

Computer Science 2006 (Outside Delhi)

General Instructions:

1. All questions are compulsory.
2. Programming Language: C++

Q.1.

- a. Name the header file to which the following belong: (1)
 - i. pow()
 - ii. random()
- b. Illustrate the use of inline function in C++ with the help of an example. (2)
- c. Rewrite the following program after removing the syntactical error(s), if any. Underline each correction. (2)

```
#include <iostream.h>
```

```
void main( )
```

```
{ struct movie
```

```
    { char movie_name [20];
```

```
      char movie type;
```

```
      int ticket cost = 100;
```

```
}MOVIE;
```

```
  gets(movie_name);
```

```
  gets(movie_type);
```

```
}
```

- d. Find the output of the following program: (3)

```
#include<iostream.h>
```

```
#include<string.h>
```

```
class student
```

```
{ char *name;
```

```
  int l;
```

```
  public:
```

```
  student( ) {l=0; name=new char [l+1]; }
```

```
  student (char *s)
```

```
  { l =strlen(s); name=new char [l+1];
```

```
    strcpy (name,s);
```

```
  }
```

```
  void display( ) {cout<<name<<endl;}
```

```
  void manipulate(student & a, student & b)
```

```
  { l = a. l + b.l;
```

```
    delete name;
```

```
    name=new char [l+1];
```

```
    strcpy(name, a.name);
```

```
    strcat(name, b.name);
```

```
  }
```

```
};
```

```

void main( )
{   char * temp = "Jack";
    student name1 (temp), name2(" Jill"), name3("John"),S1,S2;
    S1 .manipulate (name1, name2);
    S2.manipulate (S1, name3);
    S1.display ( );
    S2.display ( );
}

```

e. Find the output of the following program:

```

#include<iostream.h>
void main()
{   long Number = 7583241;
    int First=0, Second=0;
    do
    {   int R=Number%10;
        if (R%2==0)
            First+=R;
        else
            Second+=R;
        Number /=10;
    } while (Number>0);
    cout<<First-Second;
}

```

f. What is a default constructor? How does it differ from destructor? (2)

Q. 2.

a. What is "this" pointer? Give an example to illustrate the use of it in C++. (2)

b. Answer the questions (I) and (ii) after going through the following class:

```

class Exam
{   int year;
    public:
    Exam(int y) {year=y;} //Constructor 1
    Exam(Exam & t); //Constructor 2
};

```

i. Create an object, such that it invokes Constructor I. (1)

ii. Write complete definition for Constructor 2. (1)

c. Define a class named HOUSING in C++ with the following descriptions: (4)

Private members

REG_NO integer(Ranges 10 — 1000)

NAME Array of characters(String)

TYPE Character

COST Float

Public Members

- Function Read_Data() to read an object of HOUSING type
- Function Display() to display the details of an object

- Function Draw Nos() to choose and display the details of 2 houses selected randomly from an array of 10 objects of type HOUSING Use random function to generate the registration nos. to match with REGNO from the array.

d. Answer the questions (i) to (iii) based on the following code:

```
class furniture
{
    char Type;
    char Model[10];
public:
    furniture();
    void Read_fur_details( );
    void Disp_fur_detailsO;
};
class sofa : public furniture
{
    int no_of_seats;
    float cost_of_sofa;
public:
    void Read_sofa_details( );
    void Disp_sofa_details( );
};
class office: private sofa
{
    int no_of_pieces;
    char delivery_datel10l;
public:
    void Read_office_details( );
    void Disp_office_details( );
};
```

void main()

```
{ office MyFurniture; }
```

- . Mention the member names which are accessible by MyFurniture declared in main () function. **(1)**
- i. What is the size of MyFurniture in bytes? **(1)**
- ii. Mention the names of functions accessible from the member function Read_office_details () of class office. **(2)**

Q. 3.

- a. Write a function in C++ which accepts an integer array and its size as arguments/parameters and assign the elements into a two dimensional array of integers in the following format: **(3)**
- | | |
|--|----------------------------------|
| If the array is 1, 2, 3,4,5,6 | if the array is 1, 2, 3 |
| The resultant 2 D array is given below | The resultant 2 D array is given |
| below | |

If the array is 1, 2, 3, 4, 5, 6

If the array is 1, 2, 3

The resultant 2 D array is given

The resultant 2 D array is given below

	2	0	0	0	0
1	2	0	0	0	0
1	2	3	0	0	0
1	2	3	4	0	0
1	2	3	4	5	0
1	2	3	4	5	0

below

1	0	0
1	2	0
1	2	3

- b. An array MAT [20] [10] is stored in the memory along the row with each element occupying 4 bytes of memory. Find out the base address and the address of element MATE[10][5] if the location of MAT [3][7] is stored at the address 1000. **(4)**
- c. Introduction class stack
- ```
{ int data [10];
 int top;
 public:
 stack() { top=-1 }
 void push(); //to push an element into the stack
 void pop(); //to pop an element from the stack
 void Delete(int ITEM); //To delete all elements which are equal to ITEM
};
```
- Complete the class with all function definitions. Use another stack to transfer data temporarily. **(4)**
- d. Write a function in C++ to perform Insert operation in dynamically allocated Queue containing names of students. **(3)**
- e. Write the equivalent infix expression for **(2)**  
10,3, \*, 7,1, \*, 23, +

#### Q. 4.

- a. void main( )
- ```
{ char ch='A';
  ofstream fileout(" data.dat", ios::app);
  fileout<<ch;
  int p fileout.tellg( );
  cout<<p;
```

What is the output if the file content before the execution of the program is the string ? "ABC"
(Note that " " are not part of the file) **(1)**

- b. Write a function to count the number of blanks present in a text file named "PARA.TXT". **(2)**
- c. Following is the structure of each record in a data file named "PRODUCT.DAT".

```
struct PRODUCT
{ char Product_Code[10];
  char Product_Descriptionil[10];
  int Stock;
};
```

Write a function in C++ to update the file with a new value of Stock. The Stock and the Product Code, whose Stock to be updated, are read during the execution of the program. **(3)**

Q. 5.

- a. What are DDL and DML? **(2)**
 b. Study the following tables FLIGHTS and FARES and write SQL commands for the questions (i) to (iv) and give outputs for SQL queries (v) to (vi).

TABLE : FLIGHTS

FL_NO	STARTING	ENDING	NO_FLIGHTS	NO_STOPS
IC301	MUMBAI	DELHI	8	0
IC799	BANGALORE	DELHI	2	1
MC101	INDORE	MUMBAI	3	0
IC302	DELHI	MUMBAI	8	0
AM812	KANPUR	BANGALORE	3	1
IC899	MUMBAI	KOCHI	1	4
AM501	DELHI	TRIVANDRUM	1	5
MU499	MUMBAI	MADRAS	3	3
IC701	DELHI	AHMEDABAD	4	0

TABLE : FARES

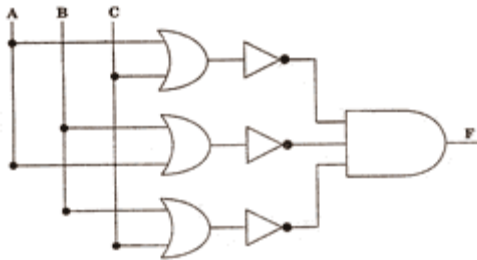
FL_NO	AIRLINES	FARE	TAX%
1C701	Indian Airlines	6500	10
MU499	Sahara	9400	5

AM501	Jet Airways	13450	8
IC899	Indian Airlines	8300	4
1C302	Indian Airlines	4300	10<
1C799	Indian Airlines	10500	10
MC101	Deccan Airlines	3500	4

- i. Display FL_NO and NO_FLIGHTS from “KANPUR” to “BANGALORE” from the table FLIGHTS.
- ii. Arrange the contents of the table FLIGHTS in the ascending order of FL_NO.
- iii. Display the FLNO and fare to be paid for the flights from DELHI to MUMBAI using the tables FLIGHTS and FARES, where the fare to be paid = FARE +FARE*TAX%/100.
- iv. Display the minimum fare “Indian Airlines” is offering from the table FARES.
- v. SELECT FL_NO, NO_FLIGHTS, AIRLINES from FLIGHTS, FARES where STARTING=”DELHI” and FLIGHTS.FL_NO=FARES.FL_NO.
- vi. SELECT count (distinct ENDING) from FLIGHTS. (6)

Q. 6.

- a. State and verify Associative Law. (2)
- b. Write the equivalent expression for the following logical circuit: (2)



- c. Express $P+Q'R$ in POS form. (1)
- d. Reduce the following Boolean expression using K-Map: (3)
 $F(P, Q, R, S) = \pi (0,3,5,6,7, 11, 12, 15)$

Q. 7.

- a. Name two transmission media for networking. (1)
- b. Expand the following terms: (2)
 - i. XML
 - ii. GSM
 - iii. SMS
 - iv. MAN
- c. Differentiate between Hackers and Crackers. (1)

- d. INDIAN PUBLIC SCHOOL in Darjeeling is setting up the network between its different wings. There are 4 wings named as SENIOR(S), JUNIOR(J), ADMIN(A) and HOSTEL(H). Distance between various wings are given below:

Wing A to Wing S	100m
Wing A to Wing J	200m
Wing A to Wing H	400m
Wing S to Wing J	300m
Wing S to Wing H	100m
Wing J to Wing H	450m

Number of Computers

Wing A	10
Wing S	200
Wing J	100
Wing H	50

- i. Suggest a suitable Topology for networking the computer of all wings. **(1)**
- ii. Name the wing where the Server is to be installed. Justify your answer. **(1)**
- iii. Suggest the placement of Hub/Switch in the network. **(1)**
- iv. Mention an economic technology to provide internet accessibility to all wings. **(1)**