

COMPUTER SCIENCE
CLASS: XII

Allowed: 3 Hrs.

M.Marks: 70

General Instructions:

All the questions are compulsory.
Programming Language: C++
Please write down the serial number of the question before attempting it.

1. a) How does an inline function differ from a preprocessor macro? Give an example. (2)

b) Name the header file to be included for the use of the following built-in functions: (1)

- i) kbhit()
- ii) log()
- iii) strcmpi()
- iv) free()

c) What will be the output of the following program? (3)

```
#include<iostream.h>
#include<string.h>
class person
    {
    char name[20];
    int age;
    public:
    person(char *s, int a)
    {
    strcpy(name,s);
    age=a;
    }
    person &greater(person &x)
    {
    if(x.age >=age)
    return x;
    else
    return *this;
    }
    void display(void)
    {
    cout<< "Name:" <<name << "\n" << "Age:" <<age << "\n";
    }
    };

void main()
```

```

{
person p1("John", 30),
        p2("Ahmed", 29),
        p3("Hebber", 40);
person p('\0', 0);
p=p1.greater(p3);
cout<< "Elder person is:\n";
p.display();
p=p1.greater(p2);
cout<< "Elder person is:\n";
p.display();
}

```

d) What will be the output of the following program?

(2)

```

#include<iostream.h>
void enhance_taco(int &taco)
{
    taco = 10;
}
void main()
{
    int unyummytaco;
    int yummytaco;
    int &taco=yummytaco;
    unyummytaco = 1;
    yummytaco = 9;
    enhance_taco(yummytaco);
    enhance_taco(unyummytaco);
    cout<< "Yummy taco is"<<yummytaco<< "\n";
    cout<< "UnYummy taco is" <<unyummytaco<<endl;
    cout<< "Reference variable Taco is"<<taco<<endl;
}

```

e) Observe the following program carefully and fill the blanks marked as S1, S2, S3 and S4.

(2)

```

#include<iostream.h>
struct date
{
    int month;
    int day;
    int year;
};
void main()
{
    int index, *point1, *point2;
    point1 = &index;

```

```

*point1=77;
point2 = new int;
_____ // S1 Assign the integer value 173 to the pointer variable point2
cout<< "The values are<<index<< " "<< *point1 << " "<<*point2;
_____ // S2 Remove the memory allocated using point2
foat *float_point1, *float_point2=new float(3.14159);
_____ // S3 Allocate dynamic memory using the pointer variable float_point1
*float_point1=2.4 * (*float_point2);
cout<<*float_point1<< " "<<*float_point2;
delete float_point1;
delete float_point2;
date * date_point;

date_point = new date;
_____ // S4 Assign the numeric value 10 to month
date_point-> day=18;
date_point -> year =1958;
delete date_point;
}

```

f) Rewrite the following program after removing all the error(s), if any: Underline each correction. (2)

```

#include<iostream.h>
void main()
{
int code, choice;
int nod1=0, nod2=0, dis1=0, dis2=0;
cout<<<Enter the city code: press 1 for Delhi and 2 for Ghaziabad;
cin>> choice;
switch(choice)
{
case 1:
cout<< "Enter the type of compliant: Press 1 for no dial tone and 2 for disrupted voice";
again:
cin>>choice;
switch()
{
case 1: nod1++; break;
case 2: dis1++; break;
default: cout<< "Wrong input"; goto again;
}
break;
case 2:
cout<< "Enter the type of complaint: Press 1 for no dial tone and 2 for disrupted voice";
again1:

```

```

cin>>choice;
switch(choice)
{
case 1: nod2++; break;
case 2: dis2++; break;
default: cout<< "Wrong input"; goto again1;
} End of nested switch
break;
default:
cout<< "Wrong city code entered" Run the program again";
}
cout<< "Number of Coplaints of no dial tone from Delhi"<<nod1<<endl;
cout<< "Number of complaints on disrupted voice from Delhi"<<dis1<<endl;
cout<< "Number of complaints of no dial tone from Ghaziabad"<<nod2<<endl;
cout<< "Number of complaints on disrupted voice from Ghaziabad"<<dis2<<endl;
getch();
}

```

2. a) “ An explicit call to the constructor lets you create a temporary instance”. Explain with example. (2)

b) Assume that you are writing a text based medieval video game. Your video game will have two types of characters, the player and the monsesters. A player has to know the values of certain attributes of characters.

Health	integer
Strength	integer
Agility	integer
Type of weapon	String
Type of armor	String

A player must be able to perform the following actions:

```

Move()          /*Initialize Health by 16, Strength by 12, Agility by 14, Type of weapon by
                Mace and Type of armor by leather */
Attackmonsester() // Display the following message ‘Attack monsester with’ Type of weapon
Gettreasure()    // Increments the value of the players health by 1

```

Define player class with the above specifications. (4)

c) What will be the value of ::y, Outer::a, Outer::s and Inner::a after executing statement1 and statement2 of the program given below? (2)

```

#include<iostream.h>
int x = 5;
int y = 3;
class Outer
{
public:

```

```

int x;
int a;
static int s;
class Inner
{
    int a;
    public:
    void fun(int i)
    {
        x=i;
        s=i;
        y=i;
        a=i;
    }
};
Inner In1;
void gun(int i)
{
    x=i;
    s=i;
    y=i;
    a=i;
}
};
int Outer::s =0;
Outer Ou1;
void main()
{
    Ou1.In1.fun(3);    //Statement1
    Ou1.gun(8);       //Statement2
}

```

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

```

class A
{
    void anyval();
protected:
    int x,y;
    void procval();
public:
    void getvalA();
    void putvalA() const;
};
class B : protected A

```

```

        {
        int a, b;
        protected:
            int c, d;
            void getvalB();
        public:
            void putvalB() const;
        };

class C: private B
    {
    int p;
    protected:
        int q;
        void getval();
    public:
        void showval();
    };

```

- i) Name all the member functions, which are accessible by the objects of class C.
- ii) Name all the protected members of class B.
- iii) Name the base class and derived class of B
- iv) Name the data members, which are accessible from member functions of class C.

3.a) A prime number is an any integer that is evenly divisible by itself and 1. The Sieve of Eratosthenes is a method of finding prime numbers. It operates as follows:

- i) Create an array with all elements initialized to 1. Array elements with prime subscripts will remain. All other elements will eventually set to zero.
- ii) Starting with array subscript 2, every time an array element is found whose value is 1, loop through the remainder of the array and set to zero every element whose subscript is a multiple of the subscript for the element with value 1. For array subscript 2, all elements beyond 2 in the array that are multiples of 2 will be set to zero(4, 6, 8,...). For array subscript 3, all elements beyond 3 in the array that are multiples of 3 will be set to zero(6, 9, 12,...) and so on.

When the process is complete, the array elements that are still set to one indicate that the subscript is a prime number. These subscripts can then be printed. Write a function that uses an array of 2000 elements to determine and print prime numbers between 1 and 1999 using The Sieve of Eratosthenes method. Ignore element 0 of the array. (3)

- b) Each element of an array ARRAY[20][50] required 4 bytes of storage. The base address of ARRAY is 2000. Determine the location of ARRAY[10][10] when the array is stored as i) row-major ii) column major. (4)
- c) Give the necessary declaration of a linked list implemented Queue containing integer type elements. Also define a function to insert an integer value into that Queue. (4)
- d) Write a user defined function to display those elements of a two dimensional array A[5][5] which are not divisible by 5. Assume the content of the array is already present and the function prototype is as follows:
void Displaynot5(int A[5][5]); (3)

- e) Convert M/N^O into postfix form showing stack status after every step in tabular form. (2)
- 4.a) Find the error and show how to correct it in each of the following: (1)
- i) The file "Tools.dat" should be opened to add data to the file without discarding the current data.


```
ofstream outTools("Tools.dat", ios::out);
```
 - ii) The following statement should read a record from the file "Payables.dat". The ifstream object `inpayable` refers to this file, and ifstream object `inreceivable` refers to the file "receivable.dat"


```
inreceivable>>account>>company>>amount;
```
- b) Write a function to count the number of one character words, 3 character words and 6 character words from a text file named "Sentence.txt". The output format is
- | CHARACTERS | NO OF WORDS |
|------------|-------------|
| ONE | 4 |
| TWO | 2 |
| THREE | NIL |
- (2)
- c) A binary file "class.dat" contains records of students of a class with name, and marks in three subjects. Write an UDF to display the student name and result (pass/fail). The passing criteria is the sum of three subject marks greater than or equal to 150. (3)
- 5.a) What is meant by Data Independence ? Make a list of data independence capabilities (2)
- b) Write SQL command for (i) to (iv) and write the outputs for (v) to (viii) on the basis of tables FURNITURE and ARRIVALS. (6)

FURNITURE

NO	ITEMNAME	TYPE	DATEOFSTOCK	PRICE	DISCOUNT
1	White lotus	Double bed	23/02/02	30000	25
2	Pink feather	Baby cot	20/01/02	7000	20
3	Dolphin	Baby cot	19/02/02	9500	20
4	Decent	Office table	01/01/02	25000	30
5	Comfort zone	Double bed	12/01/02	25000	25
6	Donald	Baby cot	21/02/02	6500	15
7	Royal finish	Office table	20/02/02	18000	30
8	Royal tiger	Sofa	22/02/02	31000	30
9	Econo sitting	Sofa	13/12/01	9500	25
10	Eating paradise	Dining table	19/02/02	11500	25

ARRIVALS

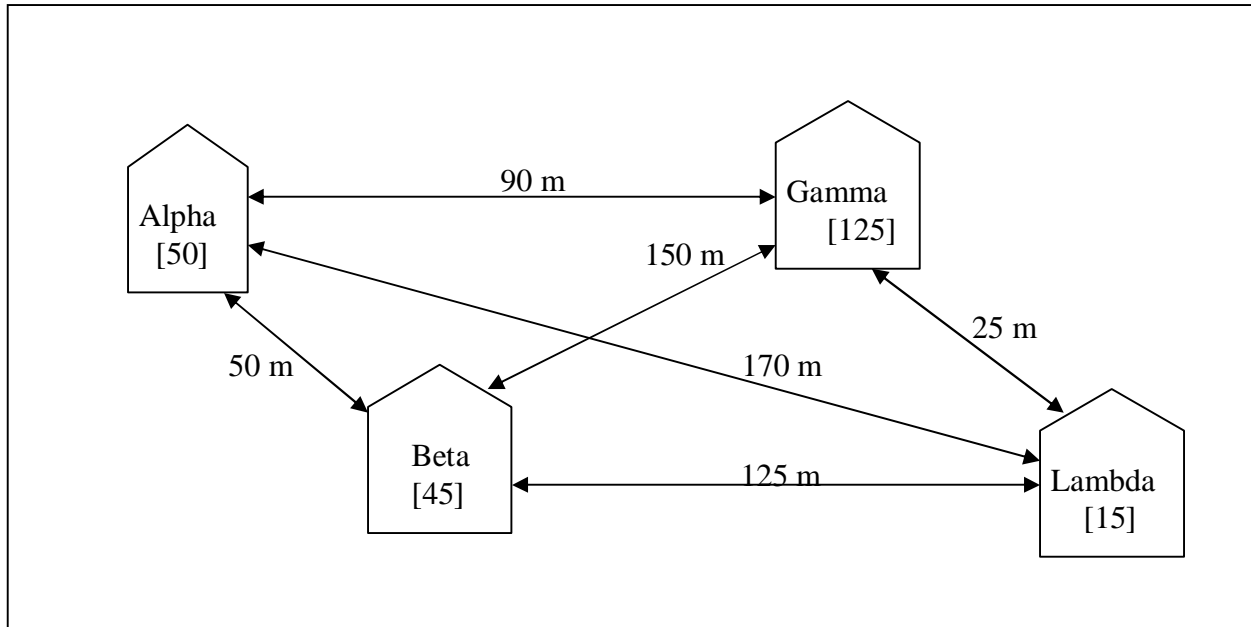
NO	ITEMNAME	TYPE	DATEOFSTOCK	PRICE	DISCOUNT
11	Wood comfort	Double bed	23/03/03	25000	25
12	Old fox	sofa	20/02/03	17000	20
13	Micky	Baby cot	19/02/03	7500	15

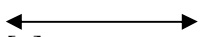
- i) To show all information about the Baby cots from the FURNITURE table.
- ii) To display all the records of FURNITURE and ARRIVALS together.

- iii) To list ITEMNAME and TYPE of those items , in which DATEOFSTOCK is before 22/01/02 from the FURNITURE table in descending order of ITEMNAME.
- iv) To insert a new row in the ARRIVALS table with the following data:
14, 'Velvet touch', 'Double bed', '25/03/03', 2500, 30
- v) select COUNT(distinct TYPE) from FURNITURE;
- vi) select MAX(DISCOUNT) from FURNITURE, ARRIVALS;
- vii) select AVG(DISCOUNT) from FURNITURE where TYPE= 'Baby cot';
- viii) select SUM(PRICE) from FURNITURE where DATEOFSTOCK<'12/02/02';

- 6.a) Write short note on principles of Duality. (1)
- b) Prove algebraically $(X + YZ) = (X+Y)(X+Z)$ (2)
- c) A Boolean function F defined on three input variables A, B, C and is 1(one) if and if only if number of 0(zero) inputs is odd (e.g. F is 1(one) if A=0, B=1, C=1). Draw the truth table for the above function and express it in canonical sum of product form. (2)
- d) Simplify the following Boolean expression using K-map : (3)
- $$F(A, B, C, D) = m_0 + m_1 + m_4 + m_5 + m_7 + m_8$$

7. a) Write any two advantages of a network. (1)
- b) Expand the following terminologies: (1)
- SIM
- POP
- c) What do you understand by Video Conferencing? (1)
- d) Define the following terms: (1)
- i) Firewall
- ii) Cookies
- e) Knowledge supplement Organization set up its new center at Muscat for its office and web based activities. It has four buildings as shown in the diagram below:



 Shows distance
 [] Shows number of computers in each building

- i) Suggest a cable layout of connections between the buildings. (1)
- ii) Suggest the most suitable place to house the server of this organization with a suitable reason. (1)
- iii) Suggest the placement of the following devices with justification: (1)
 - Repeater
 - Hub/Switch
- iv) The organization is planning to link its front office situated in the city in a hilly region, where cable connection is not feasible, suggest an economic way to connect it with reasonably high speed. (1)