

COMMON PRE-BOARD EXAMINATION 2017-2018

COMPUTER SCIENCE

CLASS: XII

Time Allowed: 3 hours

Maximum Marks: 70

Instructions-

- (i) Please check that this question paper contains 11 printed pages.
- (ii) Please check that this question paper contains 7 questions.
- (iii) Please write down the Serial Number of the question before attempting it.
- (iv) All questions are compulsory.
- (v) Programming Language: C++

SECTION – A (C++)

Question 1:

- (a) Find the correct identifiers out of the following which can be used for naming variables, constants or functions in a C++ program. [2]
- (i) Sep98_Score (ii) 98Sep_Score (iii) Grosspay (iv) cout (v) Your Age
(vi) Initial1 (vii) Marks% (viii) _DOB

- (b) Observe the following C++ code and write the name(s) of the header file(s), which will be essentially required to run it in a C++ compiler: [1]

```
void main()
{
    int a[10];
    for(int i=0;i<10;i++)
    {
        cin>>a[i];
        if(a[i]%2==0)
            a[i]=pow(a[i],3);
        else
            a[i]=sqrt(a[i]);
    }
}
```

- (c) Find syntax error(s) if any, in the following program: (Assume all required header files are already included.) [2]

```
typedef String[80] char;
void main()
{
    String S;
    for(L=0;L<26;C++)
        S[L]=L+65;
    S[L]='\0';
    cout<<S<<endl;
}
```

(d) Give the output of the following program segment:

[3]

(Assuming all required header files are already included)

```
#include<iostream.h>
class Quiz
{
    int Round;
    float Score;
public:
    Quiz()
    {
        Round=1;
        Score=0;
    }
    Quiz(Quiz &Q)
    {
        Round=Q.Round+1;
        Score=Q.Score+10;
    }
    void GetBonus(float B=5)
    {
        Score+=B;
    }
    void ShowScore( )
    {
        cout<<Round<<"#"<<Score<<endl;
    }
};
void main()
{
    Quiz A;
    A.ShowScore();
    A.GetBonus(10);
    A.ShowScore();
    Quiz B(A);
    B.GetBonus();
    B.ShowScore();
}
```

(e) Give the output of the following program segment:

[2]

(Assuming all required header files are already included)

```
void main( )
{
    float *Ptr, Points[ ]={ 20, 50, 30, 40, 10};
    Ptr=Points;
    cout<<*Ptr<<endl;
    Ptr+=2;
    cout<<*Ptr<<endl;
    Points[2]+=2.5;
    cout<<*Ptr<<endl;
    Ptr++;
    (*Ptr)+=2.5;
    cout<<Points[3]<<endl;
}
```

- (f) Find out the expected correct output(s) from the options (i) to (iv) for the following C++ code. [2]
Also, find out the minimum and the maximum value that can be assigned to the variable 'Stop' used in the code.

(Assuming all required header files are already included)

```
void main()
{
    int Begin=3, Stop;
    for (int Run=1;Run<4;Run++)
    {
        Stop=random(Begin)+6;
        cout<<Begin++<<Stop<<"*";
    }
}
```

(i) 36*46*59*

(ii) 37*46*56*

(iii) 37*48*57*

(iv) 35*45*57*

Question 2:

- (a) What is the relationship between a class and its objects? How is memory allocated to a class and its objects? [2]

- (b) Consider the following code: [2]

```
class Ci
{
    int L;
public:
    Ci(int j)
    {
        L=j; // Function 1
    }
    Ci(Ci &rv)
    {
        L=rv.L; // Function 2
    }
    void initialize()
    {
        L=0;
    }
};
```

Referring to the sample code above, answer the questions (i) and (ii).

- (i) Give the name of the feature of OOP which is implemented by Function 1 and Function 2 together in the above class Ci.

```
(ii) main()
{
    Ci . original(1);
    Ci X1(original);
    Ci X2=original;
}
```

Referring to the above sample code, what initializes the object X1?

- (i) initialize() function
- (ii) Function 1 the parameterized constructor
- (iii) Function 2 the copy constructor
- (iv) shows error

Justify your answer.

(c) Define a class **MOVIE** in C++ with the description given below:

[4]

Private Members:

- 1. Name_of_Movie - type character array (String)
- 2. Date_of_Release - type character array (String)
- 3. Name_of_Director - type character array (String)
- 4. Star - type integer
- 5. Total_Print_Release - type integer

- 1. A function **Calculate_Star ()** which calculate and assigns the value of a data member star as follows:

Total_Print_Release	Star
>=1000	5
<1000 and >=500	4
<500 and >=300	3
<300 and >=100	2
<100	1

Public Members:

- 2. A constructor to assign initial values as follows:

```
Name_of_Movie    NULL
Date_of_Release  01/01/2007
Name_of_Director NULL
Star             2
Total_Print_Release 100
```

- 3. A function **EnterMovie()** to input the values of members Name_of_Movie, Date_of_Release, Name_of_Director, Total_Print_Release and invoke the function Calculate_Star() to assign the value of Star.
- 4. A function **ShowMovie()** which displays the content of all the data members for a movie.

(d) Answer the questions from (i) to (iv) based on the code given below. (Assume all necessary header files are included in the program):-

[4]

```
class City
{
int City_Id;
char City_Name[30];
protected:
int City_Population;
public:
City();
void Get_Population();
void New_City();
void Show_City();
};
class State: Public City
{
int State_Id;
char State_Name[25];
protected:
int State_Population;
public:
State( );
void New_State( );
void Print_State();
};
class Country: private State
{
int Country_Id;
char Country_Name[25];
public:
Country( );
void New_Country( );
void Display_Country( );
};
```

- (i) Write the name of the class whose constructor is invoked first in the creation of a new object of class Country.
- (ii) Write the name of data members, which are accessible through the object of class Country.
- (iii) List name of the members which are accessible through the member function "**void New_Country()**".
- (iv) What will be the size (in bytes) of an object of class Country & State respectively?

Question 3:

- (a) Write a function in C++ which accepts an integer array and its size as arguments and exchanges the value of first half side elements with twice the value in the second half side elements of the array. [i.e. When the second half side elements are exchanged they have to be doubled and then exchanged] [3]

For Example

If an array of 8 locations initially contains the element as

5, 12, 3, 6, 7, 1, 9, 15

Then the function should rearrange the contents of the array as

14, 2, 18, 30, 5, 12, 3, 6

- (b) An array **Mat[20][12]** is stored in the memory column wise with each element occupying 2 bytes of memory. Find out the base address and the address of element **Mat[15][10]**, if the location of **Mat[2][4]** is stored at the address 1000. [3]

- (c) Consider the following portion of a program, which implements passengers Queue for a train. Write the definition of function Insert (whose prototype is shown below) to insert a new node in the queue with the required information. [4]

```
struct NODE
{
long TicketNo;
char PName[20];
NODE *Next;
};
class Queue_Train
{
NODE *Rear, *Front;
public:
Queue_Train()
{
Rear=NULL;
Front=NULL;
}
void insert();
void Delete();
~Queue_Train();
};
```

- (d) Write a user defined function **int SumSingle(int A[4][4])** in C++, which finds and returns the sum of all numbers present in the first row of the array. For example if the array contains [2]

1	13	10	9
29	17	2	21
14	3	2	31
15	6	25	52

Then the function should return 33.

- (e) Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation: [2]
- 5, 3, 2, *, 4, 2, /, -, *

Question 4:

- (a) Answer the questions (i) and (ii) in the program segment given below, for the required task. [1]

```
class Route
{
int Route_No;
char Route_Name[21];
int No_Kms;
public:
void New_Route( );
void Show_Route( );
int Get_RouteNo()
{
return Route_No;
}
void Update_Kms(int K)
{
No_Kms=K;
}
};
void Update_Route(int No, int New_Kms)
{
Route R;
fstream File("Route.DAT", ios::in|ios::out|ios::binary);
while(!File.eof())
{
File.read((char*)&R, sizeof(R));
if(R.Get_RouteNo()==No)
{
R.Update_Kms(New_Kms);
_____// Statement 1
_____// Statement 2
cout<<"Route Details Updated \n";
}
}
File.close();
}
```

- (i) Write statement 1 to position the file pointer to the appropriate place so that the data updating is done for the correct Route.
- (ii) Write statement 2 to perform the write operation so that the data updating is done in the binary file "Route.DAT".

(b) Assume a text file "Vowel.txt" is already created. Using this file write a function to create two files "Lower.txt" which contains all the lowercase vowels and "Upper.txt" which contains all the uppercase vowels. [2]

(c) Assuming the class 'Transport' given below, write functions in C++ to perform following: [3]
 (i) Write the objects of Transport to a binary file.
 (ii) Read the objects of Transport from a binary file and display them on screen.

```

class Transport
{
int Wheels;
char passenger[20];
public:
void input( )
{
cin>>Wheels;
gets(passenger);
}
void output( )
{
cout<<Wheels<<" "<<passenger<<endl;
}
};
  
```

SECTION – B

Question 5:

(a) Differentiate between primary key and alternate key with the help of an example. [2]

(b) Consider the following relation **MobileMaster** & **MobileStock**:- [6]

MobileMaster

M_Id	M_Company	M_Name	M_Price	M_MF_Date
MB001	Samsung	Galaxy	4500	2013-02-12
MB003	Nokia	N1100	2250	2011-04-15
MB004	Micromax	Unite3	4500	2016-10-17
MB005	Sony	XperiaM	7500	2017-11-20
MB006	Oppo	SelfieX	8500	2010-08-21

MobileStock

S_ID	M_Id	M_Qty	M_Supplier
S001	MB004	450	New Vision
S002	MB003	250	Praveen Gallery
S003	MB001	300	Classic Mobile Store
S004	MB006	150	A-One Mobiles
S005	MB003	150	The Mobile
S006	MB006	50	Mobile Centre

Write the SQL query for questions from (i) to (iv) & write the output of SQL command for questions from (v) to (viii) given below:-

- (i) Display the Mobile company, name & price in descending order of their Manufacturing date.
- (ii) List the details of mobile whose name starts with "S" or ends with "a".
- (iii) Display the Mobile supplier & quantity of all mobiles except "MB003".
- (iv) Display a list showing the name of mobile company having price between 3000 & 5000.
- (v) `SELECT M_Id, SUM(M_Qty) FROM MobileStock GROUP BY M_Id;`
- (vi) `SELECT MAX(M_Date), MIN(M_Date) FROM MobileMaster;`
- (vii) `SELECT M1.M_Id, M1.M_Name, M2.M_Qty, M2.M_Supplier FROM MobileMaster M1, MobileStock M2 WHERE M1.M_Id=M2.M_Id AND M2.M_Qty>=300;`
- (viii) `SELECT AVG(M_Price) FROM MobileMaster;`

Question 6:

- (a) State DeMorgan's laws. Verify one of the DeMorgan's laws using a truth table. [2]
- (b) Draw a logic circuit for the following Boolean expression. [2]
 $A \cdot B' + (C + B')$
- (c) Obtain a simplified form for the following Boolean expression using Karnaugh's Map. [3]
 $F(P, Q, R, S) = \sum(0, 2, 4, 5, 6, 7, 8, 10, 13, 15)$
- (d) Write the Product of Sum form of the function $G(U, V, W)$ for the following truth table representation of G : [1]

U	V	W	G(U, V,W)
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	0

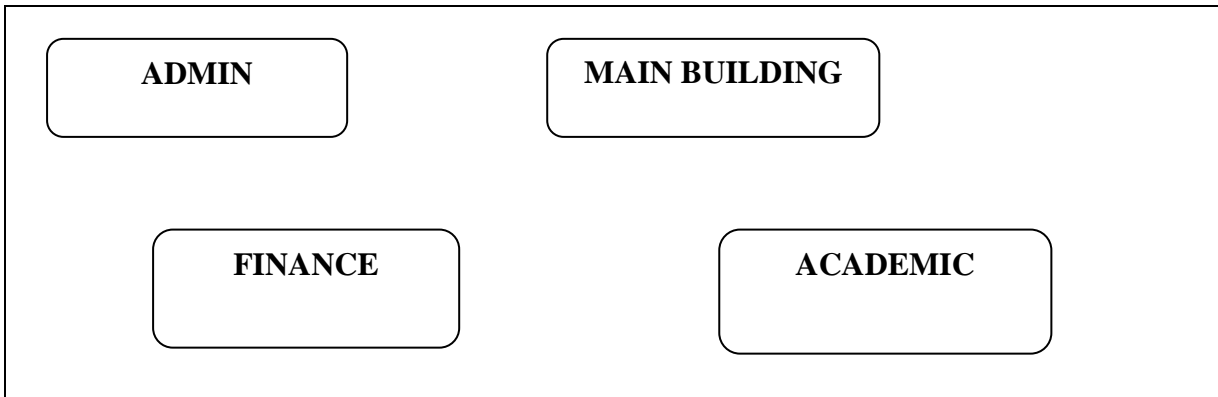
Question 7:

(a) What is a Gateway?

[1]

(b) Sanskar University of Himachal Pradesh is setting up a secured network for its campus at Himachal Pradesh for operating their day-to-day office & web based activities. They are planning to have network connectivity between four buildings. Answer the question (i) to (iv) after going through the building positions on the campus & other details which are given below:

[4]



The distance between the various buildings of the University are given as:

Building 1	Building 2	Distance (in Mtrs)
Main	Admin	50
Main	Finance	100
Main	Academic	70
Admin	Finance	50
Admin	Academic	60
Finance	Academic	70

Number of Computers:

Building	No_of_Computers
Main	150
Admin	75
Finance	50
Academic	60

As a network expert, you are required to give best possible solutions for the given queries of the university administration:-

- Suggest cable layout for the connections between the various buildings,
- Suggest the most suitable building to house the server of the network of the university,
- Suggest the placement of following devices with justification:
 - Switch/Hub
 - Repeater
- Suggest the best technology out of the following for setting-up very fast Internet connectivity among buildings of the university
 - Optical fiber
 - Coaxial cable
 - Ethernet Cable

- (c) Expand the following terms with respect to networking. [1]
(i) **HTTP** (ii) **URL**
- (d) What are cookies? [1]
- (e) Explain Web Hosting? [1]
- (f) What is an IP address? [1]
- (g) How is 4G different from 3G? [1]

*****ALL THE BEST*****