
SAMPLE PAPER- 1 (solved)
Computer Science
Class – XII

Time allowed 3 hours

Maximum Marks: 70

General Instructions:

- (i) **All** questions are compulsory.
 - (ii) Programming Language : C++
 - (iii) Marks are given at the end of each question.
-

1.

- (a) What is data abstraction? Give example (2)
- (b) Name the header file that shall be needed for successful compilation of the following C++

Code

(1)

```
void main()
{
    char string [10];
    gets(string);
    strcat(string,"SARA");
    puts(string);
}
```

- (c) Rewrite the following C++ program code after removing the syntax error(s). Underline each correction. (2)

```
#include <iostream.h>
class Train
{
    int trainnumber;
    char TrainName[25];
public:
    void Add()
    {
        cin >> trainnumber;
        gets(TrainName);
    }
    void display()
    {
        cout<<trainnumber <<":"<<TrainName<<end;
    }
};
void main()
{
    Train T;
    Add.T();
    display.T();
}
```

-
-
- (d) Explain the use of inline function in C++ with the help of an example (2)
- (e) Write a C++ program to explain working of call-by-value method of a function invoking (3)
- (f) Write the C++ program to find whether two given strings contain equal number of characters. (2)

2.

- (a) What is default constructor? How is it different from destructor? (2)
- (b) Answer the following questions based on the below given code (4)

```
class Book
{
    char Book_Name[20];
    char Author[20];
    int pages;
public:
    void reading();
    void display();
};
class Textbook:private book
{
    int chapters;
    int examples;
protected:
    int std;
public:
    void readingTextbook();
    void DisplayTextbook();
};
class Computerbook:public Textbook
{
    char content[20];
public:
    void readingCSBook();
    void DisplayCSBook();
}
```

- i. Name the members, which can be accessed from the member function of class ComputerBook.
- ii. Name the member, which can be accessed by an object by an object of class Textbook.
- iii. Name the members, which can be accessed by an object of class ComputerBook.
- iv. What will be the size of an object (in bytes) of class Computer Book.
- (c) Define a class named House in C++with the following descriptions (4)

Private members

House_no	integer [ranges 10-100]
Name	array of characters (string)
HouseType	of charterer type
Cost	float

Public members

Read_Input() function to read an object of House type
 Show() function to show the details of an object.
 Draw_nos() function to choose and display the details of 2 houses selected randomly from array of 10 objects of type house. Use the random function to generate the house number to match House_no from an array

- (d) In the following program, find the correct possible output from the given options (2)

```
#include <iostream.h>
#include <stdlib.h>
void main()
{
    randomize();
    char color[][20] = {"White","Green","Blue","Yellow"};
    int paint;
    for(int i=0;i<=2;i++)
    {
        paint = random(2) + 1;
        cout<<color[paint]<<" ";
    }
}
```

Output:

- i. Blue : Green : Yellow
- ii. White : Blue : Green
- iii. Blue : White : Yellow
- iv. White : Blue : Yellow

3.

- (a) Distinguish between LIFO and FIFO list? (2)
 (b) What is the output of the following program (assume all required header files are include in the program) (2)

```
void main()
{
    int array[] = (1,2,3,4);
    int *arrayptr = arr;
    int value = *arrayptr;
    cout<<value<<"\n";
    value = *arrayptr++;
    cout<<value<<"\n";
    value = *arrayptr;
    cout<<value<<"\n";
    value = *++arrayptr;
    cout<<value<<"\n";
}
```

- (c) An array MAT [20][10] is stored in the memory along the column with each of the elements occupying 4 bytes. Find out the base address and address of elements MAT [10][5], if an element MAT[5][7] is stored at the memory location 1000. (3)
-

(d) Write a function to check if the passed array of 20 integers is sorted or not. The function should return 1 if arranged in ascending order, -1 if arranged in descending order, 0 if it is not sorted. (3)

(e) Write a function in C++ to delete a node containing employee information from a dynamically allocated stack to employee implemented with the help of the following structure (4)

```
struct Emp
{
    int EmpId;
    char Name[25];
    Emp *Next;
}
```

4.

(a) Observe the below program segment carefully and fill the blank as line 1 using fstream function for performing the required task. (1)

```
#include <fstream.h>
class library
{
    long no;
    char bookname[20];
    int quantity;
public:
    void accept(int)
        // user to enter the data
    void show()
        // display the data
    void buy(int qty)
    {
        quantity += qty;
    }
    long Getno()
    {
        return no;
    }
};
void buybook(long Pno,int Pqty)
{
    library L;
    fstream File;
    File.open("Stock.dat",ios::binary | ios::in | ios::out);
    int position = 1;
    while (position == -1 && File.read((char *)&L.sizeof(L))
    {
        if(L.Getno() == Pno)
```

```

{
    L.buy(pqty);
    position = File.tellg()-sizeof(L);
    -----
    // line 1 : to place the file pointer to the required position
    File.write((char *) &L.sizeof(library));
}
if(position == -1)
    cout << " No updation done as required no not found:";
File.close();
}
}

```

- (b) Write a function in C++ to read the content of a text file "News.TXT" and display all those lines which are either starting with 'S' or starting with 'W'. (2)
- (c) Distinguish between ifstream class and ofstream class (3)
- 5.
- (a) What is normalization and why is it needed? (2)
- (b) Differentiate between INSERT command and UPDATE command (2)
- (c) Consider the following tables EMPLOYEE and SALARY and write SQL commands for the questions (i) to (iv) (4)

Table EMPLOYEE

EMPID	Name	DEPT	Gender	Experience
1001	Arun	Electrical	M	10
1002	Subha	Accounts	F	15
1003	Balaji	IT	M	5
1004	Geetha	Admin	F	10
1005	George	Admin	M	5
1006	S.Subha	IT	F	10
1008	Suresh	Electrical	M	7
1009	Priya	HR	F	10

Table SALARY

EMPID	Basic	Allowance	DA
1001	15000	1500	10000
1002	20000	2500	15000
1003	15000	1500	10000
1004	20000	2000	15000
1005	15000	1500	10000
1006	20000	2000	15000
1008	13000	1500	7500
1009	20000	1500	15000

- (i) Display the name of all employees who are in electrical department having more than 8 years of experience from the employee table.
- (ii) Display the average salary of all the employees in IT department using both the above tables[hint : salary = basic + DA + Allowance]
- (iii) Display the minimum DA for the female employee
- (iv) Display the name, basic, DA of the employee from the HR department.

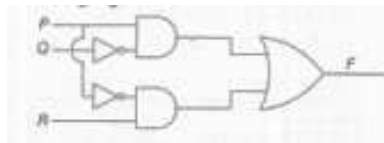
6.

(a) Express $P + \overline{Q}R$ in canonical SOP form (1)

(b) Prepare the truth table for the following Boolean algebra expression (2)

$$\overline{X}\overline{Y} + \overline{X}Y$$

(c) Write the equivalent Boolean expression for the following logic circuit (2)



(d) Reduce the following expression using K-map (3)

$$F(W, X, Y, Z) = \sum(0, 4, 8, 12)$$

7.

(a) What is meant by Bandwidth (1)

(b) Write about telnet service? (1)

(c) Differentiate between virus and worm in the computer (1)

(d) Write the full form of the following (1)

(i) FTP

(ii) XML

(e) Difference between internet and intranet (1)

(f) Define cookies? (1)

(g) Shreyas Academy has setup its new branch in Chennai for its office and web based activities. It has four offices vof building as shown in the diagram

(4)



Center to center distance between various blocks are given below

Office 1 A to Office 2	100 m
Office 2 to Office 3	140 m
Office 3 to Office 1	250 m
Office 3 to Office 4	160 m
Office 1 to Office 4	350 m
Office 2 to Office 4	180 m

Number of computer in each office

Office 1 = 50

Office 2 = 20

Office 3 = 180

Office 4 = 30

- (i) Suggest the most suitable cable layout of connections between the offices and topology
 - (ii) Suggest the most suitable place to house the server of this organization with a suitable reason.
 - (iii) Suggest the placement of the following device with justification Repeater and Hub
 - (iv) The academy is planning its head office situated in Bangalore with its office in Chennai. Suggest an economic way to connect it.
-

SAMPLE PAPER- 1 (solved)
Computer Science
Class – XII

Solutions

1.

- (a) Abstraction refers to the act of representing essential features without including the background details or explanations.

Example -

```
# include <iostream>
int main()
{
    cout << "Hello" << endl;
    return 0;
}
```

Here, you don't need to understand how **cout** displays the text on the user's screen. You need to only know the public interface and the underlying implementation of cout is free to change.

- (b) For gets and puts we need to use <stdio.h> header file and for strcat we need to use <string.h> header file.

- (c) # include <iostream.h>

```
class Train
{
    int trainnumber;
    char TrainName[25];
public:
    void Add()
    {
        cin >> trainnumber;
        gets(TrainName);
    }
    void display()
    {
        cout << trainnumber << ":" << TrainName << endl;
    }
};
void main()
{
    Train T;
    Add.T();           Actual code is F.Add();
    display.T();       Actual Code is F.diaplay();
}
```

-
- (d) A function is defined as being inline, if its implementation is substituted into the code, where the function call was made inline expansion makes a program execution faster because the overhead of a function call and return is eliminated. The inline functions are defined as follows:

```
Inline function_header
{
    Function bdy;
}
```

Example:

```
Inline double cube(double x)
{
    Return(x*x*x);
}
```

- (e)

```
#include <iostream.h>
#include <conio.h>
int main()
{
    clrscr();
    void Valuechange(int)
    int initialValue = 20;
    cout << "InitialValue:"<<initialvalue<<"\n";
    Valuechange(initialValue);
    cout << "Value Change() is over::"<<initialValue<<"\n";
    return 0;
}
void Valuechange(int a)
{
    a=30;
    cout<<"Value of initial in function valuechange:"<<a<<"\n";
    return;
}
```
- (f)

```
#include <iostream.h>
#include <string.h>
#include <conio.h>
int main()
{
    clrscr();
    char string a[20],string b[20];
    cout <<"Enter string"\n";
    cin.getline(string a,20);
    cin.getline(string b,20);
    if(strlen(string a) == strlen(string b))
        cout <<"\n Both string contain equal number"
            <<"of characters"<<"\n";
    else
        cout <<"\n Both string contain different number"
            <<"of characters"<<"\n";
}
```
-

```
        return 0;
    }
}
```

2.

- (a) A constructor that accepts no parameters is called default constructor. A destructor has the same name that of constructor function, preceded with a tilde sign(~). It gets invoked every time an object goes out of scope. It is used to destroy objects.

Hence default constructor used for initialization and destructor used for destroy of an object

(b)

- i. Data member – chapter and content
Data function – ReadingTextbook(),
displayTextbook(),readingCSBook(),displayCSBook()
- ii. Member function – readingTextbook(),DisplayTextbook()
- iii. Member functions –
readingTextbook(),DisplayTextbook(),readingCSBook(),displayCSBook()
- iv. 68 bytes

- (c) Assume that name of array of type House storing 10 objects is Arra.

Class House

```
{
    int House_no;
    char Name[35];
    char HouseType;
    float cost;
public:
    void Read_Input()
    {
        cout << "\n Enter the House Number:" :
        cin >> House_no;
        cout << "\n Enter the House Name:";
        gets (Name);
        cout << "\n Enter the House Type:";
        cin>> HouseType;
        cout<< "\n Enter the House cost:";
        cin>>cost;
    }
    void show()
    {
        cout<< "\n The No. of the House"<<House_no;
        cout<< "\n The name of the House"<<Name;
        cout<< "\n The Type of the House"<<HouseType;
        cout<< "\n The Cost of the House"<<cost;
    }
    void Draw_nos(House *Arra);
};
void House::Draw_nos(House Arra[10])
```

```

{
    int no1, no2,i;
    randomize();
    no1 = random(991) + 10;
    no2 = random(991) + 10;
    for(i=0;i<10;i++)
        if(Arra[i].House_no == no1) || (Arra[i].House_no == no2))
            Arra[i].show();
}

```

(d) Blue : Green : yellow and White : Blue : Yellow

3.

(a) LIFO is short for Last In, First Out, while FIFO is an acronym for First In, First Out

Queue

Queue is a ordered collection of items.

Items are deleted at one end called 'front' end of the queue.

Items are inserted at other end called 'rear' of the queue.

The first item inserted is the first to be removed (FIFO).

Stack

Stack is a collection of items.

It allows access to only one data item: the last item inserted.

Items are inserted & deleted at one end called 'Top of the stack'.

It is a dynamic & constantly changing object.

All the data items are put on top of the stack and taken off the top

This structure of accessing is known as Last in First out structure (LIFO)

(b) 1

1

2

3

(c) Base Address B

Number of rows M = 20

Element size W = 4

Ir, Ic =0

array in coloumn major order formula

Address of Mat[I][J] = B + W(M(J - Ic) + (I - Ir))

Mat[5][7] = 1000

$1000 = B + 4(20(7 - 0) + (5 - 0))$

$1000 = B + 4(20(7) + 5)$

$1000 = B + 4(145)$

$1000 = B + 580$

$B = 1000 - 580 = 420$

address of Mat[10][5]

$= 420 + 4(20(5 - 0) + (10 - 0))$

$= 420 + 4(20(5) + 10)$

$= 420 + 4(110)$

$= 420 + 440 = 860$

(d) Assume that header files are included

int check_sort(int x[20]);

```

    {
        int result = 0;
        for(int i =0;i<19;i++)
        {
            if(x[i] < x[i+1])
                result = 1;
            else
            {
                result =0;
                break;
            }
        }
        if(result == 1)
            return result;
        for(i=0;i<19;i++)
        {
            if(x[i] > x[i+1])
                result = 1;
            else
            {
                result = 0;
                break;
            }
        }

        return result;
    }
(e) void POP(Emp *top)
    {
        Emp *ptr = top;
        if(ptr == NULL)
            cout << "Underflow!!";
        else
        {
            cout << "Element being deleted is \n";
            cout << "EmpId:"<<top->EmpId;
            cout << "Name:"<< top->Name;
            top = top -> Next;
            delete ptr;
        }
    }

```

4.

```

(a) File.seekp(position);
(b) void show()
    {
        char str[150];
        ifstream fcin("News.TXT");
        fcin.getline(str,100);
    }

```

```

while(fcin)
{
    if(str[0] == 'S' || str[0] == 'W')
    {
        cout << str;
    }
    fcin.getline(str,100);
}
fcin.close();
}

```

(c)

NO	Ifstream	Ofstream
1	This class is derived from istream class	This class is derived from ostream class
2	It associates an input buffer with a file	It associates an output buffer with a file
3	It is used to read data from a file	It is used to write data onto a file

5.

- (a) The normalization is the process of transformation of the conceptual schema of the database into a computer representable form.

Most databases grow by adding new relations and relationships, the data may be used in new ways. Information may undergo series of updations. In such situations, the performance of a database is entirely dependent upon its design.

A bad database design may lead to certain undesirable things like repetition of information, inability to represent certain information, loss of information. The normalization process helps one attain good database design thereby avoiding these undesirable things.

- (b) INSERT command is used to add new records into the table while UPDATE command is used to change some or all the value of the existing record in the table.

(c)

- (i) SELECT name FROM EMPLOYEE WHERE dept = "Electrical" AND experience > 8.
- (ii) SELECT AVG (basic + allowance + DA) FROM salary WHERE salary.EMPID IN(SELECT EMPID FROM employee WHERE dept ="IT").
- (iii) SELECT MIN(DA) FROM salary where salary.EMPID IN(SELECT EMPID FROM Employee WHERE Gender ='F');
- (iv) SELECT NAME, Basic, DA FROM Employee, Salary where Dept = HR and Employee.EMPID = Salary.EMPID;

6.

(a)

$$P + \overline{Q}R$$

$$P(Q + \overline{Q})(R + \overline{R})$$

$$\begin{aligned}
 &(PQ + P\bar{Q})(R + \bar{R}) + P\bar{Q}R + \bar{P}\bar{Q}R \\
 &R(PQ + P\bar{Q}) + \bar{R}(PQ + P\bar{Q}) + P\bar{Q}R + \bar{P}\bar{Q}R \\
 &PQR + P\bar{Q}R + P\bar{Q}\bar{R} + \bar{P}\bar{Q}\bar{R} + P\bar{Q}R + \bar{P}\bar{Q}R
 \end{aligned}$$

NOW WE REMOVE THE DUPLICATE TERM

$$\Rightarrow PQR + P\bar{Q}R + P\bar{Q}\bar{R} + \bar{P}\bar{Q}\bar{R} + \bar{P}\bar{Q}R$$

(b) As $\bar{X}\bar{Y} + \bar{X}Y$ is a 2- variable expression. Its truth table is as follows:

X	Y	$\bar{X}$	$\bar{Y}$	$\bar{X}\bar{Y}$	$\bar{X}Y$	$\bar{X}\bar{Y} + \bar{X}Y$
0	0	1	1	1	0	1
0	1	1	0	0	1	1
1	0	0	1	0	0	0
1	1	0	0	0	0	0

(c) $F = (P.\bar{Q}) + (\bar{P} + R)$

(d) Given function

$$F(W, X, Y, Z) = \sum(0, 4, 8, 12)$$

$$F = m_0 + m_4 + m_8 + m_{12}$$

$$m_0 = 0000 = \bar{W}\bar{X}\bar{Y}\bar{Z}$$

$$m_4 = 0100 = \bar{W}X\bar{Y}\bar{Z}$$

$$m_8 = 1000 = W\bar{X}\bar{Y}\bar{Z}$$

$$m_{12} = 1100 = WX\bar{Y}\bar{Z}$$

The mapping the given function on a K-map we get

YZ WX		[00] $\bar{Y}\bar{Z}$	[01] $\bar{Y}Z$	[11] YZ	[10] $Y\bar{Z}$
[00] $\bar{W}\bar{X}$	1	0	0	0	0
[01] $\bar{W}X$	1	0	0	0	0
[11] $W\bar{X}$	1	0	0	0	0
[10] $W\bar{X}$	1	0	0	0	0

Only 1 group is here a Quad($m_0 + m_4 + m_{12} + m_8$)

Reduce the expression for this quard is $\overline{Y Z}$ as while moving across the Quard W and X are removed because these are changing their states from complemented to un-complemented or vice versa.

Final reduced expression is $-\overline{Y Z}$

7.

- (a) Bandwidth means the capacity of a medium to transmit a signal. It is the bandwidth that determines the amount of information that can be transmitted for a distance.
- (b) The telnet is an internet facility that facilitates remote login. Remote login is the process of accessing a network from a remote place without actually being at the actual place of working.
- (c) The main difference between virus and worm is the method by which they reproduce and spread. A virus is dependent upon a last file of boot sector and the transfer of files between machines to spread, while a worm can run completely independent and spread itself through network connection.
- (d)
 - (i) FTP – File Transfer Protocol
 - (ii) XML – Extensible Markup Language
- (e) The internet is a worldwide network of computer networks. Internet uses a set of protocols called TCP/IP. It is not owned by anybody. Intranet is a network which is privately owned network used for their internal sharing of data and files.
- (f) Cookies are messages that a web server transmits to a web browser so that the web server can keep track of the user's activity on a specific website.
- (g)
 - i) We can use Bus topology
 - ii) The most suitable place to house the server is Office 3 as it has most number of computers. It will save cabling cost and most of the traffic will be local.
 - iii) As per layout suggested we need to install separate repeaters as each of the office will have hub installed that acts like a repeater. Each of the office requires a hub to connect several computers in the office.
 - iv) An economic way o connecting is dial-up or broadband as it can connect two computers at an economic rate through it provides lesser speed than other expensive methods.
