions of class Flat .
iv. Write the names of all the members , which are directly accessible by the object F of class Flat declared in the main() function.

**OR**

Consider the following class Company:
```
class Company
{
    int Code;
    char Name[20];
  protected:
    float Turnover;
  public:
    void In(){cin>>Code;gets(Name);cin>>Turnover;}
    void Out(){cout<<Code<<Name<<Turnover<<endl;}
};
```
Write a code in C++ to privately derive another class **Branch** from base class **Company** with following members:

BCode of type long
BAddress of type character of size 10
**Member Functions**
- A constructor function to assign BCode as 1000.
- Input() to allow user to enter BCode and BAddress.
- Output() to display BCode and BAddress.

3.

(a) Write the definition of a function in C++, which accepts an integer array and its size as parameters and swaps the elements of every even location with its following odd location. (2)

**OR**

Write the definition of a function AddUp(int Arr[], int N) in C++, in which all even positions (i.e. 0,2,4,...) of the array should be added with the content of the element in the next position and odd positions (i.e. 1,3,5,...) elements should be incremented by 10.

Note:
- The function should not copy the altered content in another array.
- The function should not display the altered content of the array.
- Assuming, the Number of elements in the array are Even.
- The function should alter the content of the same array

(b) Let us assume T[10][15] is a two dimensional array, which is stored in the memory along the row with each of its element occupying 4 bytes, find the address of the element T[5][7], if the address of the element T[7][10] is 35000. Also, find the total number of elements which can be stored in the Array T. (3)

**OR**

Let us assume P[16][23] is a two dimensional array, which is stored in the memory along the column with each of its element occupying 4 bytes, find the address of the element P[5][8], if the base address of the array is 35000.

(c) Write a function ALTERNATE(int A[][3],int N,int M) in C++ to display all alternate elements from two dimensional array A starting from A[0][0]. (3)

**OR**

Write a function in C++ which accepts a two dimensional array of integers and its size as parameters and displays the elements of middle row and elements of middle column.

(d) Write a user defined function pop(Box B, int &T) to pop an element from a static stack of Boxes , at the location T(Top of the stack), where every Box is represented by the structure: (4)
struct Box
{
int Length,Width,Height;
};

Given that the following declaration of class BoxStack in C++ represents a dynamic stack of Box:

```
class BoxStack
    {
    Box *Top;          //Pointer with address of the Topmost Box of stack
    public:
    BoxStack()
    {
    Top = NULL;
    }
    void Push();       // Function to push a Box into the dynamic stack
    void Pop();        // Function to pop a Box from the dynamic stack
    ~BoxStack();    };
```

Write the definition for the member function void BoxStack::Push(), that pushes the details of a Box into the dynamic stack of BoxStack.

(e) Convert the following infix expression to postfix showing the stack contents at each step.          **U - V / W * X + Y**          (2)

**OR**

Evaluate the following postfix expression. Show the status of stack after every step of evaluation:          **100, 2, /, 5, 2, 3, +, *, -**

4.

(a) A text file named LETTERS.TXT contains some text. Write a user-defined function SHOWLETTERS() in C++ to read and display those words, which are starting with alphabet 'P' (irrespective of upper or lower case).          (2)

**OR**

A text file named DRAFT.TXT contains some text. Write a user-defined function MakeNew() in C++, which transfers lines from DRAFT.TXT to FINAL.TXT , which are not starting with alphabet 'X'.

(b) Write a user-defined function STUD_COUNT() in C++ to read each object of a binary file STUDENT.DAT , and count the number of students, who are paying Fee more than 2000. Assume that the file STUDENT.DAT is created with the help of objects of class STUDENT, which is defined below:          (3)

```
class STUDENT
{
  int Rno;char Name[20]; float Fee;
public:
  float Rfee() { return Fee; }
  void Show()
  {   cout<<Rno<<"|"<<Name<<"|"<<Fee<<endl; }
};
```

**OR**

A binary file HARDWARE.DAT contains records stored as objects of the following class :

```
class HARDWARE
    {
    int ID; char Device[20]; float Price;
```

```cpp
        int *GetID() { return ID; }
        float *GetPrice() { return Price;}
        void Display()
        { cout<<ID<<" # "<<Device<<" # "<<Price<<endl;
};
```
Write a user-defined function Economic() in C++, which displays the details of those HARDWARE devices from the file HARDWARE.DAT, which are priced less than 2000.

(c) Find the output of the following C++ code considering that the binary file STUD.dat already exists on the hard disk with 90 records in it. (1)

```cpp
struct Student{
        char name[31];
        int rollno;
        int marks[5];
        int total; };
void main()
{
        Student s; fstream f;
        int n,size=0;
        f.open("STUD.dat",ios::in|ios::binary);
        f.seekg(0,ios::end);
        size=f.tellg();
        n=size/sizeof(s);
        cout<<"No of Records:"<<n<<endl;
        f.close();
}
```

**OR**

Differentiate between tellp() and seekp() with the help of an example.

5.

(a) Differentiate between: (2)
   i. ALTER TABLE and UPDATE   ii. DROP TABLE and DELETE

(b) Consider the given tables and write SQL queries for **(i)** to **(iv)** and output for **(v)** to **(viii)**
(6)

TABLE: ITEMS

| Code | IName | Qty | Price | Company | TCode |
|------|-------|-----|-------|---------|-------|
| 1001 | DIGITAL PAD 121 | 120 | 11000 | XENITA | T01 |
| 1006 | LED SCREEN 40 | 70 | 38000 | SANTORA | T02 |
| 1004 | CAR GPS SYSTEM | 50 | 2150 | GEOKNOW | T01 |
| 1003 | DIGITAL CAMERA 12X | 160 | 8000 | DIGICLICK | T02 |
| 1005 | PEN DRIVE 32 GB | 600 | 1200 | STOREHOME | T03 |

TABLE: TRADERS

| TCode | TName | City |
|-------|-------|------|
| T01 | ELECTRONIC SALES | MUMBAI |
| T03 | BUSY STORE CORP | DELHI |
| T02 | DISP HOUSE INC | CHENNAI |

i) To display the details of all the items in ascending order of item names.

ii) To display Item Name and price of all those items whose price is in the range of 10000 and 22000(both inclusive)

iii) To increase the price by 10% of all those items which have 'A' in their Company names.

iv) To display names of those traders who are either from Delhi or Mumbai.

v) SELECT MAX(Price), MIN(Price) from ITEMS;

vi) SELECT Price *Quantity AMOUNT from ITEMS where Code=1004;

vii) SELECT DISTINCT(TCODE) from ITEMS;

viii) SELECT INAME,TNAME from ITEMS I, TRADERS T where I.TCODE=T.TCODE and QTY<100;

6.

(a) Verify $X'.Y+X.Y'=(X'+Y').(X+Y)$ algebraically. (2)

(b) Draw the logic circuit for the given Boolean expression (2)

$$(X'+Y).Z+W'$$

(c) Derive a Canonical POS expression for a Boolean function F, represented by the following truth table : (1)

| X | Y | Z | F(X,Y,Z) |
|---|---|---|----------|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

(d) Reduce the following Boolean Expression using K Map:
   $F (U,V,W,Z)= \Sigma(0,1,4,5,6,7,8,9,11,15)$ (3)

7.

(a) Explain the working of TCP/IP. (1)

(b) Expand the following: (2)
   i) CDMA      ii) WLL      iii)GSM      iv)ASP

(c) What is cloud computing? (1)

(d) Differentiate between STAR and BUS topologies. (2)

(e) Xcelencia Edu Services Ltd. is an educational organization. It is planning to set up its India campus at Hyderabad with its head office at Delhi. The Hyderabad campus has 4 main buildings ADMIN, SCIENCE, BUSINESS and MEDIA. The physical distances

these departments and HEAD office is given as follows. You as a network expert have
to answer the queries raised by them in (i) to (iv).                                    (4)

Shortest distances between various locations

| ADMIN to SCIENCE | 65M |
|---|---|
| ADMIN to BUSINESS | 100m |
| ADMIN to ARTS | 60M |
| SCIENCE to BUSINESS | 75M |
| SCIENCE to ARTS | 60M |
| BUSINESS to ARTS | 50M |
| DELHI Head Office to HYDERABAD Campus | 1600KM |

Number of Computers installed at the various locations are as follows:

| ADMIN | 100 |
|---|---|
| SCIENCE | 85 |
| BUSINESS | 40 |
| ARTS | 12 |
| DELHI Head Office | 20 |
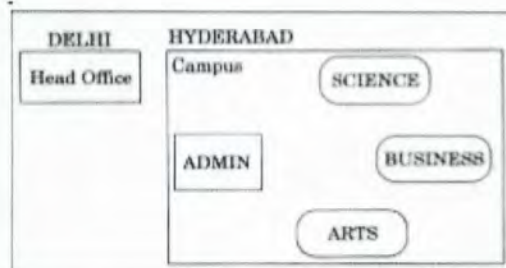


i) Suggest the most appropriate location of the server inside the HYDERABAD campus (out of the 4 buildings), to get the best connectivity for maximum no. of computers. Justify your answer.

ii) Suggest and draw the cable layout to efficiently connect various buildings within the HYDERABAD campus for connecting the computers.

iii) Which hardware device will you suggest to be procured by the company to be installed to protect and control the internet uses within the campus?

iv) Which of the following will you suggest to establish the online face-to-face communication between the people in the **Admin** Office of HYDERABAD campus and DELHI Head Office?         (a) E-mail (b) Text Chat (c) Video Conferencing (d) Cable TV

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