

**COMPUTER SCIENCE (083)**  
**CLASS XII**  
**Pre-Board Exam January-2014**

Time allowed: 3Hrs

Maximum Marks :70

Instructions:

i) All the questions are compulsory

ii) Programming Language C++

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**Ques . 1.**

(a) Write the prototype of a function named Area, which take a float as value parameter and return a double type value. The parameter should have a default value 5.2. What is the use of default value? (2)

(b) Write the names of the header files which are not necessary to execute the following C++ code (1)

```
#include<iostream.h>
```

```
#include<stdio.h>
```

```
#include<string.h>
```

```
#include<ctype.h>
```

```
void main()
```

```
{ char c, String[ ] = " System Design ";
```

```
for(int i=0; String[i]!='\0' ;i++)
```

```
if(isdigit(String[i]))
```

```
cout<<endl;
```

```
else
```

```
{
```

```
c=toupper(String[i]);
```

```
cout<<c;
```

```
}
```

```
}
```

(c) Vikas has just started working as programmer in the WORLD SOFTWARE Company. In the company, he has got his first assignment to develop a small C++ module to find the smallest number out of a given set of numbers stored in a one dimensional array. Somehow he has committed a few logical/Syntactical mistakes while writing this code and so he is not getting the desired result from the code. Find out the mistakes and correct this C++ code so that it provides the desired result (do not add any new statement in the code). Underline each correction made: (2)

```
int SMALLFIND(int ARR,Size) // Statement 1
```

```
{
```

---

```
int SMALL=ARR(1);           //Statement 2
for (int C=2,C<Size;C++)    //Statement 3
if (ARR[C]>SMALL)           //Statement 4
ARR[C]=SMALL;              //Statement 5
return SMALL;              //Statement 6
}
```

(d) Find output of the following program :

(2)

```
#include <iostream.h>
void Secret(char Str[ ])
{
for (int L=0;Str[L]!='\0';L++);
for (int C=0;C<L/2;C++)
if (Str[C]=='A' || Str[C]=='E')
Str[C]='#';
else
{
char Temp=Str[C];
Str[C]=Str[L-C-1];
Str[L-C-1]=Temp;
}
}
void main( )
{
char Message[ ]="SteveJobs";
Secret(Message);
cout<<Message<<endl;
}
```

(e) Find output of the following program:

(3)

```
#include<iostream.h>
void main()
{int Array[]={4,6,10,12};
int *pointer=Array;
for(int l=1;<=3;l++)
{
cout<<*pointer<<'#';
pointer++;
}
```

```

}
cout<<endl;
for(l=3;l>=0;l--)
{
(*pointer)*=3;
cout<<Array[l]<<'@';
--pointer;
}
cout<<endl;
for(int l=1;l<=3;l++)
{
pointer++;
cout<<*pointer<<'$';
}
cout<<endl;
}

```

(f) Write a function to accept three integers and return the smallest of three numbers (use conditional operator) (2)

**Ques .2.**

(a) What do you understand by Data Encapsulation and Data Hiding? Also, give a suitable C++ code to illustrate both. (2)

(b) What is copy constructor? Give an example to illustrate the same. (2)

(c) Define a class Train in C++ with following description: (4)

Private Members

→src of type string

→Tnm of type string

→dest of type string

→charges of float

• A member function Getdata to assign the following values for Charges

dest	charages
Mumbai	1000,
Chennai	2000
Kolkatta	2500.

**Public members**

- A parameterized constructor to initialize the data members.
- A function InputData() to allow the user to enter the values
- A function displaydata() to display all and call getdata( ) function

d) Consider the following class *counter*:

(4)

```
class counter
{ protected :
    unsigned int count;
    public :
        counter()
        { count = 0; }
        void inc_count()
        { count++; }
        int get_count()
        { return count; }
};
```

Write code in C++ to publically derive another class *new\_counter* from class *counter*.

Class *new\_counter* should have the following additional function members in the public visibility mode:

- (i) A parameterized constructor to initialize the value of *count* to the value of parameter.
- (ii) *Reset()* to set the value of data member *count* to 0.
- (iii) *dec\_count()* to decrease the value of data member *count* by 1.

**Ques .3.**

(a) Write a function *TRANSFER(int A[], int B[], int Size)* in C++ to copy the elements of array *A* into array *B* in such a way that all the positive elements of *A* appear in the beginning of *B*, followed by all the zeroes elements, followed by all the negative elements maintaining their respective orders in array *A*. For example: (2)

If the contents of array *A* are:

7, -23, 3, 0, -8, -3, 4, 0

The contents of array *B* should be

7, 3, 4, 0, 0, -23, -8, -3

(b) An array *S[10][30]* is stored in the memory along the row with each of the elements occupying 2 bytes. Find out the memory location of *S[5][10]*, if the element *S[2][15]* is stored at the location 8200. (3)

(c) Write a function in C++ to perform Insert and delete operation in a circular Queue containing Item's information (represented with the help of an array of structure *Item*). (4)

```
struct Item
{
    long IID; //Item Id
    char Iname[20]; //Item Name
};
```

(d) Write a function in C++ to find and return the sum of elements from all alternate elements of a two dimensional array passed as argument with size, starting from *[0][0]*. (3)

For eg. If the following is the content of the array

<b>B[0][0]</b>	B[0][1]	<b>B[0][2]</b>
<b>4</b>	5	<b>1</b>
B[1][0]	<b>B[1][1]</b>	B[1][2]
2	<b>8</b>	7
<b>B[2][0]</b>	B[2][1]	<b>B[2][2]</b>
<b>9</b>	6	<b>3</b>

The function should add elements B[0][0], B[0][2], B[1][1], B[2][0] and B[2][2].

- (e) Convert the expression  $X - 3 / (Z \wedge 5) * V / 2 - 7$  to corresponding postfix expression. Also show the status of operator stack after each step. (2)

**Ques .4.**

- (a) A binary file "Students.dat" contains data of 10 students where each student's data is an object of the following class: (1)

```
class Student
{
int Rno;char Name[20];
public:
void EnterData()
{cin>>Rno; cin.getline(Name,20);}
void ShowData()
{cout<<Rno<<" - "<<Name<<endl;}
};
```

With reference to this information, write output of the following program segment:

```
{
ifstream File; Student S;
File.open("STUDENTS.DAT",ios::binary|ios::in);
File.seekg(-1*sizeof(S), ios::end);
cout<<File.tellg();
}
```

- (b) Write a function in C++ to count the number of lines starting with a digit in a text file "DIARY.TXT".

(2)

(c) Write a function in C++ to search and display details, whose destination is “Chandigarh” from a binary file “Flight.Data”. Assuming the binary file is containing the objects of the following class:

(3)

```
class FLIGHT
{
    int Fno;           // Flight Number
    char From[20];    // Flight Starting Point
    char To[20];      // Flight Destination
public:
    char * GetFrom ( ) { return From; }
    char * GetTo ( ) { return To; }
    void input() { cin>>Fno; gets(From); gets(To); }
    void show ( ) { cout<<Fno<< “:”<<From << “:” <<To<<endl; }
};
```

**Ques .5.**

(a) Observe the following Table and answer the parts (i) and (ii) accordingly

(2)

**Table: MEMBER**

Mno	Name	Qty	PurchaseDate
101	Pen	102	12-12-2011
102	Pencil	201	21-02-2012
102	Eraser	90	09-08-2010
109	Sharpener	90	31-08-2012
113	Clips	900	08-08-2011

(i) In the above table, can we take Mno as Primary Key? (Answer in [YES/NO] only). Justify your answer with a valid reason.

(ii) What is the degree and the cardinality of the above table?

(b) Consider the following tables GAMES and PLAYER and answer (b1) and (b2) parts of this question:

**Table: GAMES**

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

**Table: PLAYER**

PCode	Name	GCode
1	Nabi Ahmad	101
2	Ravi Sahai	108
3	Jatin	101
4	Nazneen	103

**(b1) Write SQL commands for the following statements:**

**(4)**

- (i) To display the name of all GAMES with their GCodes
- (ii) To display details of those GAMES which are having PrizeMoney more than 7000.
- (iii) To display the content of the GAMES table in ascending order of Schedule Date.
- (iv) To display sum of PrizeMoney for each Type of GAMES

**(b2) Give the output of the following SQL queries:**

**(2)**

- (i) SELECT COUNT(DISTINCT Number) FROM GAMES;
- (ii) SELECT MAX(ScheduleDate), MIN(ScheduleDate) FROM GAMES;
- (iii) SELECT Name, GameName FROM GAMES G, PLAYER P WHERE G.GCode=P.GCode AND G.PrizeMoney>10000;
- (iv) SELECT DISTINCT GCode FROM PLAYER;

**Ques .6.**

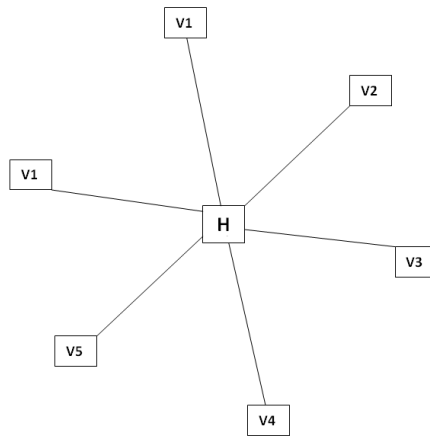
- (a) State and prove the De-Morgan's Theorem (Any One) algebraically. (2)
- b) Draw a Logical Circuit Diagram using logic gates for the following Boolean Expression: (2)  

$$A.(B+C')$$
- c) State Duality Principle. Give the dual of  $(A+BC+AB)$  (1)
- d) Obtain a simplified form for a Boolean expression: (3)  

$$F(U, V, W, Z) = \sum (0, 1, 3, 5, 6, 7, 10, 14, 15)$$

**Ques .7.**

(a) To provide telemedicine facility in a hilly state, a computer network is to be setup to connect hospitals in 6 small villages (V1, V2, . . . , V6) to the base hospital (H) in the state capital. This is shown in the following diagram.



No village is more than 20km away from the state capital.

Imagine yourself as a computer consultant for this project and answer the following questions with justification:

- (i) Out of the following what kind of link should be provided to setup this network: (i) Microwave link, (ii) Radio Link, (iii) Wired link? Justify your answer. (2)
- (ii) What kind of network will be formed: LAN, MAN, or WAN? (1)
- (iii) Many times doctors at village hospital will have to consult senior doctors at the base hospital. For this purpose, how should they contact them: using email, SMS, telephone, or video conference? (1)
- (b) Differentiate between SMTP and POP3 protocols? (1)
- (c) What are cookies in the context of computer networks? (1)
- (d) Meenu is trying for on-line subscription to a magazine. For this she has filled in a form on the magazine's web site. When she clicks submit button she gets a message that she has left e-mail field empty and she must fill it. For such checking which type of script is generally executed – client-side script or server-side script? (1)
- (e) Mention any one difference between Shareware and freeware. (1)
- (f) How is hacker different from cracker? (1)



(g) What is the difference between Trojan Horse and Virus in terms of Computer? (1)

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