

**GENERAL INSTRUCTIONS :**

- 1. ALL QUESTIONS ARE COMPULSORY.**
  - 2. PROGRAMMING LANGUAGE : C++**
- 

**Q1. (a) Out of the following, find those identifiers, which cannot be used for naming Variables, Constants or Functions in a C++ program :** (2)

continue, ALLok, 123Road, Class, me@Hello.com, \_123A, My Home, a\_b

**(b) Sahil has started learning c++ and has typed the following program. when he compiled the following code he discovered that he needs to include some header files to successfully compile and execute it. Write the names of those header files, which are required. to be included in the code:** (1)

```
void main()
{   int num=10, res ;
    for(int i=1; i<=sqrt(100); i++)
        cout<<setw(10)<<num<<"X"<<i<<"="<<setw(10)<<num*i<<endl ;
}
```

**(c) Rewrite the following C++ code, after, removing any/all syntactical errors with each correction underlined.**

**Note : Assume all required. header files are already being included in the program.** (2)

```
#define SQUARE(X) = X*X
void main()
{   float A; R=10.5;
    A=PI*Square (R) ;
    cout<<"Area of Circle ="<<<<A;
}
```

**(d) Find and write the output of the following C++ program code :** (2)

**Note: Assume all required header files are already included in the program.**

```
void main()
{   char NOTE[ ] = "Rs1000z@zEro!";
    for(int I=0; NOTE[I]!='\0';I++)
    {
        if(!isalpha(NOTE[I]))
            NOTE[I]='*';
        else if(isupper(NOTE[I]))
            NOTE[I]=NOTE[I]+1;
        else
            NOTE[I] =NOTE[I+1];
    }
    cout<<NOTE;
}
```

(e) Find and write the output of the following C++ program code :

(3)

Note: Assume all required header files are already included in the program.

```
class Class
{
    int Cno,total;
    char section;
public:
    Class(int no=1)
    {
        Cno=no;
        section='A';
        total=30;
    }
    void admission(int c=20)
    {
        section++;
        total+=c;
    }
    void ClassShow()
    {
        cout<<Cno<<":"<<section<<":"<<total<<endl;
    }
};
void main()
{
    Class C1(5),C2;
    C1.admission(25);
    C1.ClassShow();
    C2.admission();
    C1.admission(30);
    C2.ClassShow();
    C1.ClassShow();
}
```

(f) What will be the possible output(s), from options (i) to (iv) of the following code segment, also write minimum and maximum value of N when I = 2.

(2)

```
#include<iostream.h>
#include<stdlib.h>
const int L=10;
void main()
{
    randomize();
    int P=10, N;
    for(int I=1;I<=3;I++)
    {
        N=L+random(P)+1;
        cout<<N<<"@";
        P--;
    }
}
```

(i) 10@12@13@

(ii) 11@14@18@

(iii)12@16@20@

(iv)13@20@15@

**Q2. Answer the following questions:**

- a) Illustrate the concept of function overloading with the help of an example. (2)
- b) Answer the questions (i) and (ii) after going through the following program: (2)

```
class SCI
{
    char subject[20];

    int marks;
public:
    SCI () //Function 1
    {
        strcpy (subject, "IP" );
        marks = 70;
        cout<<"IP Subject ";
    }
    ~SCI() //Function 2
    {
        cout<<"Subject deleted";
    }
};
```

- (i) Name the specific features of class shown by Function 1 and Function 2 in the above example.
- (ii) How would Function 1 and Function 2 get executed?
- c) Define a class CONTEST in C++ with the following description : (4)

**Private Data Members**

```
Eventno    integer
Description char(30)
Score      integer
qualified   char
```

**Public Member functions**

- A constructor to assign initial values Eventno as 11, Description as "School level", Score as 100, qualified as 'N'.
- Input() – To take the input for Eventno, description and score.
- Award (int cutoffscore) – To assign qualified as 'Y', if score is more than the cutoffscore that is passed as argument to the function, else assign qualified as 'N'.
- Displaydata() – to display all data members.

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

```
class Newdata
{ protected:
    int data;
public:
    void Get_newdata(int);
    void Manip_newdata(int);
    void Show_newdata(int);
    Newdata( );
    ~Newdata( );
};
```

```

class Personal_info
{
    int data1;
public:
    void Get_personalinfo(int);
    void Show_personalinfo(int);
    Personal_info ();
    ~ Personal_info ();
};
class Person: private Newdata, Personal_info
{
public:
    void Show_person(void);
    person ();
    ~person ();
};

```

- How many bytes will be required by an object belonging to class Person?
- Which type of inheritance is depicted in the above example?
- List the data members that can be accessed by the member function Show\_person( )
- What is the order of constructor execution at the time of creating an object of class Person?

Q3. Answer the following questions:

- 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. (3)

For example: 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

- An array A[30][10] is stored in the memory along the column with each element occupying 4 bytes. Find out the Base address and address of the element A[2][5] if the element A[20][10] is stored at the address 10000. (3)

- Define member function insert( ) to insert a new node of a linked list implemented class Queue having the following Definitions: (4)

```

Struct Node
{
    char name[20];
    int age;
    Node *Link;
};

```

```

class Queue
{
    Node *Rear, *Front;
public:
    Queue() { Rear=NULL; Front = NULL}
    void insert();
    void del();
};

```

(d) Convert the expression  $(A-5)*6+(10/B)/2$  to corresponding postfix expression.

Also show the status of operator stack after each step. (2)

(e) Write a function in C++ to find the sum of diagonal elements of a two dimensional

integer array with 5 ROWS and 5 COLUMNS (2)

**Q4. Answer the following questions:**

a) Observe the program segment given below carefully, and answer the question that follows: (1)

```

class Candidate
{
    int Id; //Candidate's Id
    char Name[20]; // Candidate's Name
    float Score; // Candidate's Score
public:
    void Enrollment();
    void ShowData();
    void Marks(); //Function to change Score
    long R_id() {return Aid;}
};
void Update(int Id)
{
    ifstream File;
    File.open("AllData.DAT",ios::binary|ios::in|ios::out);
    candidate cn;
    int Record=0,Found=0;
    while (!Found&&File.read((char*)&cn, sizeof(cn)))
    {
        if (Id==A.R_id())
        {
            cout<<"Enter Marks...";
            cin>>A.Marks();
            _____ //statement 1
            _____ //statement 2
            Found = 1;
        }
        Record++;
    }
    if(Found==1) cout<<"Record Updated";
    File.close();
}

```

Write the Statement1 to position the File Pointer at the beginning of the Record for which the Candidate's Id matches with the argument passed, and Statement2 to write the updated Record at that position

- b) Write a function Countaroma() to count and display the number of times “Aroma” occurs in a text file “Cook.txt”. (2)
- c) Write a function in C++ to read and display the detail of all the students whose gender type is ‘M’ from a binary file “STUDENT.DAT”. Assuming the binary file “STUDENT.DAT” is containing objects of class STUDENT, which is defined as follows: (3)

```
class STUDENT
{
    int rollno.
    char name[20];
    char Gender; //Member Type: M for Male F for female
public:
    void enroll();
    void Display();
    char Type() { return Gender; }
};
```

Q5 Answer the following questions:

- (a) What do you understand by Domain of column and Cardinality of a table? (2)

Consider the following tables Employees and EmpSalary and answer

- (b) and (c) parts of this question:

**Employees**

Empid	Firstname	Lastname	Address	City
010	Ravi	Kumar	Raj nagar	GZB
105	Harry	Waltor	Gandhi nagar	GZB
152	Sam	Tones	33 Elm St.	Paris
215	Sarah	Ackerman	440 U.S. 110	Upton
244	Manila	Sengupta	24 Friends street	New Delhi
300	Robert	Samuel	9 Fifth Cross	Washington
335	Ritu	Tondon	Shastri Nagar	GZB
400	Rachel	Lee	121 Harrison St.	New York
441	Peter	Thompson	11 Red Road	Paris

**EmpSalary**

Empid	Salary	Benefits	Designation
010	75000	15000	Manager
105	65000	15000	Manager
152	80000	25000	Director
215	75000	12500	Manager
244	50000	12000	Clerk
300	45000	10000	Clerk
335	40000	10000	Clerk
400	32000	7500	Salesman
441	28000	7500	salesman

(b) Write the SQL commands for the following : (4)

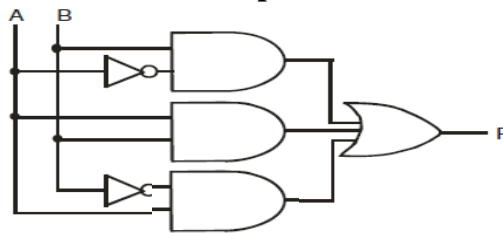
- (i) To show firstname, lastname, address and city of all employees living in New Delhi
- (ii) To delete the record of an employee with Empid is 215.
- (iii) To display the firstname, lastname and salary of that employee who is getting Maximum salary among all employees.
- (iv) To display the sum of salary of all the different designation using group clause on designation.

(c) Give the Output of following SQL commands: (2)

- (i) Select firstname,salary from employees ,empsalary where designation = 'Clerk' and Employees.empid = Empsalary.empid;
- (ii) Select count(\*) from Empsalary;
- (iii) Select designation, sum(salary) from Empsalary group by designation having count(\*) <3;
- (iv) Select avg(benefits) from Empsalary where designation ='Manager';

Q6. Answer the following questions:

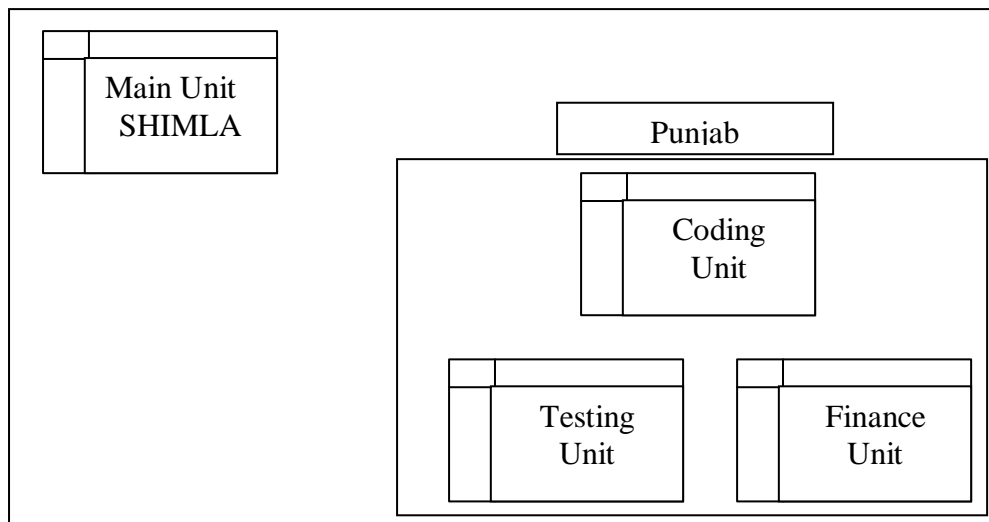
- a) State the dual of the absorption law  $X+X.Y = X$  and prove it algebraically. (2)
- b) Write the equivalent Boolean Expression F for the following circuit diagram : (2)



- c) Reduce the following Boolean expression using K – Map (3)  
 $F(A, B, C, D) = \sum(0,2,3,4,6,7,8,10,12)$
- d) Write the POS form of the Boolean function  $F(A,B,C) = \sum(2,3,4,5,7)$  (1)

Q7 Answer the following questions:

- a) “AYS Software Inc.” is planning to expand their network in India, starting with two cities in India to provide Software services. The company has planned to set up their main office units in Punjab at three locations and have named their offices as “Coding Unit”, “Testing Unit” and “Finance Unit”. The company has its corporate unit in Shimla. A rough layout of the same is as follows: (4)



Approximate distances between these Units are as follows:

From	To	Distance
Coding Unit	Testing Unit	16 KM
Coding Unit	Finance Unit	50 Mtr
Finance Unit	Testing Unit	10KM

In continuation of the above, the company experts have planned to install the following number of computers in each of their office units:

Coding Unit	100
Testing Unit	70
Finance Unit	10

i) Suggest the kind of network required (out of LAN,MAN,WAN) for connecting each of the following office units:

- Coding Unit and Testing Unit
- Coding Unit and Finance Unit

ii) Which one of the following devices will you suggest for connecting all the computers within each of their office units?

- Switch/Hub
- Modem
- Bluetooth

iii) Which of the following communication media, will you suggest to be procured by the company for connecting their local offices in Punjab for very effective (High Speed) communication?

- Coaxial cable
- Optical fiber
- Wi Fi network

(iv) Suggest a cable/wiring layout for connecting the company's local office units located in Punjab and Main Unit.

b) Expand the following

(i) FTP (ii) WLL (1)

c) What is firewall? How it works? (2)

d) Which protocol is used for sending and receiving emails? (1)

e) What do you understand by cloud computing? Briefly explain its characteristics. (2)