

## CBSE 12th Computer Science Question Papers

Time allowed: 3Hrs

Maximum Marks :70

Instructions:

- i) All the questions are compulsory
- ii) Programming Language C++

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. (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>
#include<math.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) Hussain 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 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,int 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 segment: (2)

```
int A[][4] = {{11,21,32,43}, {20,30,40,50}};
for (int i = 1; i<2; i++)
for (int j = 0; j<4; j++)
    cout<<A[i][j]<<"*\n";
```

(e) Find output of the following program segment:

```
(3)
int a = 5;
void demo(int x, int y, int &z)
{
    a += x+y;
    z = a+y;
    y += x;
    cout<<x<<"* "<<y<<"* "<<z<<endl;
}
void main()
{
    int a = 3, b = 4;
    demo(::a,a,b);
    demo(::a,a,b);
}
```

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

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 constructor overloading? 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     | charges |
|----------|---------|
| Mumbai   | 1000,   |
| Chennai  | 2000    |
| Kolkatta | 2500.   |

Public members

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

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 negative elements of *A* appear in the beginning of *B*, followed by all the positive elements, followed by all the zeroes maintaining their respective orders in array *A*. For example: (3)

If the contents of array *A* are:

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

The contents of array *B* should be

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

(b) An array *S[10][30]* is stored in the memory along the column 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 *TRANSFORM(int A[4][3])* in C++ to swap the elements of the first column with the corresponding elements of last column of array *A*.

(2)

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

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(0, 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” mfrom 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); get(To); }
void show( ) { cout<<Fno<< "."<<From << "." <<To<<endl; }
};
```

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 as [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 SUBJECT and TEACHER and answer (b), (c), (d) and (e) parts of this question:

Table: SUBJECT

| Code | Title        | Marks_Theory | Marks_Prac |
|------|--------------|--------------|------------|
| 301  | English      | 100          | 0          |
| 041  | Maths        | 100          | 0          |
| 083  | Computer Sc. | 70           | 30         |
| 042  | Physics      | 70           | 30         |
| 043  | Chemistry    | 70           | 30         |

Table: TEACHER

| TCode | Name      | Sub_Code |
|-------|-----------|----------|
| 1     | P. Jain   | 301      |
| 2     | R. Nagpal | 301      |
| 3     | Supatra   | 041      |
| 4     | Shabnam   | 083      |
| 5     | Rashika   | 042      |
| 6     | Vidushi   | 041      |
| 7     | Yash      | 043      |

Write SQL commands for the flowing statements:

(4)

(i) To display the names of all the subjects for which practical marks are 0.

(ii) To display the total number of teachers in each subject separately.

(iii) To display the names of all the teachers in the ascending order of the Sub\_Code.

(iv) To display each subject's details along with Total\_Marks in each subject from the table SUBJECT. (Total\_Marks = Marks\_Theory + Marks\_Practical).

(c) Write SQL statement to display each teacher's name along with his/her respective subject name from the tables TEACHER and SUBJECT. (2)

(d) Give the output of the following SQL queries: (1)

(i) **SELECT DISTINCT(Marks\_Theory) from SUBJECT;**

(ii) **SELECT TCode, Name from Teacher where Sub\_Code like '0%';**

(e) Identify primary keys of the tables SUBJECT and TEACHER. (1)

6) (a) State and prove the De-Morgan's Theorem (Any One) algebraically. (2)

b) Draw a Logical Circuit Diagram using NAND gates for the following Boolean Expression. (2)

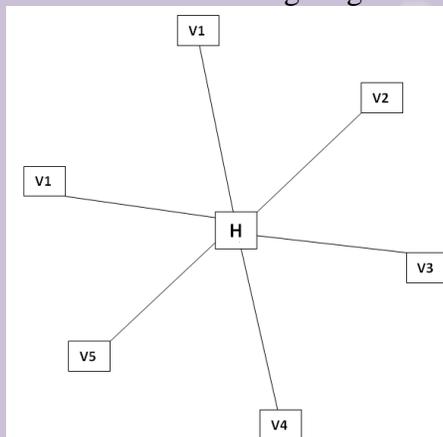
$A.(B+C')$

c) State Duality Principle. Give the dual of  $(A+BC+AB)$  (1)

d) Obtain a simplified form for a Boolean expression: (3)

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

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) Rajeshwari 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)

