

SECOND PREBOARD EXAMINATION (2019–20)

CLASS: XII

Subject: COMPUTER SCIENCE

Date: 04.02.2020

Time Allowed: 3 Hours

Maximum Marks: 70

General instructions:

- (1) All questions are **compulsory**.
- (2) Marks are indicated against each question.
- (3) Please check that this question paper contains 15 printed pages only.
- (4) Please check that this question paper contains 7 questions. In Question 2(b, d), 3 and 4 has internal choices.

1. a) Write the type of C++ Operators for the following: 2
(i) ++ (ii) != (iii) += (iv) !

b) Observe the following program very carefully and write the name of those header file(s), which are essentially needed to compile and execute the following program successfully: 1

```
void main ()
{
char C,String[]="Excellence Overload";
for(int I=0;String[I]!='\0';I++)
    if(String[I]==' ')
        puts("\n");
    else
    {
        C=toupper(String [I]);
        putchar(C);
    }
}
```

c) Rewrite the following C++ code after removing any/all Syntactical Error(s) with each correction underlined. 2

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

```

struct Pixels
{
    int Color,Style;
}
void ShowPoint(Pixels P)
{
    cout<<P.Color,P.Style<<endl;
}
void main()
{
    Pixels Point1=(5,3);
    ShowPoint(Point1);
    Pixels Point2=Point1;
    Color.Point1+=2;
    ShowPoint(Point2);
}

```

- d) 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.

```

void Newtext(char String[], int &Position)
{
    char *Pointer = String;
    int Length = strlen(String);
    for ( ; Position<Length - 2; Position+=2, Pointer++)
    {
        *(Pointer+Position) = toupper(*(Pointer + Position));
    }
}
void main()
{
    clrscr();
    int Location = 0;
}

```

```

char Message[] = "Dynamic Act";
Newtext(Message, Location);
cout << Message <<"#" << Location;
}

```

- e) Find and write the output of the following C++ program code: 2

```

#include <iostream.h>
void main()
{
    int v1 = 5, v2 = 10;
    for (int x = 1; x <= 2; x++)
    {
        cout << ++v1 <<'\t' << v2-- << endl;
        cout << --v2 <<'\t' << v1++ << endl;
    }
}

```

- f) Observe the following program and find out, which output(s) out of (i) to (iv) will not be expected from the program? What will be the minimum and the maximum value assigned to the variable Chance? Assume all required header files are already being included in the program. 2

```

void main()
{
    randomize();
    int Arr[] = {9, 6}, N;
    int Chance = random(2) + 10;
    for (int C = 0; C < 2; C++)
    {
        N = random(2);
        cout << Arr[N] + Chance << "$";
    }
}

```

- (i) 9\$6\$
- (ii) 19\$17\$
- (iii) 19\$16\$
- (iv) 20\$16\$

2. a) Why is a destructor function required in classes? Illustrate with the help of an example. 2
- b) Write the output of the following C++ code. Also, write the name of feature of Object Oriented Programming used in the following program jointly illustrated by the functions [I] to [IV]. 2

```
void Print ( ) // Function [I]
{
    for (int K=1;K<=60; K++) cout<< "-";
    cout<<endl;
}
void Print (int N) //Function[II]
{
    for (int K=1;K<=N; K++) cout<<"*";
    cout<<endl;
}
void Print(int A, int B) //Function[III]
{
    for(int K=1;K<=B;K++) cout<<A*K;
    cout<<endl;
}
void Print(char T, int N) // Function[IV]
{
    for (int K=1;K<=N;K++) cout<<T;
    cout<<endl;
}
void main( )
{
    int U=9,V=4,W=3;
    char C ='@';
    Print(C,V);
    Print(U,W);
}
```

OR

- b) Write any four features of Constructor and Destructor function with respect to object oriented programming.
- c) Define a class Serial in C++ with the following specifications : 4

private members of class Serial

- Serialcode integer
- Title 20 characters
- Duration float
- Noofepisodes integer

public member function of class Serial

- A constructor function to initialise Duration as 30 and Noofepisodes as 10.
- NewSerial() function to accept values for Serialcode and Title
- Otherentries() function to assign the values of Duration and Noofepisodes with the help of corresponding values passed as parameters to this function.
- Dispdata() function to display all the data members on the screen.

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

```
class School
{
    int A;
protected :
    int B,C;
public :
    void INPUT(int);
    void OUTPUT();
};
class Dept : protected School
{
    int X, Y;
protected :
    void IN (int,int);
public :
    void OUT();
};
class Teacher : public Dept
{
    int P;
    void DISPLAY (void);
```

```
public :  
    void ENTER();  
};
```

(i) Name the base class and derived class of the class Dept.

(ii) Name the data member(s) that can be accessed from function OUT().

(iii) Name the private member function(s) of class Teacher.

(iv) Is the member function OUT() accessible by the objects of Dept. ?

OR

d) Consider the following class definitions and answer the questions following it :

```
class Base  
{  
    int A1;  
    void BF1( );  
protected :  
    int B1;  
    void BF2( );  
public:  
    int C1;  
    void BF3();  
} ob1;  
class Middle : private Base {  
    int A2;  
protected :  
    int B2;  
    void MF1( );  
public:  
    int C2;  
    void MF3();  
} ob2;  
class Derived : protected Middle {  
    void DF1();
```

```

    int A3;
public:
    int B3;
    void DF2();
} ob3;

```

- (i) Name the member functions accessible to the objects of Derived.
(ii) Name the data members that are accessible in function DF1().
(iii) What would be the size of class **Derived** objects?
(iv) Name the data members that are accessible in function DF2().
3. a) Write a user-defined function AddSevenNine(int A[][4],int R,int C) 2
in C++ to find and display the sum of all the values, which are ending with 7 or 9 (i.e., unit place is 7 or 9).

For example: if the array P contains

17	18	22
39	8	9

Then the function should display the output 65 (Sum of 17, 39 and 9).

OR

- a) Write the definition of function named Array_Swap() that will accept an integer array & its size as arguments and the function will interchange/swap elements in such a way that the first element is swapped with the last element, second element is swapped with the second last element and so on, only if anyone or both the elements are odd.
E.g. if initially array of seven elements is:
5, 16, 4, 7, 19, 8, 2
After execution of the above function, the contents of the array will be: 2,16, 19, 7, 4, 8, 5
- b) Write a function int ALTERSUM(int B[][5], int N,int M) in C++ to 3
find and return the sum of elements from all alternate elements of a two dimensional array starting from B[0][0].

OR

- b) Define a function SWAPCOL() in C++ to swap (interchange) the first column elements with the last column elements, for a two dimensional integer array passed as the argument of the function.

- c) An array A[20][30] is stored along the row in the memory with each element requiring 4 Bytes of storage. If the base address of array A is 32000, find out the location of A[15][10], Also, find the total number of elements present in this array. 3

OR

- c) An array P[15][10] is stored along the column in the memory with each element requiring 4 bytes of storage. If the base address of array P is 1400, find out the location of P[8][5].
- d) Write a user-defined function Pop(Box B[],int &T),which pops the details of a Box, from the static stack of Box B, at the location T (representing the Top end of the stack), where every Box of the stack is represented by the following structure. 4

```
struct Box
{
    int Length,Width,Height;
};
```

OR

- d) Give the necessary declaration of a linked list implemented queue containing float type values. Also, write a user defined function in C++ to add a float type number in the queue.
- e) Convert the following Infix expression to its equivalent Postfix expression, showing the stack contents for each step of conversion. 2
- $U - V / W * X + Y$

OR

- e) Evaluate the following Postfix expression :
100,2,/ ,5,2,3,+,*,-
4. a) Write a function in C++ to count the number of characters up to the first \$ present in a text file "BOOK..txt". 2

OR

- a) Write a function RevText() to read a text file " Input.txt " and Print all the words in reverse order .
Example: If value in text file is: INDIA IS MY COUNTRY
Output will be: AIDNI SI YM YRTNUOC
- b) Write a function in C++ to search for a laptop from a binary file "LAPTOP.DAT" containing the objects of class LAPTOP (as 3

defined below). The user should enter the Model No and the function should search and display the details of the laptop.

```
class LAPTOP
{
    long ModelNo;
    float RAM,HDD;
    char Details[120];
public:
    void StockEnter()
    {
        cin>>ModelNo>>RAM>>HDD;
        gets(Details);
    }
    void StockDisplay()
    {
        cout<<ModelNo<<RAM<<HDD<<Details<<endl;
    }
    long ReturnModelNo()
    {
        return ModelNo;
    }
};
```

OR

- b) Given a binary file STUDENT.DAT, containing records of the following class Student type

```
class Student
{
    char S_Admno[10]; // Admissio number of student
    char S_Name[30]; //Name of student
    int Percentage; // Marks Percentage of student
public:
    void EnterData()
    { gets(S_Admno); gets(S_Name);
      cin>>Percentage; }
    void DisplayData()
    { cout<<setw(12)<<S_Admno;
      cout<<setw(32)<<S_Name;
```

```

    cout<<setw(3)<<Percentage<<endl;
}
int ReturnPercentage()
{ return Percentage; }
};

```

Write a function in C++, that would read contents of file STUDENT.DAT and display the details of those Students whose Percentage is above 75.

- c) Observe the program segment given below carefully and fill the blanks marked as statement 1 and Statement 2 using tellg() and seekp() functions for performing the required task. 1

```

#include<fstream.h>
class Customer
{
long Cno;
char Name[20],Mobile[12];
public:
//function to allow user to enter the Cno, Name, Mobile
void Enter();
//function to allow user to enter (modify) mobile number
void Modify();
//function to return value of Cno
long GetCno() { return Cno;}
};
void ChangeMobile()
{
Customer C;
fstream F;
F.open("CONTACT.DAT",ios::binary | ios::in | ios::out);
long Cnoc; //customer no. whose mobile number needs to be
changed
cin>>Cnoc;
while(F.read((char*)&C,sizeof(C)))
{
if(Cnoc==C.GetCno())
{
C.Modify();
//statement 1

```

```

int Pos= _____ //to find the current position
//of file pointer
// statement 2
_____ //to move the file pointer to write the
//modified the record back on to the file
//for the desired Cnoc
F.write((char*)&C,sizeof(C));
}
}
F.close();
}

```

OR

- c) Find the output of the following C++ code considering that the binary file MEMBER.DAT exists on the hard disk with records of 100 members:

```

class MEMBER
{
int Mno; char Name [20];
public :
void In (); void out ();
};
void main ()
{
fstream MF;
MF.open ("MEMBER.DAT", ios :: binary | ios :: in);
MEMBER M;
MF.read ((char*) &M, sizeof (M)) ;
MF.read ((char*) &M, sizeof (M));
MF.read ((char*) &M, sizeof (M));
int POSITION = MF. tellg () / sizeof (M) ;
cout<<"PRESENT RECORD :"<<POSITION;
MF.close () ;
}

```

5. a) (i) Define the given terms in respect of Relational Database: 1
Cardinality of a Table and Degree of a Table.

(ii) What do you understand by primary key?

1

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

Table: ACTIVITY

ACode	ActivityName	ParticipantsNum	PrizeMoney	ScheduleDate
1001	Relay 100x4	16	10000	23-Jan-2004
1002	High jump	10	12000	12-Dec-2003
1003	Shot Put	12	8000	14-Feb-2004
1005	Long Jump	12	9000	01-Jan-2004
1008	Discuss Throw	10	15000	19-Mar-2004

Table: COACH

PCode	Name	ACode
1	Ahmad Hussain	1001
2	Ravinder	1008
3	Janila	1001
4	Naaz	1003

- (i) To display the name of all activities with their ACode in descending order from the table ACTIVITY.
- (ii) To display sum of PrizeMoney for each of the Number of participants groupings (as shown in column ParticipantsNum 10, 12, 16) from the table ACTIVITY.
- (iii) To display the coach's Name and ACode in ascending order of ACode from the table COACH.
- (iv) To display the content of the ACTIVITY table whose ScheduleDate earlier than 01/01/2004 in ascending order of ParticipantsNum.
- (v) `SELECT COUNT(DISTINCT ParticipantsNum)
FROM ACTIVITY;`
- (vi) `SELECT MAX(ScheduleDate),MIN(ScheduleDate)
FROM ACTIVITY;`
- (vii) `SELECT SUM(PrizeMoney)
FROM ACTIVITY;`
- (viii) `SELECT DISTINCT ParticipantsNum
FROM ACTIVITY;`
- 6 a) State and define principle of Duality. Why is it so important in Boolean Algebra? 2

- b) Draw the Logic Circuit for the following Boolean Expression : 2
 $(X'+Y).Z+W'$
- c) Given the following truth table, derive a Sum of Product (SOP) and 1
 Product of Sum (POS) form of Boolean expression from it.

X	Y	Z	G(X,Y,Z)
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	1

- d) Reduce the following Boolean Expression to its simplest form 3
 using K-Map:
 $F(X,Y,Z,W) = \Sigma (0,1,2,3,4,5,8,10,11,14)$
7. a) Write the one advantage and one disadvantage of the following 1
 topologies in network :
 (i) Bus Topology (ii) Star Topology
- b) Write the following abbreviations in their full form : 1
 (i) PPP (ii) DNS
- c) What is the purpose of a Router ? 1
- d) Define firewall. 1
- e) When the user browses a website, the web server sends a text file 1
 to the web browser. What is the name of this?
- f) Which protocol is used to creating a connection with a remote 1
 machine?
- g) Indian School, in Mumbai is starting up the network between its 4
 different wings. There are Four Buildings named as SENIOR,
 JUNIOR, ADMIN and HOSTEL as shown below:

SENIOR

JUNIOR

ADMIN

HOSTEL

The distance between various buildings is as follows:

ADMIN TO SENIOR 200m

ADMIN TO JUNIOR 150m

ADMIN TO HOSTEL 50m

SENIOR TO JUNIOR 250m

SENIOR TO HOSTEL 350m

JUNIOR TO HOSTEL 350m

Number of Computers in Each Building

SENIOR 130

JUNIOR 80

ADMIN 160

HOSTEL 50

- (i) Suggest the cable layout of connections between the buildings.
- (ii) Suggest the most suitable place (i.e. building) to house the server of this School, provide a suitable reason.
- (iii) Suggest the placement of the following devices with justification.
 - Repeater
 - Hub / Switch
- (iv) The organization also has Inquiry office in another city about 50-60 Km away in Hilly Region. Suggest the suitable transmission media to interconnect to school and Inquiry office out of the following
 - Fiber Optic Cable
 - Microwave

· Radio Wave