Pre Board Examination 2015
Std. 12
13-01-2015

Set 2

COMPUTER SCIENCE

Max. Marks : 70
Time : 3 hrs.
_____

Instructions: i)   All questions are compulsory.
                 (ii) Programming language: C++.

1. a) Rewrite the following program after removing all syntactical error(s), if any. Underline each correction: [2]

```cpp
#include<iostream.h>
struct Display
{
int ROW, COL;
}
void Showpoint(Display D)
{
 cout<< D.ROW << D.COL <<endl;
}
void main( )
{
 Display Disp1 = ( 10, 20 );
 Display Disp2 = Disp1;
 Disp1.Showpoint( );
 ROW + = 15;
 Showpoint( ).Disp2;
}
```

b)   Give the output of the following program: [3]

```cpp
#include<ctype.h>
#include<string.h>
#include<iostream.h>
void main( )
{
        char *DATA = " a HexaDecimal" ;
        for(int ctr = 0 ; ctr<strlen(DATA) ; ctr ++)
                if(islower (DATA[ctr] ))
                        DATA[ctr] = toupper(DATA[ctr]);
        else
                if(isupper(DATA[ctr]))
                        if((ctr%2) ! = 0)
                                DATA[ctr] = tolower(DATA[ctr - 1]);
                                else
                                DATA[ctr]=DATA[ctr] -2;
                cout<<DATA;
        }
```

c)   What is difference between type casting and automatic type conversion? Explain with suitable
      example in C++.   [2]

d)   Name the header files for which the following function belongs: [1]
       (i) setw ( )   (ii) isalnum( )

e)   Study the following program and select the possible output from it: (explain the output also)   [2]

```cpp
#include<iostream.h>
#include<stdlib.h>
const int BIG = 3 ;
void main( )
{
        randomize( );
        int Digit ;
        Digit = 90 + random (BIG );
        for (int K = Digiy ; K >= 90 ; K - -)
                cout<< K << "$";
}
```

(i)   93$93$92$91$90$
(ii)   91$90$
(iii)   92$91$90$
(iv)   92$90$

f)   Give the output of the following program: [2]

```cpp
#include<iostream.h>
void main( )
{
 int *ptrArray[10];
 int marks[ ] = {75, 68, 90, 34, 0, 10, 90, 65};
```

```
        for ( int i = 0 ; marks[i] != 0 ; i++)
        {
                ptrArray[i] = &marks[i];
                *(ptrArray[i]) += 5;
        }
        int index = 0;
        while(index < i)
        {
        int k = *(ptrArray[index]);
        if (k > 60)
        cout<< k <<" , ";
        index++;
        }
        }
```

2. a) Answer the questions (i) to (iv) after going through the following class: [4]

```
        class Person
        {
                        char Name[30];
                protected:
                        char Address[20];
                public:
                        Person( );
                        void read_Person();
                        void disp_Person( );
        };
        class Employee : protected Person
        {
                        int ENo;
                protected:
                        float Salary;
                public:
                        Employee( );
                        void read_Employee( );
                        void disp_Employee( );
        };
        class Student : private Person
        {
                        int RollNo; float Marks;
                public:
                        Student( );
                        void read_Sudent( );
                        void disp_Student();
        };
```

   (i)   Which type of Inheritance is shown in the above example?
   (ii)   Mention the name of data members that are accessible by the member function of class
            Employee.
   (iii)   Mention the name of member functions that are accessible by the object of class Student.
   (iv)   How many bytes will be required by an object of class Employee?

b) Define a class named STREAM in C++ with following description: [4]

   Private Members:
   - AD_NO   Integer (Ranges 10 - 2000)
   - NAME   Array of Character
   - Percentage   float
   - FEES   float

   Public Members:
   - A function Read_Data( ) to input the values of AD_NO, NAME and Percentage.
   - A function Select_Stud ( ) to choose students for different streams depending
     upon their percentage and assign the fees they have to deposit as given below:

Percentage	Stream	Fees
Percentage >= 90	Computer	20000
Percentage <90 but >=80	Biology	18000
Percentage <80 but >= 70	Commerce	14000

   - A function Disp_Data( ) to display the value of all the data members.

   (write the complete program)

c) Answer the questions (i) to (ii) after going through the following class: [2]

```
class Teacher
{
        char  Subject[30];
        int Salary;
    public:
        Teacher( )                              //Function 1
        {
                strcpy(Subject,"Economics");
                Salary = 15000;
        }
        Teacher(char T[ ])                      //Function 2
        {
                strcpy(Subject,T);
                Salary = 15000;
        }
        Teacher(int S)                          //Function 3
        {
                strcpy(Subject, "Economics");
                Salary = S;
        }
        Teacher(chat T[ ], int S)               //Function 4
        {
                strcpy(Subject, T);
                Salary = S;
        }
}
```

(i)   Which feature of object oriented programming is demonstrated using Functionl, Function2, Function3 and Function4?

(ii)   Write statement in C++ that would call Function 2 and Function 4 of class Teacher.

d) Differentiate between Function Overloading and Default Arguments with suitable example.   [2]

3. a) Write a user defined function to print the product of each row of a two dimensional array passed as the argument of the function: [2]

Example: If the two dimensional array contains:

2	5	4	7
3	6	2	2
4	2	1	3

Then the output should appear as:

Product of Row 1 = 280

Product of Row 2 = 72

Product of Row 3 = 24

b) Write a function in C++ which accepts an integer array and its size as argument and exchange the value of all negative elements with their positive equivalent.   [3]

Example:

If an array contains:

-2, 4, -1, 6, -7, *9, -23,* 10

The function should rearrange the array as:

2, 4, 1, 6, 7, 9, 23, 10

c) An array B [30][10] is stored in the memory along the row with each element occupying 4 bytes of storage. Find the base address and address of the element B [10][4], if the location B [3][3] is stored at the address 1500.   [3]

d) Consider the following portion of a program, which implements a linked stack for BOOKS. Write the user defined function PUSH( ) to insert a new node in the stack with required information:

```
        struct BOOK                                         [4]
        {
                int BNO;
                char TITLE[20]; char
                Author[30];
            BOOK *Next;
        };
        class Stack
        {
                BOOK *top;
            public:
                Stack( )
                {
                        top = NULL;
                }
                void PUSH( );
                void POP( );
        };
```

e) Convert the following infix expression to its equivalent postfix expression showing stack contents for the conversion. [2]

A * (B + D) / E - F - (G + H / K)

4. a) Write a function in C++ to count the word "are" as an independent word present in a text file SEARCH.TXT. Example: [2]

        If the text file contains:

                "Those are wild animals. They are carnivores."

        Then the output should be:

                The Word "are" = 2

b) Write a function in C++ to add new object at the bottom of the binary file "PRODUCT.Dat" whose product price is more than Rs 200. Assuming that binary file is containing the objects of the following class: [3]

```
classPRODUCT
{
        int PRODUCT_no;
        char PRODUCT_name[20];
        float PRODUCT_price;
public:
        void enter( ) { cin>>PRODUCT_no ; gets(PRODUCT_name) ; cin>>PRODUCT_price;}
        void display( ) { cout<<PRODUCT_no ; cout<<PRODUCT_name ;cout<<PRODUCT_price; }
        float ret_Price( )
        {
                return PRODUCT_price;
        }
};
```

c) Observe the following program segment below carefully and fill the blanks marked as Statement1 and Statement 2 using seekg( ) and tellg( ) functions for performing the required task: [1]

```
#include<fstream.h>
class Flight
 {
        int FNo,
        char FName[20];
public:
        // Function1 to count total number of records.
        int CountRec( );
};
int Flight :: CountRec( )
{
        Flight Obj;
        fstream File;
        File.open("Flight.Dat", ios::in | ios::binary);
        ...............................................................// Statement1
        int bytes = ............................................... // Statement 2
        int count = bytes / sizeof(Obj);
        File.close( );
        return count;
}
```

5. a) Consider the following table CLUB and MEMBER. Write the SQL commands for the statements (i) to (iv) and output from (v) to (viii). [6]

Table: CLUB

GCode	GameName	Number	Fees	StartDate
101	Carom Board	2	5000	23-Jan-2004
102	Badminton	2	12000	12-Dec-2003
103	Table Tennis	4	8000	14-Feb-2004
105	Chess	2	9000	01-Jan-2004
108	Lawn Tennis	4	25000	19-Mar-2004

Table: MEMBER

PCode	Name	GCode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jasvinder	101
4	Robert	103

I.   To display the name of all the games with their GCodes.

II.   To display all information of those games which are having fees more than 10000.

III.   To display the information of CLUB table in descending order of StartDate.

IV.   To display Name and Number of All the members from the Table CLUB and MEMBER.

Give the Output:
    V.   SELECT COUNT(DISTINCT Number) FROM CLUB;
    VI.   SELECT MAX(StartDate), MIN(StartDate) FROM CLUB;
    VII.   SELECT SUM(Fees) FROM CLUB WHRE GameName LIKE "C%";
    VIII. SELECT DISTINCT GCode FROM MEMBER;

b) What is a relation? Explain Union operator with example.   [2]

6. a) Prove Algebraically: [2]

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

b) Draw a logic circuit diagram for the following Boolean Expression: [2]

$$A.(B + C')$$

c) Convert the following Boolean expression into its equivalent Canonical Product of Sum form: [1]

$$X. Y'.Z + X'.Y.Z + X'.Y.Z'$$

d) Reduce the following Boolean Expression using K-map: [3]
$$F (X, Y, Z, W) = \Sigma (0,1,3,4,5,7,9,10,11,13,15)$$

7. a) What do you mean by Indian IT act   [1]
  b) Define the term Spam.   [1]
  c) Define the term Bandwidth. Give any one unit of Bandwidth.   [1]
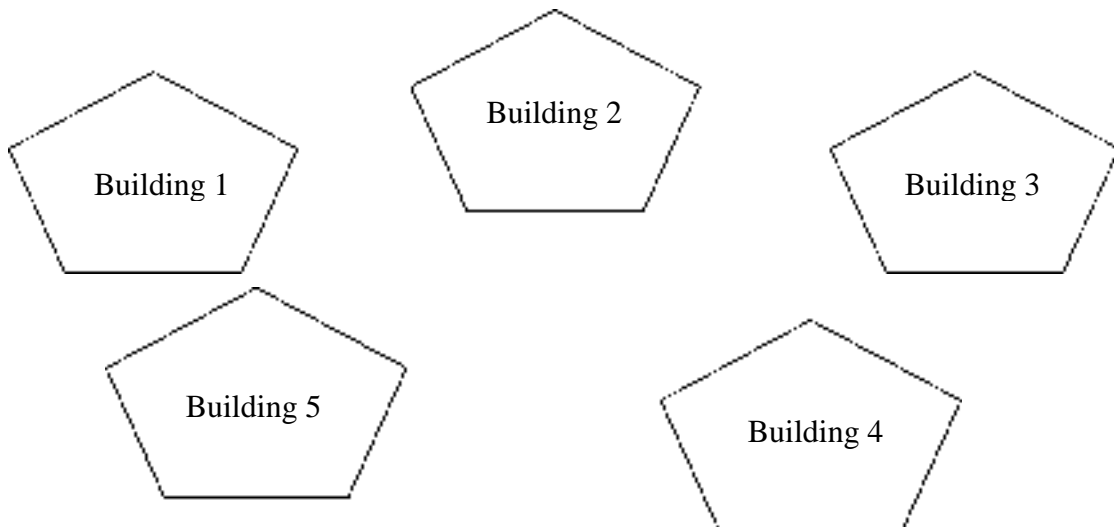 d) Give the full form of the following: [1]
      (i) WAP   (ii) W3C
  e) Differentiate between Bridge and Router.   [1]
  f) Write the name of two types of viruses.   [1]
  g) East and West Public Ltd has decided to network all its offices spread in five building as shown below:

The distance between various buildings is as follows:
    Building 1 to Building 2   20Mts
    Building 3 to Building 5   70Mts
    Building 2 to Building 3   50Mts
    Building 1 to Building 5   65Mts
    Building 3 to Building 4   120Mts
    Building 2 to Building 5   50Mts

Number of Computers in each building:
    Building 1   40
    Building 2   45
    Building 3   110
    Building 4   60
    Building 5   70

  (i) Suggest a cable layout for connecting all the buildings together.   [1]
  (ii) Suggest the most suitable building to install the server of the organization with a suitable reason.   [1]
  (iii) Building 3 is used for many critical operations. It tries that PC gets maximum possible dedicated bandwidth. Which network device should be used for this?   [1]
  (iv) The organization also has another office in same city but at a distant location about 25-30 Km away. How can link be established with building 1. (suggest the transmission media).   [1]

-x-x-x-x-x-x-