

- Q.1 (a) Write the prototype of a function which accepts two integer type arguments using call by reference method. 2

**Answer.** `Return_type function_name(int &a, int &b);`

- (b) Name the header files, to which following built-in functions belongs: 1

(i) `setw()` (ii) `isalnum()`

**Answer :** i) `iomanip.h` ii) `ctype.h`

- (c) Ayan Sharma has written the following C++ program and expect the output of this program as 5.2. But the output he is getting is 5. Find out any logical mistake that Ayan has made in his program. Underline each mistake. 2

```
#include <iostream.h>
class FindSum
{
float num1,num2,s;

public:
void sumofno(int i, int j)
{
s=num1+num2;
}
void showsum()
{
cout<<"The Sum is "<<s
}
};
void main()
{ FindSum ob;
ob.sumofno(2.1,3.1);
ob.showsum();
}
```

**Answer :** In function call we pass float type values. Whereas in the definition of this function it accept integer type values , so the float values will automatically be converted into integer type by the compiler , that is why we get integer output.

(d) Find the output for the following program:

```
#include<iostream.h>
#include<ctype.h>
void Encript ( char U[ ])
{ for( int i=0 ; U[i] != '\0' ; i += 2)
  if( U[i] == 'A' || U[i] == 'E' )
    U[i] = '#';
  else if (islower (U[i] ))
    U[i] = toupper(U[i]);
  else
    U[i] = '@';
}
int main()
{ char text [ ] = "SaVE EnVironMENT in 2012";
  Encript(text);
  cout<<text<<endl;
  return 0;
}
```

**Answer :@a@E@ENVirOn@E@T@iN @0@2**

(e) Study the following program and find out its output :

2

```
#include <iostream.h>
int main()
{
  int U=10, V=20;
  for(int I=1;I<=2;I++)
  {
    cout<<"[1]"<<U++<<"&"<<V-5<<endl;
    cout<<"[2]"<<++V<<"&"<<U+2<<endl;
  }
}
```

**Answer:**

[1]10&15

[2]21&13

[1]11&16

[2]22&14

(f) Write a function findsum in C++ that will find the sum of all the elements of a one dimensional Array. The Array and its size are passed as arguments to this function. 3

**Answer:**

```
Void findsum(int A[],int n)
{
  int s=0,i;
  for(i=0;i<n;i++)
  s=s+A[i];
  cout<<s;
}
```

**Q.2** (a) Explain the difference between the multiple inheritance and multilevel inheritance? **2**

**Answer:**

**Multiple Inheritances:** In this type of inheritance a class can derive more than one class.

**Single Inheritance:** In this type of Inheritance a derived class can serve as a base class for another class in the hierarchy.

(b) Answer the following questions (i to ii) after going through the following class: **2**

```
class Intermission
{ int m;
public:
Intermission( int Y ) { m = y; }           // Function 1
Intermission ( Intermission & t );       // Function 2
~Intermission() { }                       // Function 3
};
```

- (i) a) Create an object, such that it invokes Function 1.  
b) What is Function 3?

(ii) Write complete definition for Function 2.

**Answer:**

**i) Intermission ob(10);**

**ii) Intermission (Intermission &t)**

```
{
    m= t.m;
}
```

(c) Define a class EVENT in C++ with the following descriptions **4**

Private Members:

Eno integer

Description char(30)

Score integer

Qualified char

Award(int) To award qualified as 'Y', if score is more than the cut off score passed As argument to the function else 'N'.

Public Members:

- ◆ A constructor to assign initial values ENo as 101, Description as "State level", Score is 50 and Qualified as 'N'.
- ◆ Input(), To take the input for Eno, Description and Score and call the function Award().
- ◆ Show(), To display all the details.

Answer:

```
Class EVENT
{
private:
int ENo;
char Description[30];
int Score;
char Qualified;
void Award(int t)
{
    if(Score >t)
        Qualified ='Y' ;
    else
        Qualified ='N' ;
}
public:
EVEN()
{
    Eno =101
    Strcpy(Description ,"State level");
    Score = 50;
    Qualified = 'N' ;
}
void Input()
{

    cout<<"Enter values";
    cin>ENo;
    gets(description);
    cin>>Score;
    cin>>Qualified;
    Award(Score);
}

void show()
{

    cout<<"The values are";
    cout<<ENo;
    pets(description);
    cout<<Score;
    cout<<Qualified;
}
}
```

(d) Consider the following and answer the questions given below: **4**

```
class Director
{
protected:
int num1;
int num2;
public:
Director()
{

}
};
```

Write C++ code to publicly derive another class Manager. The new class manager has the following additional members in the public visibility mode.

- a) A data member totalsum and a two arguments parameterized constructor of class Manager which will initialize the data members of class Director with its parameters.
- b) A sumofno function in the newly created class Manager that will find the sum of inherited data members from class Director.
- c) A showsum function in class Manager to display the sum calculated in function sumofno.

**Answer:**

```
class Manager : public Director
{
    public:

    int totalsum;
    int s;
    Manager(int a,int b)
    {
        num1=a;
        num2=b;
    }
    void sumofnum()
    {

        s= num1+num2;
    }
    void showsum()
    {
        cout<<"the sum is"<<s;
    }
}
```

**Q.3** (a)Write a function in C++, which accepts an integer array and its size as arguments and replaces elements having even values with its half and elements having odd values with twice its value. **3**

Example : if an array of five elements initially contains the elements 3, 4, 5, 16, 9 then the function should rearrange the content of the array as: 6, 2, 10, 8, 18

**Answer:**

```
void replace(int A[],int n)
{
    int i;
    for(i=0;i<n;i++)
    if(A[i]%2==0)
        A[i]=A[i]/2;
    else
        A[i]=A[i]*2;

    Cout<<"New Values of the Array are";
    for(i=0;i<n;i++)
        cout<<endl<<A[i];}
```

(b) An array A[15][30] is stored in the memory with each element requiring 8 bytes of storage. If the base address of A is 5300, found out the memory locations of A[8][12] and A[12][2], if the array is stored along the row. **3**

**Answer: Left as an Exercise for students**

(c) Write a function in C++ to perform delete operation on a dynamically allocated Queue containing members details as given in the following definition of NODE **4**

```
struct NODE
{
    int nno;
    char name[20];
    NODE *link;
}
```

**Answer:**

```
void delqueue()
{
    NODE *temp;

    If(front==NULL) // If queue is empty
    {
        cout<<"Queue is empty"
        return;
    }
    temp=front;
    front=front->link;
    if(front==NULL) //if the queue has only a sing node
        rear=front=NULL;
    delete temp;
}
```

(d) Write a function diagsum to find the sum of the lower diagonal elements of a two dimensional array. The array and its size is passed as an argument. **2**

**Anser:**

```
void diasum(int A[][] ,int m,int n)
{
    int i,j,s=0;
    for(i=0;i<m;i++)
        for (j=0;j<n;j++)
            if(i==j)
                s = s+ A[i][j];
    cout<<endl<<"The Sum is "<<s;
}
```

(e) Evaluate the following postfix expression using a stack and show the contents of the stack after execution of each operation **2**  
5 6 2 + \* 2 4 / -

**Answer: 38**

Q.4

```
(a)
class PracFile
{
    int Pracno;
    char PracName[20];
    int TimeTaken;
    int Marks;
public:
    void EnterPrac( );    // function to enter PracFile details
    void ShowPrac( ):    // function to display PracFile details
        TimeTaken
    {
        return TimeTaken;
    }
    void Assignmarks (int M) // function to assign Marks
    {
        Marks = M;
    }
};

void PracFile:: EnterPrac( )
{
    fstream File;
    File.open("MARKS.DAT",ios::binary|ios::in|ios::out);
    PracFile P;
    int Record = 0;
    while (File.read(( char*) &P, sizeof(P)))
    {
        if(P.TimeTaken()>50)
            P.Assignmarks(0)
        else
            P.Assignmarks(20)
            _____ //statement 1
            _____ //statement 2
            Record + + ;
    }
    File.close();
}
```

If the function EnterPrac ( ) is supposed to Allocate Marks for the records in the file MARKS.DAT based on their value of the member TimeTaken. Write C++ statements for the statement 1 and statement 2, where, statement 1 is required to position the file write pointer to an appropriate place in the file and statement 2 is to perform the write operation with the modified record.

**Answer: Statement 1= File.seekp(-1\*sizeof(p), ios::cur);**  
**Statement 2= File.write((char \*)&p,sizeof(p));**

(b)Write functions in C++ to count the no of "the" words present in a text file 2

**Answer:**

```
Void countword()
{
    fstream fin;
    char temp[20];
    int cout=0;
    fin.open("temp.txt",ios::in)
```

```
while(!fin.eof())
{
    fin.get(temp,20,' '); // End of word is detected with space
    if(strcmp(temp,"the")==0)
        count++;
}
cout<<endl<<"The number of times the word occurs "<<count;
}
```

(c )Given a binary file "TRAIN.DAT", containing records of the following class bus type. 3

```
class Train
{
    int train_no;
    char destination[40];
    int distance; //in km
public:
    void read()
    {
        cin>>train_no;
        gets(destination) ;
        cin>>distance;
    }
    void display()
    {
        cout<<train_no;
        puts(destination);
        cout<<distance;
    }

    int retdist()
    {
        return distance;
    }
};
```

Write a function in C++ that would read the contents of file "TRAIN.DAT" and display the details of those buses which travels the distance more than 1000 km.

**Answer:**

```
void detail()
{
    Train tr;
    fstream fin;
    fin.open("TRAIN.DAT",ios::in||ios::binary)

    while(!fin.eof())
    {
        fin.read((char *)&tr,sizeof(tr);
        if(tr.retdist()>1000)
            tr.display();
    }
}
```



Q. 5 (a) Consider the following table and answer the questions given below

Student table

S_ID	FIRSTNAME	LASTNAME	CITY
101	Sam	Tones	Paris
102	Sarah	Ackerman	New York
103	Manila	Sengupta	New Delhi
104	Sam	Tones	New York

- i) Identify the Primary key/Keys in this table.
- ii) What will be the domain of the column LASTNAME

**Answer:**

- i) **S\_ID**
- ii) **Domain of the column LASTNAME is any string which contain only alphabets (upper or Small case).**

(b) Consider the following EMPLOYEE and DESIG. Write SQL commands for the statements (i) to (iv)

EMPLOYEE

E_ID	FIRSTNAME	LASTNAME	ADDRESS	CITY
102	Sam	Tones	33 Elm St.	Paris
105	Sarah	Ackerman	440 U.S. 110	New York
144	Manila	Sengupta	24 Friends Street	New Delhi
210	George	Smith	83 First Street	Howard
255	Mary	Jones	842 Vine Ave.	Losantiville
300	Robert	Samuel	9 Fifth Cross	Washington
335	Henry	Williams	12 Moore Street	Boston
403	Ronny	Lee	121 Harrison St.	New York
451	Pat	Thompson	11 Red Road	Paris

DESIG

E_ID	SALARY	BENEFITS	DESIGNATION
102	75000	15000	Manager
105	85000	25000	Director
144	70000	15000	Manager
210	75000	12500	Manager
255	50000	12000	Clerk
300	45000	10000	Clerk
335	40000	10000	Clerk
403	32000	7500	Salesman
451	28000	7500	Salesman

(i) To display the content of employee table in ascending order of first name.

**Answer: select \* from employee order by FIRSTNAME asc;**

(ii) To display the FIRSTNAME, CITY and TOTAL SALARY of all Clerks from the tables employee and desig, where TOTAL SALARY = SALARY + BENEFITS.

**Answer: select FIRSTNAME ,CITY ,SALARY+BENEFITS "Total Salary"  
From employee ,Desig where DESIGNATION ='Clerk' ;**

(iii) To display the minimum SALARY among Managers and Clerks from the table DESIG.

**Answer : select DESIGNATION,min(salary) from desig group by  
DESIGNATION having DESIGNATION ='Clerk' OR DESIGNATION  
='Managers' ;**

(iv) Increase the BENEFITS of all Salesmen by 10% in table DESIG.

**Answer: update DESIG set BENEFITS = BENEFITS +(BENEFITS\*.10)**

(c) Write a SQL statement to display each employee name with his/her salary and designation from the table EMPLOYEE and DESIG.

**Answer: Select FIRSTNAME, LASTNAME, SALARY, DESIGNATION from  
employee ,design;**

(d) What will be the output of the following SQL Commands  
i) SELECT FIRSTNAME, SALARY FROM EMPLOYEE, DESIG WHERE  
DESIGNATION = 'Manager' AND EMPLOYEE.E\_ID = DESIG.E\_ID;

**Answer:**

FIRSTNAME	SALARY
Sam	75000
Manila	70000
George	75000

ii) SELECT DESIGNATION, SUM(SALARY) FROM DESIG  
GROUP BY DESIGNATION HAVING COUNT(\*) >= 2 ;

**Answer:**

DESIGNATI ON	SALARY
Manager	230000
Clerk	135000
Salesman	60000

(e) What will be the degree of table EMPLOYEE and cardinality of table DESIG.

**Answer: Degree of EMPLOYEE : 5  
Cardinality of DESIG : 9**

**Q. 6**

(a) State and verify the Absorption Law in Boolean Algebra.

**Answer: Left as an Exercise for students**

(b) Draw the logic circuit diagram for the Boolean equation:  
 $(X+Y')(X'+Y+Z')(X'+Z')$

**Answer: Left as an Exercise for students**

(c) Write the Sum of Product form of the function H (U, V, W).  
Truth table representation of the function H is as follows:

U	V	W	H
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

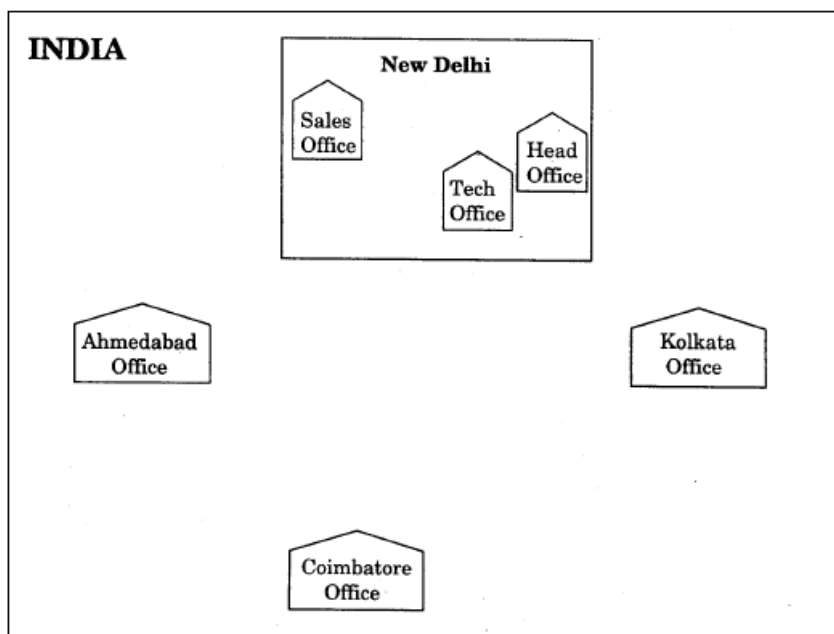
**Answer: Left as an Exercise for students**

(d) Minimize the following function using K- map and find out the expression

$$F(A, B, C, D) = \sum (0,1,4,5,7,8,9,12,13,15)$$

**Answer: Left as an Exercise for students**

**Q.7** (a) "Hindustan Connecting World Association" is planning to start their offices in four major cities in India to provide regional IT infrastructure support in the field of Education & Culture. The company has planned to set up their head office in New Delhi in three locations and have named their New Delhi offices as "Sales Office", "Head Office" and "Tech Office". The company's regional offices are located at "Coimbatore", "Kolkata" and "Ahmedabad". A rough layout of the same is as follows :



(i) Which protocol you will suggest to be used for connecting each computer within a office. Justify your answer **2**

**Answer: I will use TCP/IP because TCP/IP is a secure and**

**reliable protocol.**

- (ii) As a network administrator suggest network type (out of LAN, MAN, WAN) for connecting each of the offices in India : **1**

**Answer: WAN**

- (iii) A proxy server is required to set up in the main server of the company. Which proxy server you will suggest to use. **1**

**Answer: Winproxy /Squid proxy server**

- (b)Name the device that can be used to connect all the computers within a office. **1**

**Answer : Hub/Switch**

- (c)What is the use of a firewall in a Computer System? **1**

**Answer:**

**Firewall protects our computer system from viruses and other malicious program. It can also used to protect out system from unauthorized access**

- (d)You are designing a form for user registration in your website. Before submitting the user filled information to the Web server, you want to ensure that the Name entered by the user must have at least eight characters. Which type of scripting language you use for this type of validation. **1**

**Answer : Client side scripting language : JAVASCRIPT/VBSCRIPT**

- (e)Write one difference between a Open Source Software and a Proprietary software. **1**

**Answer:**

**Open Source Software: The Software whose Source code are freely available for modification and re-distribution are called Open Source Softwar.**

**Proprietary software: The Software whose Source code are not available for modification and re-distribution are called Open Proprietary software.**