COMPUTER SCIENCE – 2002
(Delhi Board)

Time allowed: 3 hours   *Max. Marks: 70*
Instructions: (i) All the questions are compulsory.
                (ii) Programming Language: C++

QUESTION l.
(a) What the purpose of a header file in a program?
Name the header files C++ to which the following functions belong:
 (i) write() (ii) arc(iii) open() (iv) strlen()
c) Find the syntax error(s), if any, in the following program:
```
# include <iostream.h>
void main()
{
        int x;
        cin<< x;
        for(int y = 0; y<10; y++);
        cout>>x + y;
}
```

d) Find the output of the following program:
```
void main()
{
        int x=5,y=5;
        cout << x++;
        cout<<",";
        cout<<++x;
        cout<< ",";
        cout << y++<<","<<++y;
}
```
(e) Write the output of the following program:
```
#include <iostream.h>
void X(int A, int &B)
{
        A = A+B;
        B = A-B;
        A = A-B;
}
void main()
{
        int a=4, b=l8;
        X(a,b);
        cout<< a <<","<<b;
}
```

(d) Raising a number to a power p is the same as multiplying n by itself p times. Write a function called power that takes two arguments, a double value for n and an int value for p, and return the result as double value. Use default argument of 2 for p, so that if this argument is omitted the number will be squared. Write the main function that gets value from the user to test power function.

QUESTION 2.
(a) What do you understand about a base class and a derived class? If a base class and a derived class each include a member function with the same name and arguments, which member function will be called by the object of the derived class if the scope operator is not used ?
(b) Considering the following specifications :

Structure name	Data	Type	Size
Name	first	array of character	40
	mid	array of character	40
	last	array of character	60
Phone	area	array of character	4
	exch	array of character	4
	numb	array of character	6

Class name	Data	Type
P_rec	name	Name
	Phone	Phone

With member functions constructor and display_rec.
Declare a class of P_rec.
Define the constructor (outside the class P_rec) that gathers information from the user for the above two structures Name and Phone.
Define the display_rec (outside the class P_rec) that shows the current values.

c) consider the following class declaration and answer the question below :
```
class SmallObj
{
        private :
                int some;
                more;
                void err_1() {cout<<"error";}
        public:
                void Xdata(int d) {some=d; more=d++;}
                void Ydata() {cout<<some<<" "<<more;}
};
```

(i) Write the name that specifies the above class.
(ii) Write the data of the class with their access scope.
(iii) Write all member function of the class along with the access scope.
(iv) Indicate the member function of the SmallObj that sets data.

QUESTION 3.
(a) Define Queue and Stack.
(b) Given the following class :
char *msg[ ] = {"overflow" , "under flow"}

class Stack
{
        int top;   // the stack pointer
        stk[5]:   //the elements
        void err_rep(int e_num)
        {
                cout << msg[e_enum];
        }// report error message
public :
        void init()
        {
                top=0;
        }   // initialize the stack pointer
        void push(int);   // put new value in stk
        void pop();   // get the top value
};
Define push outside the Stack. In your definition take care of overflow condition.
Function push has to invoke err_rep to report over flow.
c) Use a stack to evaluate the following postfix expression and show the content of the
stack after execution of each operation. Don't write any code. Assume as if you are using
push and pop member functions of the stack.
        AB - CD + E * + (where A=5, B=3, C=5, D =4, and E=2)
d) The array A[20] [10] is stored in the memory with each element requiring one byte of
storage if the base address of A is C_0. Determine C_0 when the location of A[10] [5] is
2000.
e) Considering the following key set: 42, 29, 74, 11, 65, 58. Use bubble sort to sort the
data in ascending order and indicate the sequences of steps required.

QUESTION 4.
a) What is the difference between get() and read() ?
b) Write a C++ program, which reads one line at a time from the disk file TEST.TXT,
and displays it to a monitor. Your program has to read all the contents of the file.
Assume the length of the line not to exceed 80 characters. You have to include all the
header files if required.

QUESTION 5.
(a) What is relation ? Define the relational data model.

Given the following Lab relations :
Write SQL command for questions (b) to (g).

RELATION : LAB

No.	ItemName	Cost	QuantityPerltem	DateofPurchase	Warranty	Operational
1	Computer	60000	9	21/5/96	2	7
2	Printer	15000	3	21/5/97	4	2
3	Scanner	13900	1	29/8/98	3	1
4	Camera	21901	2	13/6/96	1	2
5	Hub	8000	1	31 10/99	2	1
6	UPS	5000	5	21/5/96	1	4
7	Plotter	25000	2	11/1/2000	2	2

(b) To select the Itemname purchased after 31/10/97.
(c) To list the ItemName, which are within the Warranty period till present date.
(d) To list the ItemName in ascending order of the date of purchase where quantity is more than 3.
(e) To display ItemName, CostPerltem and Quantity whose Warranty is over.
(f) To count the number of items whose cost is more than 10000.
(g) To insert a new record in the Lab table with the following data :
        I 8. "VCR", 10000. 2. 2 2 2000 . 1, 2
(h) Give the output of the following SQL command :

i) SELECT MIN (DISTINCT quantity) FROM lab;
ii) SELECT MIN(warranty) FROM lab WHERE quantity = 2;
iii) SELECT SUM(costperitem) FROM lab WHERE quantity >2;
iv) SELECT AVG(csostperitem) FROM lab WHERE dateofpurchase<{l/199};

QUESTION 6.
(a) State the associative law and verify the law using truth table.
(b) Prove XY+ YZ + YZ' = Y
(c) Obtain the simplified form of a Boolean expression using Karnaugh map.
$F(x,y,z) = \sum (2, 3, 6, 7)$
(d) Draw a logic circuit of full Adder.
(e) Represent the Boolean expression X(Y'+ Z) with help of NOR gate only.
(f) Given the following truth table, write the sum of products form of the function
$F(x,y,z)$:

x	y	z	F
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

QUESTION 7.
(a) Compare coaxial and optical fiber cable.
(b) Write the following abbreviations in their full form : LAN, OSI
(c) What is the purpose of Telnet?
(d) Briefly mention two advantages and disadvantages of Ring topology in network.